International Niagara Board of Control
One Hundred Fourth
Semi-Annual Progress Report
to the
International Joint Commission

Covering the Period September 24, 2004 through March 8, 2005

EXECUTIVE SUMMARY

The level of Lake Erie remained at or above its long-term average during the months of September 2004 through February 2005 (Section 2). Precipitation on the Lake Erie basin was above average for the period.

The level of the Chippawa-Grass Island Pool was regulated in accordance with the International Niagara Board of Control's 1993 Directive (Section 3). Modifications/upgrades of all eighteen gates of the control structure were completed by the end of 2004.

On February 26, the International Niagara Control Works were operated in conjunction with altered diversions to the Fortis, Ontario Power Generation and New York Power Authority generating facilities to lower the water level along the Canadian shore that assisted in a successful rescue operation.

Work was completed in the fall of 2004 that improved the stability of the Ashland Avenue gauge site and river bank (Section 6).

A series of discharge measurements, as part of the on-going program to verify the Ashland Avenue rating, were taken at the Cableway Section in late October/early November 2004. A report has been completed and a review of all past measurements, the need for future conventional measurements, and an investigation into the possible revision of the 1981 rating will be started (Section 7).

The Power Entities (Ontario Power Generation and the New York Power Authority) continue with their generator upgrade programs to increase hydroelectric power production at Niagara (Section 8). The New York Power Authority's re-licensing process for the Niagara Power Project continues as studies and surveys progress and settlement agreements with stakeholders are reached. Ontario Power Generation continues to proceed with preliminary work associated with its Niagara Tunnel Project.

The Lake Erie-Niagara River Ice Boom was installed during the period December 17 through 20 in accordance with the Commission's supplementary Order of Approval (Section 9).

The Board will hold a meeting with the public on September 20, 2005 in Niagara-on-the-Lake, Ontario (Section 10).

Brigadier General Bruce A. Berwick replaced Brigadier General Steven R. Hawkins as the U.S. Chair of the Board.

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COVER: **Ontario Power Generation's ice breaker *Niagara Queen II* works to remove an ice build-up near the Beck Intakes on January 23, 2005. (Image courtesy of Bob Young, Ontario Power Generation)**

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INTERNET SITES

International Joint Commission

http://www.ijc.org

International Niagara Board of Control

http://www.ijc.org/conseil_board/niagara/en/niagara_home_accueil.htm

Lake Erie-Niagara River Ice Boom

http://www.iceboom.nypa.gov

INTERNATIONAL NIAGARA BOARD OF CONTROL

Chicago, Illinois
Burlington, Ontario

March 8, 2005

International Joint Commission
Washington, D.C.
Ottawa, Ontario

Commissioners:

1. GENERAL

The International Niagara Board of Control (Board) submits its One Hundred Fourth Semi-Annual Progress Report, covering the period September 24, 2004 through March 8, 2005.

2. LAKE LEVELS

All elevations in this report are referenced to International Great Lakes Datum 1985 (IGLD 1985). The values are expressed in metric units, with approximate English units (in parentheses) for information purposes only. The monthly lake level data are based on a network of four gauges to better represent the average level of the lake.

During the months of September 2004 through February 2005, the level of Lake Erie remained at or above its long-term average. The level of the lake started the period 10 centimetres (3.9 inches) above average. It reached its seasonal low in November with a mean of 174.02 metres (570.93 feet), which was 3 centimetres (1.2 inch) above average. In February the level was at 174.27 metres (571.75 feet), or 29 centimetres

(11.4 inches) above average. This unseasonable rise in levels was the result of above average precipitation, in the form of both heavy snowfalls and rain. Warm weather caused the snow to quickly melt in December and January. Recorded water level data for the period September 2004 through February 2005 and departures from long-term averages are shown in Table 1 and depicted graphically on Figure 1.

The Lake Erie basin received approximately 46 centimetres (18.3 inches) of precipitation during the period September 2004 through February 2005. This is about 15% above average for the period. A somewhat dry fall preceded a wet, relatively warm, winter. Heavy snowfalls were often followed within a couple of weeks by spells of unseasonably warm temperatures and rain. As a result, the snow cover, while significant at times, did not often remain long. Recent precipitation data and departures from long-term averages are shown in Table 2 and depicted graphically on Figure 2.

Lakes Michigan and Huron remained below their long-term average levels during this period. As a result, inflows to Lake Erie from the upstream lakes continued to be generally lower than average. In December and January, locally heavy precipitation and snowmelt on the Lake St. Clair and Detroit River basins, coupled with the lack of a significant ice cover in January and February, kept the flow in the Detroit River for those months near or above average. Inflows from the upper lakes, averaged over the six-month period September 2004 through February 2005 were about 2% below the long-term average. September to November flows were 7% below average, while for December through February they averaged 4% above average.

Water supplied to Lake Erie from its local drainage basin was above average for the period September through February, as can be seen in Figure 3. This is partly a reflection of the precipitation received during the period. The very high January supply resulted from heavy snows alternating with warm temperatures and rain, which quickly melted the snow cover.

The water level on Lake Erie naturally affects the flow in the Niagara River, as does the amount of flow retardation in the river due to ice and weeds. The above average level of the lake has kept the flows in the Niagara River generally above average. The flows in the Niagara River are graphically depicted in Figure 4 and summarized in Section 6.

The March 2005 water level forecast indicates that the level of Lake Erie is expected to remain above its long-term average during the next six months.

TABLE 1 - MONTHLY AVERAGE LAKE ERIE WATER LEVELS

(Based on a network of 4 water level gauges)

International Great Lakes Datum (1985)

	Metres			Feet		
Month	Recorded* 2004-05	Average 1918-2003**	Departure	Recorded* 2004-05	Average 1918-2003**	Departure
September	174.26	174.16	0.10	571.72	571.39	0.33
October	174.07	174.06	0.01	571.10	571.06	0.04
November	174.02	173.99	0.03	570.93	570.83	0.10
December	174.12	173.99	0.13	571.26	570.83	0.43
January	174.24	173.99	0.25	571.65	570.83	0.82
February	174.27	173.98	0.29	571.75	570.80	0.95

*Provisional **Period of record is 1918-2003

TABLE 2 - MONTHLY AVERAGE PRECIPITATION ON THE LAKE ERIE BASIN

	Centimetres			Inches			
Month	Recorded* 2004-05	Average 1900-99+	Departure	Recorded* 2004-05	Average 1900-99+	Departure	Departure in percent
September	5.33	8.00	-2.67	2.10	3.15	-1.05	-33
October	6.07	6.96	-0.89	2.39	2.74	-0.35	-13
November	8.15	7.21	0.94	3.21	2.84	0.37	13
December	9.35	6.63	2.72	3.68	2.61	1.07	41
January	10.92	6.27	4.65	4.30	2.47	1.83	74
February	6.58	5.26	1.32	2.59	2.07	0.52	25

*Provisional +Most recent period of record is 1900-99

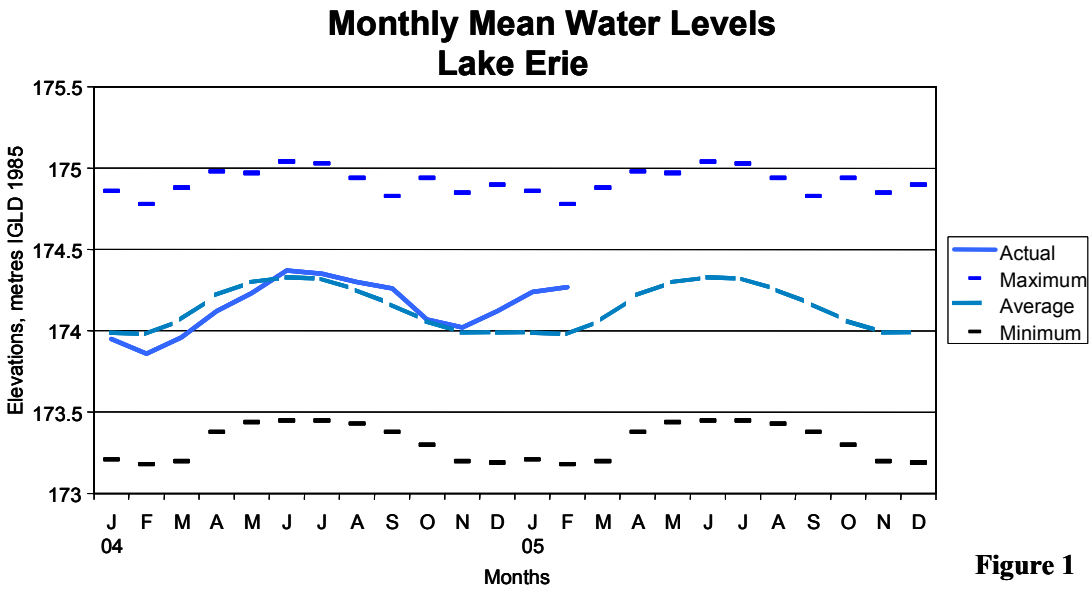


Figure 1

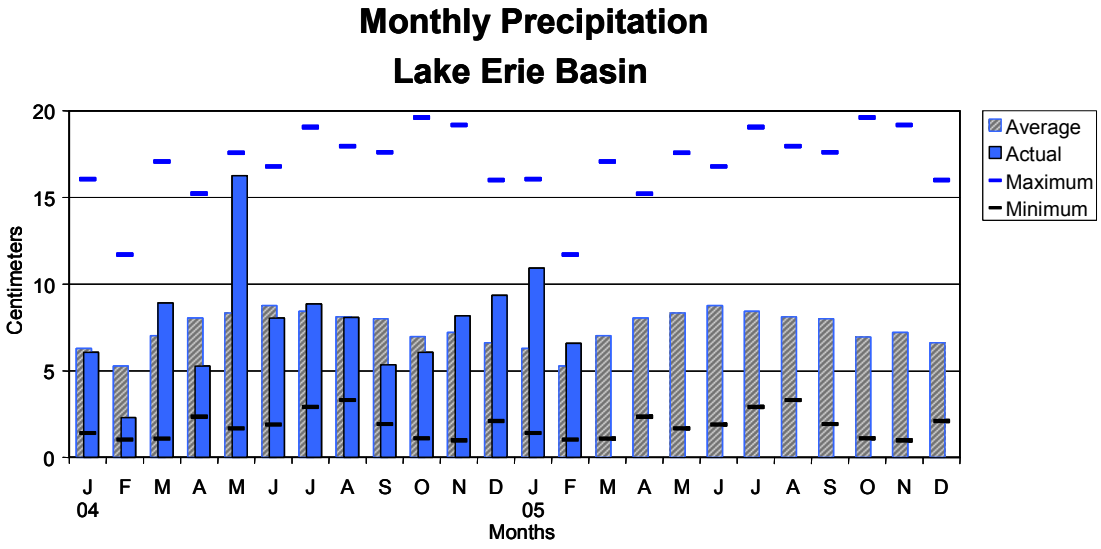


Figure 2

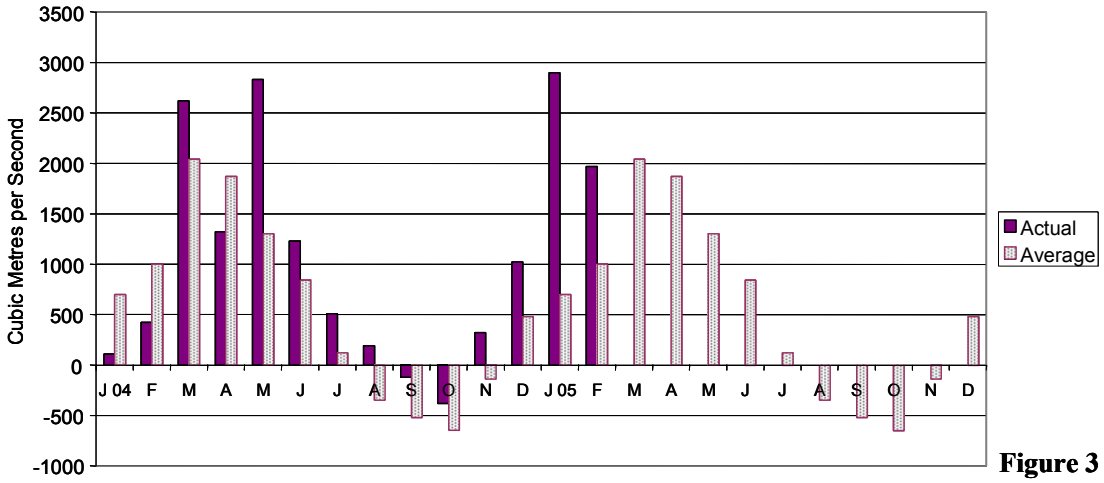


Figure 3

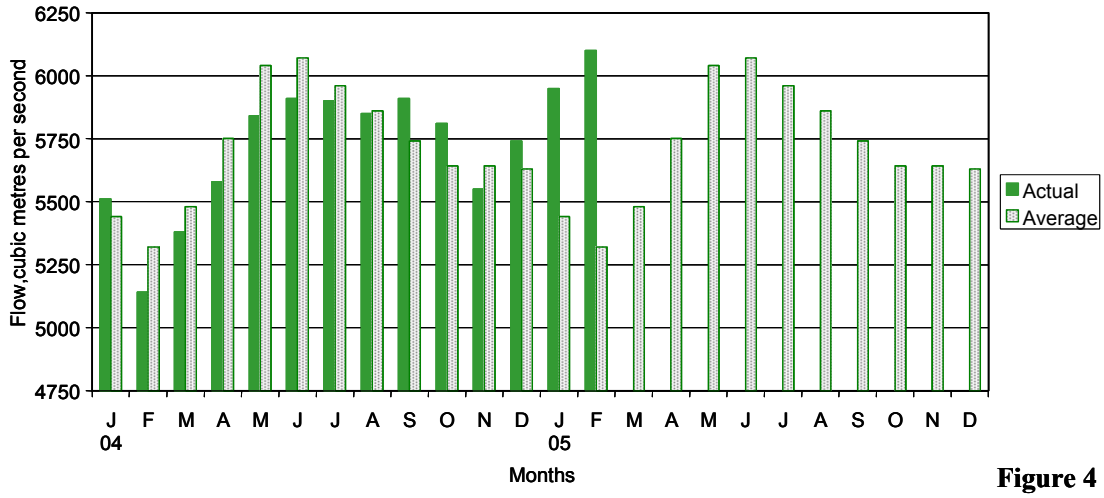


Figure 4

3. OPERATION AND MAINTENANCE OF THE CHIPPAWA-GRASS ISLAND POOL CONTROL STRUCTURE

The water level in the Chippawa-Grass Island Pool (Pool) is regulated in accordance with the Board's 1993 Directive. The Directive requires that the Power Entities, Ontario Power Generation (OPG) and the New York Power Authority (NYPA) operate the Chippawa-Grass Island Pool control structure to ensure the maintenance of an operational long-term average Pool level of 171.16 metres (561.55 feet) to ameliorate adverse high or low water levels in the Pool. The Directive also establishes certain tolerances for the Pool's level as measured at the Material Dock gauge. The Power Entities complied with the Board's Directive throughout the reporting period.

The accumulated deviation of the Pool's level from March 1, 1973 through February 28, 2005 was 0.36 metre-month (1.18 foot-months) above the long-term average elevation. The maximum permissible accumulated deviation is 0.91 metre-month (3.00 foot-months).

Tolerances for regulation of the Pool levels were suspended for October 31 and November 1, 2004 due to flow measurements and for December 1, 7 and 8 as the result of abnormally high flows. Tolerances were also suspended for January 23, 24, 26, 27 and February 11, 15 and 19 to assist in ice management.

At the request of the City of Niagara Falls Ontario Fire Department, in the early evening of February 26, actions were taken by the control structure operator to lower the level of the river along the Canadian shore. Changes from normal operations were taken to assist in the rescue of a person spotted on the ice a short distance from the brink of the Horseshoe Falls. Gates One through Three, the only gates open at the time, were closed while generation at the Fortis plant ceased and diversions to the high head plants were maximized. Lowering of the water level at the site contributed to the

successful rescue of the individual. Tolerances were suspended for February 26 and 27 as the result of the actions taken in response to this emergency.

The locations of the water level gauges on the Niagara River are shown in Enclosure 1. Recorded daily Material Dock water levels covering the period September 2004 through February 2005 are shown in Enclosure 2.

Modifications/upgrades of all eighteen gates of the control structure were completed by the end of 2004. These allow individual gate operation, should electrical power be interrupted, through use of a portable hydraulic pump powered by an auxiliary generator.

4. FLOWS OVER NIAGARA FALLS

During the tourist season daylight hours, the required minimum Niagara Falls flow is 2832 cubic metres per second (m^3/s) (100,000 cubic feet per second (cfs)). At night and during the winter months, the required minimum Falls flow is 1416 m^3/s (50,000 cfs). The operation of the Chippawa-Grass Island Pool control structure, in conjunction with power diversion operations, ensures sufficient flow over the Falls to meet the requirements of the Niagara Treaty of 1950.

A series of discharge measurements were conducted at the Cableway Section from October 30 through November 2, 2004 to verify the Ashland rating. Gates in the International Niagara Control Works were operated in such a way as to prepare for and provide specified Falls flows as defined in the test schedule. As a result, Falls flows were below the required 2832 cubic metres per second (m^3/s) by 264 m^3/s at 1600 and by 269 m^3/s at 1700 Eastern Standard Time on October 31. The Governments of Canada

and the United States are in agreement that Falls flows below Treaty requirements are acceptable for the purpose of conducting flow measurements.

Falls flows met or exceeded minimum Treaty requirements at all other times during the reporting period. The recorded daily flows over Niagara Falls, covering the period September 2004 through February 2005 are shown in Enclosure 3.

5. DIVERSIONS AND FLOW AT QUEENSTON

Diversion of water from the Niagara River for power purposes is governed by the terms and conditions of the 1950 Niagara Treaty. The Treaty prohibits the diversion of Niagara River water that would reduce the flow over Niagara Falls to below the amounts specified for scenic purposes.

The high head hydro power plants, OPG's Sir Adam Beck 1 and 2 in Canada and NYPA's Niagara Power Project in the United States, withdraw water from the Chippawa-Grass Island Pool above Niagara Falls and discharge it into the lower Niagara River at Queenston, Ontario and Lewiston, New York, respectively.

During the period September 2004 through February 2005, diversion for the Sir Adam Beck 1 and 2 plants averaged 1659 m^3/s (58,590 cfs) and those by the Robert Moses Niagara Power Project averaged 2164 m^3/s (76,420 cfs).

The low head generating station, Fortis Ontario's Rankine Plant, diverts water from the Cascades, just upstream of the Horseshoe Falls, and discharges it into the Maid-of-the-Mist Pool. Since the operating efficiency of this older plant is much lower than those of the high head plants, water that is available for power generation is normally dispatched on a priority basis to the high head plants, with the excess being directed to

the low head installation. During the reporting period, diversion flow for the Rankine plant averaged 14 m^3/s (490 cfs).

The average flow from Lake Erie to the Welland Canal for the period September 2004 through February 2005 was 210 m^3/s (7,420 cfs) compared to 201 m^3/s (7,100 cfs) for the same period one year ago. Diversion from the canal to OPG's DeCew Generating Stations averaged 193 m^3/s (6,820 cfs) for the period September 2004 through February 2005.

Records of Niagara River diversions for power generation covering the period September 2004 through February 2005 are shown in Enclosure 4.

The monthly average Niagara River flows at Queenston, Ontario for the period September 2004 through February 2005 were:

September	5674 m^3/s	(200,370 cfs)
October	5565 m^3/s	(196,530 cfs)
November	5565 m^3/s	(196,530 cfs)
December	5788 m^3/s	(204,400 cfs)
January	5996 m^3/s	(211,750 cfs)
February	6036 m^3/s	(213,160 cfs)

During this period, the flow at Queenston averaged 5771 m^3/s (203,800 cfs). One year ago, flows averaged 5376 m^3/s (189,850 cfs) for the period September 2003 through February 2004 with the monthly averages ranging between 5311 m^3/s (187,560 cfs) and 5568 m^3/s (196,630 cfs).

6. GAUGING STATIONS

The Niagara River gauges used to monitor the Chippawa-Grass Island Pool levels and the flows over Niagara Falls are Slater's Point, Material Dock, American Falls and Ashland Avenue gauges (see Enclosure 1). All gauges required for the operation of the Chippawa-Grass Island Pool control structure were in operation during the reporting period.

Both the U. S. National Oceanic and Atmospheric Administration (NOAA) and the Power Entities operate water level gauges at the Ashland Avenue location. Subject to continuing comparison checks of the water level data from both instruments by the International Niagara Committee (INC), the Power Entities' gauge is used for officially recording water levels used in determining the flows over Niagara Falls. Comparison of water level readings from both gauges showed that they were within acceptable INC tolerances throughout the reporting period.

An investigation into the stability of the Ashland Avenue gauge site and river bank indicated no serious concern for the stability of the gauge house or the river bank surrounding it. Work to improve the stability of the riverbank, less than the magnitude first thought prior to the investigation, was completed in the fall of 2004.

7. FLOW MEASUREMENTS IN THE NIAGARA RIVER AND WELLAND SHIP CANAL

Discharge measurements are regularly scheduled in the Niagara River and Welland Canal as part of a program to verify the gauge ratings used to determine flows in these channels for water level management. The present schedule calls for measurements at the American Falls Section in 2005. All measurements will be

obtained through joint efforts of the United States Army Corps of Engineers and Environment Canada.

Both standard current meter and Acoustic Doppler Current Profiler (ADCP) discharge measurements were made at the Welland Canal Supply Weir section in March 2004. Results have been analyzed and a draft report prepared for review.

A series of ADCP measurements were made during the period October 30 through November 2 at the Cableway Section on the lower Niagara River and a summary report has been completed. The measurements used three different acoustic instruments which all provided reliable and accurate data. The results presented in the report reveal a consistent pattern of field discharge measurement values plotting higher than the 1981 stage-discharge rating curve. As a result, a detailed review of all past measurements will be conducted during the next six months. This review will help to determine the need for future conventional measurements and begin the investigation into the possible revision of the 1981 rating.

8. POWER PLANTS

a) New York Power Authority

Eleven of the thirteen units at the Robert Moses Niagara Power Plant have been upgraded. Upgrade of Unit 5 began in January and was completed in October 2004. Upgrade of Units 9 and 8 respectively will be completed in 2005 and 2006, concluding the upgrade program.

The New York Power Authority is proceeding with the re-licensing process for the Robert Moses Niagara Power Project. The current license expires August 31, 2007. The process is following the Federal Energy Regulatory Commission's Alternative

Licensing Procedures (ALP). NYPA continues to hold settlement discussions with stakeholders on various packages. NYPA and the re-licensing team continue to finalize a number of draft licensing documents including the Draft License Application, the Preliminary Draft Environmental Assessment and the Draft Comprehensive Re-licensing Settlement Agreement. These documents are expected to be released for stakeholder review by early March 2005.

A Niagara re-licensing website continues to be updated with all pertinent information including correspondence, comments received from stakeholders, NYPA responses, meeting schedules etc. The website is: http://niagara.nypa.gov

b) Ontario Power Generation

Ontario Power Generation continues to proceed with preliminary work associated with the Niagara Tunnel Project. This project involves construction of a third tunnel to supply water to the Sir Adam Beck generating stations. Three pre-qualified companies are currently preparing detailed proposals for the completion of the project. These proposals are due in April 2005, with construction expected to start in the third quarter of this year. Completion of the tunnel is expected in 2009.

To date, fifteen of the sixteen units at the Sir Adam Beck II Generating Station have been rehabilitated. The most recent upgrade was on Unit 13, with work starting in February and completed in October 2004. Currently, work is proceeding on Unit 14. This began in July 2004, with expected completion in May 2005. Performance testing of the last two units upgraded is currently scheduled for the fall of 2005.

Overhaul work on the Sir Adam Beck 1 units, including removal of the Johnson valves and headgate installation, continues. Unit 2 is currently out of service for this

work, with Unit 6 and Unit 1 also to be completed this year. Unit 7 was deregistered with the IESO and removed from service on January 30, 2005. When the unit is rewound to 60 Hz, the overhaul work will also be completed.

The upgrades and expansions by the Power Entities will not affect the regulation of the Chippawa-Grass Island Pool water levels as governed by the International Niagara Board of Control's Directive. In addition, they will not require any modifications to other rules or regulations (such as the 1950 Niagara Treaty) relating to the diversion of water for operation of the projects.

9. ICE CONDITIONS AND ICE BOOM OPERATIONS

In accordance with Condition (d) of the Commission's October 5, 1999 supplementary Order of Approval, installation of the Lake Erie-Niagara River Ice Boom's spans commenced on December 17, 2004. The water temperature at Buffalo reached 4 degrees Celsius (^{o}C) (39 degrees Fahrenheit (^{o}F)) on December 21. Installation may begin when the Lake Erie water temperature at Buffalo reaches 4^{o}C (39^{o}F) or on December 16th, whichever occurs first.

Preparations for span placement began on December 6 when 16 floatation barrels were installed. A further five barrels were installed on December 7 and the final two were placed on December 14. The strings of pontoons were removed from the summer storage area and placed inside the Buffalo Harbor breakwall on December 8, 9 and 10.

Installation of the ice boom's spans began on December 17 when six spans were placed starting from the Canadian side. Weather conditions were unfavourable on December 18. On December 19, a further six spans were installed. The final 10 spans, continuing on towards the US shore, were installed on December 20.

Ice, which had formed in the river, was first observed at the International Niagara Control Works on January 18, 2005. By January 23, ice procedures and ice breaker activity were required to maintain movement of river ice through the Chippawa-Grass Island Pool (CGIP). Ice began forming behind the Lake Erie-Niagara River Ice Boom during the third week of the month.

A helicopter flight to measure ice thickness at six sites in the eastern part of Lake Erie was conducted on February 15. Due to predominantly open water or lack of a substantive ice cover, only one test hole was drilled. This was located in the southeastern end of the lake in the shore-bound ice field. The thickness at this site was 25 centimetres (10 inches). By comparison, similar measurements taken on February 16, 2004 resulted in an average thickness of 24 centimetres (9 inches) however, ice cover was present at all six sampling locations.

Although the beginning of February was mild and dry at Buffalo, a change to colder than usual conditions for the second half of the month resulted in an extensive ice cover forming. By March 7, ice cover on the eastern basin of Lake Erie was estimated to be around 81% or 4670 square kilometres (1,800 square miles).

10. MEETING WITH THE PUBLIC

In accordance with the Commission's requirements, the Board will hold an annual meeting with the public on September 20, 2005 in Niagara-on-the-Lake, Ontario. The Board welcomes participation by Commissioners and staff. Information on items including current and projected Great Lakes levels, the Public Bridge Authority expansion undertaking and the operation of the Lake Erie-Niagara River Ice Boom will be presented.

11. MEMBERSHIP OF THE BOARD

Brigadier General Bruce A. Berwick assumed command of the U. S. Army Corps of Engineers Great Lakes and Ohio River Division on January 31, 2005 and succeeded Brigadier General Steven R. Hawkins as the U. S. Chair of the International Niagara Board of Control. Mr. Robert Messervey was appointed on October 13, 2004 as Canadian Member of the Board, succeeding Mr. David de Launay. The remaining membership of the Board and its Working Committee is unchanged from the last reporting period.

12. ATTENDANCE AT BOARD MEETINGS

The Board met once during this reporting period. The meeting was held on March 8, 2005 in New York City. Mr. Messervey was unable to attend.

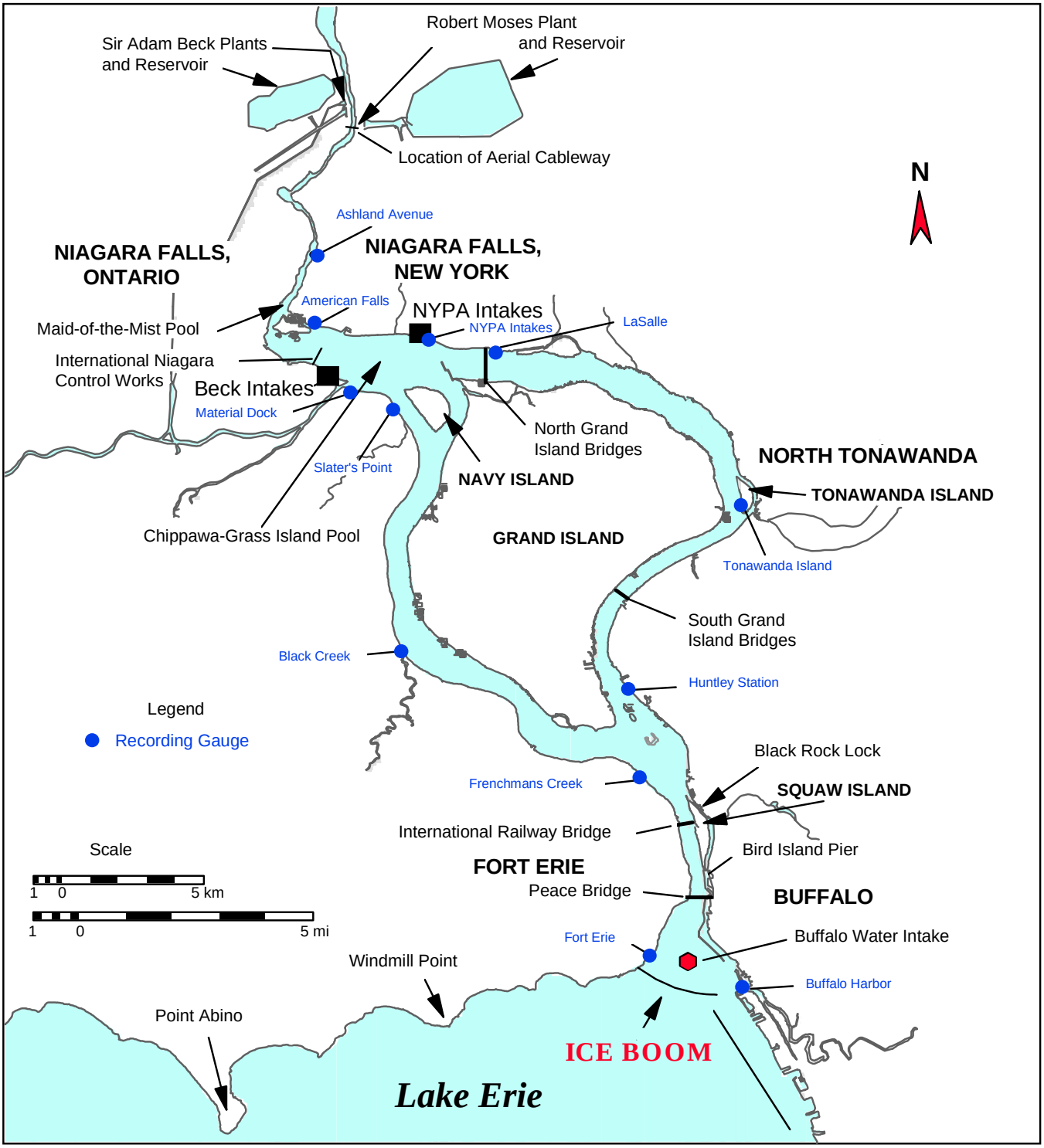
Respectfully Submitted,

BG BRUCE A. BERWICK
Chair, United States Section

CARR MCLEOD
Chair, Canadian Section

CONSTANTINE G. TJOUMAS
Member, United States Section

ROBERT MESSERVEY
Member, Canadian Section

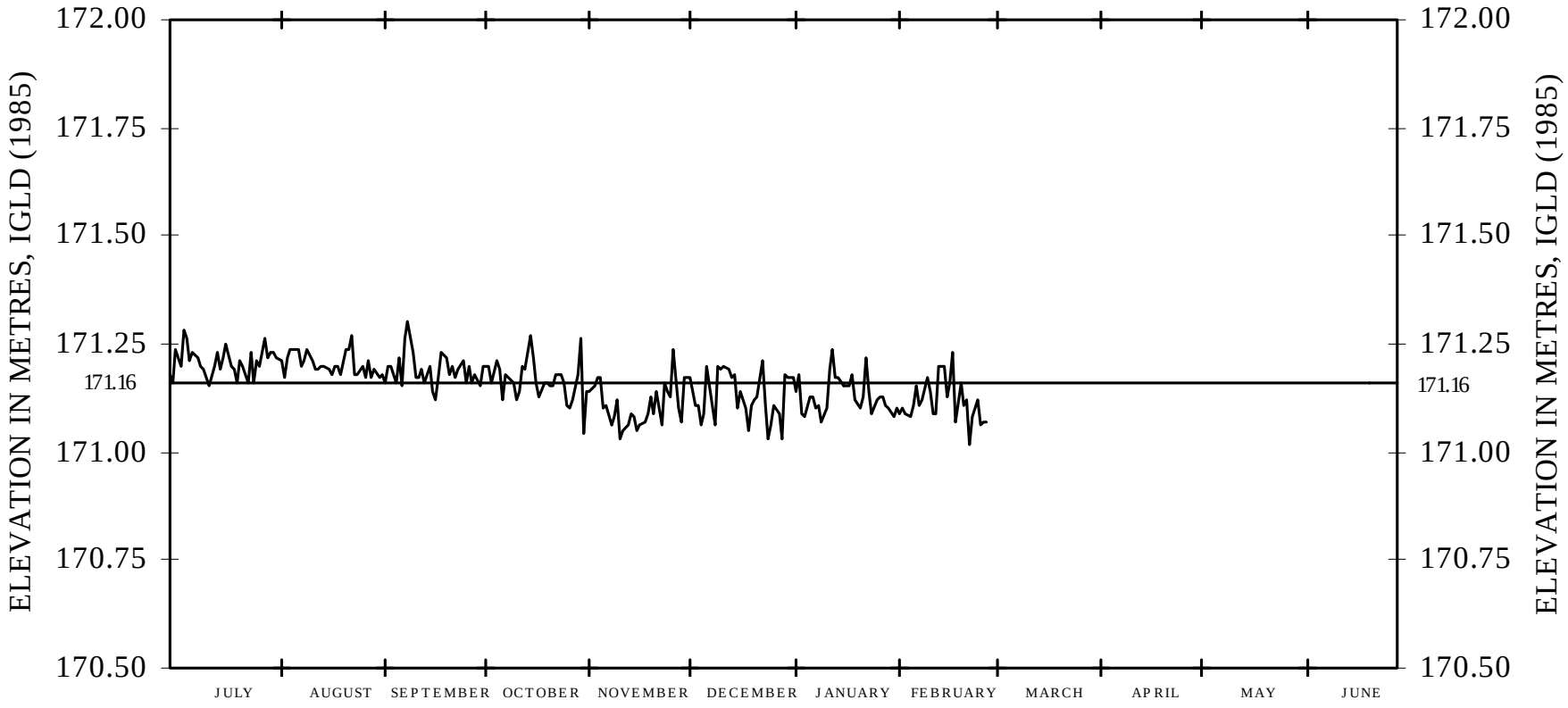

Sir Adam Beck Plants
and Reservoir
Robert Moses Plant
and Reservoir
Location of Aerial Cableway
N
Ashland Avenue
NIAGARA FALLS,
ONTARIO
NIAGARA FALLS,
NEW YORK
American Falls
NYPA Intakes
NYPA Intakes
LaSalle
Maid-of-the-Mist Pool
International Niagara
Control Works
Beck Intakes
Material Dock
North Grand
Island Bridges
NORTH TONAWANDA
TONAWANDA ISLAND
Slater's Point
NAVY ISLAND
Chippawa-Grass Island Pool
GRAND ISLAND
Tonawanda Island
South Grand
Island Bridges
Black Creek
Huntley Station
Legend
Recording Gauge
Black Rock Lock
Frenchmans Creek
SQUAW ISLAND
International Railway Bridge
Bird Island Pier
Scale
FORT ERIE
Peace Bridge
BUFFALO
1 0 5 km
1 0 5 mi
Fort Erie
Buffalo Water Intake
Windmill Point
Buffalo Harbor
Point Abino
ICE BOOM
Lake Erie

ENCLOSURE 1

NIAGARA RIVER DAILY MEAN LEVEL AT MATERIAL DOCK GAGE

NOTE: LONG-TERM MEAN STAGE = 171.16 METRES, IGLD (1985)

JULY 2004 THROUGH FEBRUARY 2005



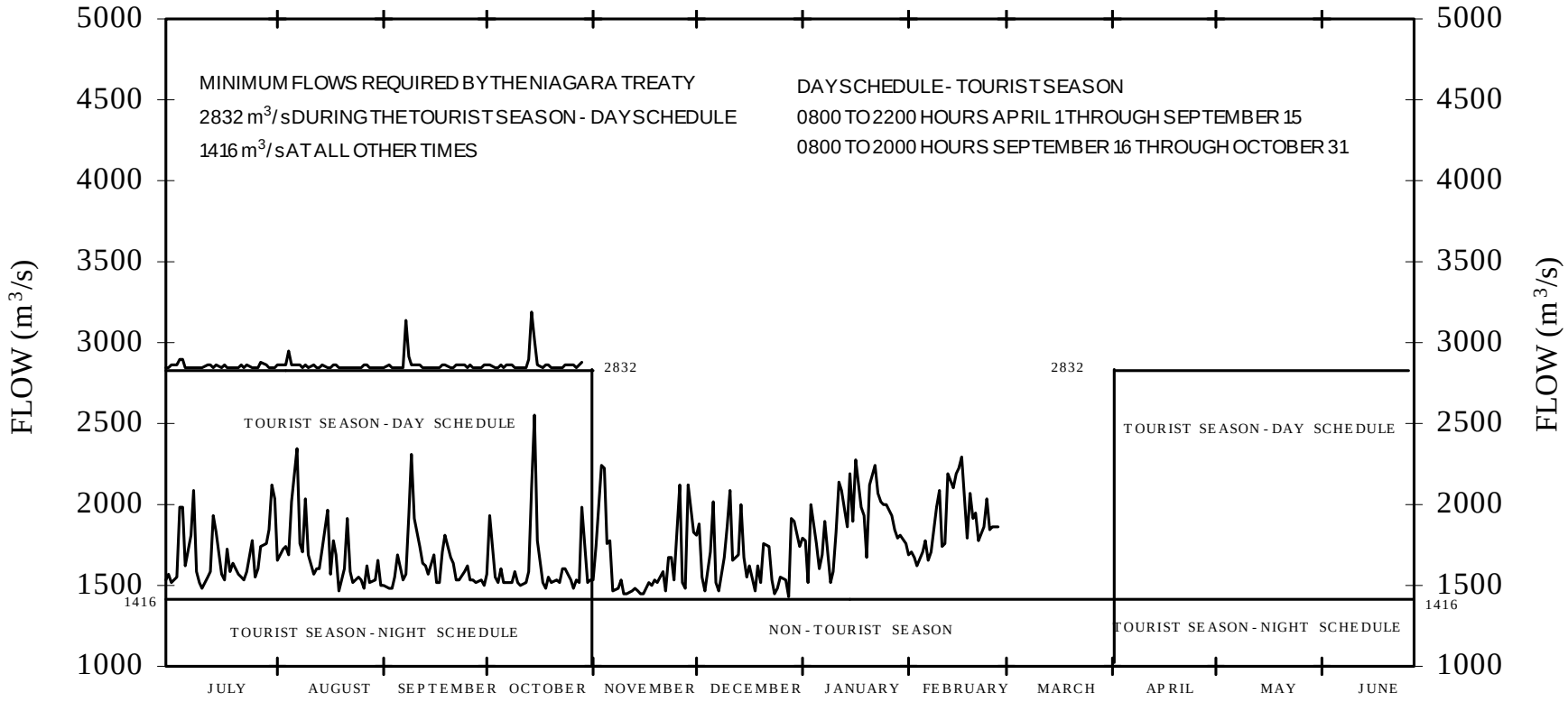
ENCLOSURE 2

DAILY FLOW OVER NIAGARA FALLS

FLOW AT ASHLAND AVENUE GAGE MINUS CN AND OP DIVERSIONS

IN CUBIC METRES PER SECOND (m^3/s)

JULY 2004 THROUGH FEBRUARY 2005

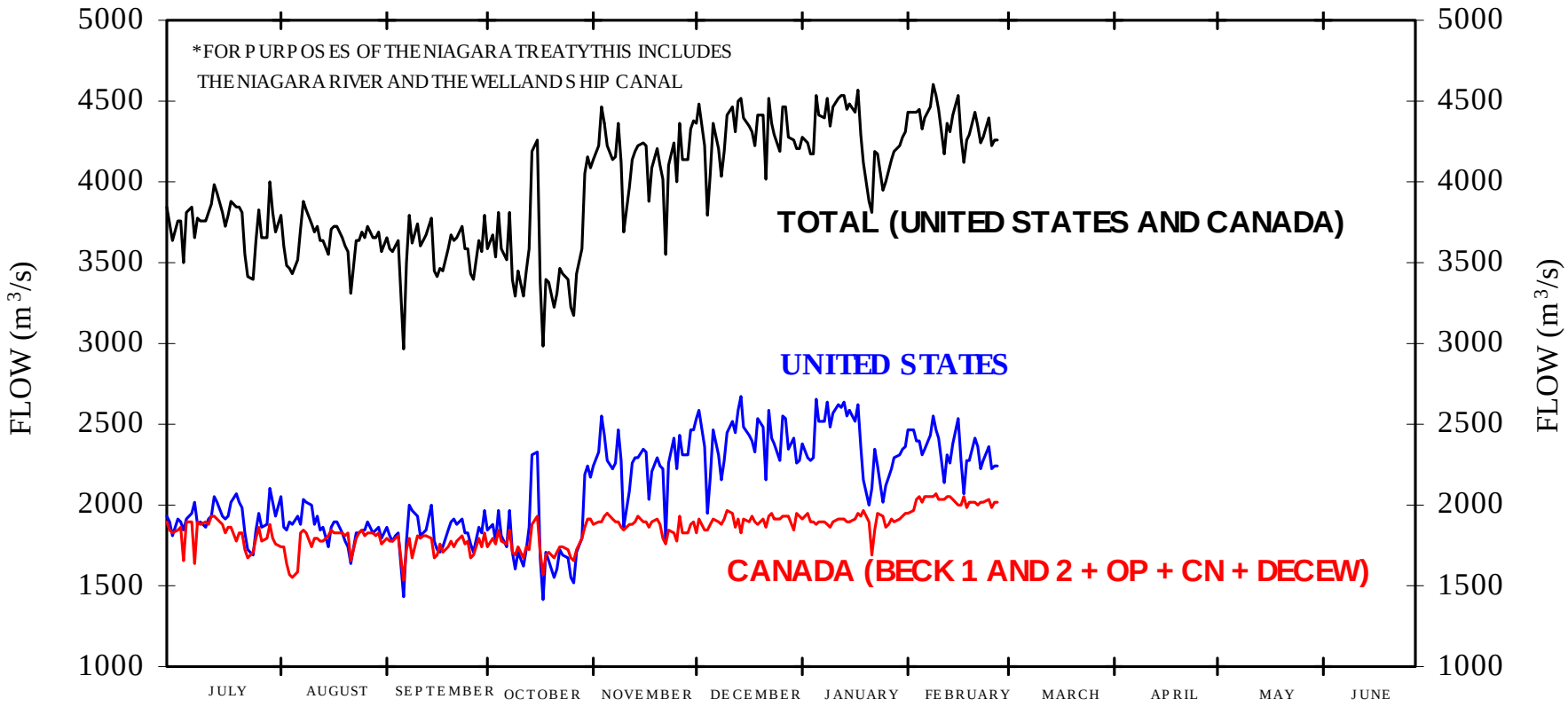


ENCLOSURE 3

DAILY DIVERSIONS OF NIAGARA RIVER WATER* FOR POWER PURPOSES

IN CUBIC METRES PER SECOND (m^3/s)

JULY 2004 THROUGH FEBRUARY 2005



ENCLOSURE 4