



**International  
Lake Ontario - St. Lawrence River  
Study Board**



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March 23, 2006

Mr. Dennis L. Schornack  
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Rt. Hon. Herb Gray  
Chairman, Canadian Section  
International Joint Commission  
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Dear Chairman Schornack and Chairman Gray:

The International Lake Ontario–St. Lawrence River Study Board is pleased to submit herewith its Final Report at the request of the International Joint Commission. The Report identifies the regulation plan options, which address new hydrologic conditions, and all interest groups that benefit from the operation and regulation of the system. All candidate regulation plans provide net economic and environmental benefits over the current Plan 1958-D with Deviations. Each of these options represents a mixture of tangible benefits and minimal costs. All achieve the goals mandated by the Commission in its Directive of December 11, 2000.

This report, its findings and recommendations represent five years of international cooperation by hundreds of Study participants, countless citizens and dozens of agencies, for which we are extremely grateful.

Respectfully submitted,

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U.S. Director

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# Options for Managing Lake Ontario and St. Lawrence River Water Levels and Flows

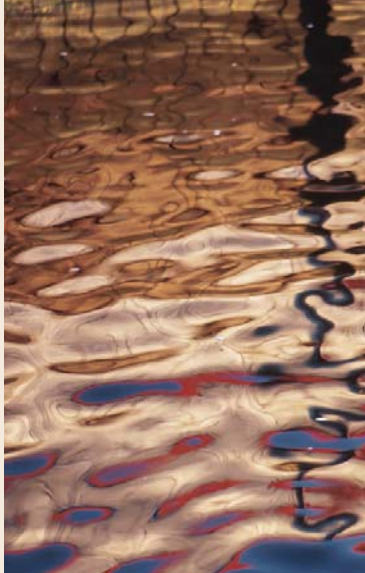
**Final Report by the International  
Lake Ontario - St. Lawrence River  
Study Board**

**to the**

**International Joint Commission  
March 2006**







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# Annex 1

## Pertinent Documents

### Introduction

Annex 1 provides three pertinent background documents for the Lake Ontario-St. Lawrence River Study. These documents are:

1. The December, 2000 International Joint Commission Directive to the International Lake Ontario - St. Lawrence River Study Board;
2. The executive summary of the September 1999 original Plan of Study for criteria review in the Orders of Approval for regulation of Lake Ontario - St. Lawrence River levels and flows; and
3. The Orders of Approval, October 29, 1952 as amended by Supplementary Orders dated July 2, 1956.



# Pertinent Document 1

## International Joint Commission Directive to the International Lake Ontario-St. Lawrence River Study Board, December 2000

1. Pursuant to the Boundary Waters Treaty of 1909 (Treaty), the International Joint Commission has an ongoing responsibility for assuring that projects it has approved continue to operate in a manner that is consistent with the provisions of the Treaty as interpreted by the Commission and the governments of Canada and the United States (governments). In carrying out this responsibility, the Commission has prepared and submitted to the governments a **Plan of Study for Criteria Review in the Orders of Approval for Regulation of Lake Ontario - St Lawrence River Levels and Flows** (Plan of Study), dated September 1999. The Plan of Study describes the work required to review water levels and flow regulation in the Lake Ontario - St Lawrence River system, and provides for consideration of knowledge that has been gained since the Commission's Order of Approval of the construction of certain works for development of power in the International Rapids Section of the St Lawrence River was issued on October 29, 1952 and amended on July 2, 1956, changed uses of the system, and likely future trends. The purpose of the study is i) to review the current regulation of levels and flows in the Lake Ontario-St. Lawrence River system, taking into account the impact of regulation on affected interests, ii) to develop an improved understanding of the system by all concerned, and iii) to provide all the relevant technical and other information needed for the review. In reviewing the Order and Regulation plan, and in assessing their impacts on affected interests, the Commission will be seeking to benefit both these interests and the system as a whole, consistent with the requirements of the Treaty.
2. This directive establishes the International Lake Ontario - St Lawrence River Study Board (Study Board). The mandate of the Study Board is to undertake the studies required to provide the Commission with the information it needs to evaluate options for regulating levels and flows in the Lake Ontario-St. Lawrence River system in order to benefit affected interests and the system as a whole in a manner that conforms to the requirements of the Treaty, and the Board shall be guided by this mandate in pursuing its studies. These studies include:
  - a. reviewing the operation of the structures controlling the levels and flows of the Lake Ontario-St. Lawrence River system in the light of the impacts of those operations on affected interests, including the environment;
  - b. assessing whether changes to the Order or regulation plan are warranted to meet contemporary and emerging needs, interests and preferences for managing the system in a sustainable manner; and
  - c. evaluating any options identified to improve the operating rules and criteria governing the system.

The Study Board shall provide options and recommendations for the Commission's consideration. In carrying out this mandate, the Study Board is encouraged to integrate as many relevant considerations and perspectives into its work as possible, including those that have not been incorporated to date in assessments of Lake Ontario-St Lawrence River regulation, to assure that all significant issues are adequately addressed.

3. The Commission will appoint an equal number of members from Canada and the United States to the Study Board, and the Commission will name a member from Canada and a member from the United States to be the co-chairs of the Study Board. The co-chairs of the Public Interest Advisory Group will be members of the Study Board. The co-chairs of the Study Board shall convene and preside at meetings of the Study Board and shall jointly take a leadership role in planning and implementing the Study Board's work.
4. The Study Board, after consultation with Commission, may establish study teams, committees, work groups and other advisory bodies to address the substantive areas identified in the Plan of Study and assist it in carrying out its responsibilities. The Study Board shall normally appoint an equal number of persons from Canada and from the United States to each of these entities. Unless other arrangements are made, members of the Study Board, study teams, committees, work groups and other advisory bodies will make their own arrangements for reimbursement of necessary expenditures.
5. The Commission, after consultation with the Study Board, will appoint a co-manager in Canada and a co-manager in the United States to assist the Study Board on a full-time basis in performing the responsibilities assigned to it in this directive. The co-managers shall work under the joint direction of the co-chairs of the Study Board and shall keep fully abreast of the work of the study teams, committees, work groups and other advisory bodies, as well as the Public Interest Advisory Group, which is established pursuant to the Public Participation terms of reference dated December 11, 2000.
6. The Study Board, study teams, committees, work groups and other advisory groups shall act as unitary bodies. The members of the Study Board, the study teams, work groups, other advisory bodies, and the co-managers shall serve the Commission in their personal and professional capacities, and not as representatives of their countries, agencies, organizations, or other affiliations.
7. The Study Board and the study teams, committees, work groups and other advisory bodies shall endeavour to conduct all their work by consensus. The Study Board shall notify the Commission of any irreconcilable differences and shall refer promptly to the Commission any lack of clarity or precision in instructions or directives received from the Commission.
8. The Study Board shall carry out its work independent of the work of the International St. Lawrence River Board of Control (Board of Control), which is responsible for overseeing the regulation of the outflows from Lake Ontario pursuant to the Commission's 1952 Orders of Approval, as amended and shall not take instructions from the Board of Control. The Study Board, however, shall maintain liaison with the Board of Control so that each Board may be aware of any activities of the other that might be useful to it in carrying out its responsibilities.

9. The Study Board shall keep the Commission fully informed of its progress and direction. The Study Board shall also maintain an awareness of basin-wide activities and conditions and shall inform the Commission about any such activities or conditions that might affect its work. In addition to regular contact with designated Commission personnel, the Study Board shall meet with the Commission at least semi-annually and shall submit written progress reports to the Commission at least three weeks in advance of those times and at other times as deemed appropriate by the Study Board or as requested by the Commission. The Study Board will also maintain such financial and other records as may be necessary to document the contributions of each country to the study effort.
10. The Commission emphasizes the importance of public outreach, consultation, and participation. In the conduct of its activities, the Study Board shall be guided by the Public Participation Guidance dated December 11, 2000. The Commission expects the Study Board to involve the public in its work to the fullest extent possible. The Study Board shall provide the text of media releases to the Secretaries of the Commission prior to their release.
11. To facilitate public outreach and consultation, the Study Board shall make information related to the study as widely available as practicable, including white papers, data, reports of the Study Board or any of its subgroups, and other materials, as appropriate. The Study Board shall develop and maintain a web-site as a means for disseminating information related to implementation of the Plan of Study, and will use the web-site to encourage public discussion of such information. To the extent practicable, the Study Board shall make available on the web-site all documents that are available for public information under the Commission's Rules of Procedure, including public comment and other information made available by decision pursuant to the Rules of Procedure.
12. The Commission will conduct formal public hearings at appropriate times during the course of this study.
13. The Study Board shall within two months of its creation submit for the Commission's approval a comprehensive work plan with an associated schedule of activities, products and budget, all based on the Plan of Study.
14. The Commission will administer, or coordinate, resource contributions from the two governments to support the activities of the Study Board, the study teams, committees, work groups, other advisory bodies, and the Public Interest Advisory Group.

Signed this the 11<sup>th</sup> day of December, 2000.

Gerald E. Galloway, Secretary  
United States Section

Murray Clamen, Secretary  
Canadian Section

# Pertinent Document 2

## Plan of Study for Criteria Review in the Orders of Approval for Regulation of Lake Ontario – St. Lawrence River Levels and Flows, September 1999

### Executive Summary

In May 1999, a Binational Study Team was assembled by the International Joint Commission to transform the 1996 Scope of Work, which had been prepared by the International St. Lawrence Board of Control, into a detailed Plan of Study to review the operation of the structures controlling the flows and levels of the Lake Ontario – St. Lawrence system. This will require investigation of the existing criteria within the Commission's Orders of Approval for these works and a determination of what would be required to establish new criteria for improved regulation of Lake Ontario, should the Commission so desire. The 1996 Scope of Work placed emphasis on wetlands and other environmental factors, and recreational boating interests; factors not previously addressed by the original plan. The Scope of Work had also concluded that future studies should evaluate existing criteria in order to see if modifications could be made incorporating operational experience and interest preferences which have been identified since the original plan was adopted. The IJC instructed that the Scope of Work serve as the basis for this new Plan of Study. In developing this document, experts were asked to provide input on wetlands, fisheries and the environment, recreational boating, coastal processes including erosion and flood potential, commercial navigation, hydropower, industrial, municipal and domestic water intakes, public information and education, and hydrologic modeling. The Study Team then assembled these inputs and proposals into an overall Plan of Study, with costing and timelines. The following are highlights of the input provided.

### Data Collection

In order to assess the various interests and criteria, extensive data collection is required. For example, information needs for environmental assessments should be centered on collection of more thorough topographic/bathymetric data at an increased number of wetland sites, concurrent collection of plant community data to reflect changes that have occurred since the Levels Reference Study data collection in 1991, and collection of data relating to fish use and accessibility to wetland habitat. The investigation of flooding, erosion and other coastal processes, requires very detailed information about the shoreline, including the shoreline geomorphology and subaqueous geology, shoreline bathymetry, shoreline elevations, bluff heights and slope, land use and property values. Understanding impacts on recreational boating requires systematic surveys of all marina operators to obtain the physical layout and operation of facilities and to obtain the current distribution of required drafts of the existing users of these facilities. Surveys are also required to determine the characteristics of water intakes and shore wells including information about those dependent upon them and changes that have occurred since 1956 to ensure that domestic and industrial water usage is catalogued.

Data collection is required at specific sites, or on a continuous shoreline basis, depending on the particular interest investigated, along both shores of Lake Ontario and the St. Lawrence River to Trois-Rivières. State-of-the-art data collection techniques are proposed, such as airborne laser-survey techniques, with geographic positioning systems (GPS), and geographic information systems (GIS).

The evaluations of impacts and effects associated with changing water levels will be based on historic recorded supply and lake level information. To the extent practical, possible future changes due to climate and demographics will be considered, and simulation techniques will also be utilized to gauge impacts and effects of possible future supply scenarios.

## **Evaluations**

Several of the evaluations will require the development of investigative and predictive models which will assess the impact of changing levels on a particular interest. The output from each of these models will be evaluated to identify alternative approaches that meet, as nearly as possible, the needs of all interests (including the integrity of the ecosystem) while always respecting the requirements of the Boundary Waters Treaty and its Article VIII in particular.

It is proposed that new regulation plan(s) be developed and evaluated to determine to what degree they meet the new or modified criteria proposed as a result of the studies. If the regulation criteria are to be satisfied by the regulation plan for the chosen hydrologic design conditions, the criteria and regulation plan may have to be developed in concert. If the new plan does not have to fully satisfy completely each criterion, the criteria can be set prior to the plan development. If the plan cannot meet all of the criteria, a method of ranking the importance of proposed criteria, beyond that already provided for in the Treaty, must be developed to test plan changes and determine which plan best meets proposed criteria.

Since the needs and preferences of the various interests are different and at times in opposition, development of a more comprehensive set of criteria and a matching regulation plan satisfying all the interests will not be a simple task. There is a need to demonstrate what levels and flows are physically possible with the current physical regulatory works and channels, through simulation of regulation for the wide range of possible hydrologic conditions. An understanding of the reality and practicability of certain level or flow conditions could help promote better dialogue amongst the interest groups and the acceptance of the needs of others and the eventual needed compromise among the groups. It will be important that all interested parties appreciate that, within the constraints of the existing works and probable future supplies, it is highly unlikely that any new regulatory plan will be able to provide significant additional benefits to every interest group.

## **Project Management**

It is proposed that the overall management of the multi year program of studies described herein be assigned to a Study Board created for that purpose by the Commission. The Study Board will then establish specific binational work groups which will be responsible for common data collection, as outlined in section 4.2 above, using the available expertise of the two nations and allocating resources accordingly. Study Teams will also be created for each of the “interests” identified in Part 6 of this Plan, in each case comprising a binational team from the various agencies, as a minimum, listed in Annex 1. Scheduling of their work will need to be coordinated through the Study Board. It will be the task of the overall Study Board, with input from each Study Team and the Interest Advisory Group outlined in Section 5.1, to then consider the differing outputs of each study area and bring these together in a coherent manner that allows for public discussion of the impacts and benefits of various regulation plans and criteria, always having in mind the priorities already established under Article VIII of the Boundary Waters Treaty.

The evaluation process will be iterative, beginning early on in the study process and continuing to its completion. It will involve the development and refinement of an evaluation methodology, workshops, public meetings, regulation plan development and testing. While some portions of the overall study will require data collection extending over four to five years in order to obtain an adequate baseline, others can be split into phases with data collection in the early years and scenario testing in latter years. It is expected that the last two years of this study will concentrate heavily on the development of criteria and an acceptable regulation plan. The challenge will be to develop criteria and regulation plans that recognize the interests of all groups, and which create improved benefits for some without significant negative impacts on others. A decision support methodology specific to this situation will need to be developed as a part of the proposed studies which recognizes the complexity of the impact and benefit distribution challenge inherent in regulation of the Lake Ontario - St. Lawrence River system. It is anticipated that a number of

trial regulation plans will need to be developed and considered by the Study Board, so as to allow the effects of any new or revised criteria to be described in a manner which the representatives of the various interests, the general public, and the Commission can fully appreciate.

### **Public Involvement**

Public consultation is critical to the assessment of plan criteria. It is recognized that progress in addressing water levels issues is dependent in large part on public understanding of the causes of the water level problems, and the further understanding that most proposed solutions could have consequences for others. To achieve this understanding, it is recommended that the major interests and the relevant public be involved directly in the studies, by the formation of an Interest Advisory Group, described in section 5.1. This would allow individuals with diverse interests to find common ground on many aspects of the issues. The continuous involvement of all interests throughout the criteria review process is critical to the success of the study.

Upon completion of this work, the Study Board will then report to the Commission regarding the work carried out, its recommendations on any amendments or additions to the present criteria, and the recommended regulation plan to give effect to these criteria. The Commission, in turn, may wish to hold further public consultations prior to any decision to adopt, or otherwise, the Study Board's recommendations. Additional time for consideration of the Study Board's work by the Commission, or for further public consultations, cannot be accurately estimated at this point, and is therefore not included in the overall five year project schedule.

### **Cost Summary**

The proposed study will define the Lake Ontario-St. Lawrence River system thoroughly as an ecosystem and hydrologically in terms of its past history and potential future benefits or impacts, though at considerable cost. The full investigation of all factors will require five years to complete and is estimated to cost **\$10.07 million in U.S. dollars** (\$14.80 Cdn. equivalent) for work to be carried out within the United States plus **\$15.79 million in Canadian dollars** (\$10.74 U.S. equivalent) for work to be carried out within Canada. This converts to totals equivalent to 30.59 million Cdn. or \$20.81 U.S. The study would be conducted, and these funds spent by a series of binational teams, comprising subject matter specialists serving in their personal and professional capacities from various federal, state and provincial agencies, academia and private consultants, and by the stakeholders impacted by Lake Ontario regulation, with overall coordination by the binational Study Board.

### **Acknowledgment**

This document could not have been developed without the assistance of dozens of individuals who responded expeditiously providing input and quickly establishing teams to define required studies.

Respectfully submitted by the Study Team:

Lieutenant Colonel Mark D. Feierstein

Michael Turner

Dr. Douglas A. Wilcox

André Carpentier

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# Pertinent Document 3

## Orders of Approval, October 29, 1952 as amended by Supplementary Orders dated July 2, 1956

### APPENDIX G

#### ORDERS OF APPROVAL FOR REGULATION OF LAKE ONTARIO

#### *Office Consolidation*

IN THE MATTER OF THE APPLICATIONS OF THE GOVERNMENT OF CANADA AND THE GOVERNMENTS OF THE UNITED STATES OF AMERICA FOR AN ORDER OF APPROVAL OF THE CONSTITUTION OF CERTAIN WORKS FOR DEVELOPMENT OF POWER IN THE INTERNATIONAL RAPIDS SECTION OF THE ST. LAWRENCE RIVER.

NOTE:

1. *The amendments of July 2, 1956 are in Light Italic type.*
2. All elevations have been converted to International Great Lakes Datum (1985) and the metric system of measurement.

#### ORDERS OF APPROVAL

October 29, 1952, as amended by a supplementary  
Order dated July 2, 1956

WHEREAS the Government of Canada and the Government of the United States of America under date of 30 June, 1952, have submitted Applications to the International Joint Commission (hereinafter referred to as the "Commission") for its approval of the construction, jointly by entities to be designated by the respective Governments, of certain works for the development of power in the International Rapids Section of the St. Lawrence River, these being boundary waters within the meaning of the Preliminary Article of the Boundary Waters Treaty of 11 January, 1909 (hereinafter referred to as the "Treaty"), and of the construction, maintenance and operation of such works subject to and under conditions specified in the Applications, and have requested that the Applications be considered by the Commission as in the nature of a joint application; and

WHEREAS pursuant to the aforementioned request of the two Governments, the Commission is considering the two Applications as in the nature of a joint application; and

WHEREAS notices that the Applications have been filed were published in accordance with the Rules of Procedure of the Commission; and

WHEREAS Statements in Response to the Applications and Statements in Reply thereto by both Applicants were filed in accordance with the Rules of the Commission; and

WHEREAS pursuant to published notices, hearings were held by the Commission at Toronto, Ontario, on 23 July, 1952; at Ogdensburg, New York, on 24 July, 1952; at Cornwall, Ontario, on 25 July, 1952; at Albany, New York, on 3 September, 1952; at Montreal, Quebec, on 8 September 1952; and at Washington, D.C. on 20 October, 1952; and

WHEREAS by reason of the said notices of the said applications and hearings, all persons interested were afforded convenient opportunities of presenting evidence to and being heard before the Commission; and

WHEREAS pursuant to the said Applications, the hearings before, the evidence given, and material filed with the Commission is satisfied that the proposed works and use of the waters of the International Rapids Section comply with the principles by which the Commission is governed as adopted by the High Contracting Parties in Article VIII of the Treaty; and

WHEREAS the Commission has been informed that the Government of Canada has designated The Hydro-Electric Power Commission of Ontario as the entity to construct, maintain and operate the proposed works in Canada; and

*WHEREAS the Commission has been informed that the President of the United States of America by Executive Order No. 10.500, dated 4 November 1953, designated the Power Authority of the State of New York as the United States entity to construct, maintain and operate the proposed works in the United States; and*

WHEREAS the program of construction of the works, as proposed by the Applicants, includes the removal of Gut Dam from the International Rapids Section and the Government of Canada has informed the Commission that it is its intention to take steps for the early removal of Gut Dam as soon as the construction of the proposed works is approved and as soon as river conditions and the protection of down river and interests that will be affected during its removal will permit, thereby advancing the time of removal of Gut Dam; and

WHEREAS the Commission finds that suitable and adequate provision is made by the laws in Canada and by the Constitution and laws in the United States for the protection and indemnity of all interests on either side of the International Boundary which may be injured by reason of the construction, maintenance and operation of the works; and

WHEREAS the Commission finds that it has jurisdiction to hear and dispose of the Applications by approval thereof in the manner and subject to the conditions hereinafter set out; and

*WHEREAS the Commission by Order dated 29 October 1952 (Docket 68), approved the construction, maintenance and operation of the works; and Appendix A to the said Order describes the features of the works so approved and provides the channel enlargements will be undertaken in specified areas; and*

*WHEREAS condition (i) of said Order provides that, upon completion of the works, the discharge of water from Lake Ontario and the flow of water through the International Rapids Section shall be regulated to meet the requirements of conditions (b), (c) and (d) thereof, and subject to possible modifications and changes to be recommended subsequently by the International St. Lawrence River Board of Control, in accordance with Method of Regulation No. 5 as prepared by the General Engineering Branch, Department of Transport, Canada, dated Ottawa, September 1940; and*

*WHEREAS, by the said Order of 29 October 1952, the Commission specifically retained jurisdiction to make such further Order or Orders relating to the subject matter of the Applications of the United States of America and Canada (Docket 68) as may be necessary in the judgment of the Commission; and*

*WHEREAS the Commission, as a result of its investigations under the Reference from the Government of Canada and the United States of America, dated 25 June 1952, regarding the levels of Lake Ontario (Docket 67), has determined that it would not be practicable to base the regulation of flows from Lake Ontario on the said Method of Regulation No. 5; and*

*WHEREAS, pursuant to published notices, hearings were held by the Commission at Detroit, Michigan, on 4 June 1953, Rochester, New York on 17 November 1953 and 12 April 1955, Hamilton, Ontario on 18 November 1953, and Toronto, Ontario, 18 November 1953, and Toronto, Ontario on 14 April 1955 at which all persons interested were afforded convenient opportunity of presenting evidence to and being heard before the Commission; and at the said hearings held at Toronto and Rochester in April 1955 all interested persons were given convenient opportunity to express their views upon the criteria and range of stage which had been tentatively proposed by the Commission; and*



*WHEREAS the Commission on 9 May 1955, by letters addressed to the Secretary of State for External Affairs of Canada and the Secretary of State of the United States of America, respectively, recommended adoption by the two Governments of the following:*

- (i) A range of mean monthly elevations for Lake Ontario of 74.15 m (243.3 feet) navigation season to 75.37 m (247.3 feet) as nearly as may be; and*
- (ii) Criteria for a method of regulation of outflows and levels of Lake Ontario applicable to the works in the International Rapids Section of the St. Lawrence River; and*
- (iii) Plan of Regulation No. 12-A-9, subject to minor adjustments that may result from further detailed study and evaluation by the Commission;*

*WHEREAS, by letters dated 3 December 1955, the Secretary of State for External Affairs of Canada and the Under Secretary of State of the United States of America advised the Commission that the Government of Canada and the Government of the United States of America, respectively, approved the range of mean monthly elevations for Lake Ontario and the criteria recommended in the Commission's said letters of 9 May, 1955; and also approved Plan of Regulation No. 12-A-9 for the purpose of calculating critical profiles and the design of channel excavations in the International Rapids Section of the St. Lawrence River; and*

*WHEREAS, in the said letters dated 3 December 1955, the two governments urged the Commission to continue its studies with a view to perfecting a plan of regulation so as best to meet the requirements of all interests both upstream and downstream, within the range of elevations and criteria therein approved; and*

*WHEREBY, by letter dated 3 December 1955, the Secretary of State for External Affairs, on behalf of the Government of Canada, has informed the Commission of the arrangements that have been made for the redesign of a portion of the St. Lawrence Seaway Canal in the vicinity of Montreal, between Lake St. Louis and the Laprairie Basin; and*

*WHEREBY condition (i) of the said Order of Approval dated 29 October 1952 makes the provision for adjustments and progressive improvements in the plan of regulation, subject to requirements and procedures specified therein:*

*NOW, THEREFORE, IT IS ORDERED that the construction, maintenance and operation jointly by The Hydro-Electric Power Commission of Ontario and the Power Authority of the State of New York of certain works (hereinafter called "the works) in accordance with the "Controlled Single Stage Project (238-242)", which was part of the joint report dated 3 January, 1941, of the Canadian Temporary Great Lakes-St. Lawrence Basin Committee and the United States St. Lawrence Advisory Committee, containing the features described in Appendix "A" to this Order and shown in Appendix "B" to this Order, be and the same are hereby approved subject to the conditions enumerated below, namely,*

- (a) All interests on either side of the International Boundary which are injured by reason of the construction, maintenance and operation of the works shall be given suitable and adequate protection and indemnity in accordance with the laws in Canada or the Constitution and laws in the United States respectively, and in accordance with the requirements of Article VII of the Treaty.*
- (b) The works shall be so planned, located, constructed, maintained and operated as not to conflict with or restrain uses of the waters of the St. Lawrence River for purposes given preference over uses of water for power purposes by the Treaty, namely, uses for domestic and sanitary purposes and uses for navigation, including the service of canals for the purpose of navigation, and shall be so planned, located, constructed, maintained and operated as to give effect to the provisions of this Order.*

- (c) The works shall be constructed, maintained and operated in such manner as to safeguard the rights and lawful interests of other engaged or to be engaged in the development of power in the St. Lawrence River below the International Rapids Section.
- (d) The works shall be so designed, constructed, maintained and operated as to safeguard so far as possible the rights of all interests affected by the levels of the St. Lawrence River upstream from the Iroquois regulatory structure and by the levels of Lake Ontario and the lower Niagara River; and any change in levels resulting from the works which injuriously affects such rights shall be subject to the requirements of paragraph (a) relating to protection and indemnification.
- (e) The hydro-electric plants approved by this Order shall not be subjected to operating rules and procedures more rigorous than are necessary to comply with the provisions of the foregoing paragraphs (b), (c) and (d).
- (f) Before the Hydro-Electric Power Commission Ontario commences the construction of any part of the works, it shall submit to the Government of Canada, and before the *Power Authority of the State of New York* commences the construction of any part of the works, it shall submit to the Government of the United States, for approval in writing, detailed plans and specifications of that part of the works located in their respective countries and details of the program of construction thereof of such details of such plans and specifications or programs of construction relating thereto as the respective governments may require. If after any plan, specification or program has been so approved. The Hydro-Electric Power Commission of Ontario or the *Power Authority of the State of New York* wishes to make any change therein, it shall, before adopting such change, submit the changed plan, specification or program for approval in a like manner.
- (g) In accordance with the Applications, the establishment by the Governments of Canada and the United States of a Joint board of Engineers to be known as the St. Lawrence River Joint board of Engineers (hereinafter referred to as the “Joint Board of Engineers”) consisting of an equal number of representatives of Canada and the United States to be designated by the respective Governments, is approved. The duties of the Joint Board of Engineers shall be to review and coordinate, and, if both Governments so authorized, approve the plans and specifications of the works and the programs of construction thereof submitted for the approval of the respective Governments as specified above, and to assure the construction of the works in accordance therewith as approved. The Joint Board of Engineers shall consult with and keep the board of Control, hereinafter referred to, currently informed on all matters pertaining to the water levels of Lake Ontario and the International Rapids Section and the regulation of the discharge of water from Lake Ontario and the flow of water through the International Rapids Section, and shall give full consideration to any advice or recommendations received from the Board of Control with respect thereto.
- (h) A Board of Control to be known as the International St. Lawrence River Board of Control (hereinafter referred to as the “Board of Control) consisting of an equal number of representatives of Canada and of the United States, shall be established by this Commission. The duties of the Board of Control shall be to give effect to the instructions of the Commission as issued from time to time with respect to this Order. During construction of the works the duties of the Board of Control shall be to keep itself currently informed of the plans of the Joint Board of Engineers insofar as these plans relate to water levels and the regulation of the discharge of water from Lake Ontario and the flow of water through the International Rapids Section, and to consult with the advise the Joint Board of Engineers thereon. Upon completion of the works, the duties of the Board of Control shall be to ensure that the provisions of this order relating to water levels and the regulation of the discharge of water from Lake Ontario and the flow of water through the International Rapids Section as herein set out are complied with, and the Hydro-electric Power Commission of Ontario and the *Power Authority of the State of New York* shall duly observe any direction given them by the Board of Control for the purpose

of ensuring such compliance. The Board of Control shall report to the Commission at such times as the Commission may determine. In the event of any disagreement amongst the members of the Board of Control which they are unable to resolve the matter shall be referred by them to the Commission for decision. The Board of Control may, at any time, make representations to the Commission in regard to any matter affecting or arising out of the terms of this Order with respect to water levels and the regulation of the said discharge and flow.

- (i) Upon the completion of the works, the discharge of water from Lake Ontario and the flow of water through the International Rapids Section shall be regulated to meet the requirements of conditions (b), (c) and (d) hereof; shall be regulated within a range of stage from elevation 74.15 m (243.3 feet) (navigation season) to elevation 75.37 m (247.3 feet), as nearly as may be; and shall be regulated in accordance with the criteria set forth in the Commission's letters of 17 March 1955 to the Governments of Canada and the United States of America and approved by the said governments in their letters of 3 December 1955 and qualified, by the terms of separate letters from the government of Canada and the Government of the United States of America dated 11 April 1956 and 1 May 1956, respectively, to the extent that these letters agree that the criteria are intended to establish standards which would be maintained with the minimum variation. The project works shall be operated in such a manner as to provide no less protection for navigation and riparian interests downstream than would have occurred under pre-project conditions and with supplies of the past as adjusted, as defined in criterion (a) herein. The Commission will indicate in an appropriate fashion, as the occasion may require, the inter-relationship of the criteria, the range of elevations and the other requirements.

The criteria are as follows:

- (a) *The regulated outflow from Lake Ontario from 1 April to 15 December shall be such as not to reduce the minimum level of Montreal Harbour below that which would have occurred in the past with the supplies to Lake Ontario since 1860 adjusted to a condition assuming a continuous diversion out of the Great Lakes Basin of 3,100 cubic feet per second at Chicago and a continuous diversion into the Great Lakes Basin of 5,000 cubic feet per second from the Albany river Basin (hereinafter called the "supplies of the past as adjusted").*
- (b) *The regulated winter outflows from Lake Ontario from 15 December to 31 March shall be as large as feasible and shall be maintained so that the difficulties of winter power operation are minimized.*
- (c) *The regulated winter outflows from Lake Ontario during the annual spring break-up in Montreal Harbour and in the river downstream shall not be greater than would have occurred assuming supplies of the past as adjusted.*
- (d) *The regulated outflow from Lake Ontario during the annual flood discharge from the Ottawa River shall not be greater than would have occurred assuming supplies of the past as adjusted.*
- (e) *Consistent with other requirements, the minimum regulated monthly outflow from Lake Ontario shall be such as to secure the maximum dependable flow for power.*
- (f) *Consistent with other requirements, the maximum regulated outflow from Lake Ontario shall be maintained as low as possible to reduce channel excavations to a minimum.*
- (g) *Consistent with other requirements, the levels of Lake Ontario shall be regulated for the benefit of property owners on the shores of Lake Ontario in the United States and Canada so as to reduce the extremes of stage which have been experienced.*
- (h) *The regulated monthly mean level of Lake Ontario shall not exceed elevation 75.37 m (247.3 feet) with the supplies of the past as adjusted.*

- (i) *Under regulation, the frequency of occurrences of monthly mean elevations of approximately 75.07 m (246.3 feet) and higher on Lake Ontario shall be less than would have occurred in the past with the supplies of the past as adjusted and with present channel conditions in the Galops Rapids Section of the St. Lawrence River, ("present channel conditions refers to conditions as of March 1955.)*
- (j) *The regulated level of Lake Ontario on 1 April shall not be lower than elevation 74.15 m (243.3 feet). The regulated monthly mean level of the lake from 1 April to 30 November shall be maintained at or above elevation 74.15 m (243.3 feet).*
- (k) *In the event of supplies in excess of the supplies of the past as adjusted, the works in the International Rapids Section shall be operated to provide all possible relief to the riparian owners upstream and downstream. In the event of supplies less than the supplies of the past as adjusted, the works in the international Rapids Section shall be operated to provide all possible relief to navigation and power interests.*

The flow of water through the International Rapids Section in any period shall equal the discharge of water from Lake Ontario as determined for that period in accordance with a *plan of regulation work which, in the judgment of the Commission, satisfies the afore-mentioned requirements, range of stage and criteria and when applied to the channels as determined in accordance with Appendix A hereto produces no more critical governing velocities than those specified in that appendix, nor more critical governing water surface profiles than those established by Plan of Regulation 12-A-9, when applied to the channels as determined in accordance with Appendix A hereto*, and shall be maintained as uniformly as possible throughout that period.

Subject to the requirements of conditions (b), (c) and (d) hereof, *and of the range of stage, and criteria, above written*, the Board of Control, after obtaining the approval of the Commission, may temporarily modify or change the restrictions as to discharge of water from Lake Ontario and the flow of water through the International Rapids Section for the purpose of determining what modifications or changes *in the plan of regulation* may be advisable. The Board of Control shall report to the Commission the results of such experiments, together with its recommendations as to any changes or modifications *in the plan of regulation*. *When the plan of regulation has been perfected so as best to meet the requirements of all interests, within the range of stage and criteria above defined, the Commission will recommend to the two Governments that it be made permanent* and, if the two Governments thereafter agrees, such plan of regulation shall be given effect as if contained in this order.

- (j) Subject as hereinafter provided, upon completion of the works, the works shall be operated initially for a test period of ten years, or such shorter period as may be approved by the Commission with the forebay water level at the power houses held at a maximum elevation of 72.36 m (237.4 feet). Subject to the requirements of paragraphs (b), (c), and (d) hereof, the Board of Control, after obtaining the approval of the Commission, may temporarily modify or change the said forebay water level in order to carry out experiments for the purpose of determining whether it is advisable to increase the forebay water level at the power houses to a maximum elevation exceeding 72.36 m (237.4 feet).

If the Board of Control, as a result of these experiments considers that operation during this test period at the maximum elevation exceeding 72.36 m (237.4 feet). would be advisable, and so recommends, the Commission will consider authorizing operation during this test period at a maximum elevation exceeding 72.36 m (237.4 feet). At the end of this test period, the Commission will make such recommendations to the two Governments with respect to a permanent forebay water level as it deems advisable or it may recommend an extension of the test period. Such of these recommendations as the two Governments thereafter agree to adopt shall be given effect as if contained in this Order.

- (k) The Hydro-Electric Power Commission of Ontario and the *Power Authority of the State of New York* shall maintain and supply for the information of the Board of Control accurate records relating to water levels and the discharge of water through the works and the regulation of the flow of water through the International Rapids Section, as the Board of Control may determine to be suitable and necessary, and shall install such gauges, carry out such measurements, and perform such other services as the Board may deem necessary for these purposes.
- (l) The Board of Control shall report to the Commission as of 31 December each year on the effect, if any, of the operation of the down-stream hydro-electric power plants and related structures on the tail-water elevations at the hydro-electric power plants approved by this Order.
- (m) The government of Canada shall proceed forthwith to carry out its expressed intention to remove Gut Dam.

AND IT IS FURTHER ORDERED that the allocation set out in Appendix "C" of the costs of constructing, maintaining and operating the works approved by this Order between The Hydro-Electric Power Commission of Ontario and the *Power Authority of the State of New York* be and the same is hereby approved but such approval shall not preclude the Applicants from submitting to the Commission for approval any variation in the said allocation that may be agreed upon between them as being appropriate or advisable.

AND IT IS FURTHER ORDERED that the Commission retains jurisdiction over the subject matter of these Applications, and may, after giving such notice and opportunity to all interested parties to make representations as the Commission deems appropriate, make such further Order or Orders relating thereto as may be necessary in the judgment of the Commission.

## APPENDIX A

### FEATURES OF THE WORKS APPROVED BY THIS ORDER:

#### *(a) Channel Enlargements*

Channel enlargements will be undertaken from above Chimney Point to below Lotus Island, designed to give a maximum mean velocity in any cross-section of the channel which will be used for navigation not exceeding four feet per second at any time, also between Lotus Island and Iroquois Point and from above Point Three Points to below Ogden Island designed to give a maximum mean velocity in any cross-section not exceeding two and one quarter feet per second with the flow and at the stage to be permitted on the first of January of any year, under regulation of outflow and levels of Lake Ontario in accordance with *Plan of Regulation No. 12-A-9, as prepared by the International Lake Ontario Board of Engineers, dated 5 May 1955*. Downstream from the power houses channel enlargements will be carried out for the purpose of reducing the tail water level at the power houses.

Final locations and cross-sections of these channel enlargements will be determined from further studies.

*As approved by the Government of Canada and the Government of the United States of America in similar letters dated 3 December 1995, the said Plan of Regulation No. 12-A-9 shall be the basis for calculating critical profiles and designing channel excavations.*

*(b) Control Facilities*

Adequate control facilities will be constructed for the regulation of the outflow from Lake Ontario.

*(c) Power House Structures*

The powerhouse structures will be constructed in the north channel extending from the lower end of Barnhart Island to the Canadian shore, and so located that one structure will be on each side of the International Boundary.

Each power house structure will include the main generating units to utilize economically the river flows available to it, units to utilize economically the river flows available to it, with provisions for ice handling and discharge sluices.

*(d) Dams and Associated Structures*

A control dam will be constructed extending from Iroquois Point on the Canadian side of the river in an easterly direction to the United States mainland above Point Rockway.

A dam will be constructed in the Long Sault Rapids at the head of Barnhart Island

Dykes and associated works will be provided as may be necessary in both the Province of Ontario and the State of New York.

All the works in the pool below the control dam will be designed to provide for full Lake Ontario level.

*(e) Highway Modifications*

In both the Province of Ontario and the State of New York provincial and state highways, and other roads, will be relocated in those portions subject to flooding, and reconstructed to standards at least equal to those now in existence.

*(f) Railway Modifications*

Such railway relocations as may be required as a result of the works herein described will be made in the Province of Ontario and the State of New York to standards at least equal to those now in existence.

*(g) Navigation Facilities*

Provision will be made for the continuance of 14-foot navigation throughout the International Rapids Section during the construction period.

*(h) Flooded Areas*

Lands and building in both the Province of Ontario and the State of New York will be acquired or rehabilitated as required. Inundated wooded areas will be cleared.

## APPENDIX B

*General Plan showing major works of the Great Lakes-St. Lawrence Basin Power Project are not included in the consolidation.*

## APPENDIX C

1. The power development works under this Application are those specified in Section 8 of the Application.
2. Total costs of the works described in Section 8 shall be based on Canadian costs and the United States costs and the total shall be equally divided between the two constructing entities.
3. The costs to be divided should be based on actually experienced and audited expenses.
4. In relation to the three principles above, the three following provisions apply:
  - (a) The amount to be paid to Canada, as specified in the Agreement of December 3, 1951, between Canada and Ontario, in lieu of the construction by the power-developing entities of facilities required for the continuance of 14-foot navigation, shall be excluded from the total cost of the power project to be divided between the Canadian and the United States power-developing entities, in consideration of the fact that actual replacement of 14-foot navigational facilities will be rendered unnecessary by reason of the concurrent construction of the deep waterway in Canada.
  - (b) The Authority to be established pursuant to the provisions of the St. Lawrence Seaway Authority Act, Chapter 24 of the Status of Canada, 1951 (Second Session), shall contribute an agreed sum of money towards the cost of the channel enlargement which the power-developing entities must undertake in the St. Lawrence River, as set out in paragraph 4 of the Annex to the Canada-Ontario Agreement of December 3, 1951, and in section 8 of the application to the International Joint Commission, in consideration of the benefits which will accrue to navigation from such channel enlargement.
  - (c) All costs for construction, maintenance and operation of the project except machinery and equipment in the respective power houses shall be borne equally by the two entities. All costs for construction, maintenance and operation of machinery and equipment in their respective power houses shall be paid by the respective entities and shall be deemed to satisfy the principle of an equal division between the two entities.