ANNUAL REPORT
to the
GOVERNMENTS
of
THE UNITED STATES and CANADA

COLUMBIA RIVER TREATY

PERMANENT ENGINEERING BOARD

Washington, D.C. Ottawa, Ontario

30 SEPTEMBER 1996

COLUMBIA RIVER TREATY PERMANENT ENGINEERING BOARD

C A N A D A • U N I T E D S T A T E S

CANADIAN SECTION
D. R. WHELAN, Chairman
J. Allan, Member

UNITED STATES SECTION
S. L. STOCKTON, Chairman
R. H. Wilkerson, Member

28 February 1997

The Honorable Madeleine Albright
The Secretary of State
Washington, DC

The Honourable A. Anne McLellan
Minister of Natural Resources
Ottawa, Ontario

Dear Secretary Albright and Minister McLellan:

Reference is made to the Treaty between the United States of America and Canada relating to co-operative development of the water resources of the Columbia River basin, signed at Washington, DC, on 17 January 1961.

In accordance with the provisions of Article XV paragraph 2(e), there is submitted herewith the thirty-second Annual Report, dated 30 September 1996, of the Permanent Engineering Board.

The report sets forth results achieved under the Treaty for the period from 1 October 1995 to 30 September 1996. For reasons explained in the report, the Board concludes that the requirements of the Treaty were not fully met during the report year.

Respectfully submitted:

For the United States

Steven Stockton, Chair

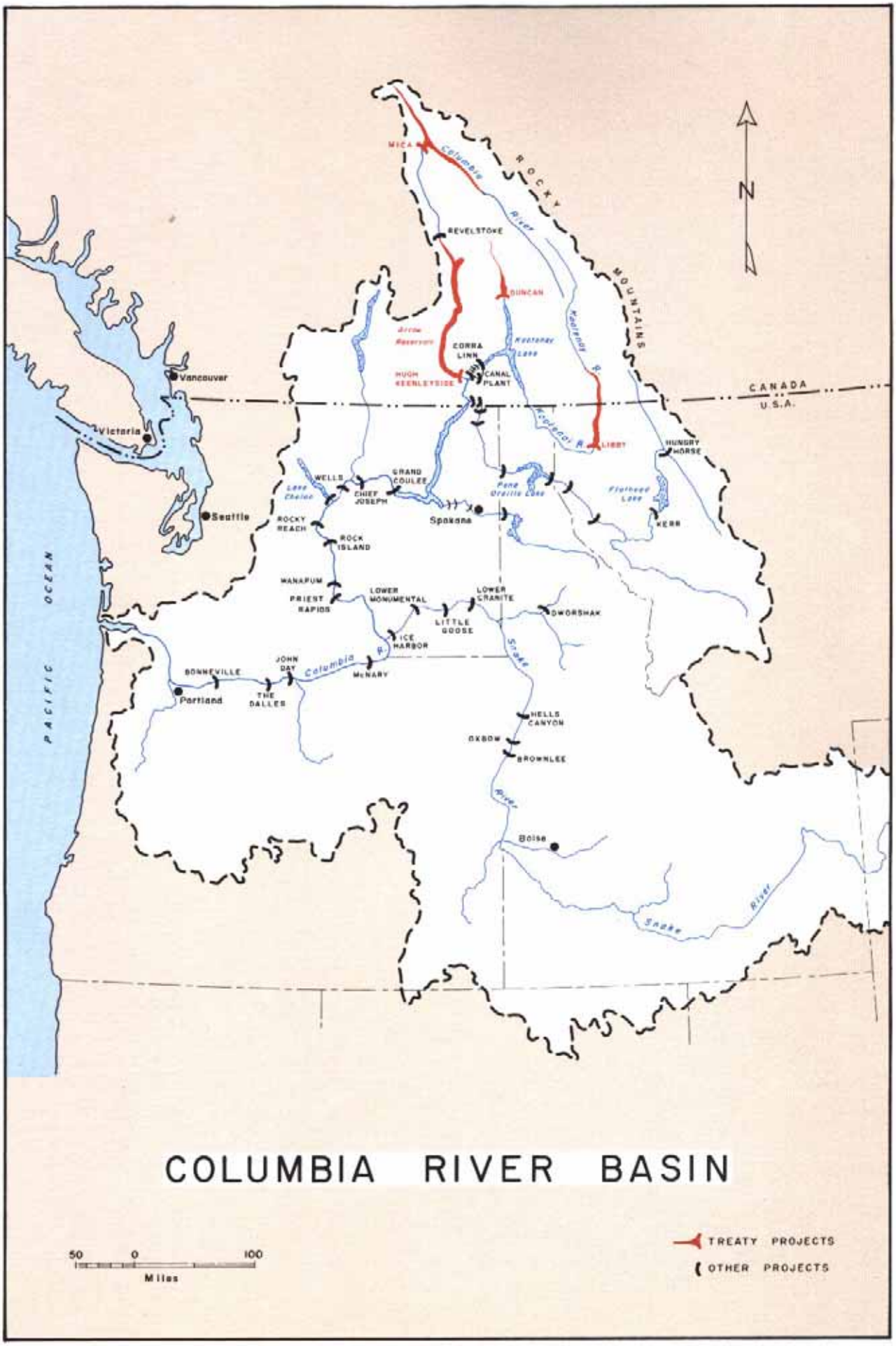
Ronald Wilkerson

For Canada

Dan Whelan, Chair

per

John Allan



COLUMBIA RIVER BASIN

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to the
GOVERNMENTS
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THE UNITED STATES and CANADA

COLUMBIA RIVER TREATY

PERMANENT ENGINEERING BOARD

Washington, D.C. **Ottawa, Ontario**

30 September 1996

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DEDICATION

The Permanent Engineering Board dedicates this Annual Report to the United States and Canadian Entities for resolving their disagreements over the most complex set of issues that they have faced since the ratification of the Treaty in 1964. These issues were related to the calculation of the Treaty downstream power benefits and the delivery of the Canadian entitlement to these benefits.

In addition, the Board praises the Entities for keeping the efficient and effective operation of the Treaty projects as their paramount objective throughout the resolution process. Despite their strong disagreements over Treaty matters, the Entities managed to continue the day-to-day Treaty operation. The Board recognizes that this was achieved largely through the dedicated efforts of the members of the Entities' Operating Committee, who put aside their differences and worked together to implement the Treaty.

SUMMARY

The thirty-second Annual Report of the Permanent Engineering Board is submitted to the governments of the United States and Canada in compliance with Article XV of the Columbia River Treaty of 17 January 1961. This report describes the status of projects, progress of Entity studies, operation of the Duncan, Arrow, Mica and Libby reservoirs, and the resulting benefits.

The Duncan, Arrow and Mica storage projects were operated throughout the year in accordance with the objectives of the Treaty and the terms of operating plans developed by the Entities. During the period September through December 1995, Libby was operated for power requirements in accordance with the *Detailed Operating Plan (DOP) for Columbia River Treaty Storage for Operating Year 1995–1996*. For the remainder of the report year, the U.S. Entity operated the Libby project in accordance with the U.S. Fish and Wildlife Service and the U.S. National Marine Fishery Service biological opinions on measures to protect and enhance white sturgeon and salmon—species listed under the *U.S. Endangered Species Act*. Since the Canadian Entity believes that these fishery operations are inconsistent with the Treaty, the two governments have initiated discussions to resolve the issue.

Operations under the 1990 and subsequent agreements between the Entities relating to the use of non-Treaty storage, refill enhancement for the Mica and Arrow reservoirs, and initial filling of non-Treaty reservoirs did not conflict with Treaty operations. During two floods in the 1995-1996 winter, daily flood control operation was required for the Treaty projects in order to alleviate flooding in the Portland, Oregon, area.

The Entities signed agreements in August and November 1996 resolving issues related to: i) the calculation of the Treaty downstream power benefits; and, ii) delivery of the Canadian entitlement to these benefits. As a result of the August Agreement dealing with the former issue, the Entities' reports: *Assured Operating Plan (AOP) and Determination of Downstream Power Benefits (DDPB) for Operating Years 1998–1999 and 1999–2000* are brought into compliance with Treaty requirements.

However, the Libby operation issue prevented the Entities from agreeing on the AOP and DDPB reports for the operating years 2000–2001 and 2001–2002. The Treaty requires the Entities to prepare an AOP and the associated DDPB for each operating year six years in advance. For this reason, the Board concludes that the requirements of the Treaty are not being fully met.

INTRODUCTION

The Columbia River Treaty provides for the cooperative development of the water resources of the Columbia River basin. Article XV of the Treaty established a Permanent Engineering Board and specified that one of its duties is to "make reports to Canada and the United States of America at least once a year of the results being achieved under the Treaty."

This Annual Report, which covers the period 1 October 1995 through 30 September 1996, describes activities of the Board, progress being achieved by both countries under the terms of the Treaty, operation of the Treaty projects, and the resulting benefits. Summaries of the essential features of the Treaty and of the responsibilities of the Board and of the Entities are included. The report refers to items currently under review by the Entities, provides discussion regarding the operations of the Treaty reservoirs and of the resulting power and flood control benefits, and presents the conclusions of the Board.

Libby Dam - Kootenai River, Montana

The dam and reservoir, Lake Koocanusa. The powerhouse is at the left of the spillway.

THE COLUMBIA RIVER TREATY

General

The Columbia River Treaty was signed in Washington, D.C., on 17 January 1961 and was ratified by the United States Senate in March of that year. In Canada ratification was delayed. Further negotiations between the two countries resulted in a formal agreement by an exchange of notes on 22 January 1964 to a Protocol to the Treaty and to an Attachment Relating to Terms of Sale. The Treaty and related documents were approved by the Canadian Parliament in June 1964.

The Canadian Entitlement Purchase Agreement was signed on 13 August 1964. Under the terms of this agreement, Canada's share of downstream power benefits resulting from the first thirty years of scheduled operation of each of the storage projects was sold to a group of electric utilities in the United States known as the Columbia Storage Power Exchange.

On 16 September 1964, the Treaty and Protocol were formally ratified by an exchange of notes between the two governments. The sum of $253.9 million (U.S. funds) was delivered to the Canadian representatives as payment in advance for the Canadian entitlement to downstream power benefits during the period of the Purchase Agreement. On the same date, at a ceremony at the Peace Arch Park on the International Boundary, the Treaty and its Protocol were proclaimed by President Johnson of the United States, Prime Minister Pearson of Canada, and Premier Bennett of British Columbia.

Features of the Treaty and Related Documents

The essential undertakings of the Treaty are as follows:

(a) Canada will provide 15.5 million acre-feet of usable storage by constructing dams near Mica Creek, the outlet of Arrow lakes, and Duncan Lake in British Columbia.

(b) The United States will maintain and operate hydroelectric power facilities included in the base system and any new main-stem projects to make the most effective use of improved stream flow resulting from operation of the Canadian storage. Canada will operate the storage in accordance with procedures and operating plans specified in the Treaty.

(c) The United States and Canada will share equally the additional power benefit available in the United States as a result of river regulation by upstream storage in Canada.

(d) On commencement of the respective storage operations, the United States will make payments to Canada totalling $64.4 million (U.S. funds) for flood control provided by Canada.

(e) The United States has the option of constructing a dam on the Kootenai River near Libby, Montana. The Libby reservoir would extend some 42 miles into Canada, and Canada would make the necessary Canadian land available for flooding.

(f) Both Canada and the United States have the right to make diversions of water for consumptive uses and, in addition, after September 1984 Canada has the option of making for power purposes specific diversions of the Kootenay River into the headwaters of the Columbia River.

(g) Differences arising under the Treaty that cannot be resolved by the two countries may be referred by either country to the International Joint Commission or to arbitration by an appropriate tribunal as specified by the Treaty.

(h) The Treaty shall remain in force for at least 60 years from its date of ratification, 16 September 1964.

The Protocol of January 1964 amplified and clarified certain terms of the Columbia River Treaty. The Attachment Relating to Terms of Sale signed on the same date established agreement that under certain terms Canada would sell in the United States its entitlement to downstream power benefits for a 30-year period. The Exchange of Notes and Attachment Relating to Terms of Sale of January 1964 and the Canadian Entitlement Purchase Agreement of 13 August 1964 (the Sales Agreement) provided that the Treaty storage would be operative for power purposes on the following dates: Duncan storage on 1 April 1968; Arrow storage on 1 April 1969; and, Mica storage on 1 April 1973.

PERMANENT ENGINEERING BOARD

General

Article XV of the Columbia River Treaty established a Permanent Engineering Board consisting of two members to be appointed by Canada and two members by the United States. Appointments to the Board were to be made within three months of the date of ratification. The duties and responsibilities of the Board were also stipulated in the Treaty and related documents.

Establishment of the Board

Pursuant to Executive Order No. 11177 dated 16 September 1964, the Secretary of the Army and the Secretary of the Interior, on 7 December 1964, each appointed a member and an alternate member to form the United States Section of the Permanent Engineering Board. Pursuant to the *Department of Energy Organization Act* of 4 August 1977, the appointments to the United States Section of the Board are now made by the Secretary of the Army and the Secretary of Energy. The members of the Canadian Section of the Board were appointed by Order in Council P.C. 1964-1671 dated 29 October 1964. Each Canadian member was authorized to appoint an alternate member. On 11 December 1964, the two governments announced the composition of the Board.

The names of Board members, alternate members and secretaries are shown in Appendix A. Messrs. Steven Stockton and Daniel Whelan were appointed to replace, respectively, Mr. John Elmore as U.S. Chair on 12 March 1996, and Mr. David Oulton as Canadian Chair on 16 April 1996. Furthermore, Mr. Jack Farrell succeeded Dr. Donald Kasianchuk as Alternate for Canada on 8 November 1995. The names of the current members of the Board's Engineering Committee are also shown in Appendix A.

Duties and Responsibilities

The general duties and responsibilities of the Board to the governments, as set forth in the Treaty and related documents, include:

(a) assembling records of the flows of the Columbia River and the Kootenay River at the Canada–United States of America boundary;

(b) reporting to Canada and the United States of America whenever there is substantial deviation from the hydroelectric and flood control operating plans and, if appropriate, including in the report recommendations for remedial action and compensatory adjustments;

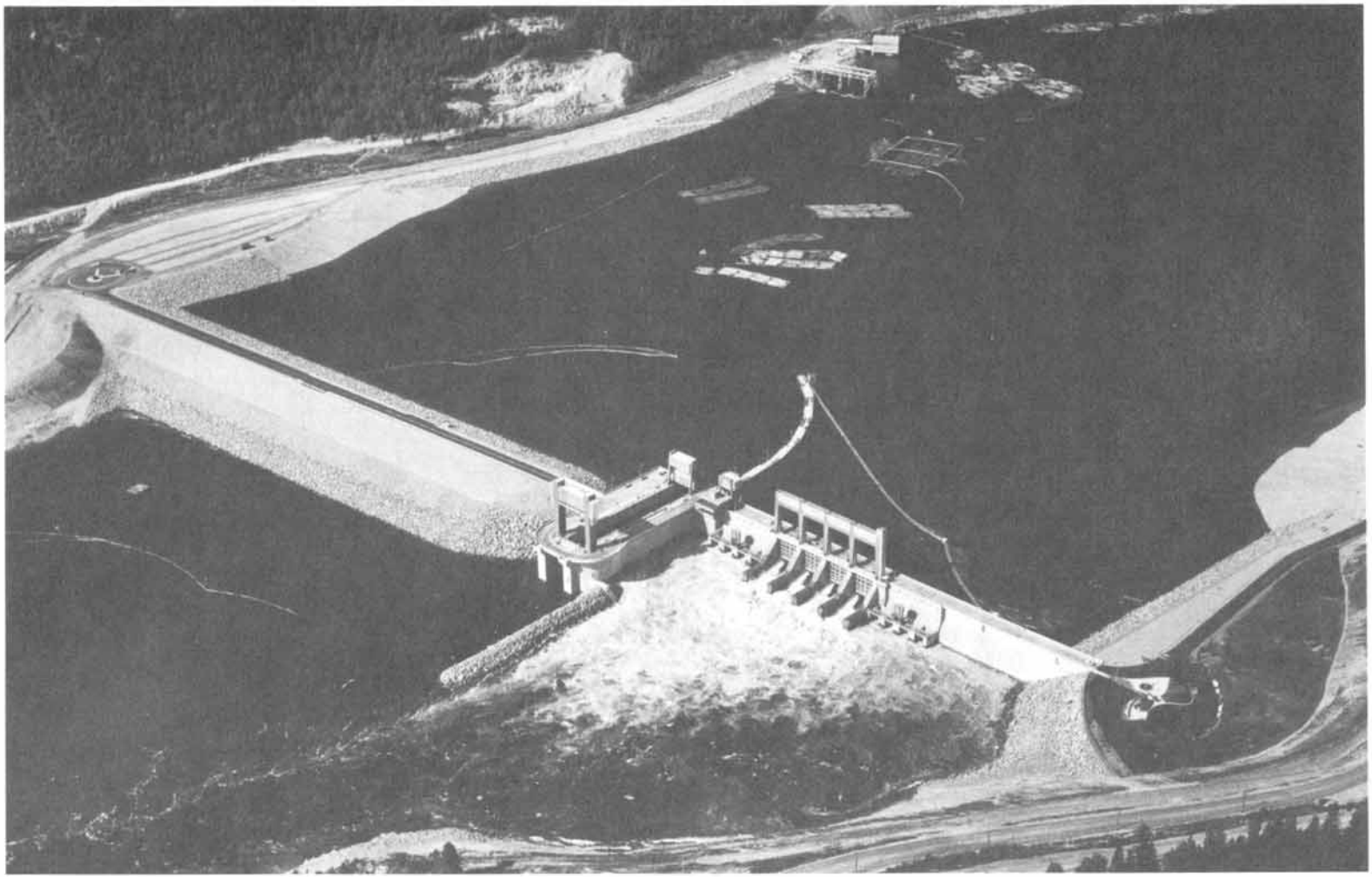
(c) assisting in reconciling differences concerning technical or operational matters that may arise between the Entities;

(d) making periodic inspections and requiring reports as necessary from the Entities and with a view to ensuring that the objectives of the Treaty are being met;

(e) making reports to Canada and the United States of America at least once a year of the results being achieved under the Treaty and making special reports concerning any matter that it considers should be brought to their attention;

(f) investigating and reporting with respect to any other matter coming within the scope of the Treaty at the request of either Canada or the United States of America; and

(g) consulting with the Entities in the establishment and operation of a hydrometeorological system as required by Annex A of the Treaty.



Hugh Keenleyside Dam - Columbia River, British Columbia

Concrete spillway and discharge works with navigation lock and earth dam.

ENTITIES

General

Article XIV(1) of the Treaty provides that Canada and the United States of America shall each designate one or more Entities to formulate and execute the operating arrangements necessary to implement the Treaty. The powers and duties of the Entities are specified in the Treaty and its related documents.

Establishment of the Entities

Executive Order No. 11177, previously referred to, designated the Administrator of the Bonneville Power Administration, the Department of the Interior, and the Division Engineer, North Pacific Division, Corps of Engineers, Department of the Army, as the United States Entity with the Administrator to serve as Chair. Pursuant to the *Department of Energy Organization Act* of 4 August 1977, the Bonneville Power Administration was transferred to the Department of Energy. Order in Council P.C. 1964-1407, dated 4 September 1964, designated the British Columbia Hydro and Power Authority as the Canadian Entity.

The names of the members of the two Entities are shown in Appendix B. On 28 February 1996, Mr. Brian Smith succeeded Mr. John Laxton as Chair of the Canadian Entity. Colonel Bartholomew Bohn was appointed to replace Major General Russell Fuhrman as Member of the U.S. Entity on 2 August 1996.

Powers and Duties of the Entities

In addition to the powers and duties specified elsewhere in the Treaty and related documents, Article XIV(2) of the Treaty requires that the Entities be responsible for the following:

(a) coordination of plans and exchange of information relating to facilities to be used in producing and obtaining the benefits contemplated by the Treaty;

(b) calculation of and arrangements for delivery of hydroelectric power to which Canada is entitled for providing flood control;

(c) calculation of the amounts payable to the United States for standby transmission services;

(d) consultation on requests for variations made pursuant to articles XII(5) and XIII(6);

(e) the establishment and operation of a hydrometeorological system as required by Annex A;

(f) assistance to and cooperation with the Permanent Engineering Board in the discharge of its functions;

(g) periodic calculation of accounts;

(h) preparation of the hydroelectric operating plans and the flood control operating plans for the Canadian storage together with determination of the downstream power benefits to which Canada is entitled;

(i) preparation of proposals to implement Article VIII and carrying out of any disposal authorized or exchange provided for therein;

(j) making appropriate arrangements for delivery to Canada of the downstream power benefits to which Canada is entitled including such matters as load factors for delivery, times and points of delivery, and calculation of transmission loss; and

(k) preparation and implementation of detailed operating plans that may produce results more advantageous to both countries than those that would arise from operation under the plans referred to in annexes A and B.

Article XIV(4) of the Treaty provides that the two governments may, by an exchange of notes, empower or charge the Entities with any other matter coming within the scope of the Treaty.

ACTIVITIES OF THE BOARD

Meetings

The Board met on 26 and 27 September 1995 in Portland, Oregon, and on 8 and 9 November 1995 in Vancouver, British Columbia. For continuity, these meetings were reported in the Board's 1995 Annual Report, since the Board had embarked in early September 1995 on a process to assist the Entities in resolving their differences on the outstanding issues.

On 21 and 22 February 1996, the Board met in Portland, Oregon, to review progress under the Treaty and to finalize the Annual Report for the year ending 30 September 1995. On 22 February 1996, the Board met with the Entities to assess operations under the Treaty and to discuss the Entities' progress toward resolving the following issues: i) definition of the critical streamflow period; ii) determination of the established operating procedures for the U.S. base hydro system; iii) operation of Libby Dam in accordance with the biological opinions; and, iv) alternate points and transmission reliability of delivering the Canadian entitlement to the Treaty downstream power benefits. The Entities reported that discussions were under way among themselves to resolve the first two issues by the end of the summer, and between the governments of Canada and the United States to address the Libby Dam issue (item iii above). With regard to the fourth issue, the Entities also reported that the Board's offer (described in a letter dated 21 December 1995) to mediate the matter if requested to do so by the Entities was still being considered.

The Board held a meeting on 19 August 1996 in Richmond, British Columbia, to review the outstanding issues, to evaluate the various options available to the Board in assuring that the Treaty objectives are met, and to decide on a course of action. The Board convened a special Board-Entity meeting on 17 October 1996 in Portland, Oregon, for the Entities to report the measures and the schedule for final resolution of these issues.

At the October meeting (subsequent to the end of this report year but reported here for continuity), the Entities presented to the Board, and discussed with them, two Entity Agreements: one resolving matters related to the calculation of the downstream power benefits (items i and ii above), and the other solving the delivery of the Canadian entitlement questions (item iv above). At the time of the meeting, only the former agreement (dated 29 August 1996) was finalized by the Entities. The Entities subsequently signed the latter agreement on 20 November 1996. Concerning the Libby Dam issue (item iii above), the Entities reiterated the comments they expressed at the February Board-Entity meeting, i.e., that the governments were dealing with this question. In letters dated 27 November and 9 December 1996, the U.S. and Canadian Entities respectively advised the governments of their agreements and responded to the Board's letters to the Entities of 18 October 1995. The Entities' letters are reported in Appendix E.

The Board inspected Treaty storage projects on 20 and 21 August 1996. Inspection tours were conducted at the Mica, Hugh Keenleyside and Libby projects; the Duncan project was viewed from the air. The Board also visited British Columbia Hydro's Revelstoke Dam and saw the Kootenay Canal Plant project from the air. These last two projects were made feasible by the Treaty.

Reports Received

Throughout the report year, the Entities maintained contact with the Board and the Board's Engineering Committee. Information pertinent to the operation of Treaty storage projects was made available to the Board.

In addition, the Entities provided the following documents to the Board:

- Annual Report of the Columbia River Treaty, Canadian and United States Entities for the period 1 October 1994 through 30 September 1995, dated November 1995;

- Detailed Operating Plan for Columbia River Treaty Storage, 1 August 1995 through 31 July 1996, dated August 1995, and the Entities' Agreement on the Plan, dated 31 January 1996;

- Winter 1995–96 Operation of Columbia River System; Cooperative Actions Taken by Treaty Entities in Consideration of Fish (Excerpts from the 17 July 1996 Treaty Operating Committee Notes);

- Columbia River Treaty Operating Committee Agreement on Operation of Treaty Storage for Non-Power Uses for 1 January through 31 July, 1996, dated 30 April 1996;

- Detailed Operating Plan for Columbia River Treaty Storage, 1 August 1996 through 31 July 1997, dated August 1996, and the Entities' Agreement on the Plan, dated 27 August 1996; and,

- Entity Agreement on Resolving the Dispute on Critical Period Determination, the Capacity Entitlement for the 1998–1999, 1999–2000, and 2000–2001 AOP/DDPB's, and Operating Procedures for the 2001–2002 and Future AOPs, dated 29 August 1996.

Subsequent to the end of this report year, the Board received the following from the Entities:

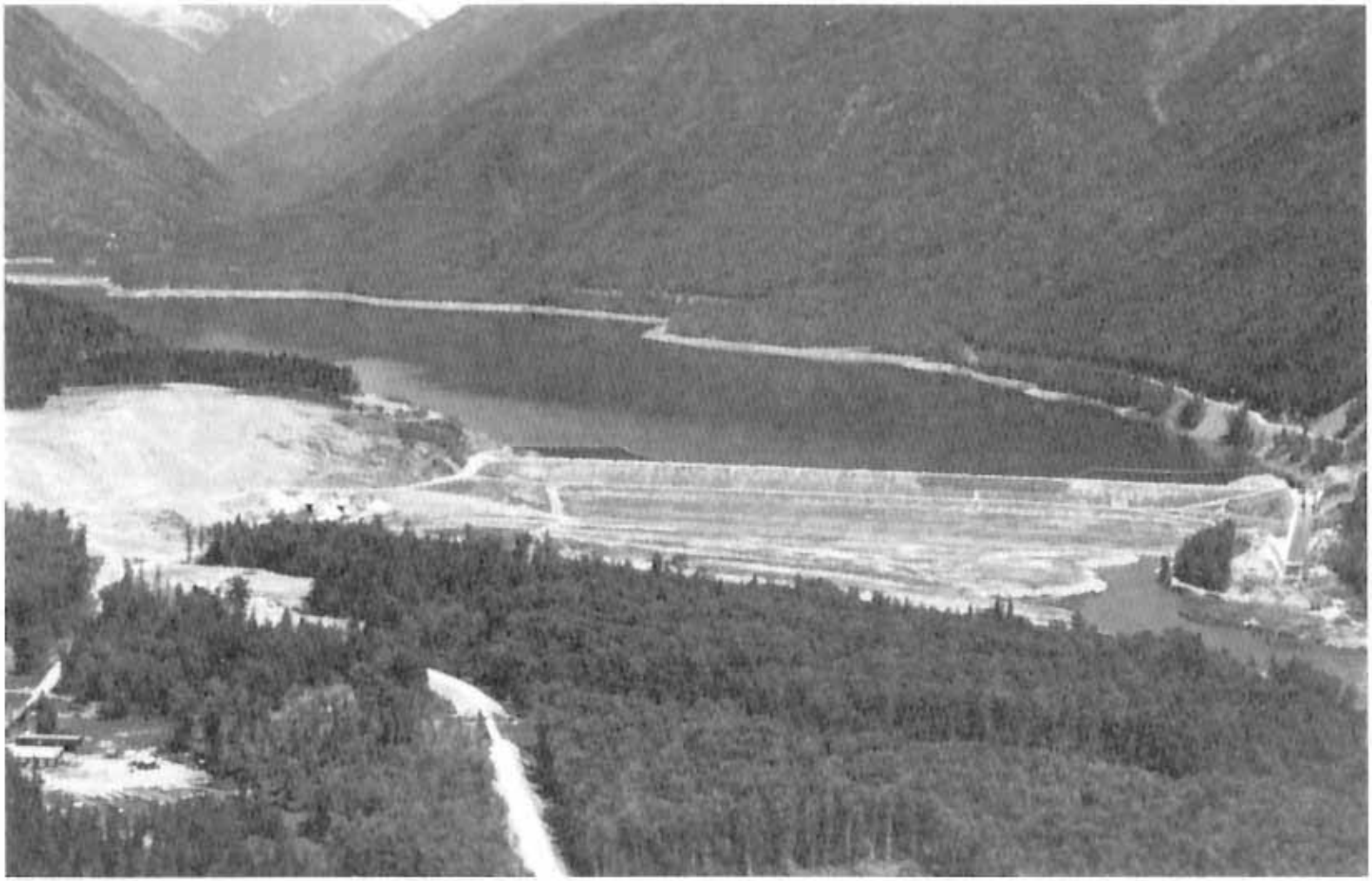
- Annual Report of the Columbia River Treaty, Canada and United States Entities for the period 1 October 1995 through 30 September 1996, dated November 1996;

- Letter Agreement between Bonneville Power Administration and B.C. Hydro and Power Authority Regarding Libby-Arrow Water Exchange for the period 31 July through 31 December 1995, dated 8 October 1996; and,

- Columbia River Treaty Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for 1 April 1998 through 15 September 2024 between the Canadian Entity and the United States Entity, dated 20 November 1996.

Report to Government

The thirty-first Annual Report of the Board was submitted to the governments of Canada and the United States of America on 29 February 1996.



Duncan Dam - Duncan River, British Columbia

The earth dam with discharge tunnels to the left and spillway to the right.

PROGRESS

General

The results achieved under the terms of the Treaty include construction of the Treaty projects, development of the hydrometeorological network, annual preparation of power and flood control operating plans, and the annual calculation of downstream power benefits. The three Treaty storage projects in British Columbia—the Duncan, Arrow and Mica projects—produce power and flood control benefits in Canada and the United States. The Libby storage project also provides power and flood control benefits in both countries. In the United States, increased flow regulation provided by Treaty projects facilitated the installation of additional generating capacity at existing plants on the Columbia River. In Canada, completion of the Canal Plant on the Kootenay River in 1976, installation of generators at Mica Dam in 1976–1977, and the completion of the Revelstoke project in 1984 have caused power benefits to increase substantially. This amounts to some 4,000 megawatts of generation in Canada that may not have been installed without the Treaty. In addition, the installation of generating capacity at Hugh Keenleyside Dam and at the Murphy Creek Site near Trail, British Columbia, is planned for the future.

The Treaty provides Canada with an option, which commenced in 1984, of diverting the Kootenay River at Canal Flats into the headwaters of the Columbia River. The British Columbia Hydro and Power Authority completed engineering feasibility and detailed environmental studies of the potential diversion. No further activities are planned at this time.

The locations of the above projects are shown on Plate 1 in Appendix D.

Status of the Treaty Projects

Duncan Project

Duncan Dam, the smallest Treaty project, was scheduled in the Sales Agreement for operation by 1 April 1968, and was the first of the Treaty projects to be completed. It became fully operational on 31 July 1967, well in advance of Treaty requirements.

The earthfill dam is about 130 feet high and extends 2,600 feet across the Duncan River valley, approximately six miles north of Kootenay Lake. The reservoir behind the dam extends for about 27 miles and provides 1,400,000 acre-feet of usable storage, which is committed under the Treaty. There are no power facilities included in this project.

The project is shown in the picture on page 13, and project data are provided in Table 1 of Appendix D.

Arrow Project

The Hugh Keenleyside Dam, at the outlet of the Arrow Lake, was the second Treaty project to be completed. It became operational on 10 October 1968, well ahead of the date of

1 April 1969 scheduled by the Sales Agreement. The project at present has no associated power facilities; however, installation of generators is planned for the future.

The dam consists of two main components: a concrete gravity structure that extends 1,200 feet from the north bank of the river and includes the spillway, low-level outlets, and navigation lock; and an earthfill section that rises 170 feet above the river bed and extends 1,650 feet from the navigation lock to the south bank of the river. The reservoir, about 145 miles long, includes both the Upper and Lower Arrow lakes, and provides 7,100,000 acre-feet of Treaty storage.

The project is shown in the picture on page 7, and project data are provided in Table 2 of Appendix D.

Mica Project

Mica Dam, the largest of the Treaty projects, was scheduled by the Sales Agreement for initial operation on 1 April 1973. The project was declared operational and commenced storing on 29 March 1973.

Mica Dam is located on the Columbia River about 85 miles north of Revelstoke, British Columbia. The earthfill dam rises more than 800 feet above its foundation and extends 2,600 feet across the Columbia River valley. It creates a reservoir 135 miles long, Kinbasket Lake, with a total storage capacity of 20,000,000 acre-feet. The project utilizes 12,000,000 acre-feet of live storage, of which 7,000,000 acre-feet are committed under the Treaty.

Although not required by the Treaty, a powerhouse was added to the project by B.C. Hydro and Power Authority. The underground powerhouse has space for a total of six 434-megawatt units, with a total capacity of 2,604 megawatts. At present, four generators are in operation, for a total of 1,736 megawatts.

The project is shown in the picture on page 20, and project data are provided in Table 3 of Appendix D.

Libby Project in the United States

Libby Dam is located on the Kootenai River, 17 miles northeast of the town of Libby, Montana. Construction began in the spring of 1966; storage has been fully operational since 17 April 1973. Commercial generation of power began on 24 August 1975, which coincided with the formal dedication of the project. The concrete gravity dam is 3,055 feet long, rises 370 feet above the river bed and creates Lake Koocanusa, which is 90 miles long and extends 42 miles into Canada. Lake Koocanusa has a gross storage of 5,869,000 acre-feet, of which 4,980,000 acre-feet are usable for flood control and power purposes. The Libby powerhouse, completed in 1976, has four units with a total installed capacity of 420 megawatts.

Construction of four additional units was initiated during fiscal year 1978, and the turbines have been installed. However, Congressional restrictions imposed in the 1982

Appropriations Act provide for completion of only one of these units. That unit became available for service late in 1987. The total installed capacity for the five units is 525 megawatts.

The Libby project is shown in the picture on page 2, and project data are provided in Table 4 of Appendix D.

Libby Project in Canada

Canada has fulfilled its obligation to prepare the land required for the 42-mile portion of Lake Koocanusa in Canada. British Columbia Hydro and Power Authority is now responsible for reservoir maintenance, debris clean-up and shoreline activities.

Hydrometeorological Network

One of the responsibilities assigned to the Entities by the Treaty is the establishment and operation, in consultation with the Permanent Engineering Board, of a hydrometeorological system to obtain data for detailed programming of flood control and power operation. This system includes snow courses, meteorological stations and stream flow gauges. The Columbia River Treaty Hydrometeorological Committee, formed by the Entities, makes recommendations on further development of the Treaty Hydrometeorological System.

In developing the hydrometeorological network, the Entities, with the concurrence of the Board, adopted a document in 1976 that defines the Columbia River Treaty Hydrometeorological System Network and sets forth a method of classifying facilities into those required as part of the Treaty System and those of value as Supporting Facilities. During the 1976–1977 report year, the Entities, with the concurrence of the Board, adopted a plan for exchange of operational hydrometeorological data. That plan is still in force.

In the 1985–1986 report year, the Entities provided the Board with the report *Revised Hydrometeorological Committee Documents*, dated November 1985. The list of hydrometeorological facilities included in this document, which constitute the network, was updated by the Entities in 1987, 1989 and 1990.

Power Operating Plans and Calculation of Downstream Benefits

The Treaty and related documents require the Entities to agree annually on operating plans and on the resulting downstream power benefits for the sixth succeeding year of operation. These operating plans, prepared five years in advance, are called assured operating plans. They represent the basic commitment of the Canadian Entity to operate the Treaty storage in Canada (Duncan, Arrow and Mica) and provide the Entities with a basis for system planning. Canada's commitment to operate under an assured operating plan is tied directly to the benefits produced by that plan. At the beginning of each operating year, a detailed operating plan, which includes the three Treaty storage projects in Canada and the Treaty project in the United States (Libby), is prepared on the basis of current resources and loads to obtain results that may be more advantageous to both countries than those that would be obtained by operating in accordance with the assured operating plan.

Near the end of the 1987–1988 report year, the Entities signed two agreements relating to changes in the principles and procedures used in preparing the assured operating plans and in calculating downstream power benefits. These agreements were based on Entity studies of the impact of several proposed changes to Treaty reservoir operating procedures and to the determination of downstream power benefits. The Entities' report: *Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans*, dated December 1991, provides guidelines for the preparation of the operating plans and incorporates the Entities' agreements.

In 1991, the Entities submitted to the Board the report entitled: *Assured Operating Plan (AOP) and Determination of Downstream Power Benefits (DDPB) for Operating Year 1995–1996.* The report established operating rule curves for the three Treaty storage reservoirs in Canada and calculated the downstream power benefits resulting from the operation of the reservoirs for the 1995–1996 operating year.

During the report year, actual operations of the Treaty storage in Canada were regulated under the rule curves set out in the Entities' report: *Detailed Operating Plan (DOP) for Columbia River Treaty Storage, 1 August 1995 through 31 July 1996*, and in associated Entities' agreements. In January 1996, the Entities submitted this report to the Board. As in the previous detailed operating plan, the DOP for the 1995–1996 operating year includes firm energy shifting into the first year of the critical period, provisional draft operation for the U.S. Entity, and determination of the compensation to Canada for increased downstream benefits resulting from these operations.

This DOP essentially implemented the AOP for the same year, with the exception of Libby Dam operations. During the September–December 1995 period, Libby was operated for power requirements according to Entities' report: *Detailed Operating Plan (DOP) for Columbia River Treaty Storage for Operating Year 1995–1996.* For the remainder of the operating year, the U.S. Entity (North Pacific Division, Army Corps of Engineers) operated Libby to protect and enhance white sturgeon and salmon—species listed under the U.S. *Endangered Species Act*—in accordance with the U.S. Fish and Wildlife Service (FWS) and the U.S. National Marine Fishery Service (NMFS) Biological Opinions. One of the main measures defined in the Biological Opinions includes changing the customary seasonal release rates from Libby Dam such that spring and summer flows would be higher, and fall and winter flows lower, than in the past.

The Canadian Entity believes that these fishery operations are not consistent with the Treaty. The DOP for the operating year 1995–1996 shows the divergence of opinions between the Entities on the Libby operation since this plan has two sets of operating rule curves for the project. While the rule curves defined by the U.S. Entity include the flow regime specified in the FWS and NMFS Biological Opinions, the Canadian Entity's rule curves reflect the earlier agreements between the Entities. Given that the Entities have been unable to reach an agreement on the operation of the Libby project since early 1995, the two governments have initiated discussions to resolve the question.

In its 1995 Annual Report, the Board stated that the AOP and DDPB reports for the operating years 1998–1999 and 1999–2000 were inconsistent with the Treaty, since they

contained two calculations of the Treaty downstream power benefits. The inclusion of two capacity numbers in the reports resulted from the Entities' different interpretations of the critical streamflow period definition and the established operating procedures for the U.S. base hydro system. In addition, the Board reported that the Entities were unable to submit the AOP and DDPB report for the operating year 2000-2001 in accordance with the Treaty requirements because of the issues related to the calculation of the downstream power benefits and the operation of the Libby project. Since the issuance of the Board's 1995 Annual Report in February 1996, the Entities have made much progress in bringing these AOP and DDPB reports into compliance with Treaty requirements.

At the Board-Entity meeting in October 1996, the Entities presented to the Board, and discussed with its members, the following document (dated 29 August 1996): *Entity Agreement on Resolving the Dispute on Critical Period Determination, the Capacity Entitlement for the 1998–1999, 1999–2000, and 2000–2001 AOP/DDPB's, and Operating Procedures for the 2001/2002 and Future AOPs*. During the meeting, the Entities stated that one of the implications of the Agreement was to bring the AOP and DDPB reports for the operating years 1998–1999 and 1999–2000 into compliance with the Treaty, since they agreed on a single value of the downstream power benefits for each report. The agreed value, which results from the "Draft for Power" calculation methodology, was already included in these two AOPs and DDPBs when they were signed by the Entities in April 1995. The Entities also reported that the AOP and DDPB reports for the operating years 2000–2001 and 2001–2002 cannot be finalized due to the non-resolution of the Libby operations issue.

According to the Entities, the Agreement will produce results equivalent to those that would have occurred had the Board's recommendations[1] been implemented exactly as proposed. This is explained by the Entities' desire to reach a mutually beneficial agreement that gives the Canadian Entity equivalent benefits to those anticipated by implementing the Board's recommendations, while preserving the U.S. Entity's position that it does not accept these recommendations. The U.S. and Canadian Entities confirmed their Agreement, and responded to the Board's earlier recommendations, in letters to the Board dated 27 November 1996 and 9 December 1996 respectively. These letters are presented in Appendix E.

The Board is pleased to see that the Entities have reached an agreement resolving, for the foreseeable future, the long-standing calculation of the downstream power benefits issue (i.e., the critical streamflow period definition and the established operating procedures issues). It concurs with the Entities that the Agreement brings the AOP and DDPB reports for the operating years 1998–1999 and 1999–2000 into compliance with the Treaty. However, the Board is concerned that this issue may come up again, since there is a possibility that using both of the Entities' interpretations of the critical streamflow period definition may lead to two values for the downstream power benefits. If this occurs, the Board will re-examine the matter by using its recommendations on the appropriate Treaty interpretation and application of the critical streamflow period definition and the established operating procedures.

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[1] A complete description of the Board's recommendations (dated 18 October, 1995) can be found in Appendix F of the Board's 1995 Annual Report.

Flood Control Operating Plans

The Treaty provides that Canadian storage reservoirs will be operated by the Canadian Entity in accordance with operating plans designed to minimize flood damage in the United States and Canada. The *Columbia River Treaty Flood Control Operating Plan* defines flood control operation of the Duncan, Arrow, Mica and Libby reservoirs. This plan was received from the Entities and reviewed by the Board in the 1972–1973 report year and is still in effect.

Flow Records

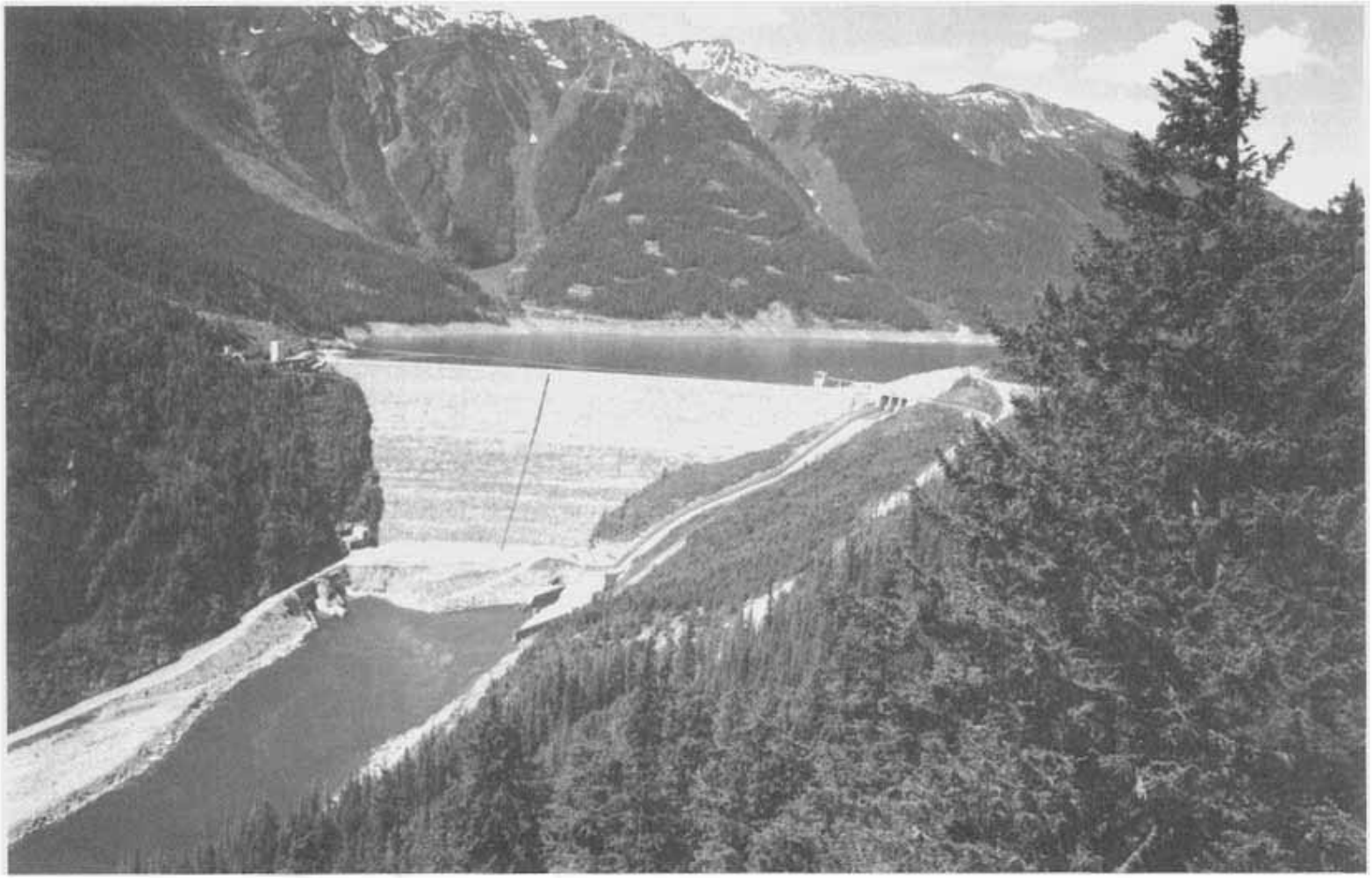
Article XV(2)(a) of the Treaty specifies that the Permanent Engineering Board shall assemble records of flows of the Columbia and Kootenay rivers at the Canada-United States of America boundary. Flows for this report year are tabulated in Appendix C for the Kootenai River at Porthill, Idaho, and for the Columbia River at Birchbank, British Columbia.

Non-Treaty Storage

Since 1984 there have also been agreements between the B.C. Hydro and Power Authority and the Bonneville Power Administration concerning non-Treaty storage. These agreements have not interfered with operations under the Treaty; rather, they extend the concepts of the Treaty and are expected to benefit both the B.C. Hydro and Power Authority and the Bonneville Power Administration.

Operations for Fish

The Northwest Power Planning Council was established by an Act of Congress in 1980 to prepare, among other things, a program for improvement of fish and wildlife in the Columbia River basin in the United States. This effort continues to evolve. In this regard, the Board notes that the assured operating plans and the determination of downstream power benefits are to provide for optimal operation for power and flood control in accordance with the requirements of the Treaty. The Board has also noted, however, that the Entities may agree to provide water for fish migration under detailed operating arrangements providing this does not conflict with Treaty requirements.



Mica Dam - Columbia River, British Columbia

The earth dam showing the spillway at the right. The underground powerhouse is at the left.

OPERATION

General

The Columbia River Treaty Operating Committee was established by the Entities to develop operating plans for the Treaty storage and to direct operation of this storage in accordance with the terms of the Treaty and subsequent Entity agreements.

During the report year, the Treaty storage in Canada was operated by the Canadian Entity in accordance with the following documents:

- Columbia River Treaty Flood Control Operating Plan, dated October 1972, as amended by the Review of Flood Control, Columbia River Basin, Columbia River and Tributaries Study, CRT-63, dated June 1981;

- Columbia River Treaty Entity Agreement on Principles for Preparation of the Assured Operating Plan and Determination of Downstream Power Benefits, dated July 1988;

- Columbia River Treaty Entity Agreement on Changes to Procedures for the Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies, dated August 1988;

- Agreement executed by the United States of America Department of Energy acting by and through the Bonneville Power Administration and British Columbia Hydro and Power Authority relating to: (a) Use of Columbia River non-Treaty Storage, (b) Mica and Arrow Refill Enhancement, and (c) Initial Filling of non-Treaty Reservoirs, signed 9 July 1990;

- Assured Operating Plan for Columbia River Treaty Storage, 1 August 1995 through 31 July 1996, dated January 1991;

- Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans, dated December 1991;

- Assured Operating Plan for Columbia River Treaty Storage, 1 August 1996 through 31 July 1997, dated February 1992;

- Letter Agreement of July 20, 1995, between B.C. Hydro and Power Authority and Bonneville Power Administration, regarding storage and return of energy to enable optimal balancing of system reservoirs considering power and non-power trade-offs during the period 15 July through 31 December 1995;

- Detailed Operating Plan for Columbia River Treaty Storage, 1 August 1995 through 31 July 1996, dated August 1995, and the Entities' Agreement on the Plan, dated 31 January 1996;

- Columbia River Treaty Operating Committee Agreement on Operation of Treaty Storage for Non-power Uses for 1 January through 31 July 1996, dated 30 April 1996;

- Winter 1995–1996 Operation of Columbia River System; Cooperative Actions Taken by Treaty Entities in Consideration of Fish (Excerpts from the 17 July 1996 Treaty Operating Committee Notes);

- Detailed Operating Plan for Columbia River Treaty Storage, 1 August 1996 through 31 July 1997, dated August 1996, and the Entities' Agreement on the Plan, dated 27 August 1996; and,

- Letter Agreement between Bonneville Power Administration and B.C. Hydro and Power Authority Regarding Libby-Arrow Water Exchange for the period 31 July through 31 December 1995, dated 8 October 1996.

Power Operation

The three Canadian Treaty storage projects, Duncan, Arrow and Mica, and the one U.S. Treaty storage project, Libby Dam, were in operation throughout the report year.

The summer of 1995, preceding the beginning of the report year, saw the coordinated Columbia River reservoir system filled to 89.2 percent of the maximum storage energy. As a result, first-year firm energy load carrying capability (FELCC) was adopted for the remainder of the report year. Due to greater than average streamflows throughout the year, the system generally operated to the Operating Rule Curve or Flood Control Rule Curve for the entire period.

During the spring and summer of 1996, reservoir operations were controlled not only by power requirements, but also by environmental considerations to ensure adequate flows to meet fishery needs in both Canada and the United States. At Libby Dam, operations for the white sturgeon and salmon mandated by the requirements of the U.S. *Endangered Species Act* were implemented by the U.S. Army Corps of Engineers. The Canadian Entity disputes the U.S. Entity's authority under the treaty to unilaterally decide on this operation. Discussions between the Canadian and U.S. governments continued in an effort to resolve this issue. Normal operations at other Treaty reservoirs, as formulated in the 1995–1996 Detailed Operating Plan, were modified through Entity agreements. The use of non-Treaty storage was modified by corporate agreements, so as to minimize interference between fishery requirements and power operations.

The coordinated Columbia River reservoir system reached 97 percent of its maximum storage energy by the end of July 1996. This value was used to determine the FELCC, with the result that first-year FELCC was adopted for the 1996–1997 operating year.

Mica Project

Kinbasket Lake began the report year at elevation 2,469.6 feet, about 5.4 feet below its full level, after having reached a peak of 2,470.7 feet (4.3 feet below full) in August 1995. The Mica Treaty storage volume reached 5.5 million acre-feet (maf) by the end of July 1996, and filled to 6.0 maf by the end of August 1996, which was 98 percent of full content.

Throughout the fall of 1995, Treaty storage in Mica was generally drafted for power purposes. The exception to this was in November, when special operations were initiated in order to reduce releases and minimize flooding that was occurring downstream at Portland, Oregon. The reservoir was drafted to elevation 2,455.0 feet by 31 December 1995.

During the period beginning in January and continuing through May, the reservoir was drafted for power purposes and reached its lowest level of the year, elevation 2,404.4 feet, in May 1996. This level was 30 feet higher than the previous year's lowest level. With the start of the spring freshet in early May, Mica discharges were reduced and the reservoir quickly refilled. The reservoir reached the peak level for the year of 2,475.4 feet (0.4 feet below full) on 1 September 1996. The elevation at the end of the reporting year was 2,471.3 feet.

Arrow Project

Arrow Lake began the report year at elevation 1,429.0 feet, 15.0 feet below full, after a summer in which the reservoir reached a peak elevation of 1,442.8 feet in July 1995. Reservoir releases were increased over the autumn months from an average of 24 thousand cubic feet per second (kcfs) in October to an average of 50 kcfs in December. The winter discharge peaked at 56 kcfs in mid-December. Arrow reservoir was drafted to elevation 1,430.9 feet by 31 December 1995, and Arrow Treaty storage on that date was 6.9 maf, or 98 percent of full.

In early January, the Canadian Entity requested that Arrow outflows be selectively reduced below Treaty requests to keep river levels at acceptable and maintainable levels during whitefish spawning and later emergence. The U.S. Entity agreed to this request in exchange for a later Fall Flexibility Draft. During the period from January through March, the reservoir continued to be drafted. The reservoir reached its lowest level of the period, elevation 1,395.1 feet, on 16 March 1996. During the period from April through June, Arrow was operated under the terms of the agreement on "Non-power Use of Canadian Treaty storage" between the Entities. This agreement allowed the U.S. Entity to store and release water that was above proportional draft levels in Canadian Treaty space, and specified non-decreasing discharges from Arrow to avoid dewatering rainbow trout redds.

Arrow reservoir reached its highest level of the year, elevation 1,442.6 feet, on 11 July 1996. The Arrow Treaty storage content continued to fill and reached its highest level for the year of 7.1 maf, or 100 percent of full, on 30 July. By the end of the reporting period, 30 September, the reservoir had been drafted to elevation 1,428.4 feet, with Treaty storage of 6.0 maf, or 85 percent of full.

To minimize spill at the downstream Kootenay River plants in Canada and maintain water levels in Lake Koocanusa in Canada, Bonneville Power Administration and B.C. Hydro Power Authority agreed to a Libby-Arrow water transfer for the late summer of 1996. Under this commercial agreement, Libby release volumes were reduced by about a total of 200 thousand second foot-days (ksfd) through August, and an equal amount of water was released from Arrow reservoir. This Arrow water that was effectively stored in Libby was to be returned to Arrow reservoir in the October to December 1996 period.

Duncan Project

Duncan reservoir began the report year at 1,883.9 feet elevation, 8.1 feet below full. During early October 1995, Duncan discharges averaged 8 kcfs to sustain the Kootenay Lake levels and Kootenay Lake flows. The project discharge was reduced to the minimum of 100 cfs in late October and remained there for most of November 1995. Higher discharges were necessary again in late December to support Kootenay Lake levels and flows. The reservoir elevation was 1,867.2 feet (70 percent of full) on 31 December 1995.

During the period beginning in January and continuing through early May, the project was drafted and reached its lowest level for the year, elevation 1,798.7 feet (4.5 feet above empty) on 2 May 1996. Beginning in May, the reservoir was returned to its minimum outflow of 100 cfs to start the refill process. It remained on minimum discharge until mid-July, when the outflow was increased to slow the rate of reservoir refill. The reservoir was refilled to elevation 1,892.2 feet (0.2 feet above full) on 31 July 1996. Inflow was adequate during the month of August to maintain the reservoir to near full pool, and on 3 September, the discharge was increased to start drafting the reservoir and fill Kootenay Lake. The reservoir was drafted to elevation 1,883.7 feet by 30 September 1996.

Libby Project

Lake Koocanusa did not completely refill during the summer of 1995, and the reservoir began the report year at elevation 2,448.4 feet, 10.6 feet below full. At the start of the report year in October 1995, selective releases of 4 kcfs were made for an ongoing Montana Department of Fish, Wildlife, and Parks fishery study, boat ramp work, and bridge pier removal. On 27 October, the outflow was increased to 20 kcfs to begin drafting the lake to its 31 December flood control level of 2,411 feet. It should be noted that Libby started the reporting year with an imposed maximum outflow limit of 20 kcfs, the hydraulic capacity of 4 units, since Unit #3 was out of service until November. The outflow of 20 kcfs that was started on 27 October was maintained until late November, when it was reduced to the minimum outflow of 4 kcfs through 5 December as the Columbia River system was on flood control to reduce a possible flood stage that was forecast at Vancouver, Washington. On 6 December, outflows were increased to the maximum of 20 kcfs in order to continue drafting to meet flood control requirements. This was continued until 11 December, when Unit #3 was returned to service and outflows were increased to the maximum powerhouse output with five units of 26 kcfs. Due to high local streamflows and the limitations on Libby's outflow capability resulting from the unit outage, the reservoir only drafted to elevation 2,420.7 feet by 31 December, which was 9.1 feet above the flood control rule

curve level of 2,411 feet. Inflow during the October to December period was 169 percent of normal.

During the period from January through April, the operation at Libby fluctuated from releasing the maximum allowable outflow to draft the reservoir for flood control storage to releasing the minimum outflow required for alleviating downstream flooding and maintaining the International Joint Commission (IJC) rule curve levels at Kootenay Lake downstream. Due to the combined effect of these outflow restrictions and abnormally high inflows, on 31 March 1996, the reservoir was at elevation 2,366.0 feet, or 79 feet above the 31 March flood control level of 2,287.0 feet

Because of the concern for Total Dissolved Gas (TDG) associated with spill at Libby, the special operations to meet the *Endangered Species Act* requirements for white sturgeon during May through July were held off during filling while inflows were above 25 kcfs. These special operations would have involved fluctuating the outflows from the reservoir to produce pulsing flows to assist in sturgeon spawning. Outflows during the last half of May and June were maintained at the full powerhouse discharge of 25 to 28 kcfs, because above normal runoff had the lake filling at a rate of 1-3 feet per day. Some pulsing flows were provided for sturgeon in late June, July and August. The reservoir fully refilled at the end of July, reaching a peak elevation of 2,459.0 feet. The observed reservoir elevation at the end of the reporting year on 30 September 1996 was 2,448.7 feet.

Flood Control Operation

Major storm conditions occurred six times during this year, at the end of November, mid-December, mid-January, early February, the latter part of April and mid-May. These storms resulted in two major floods during the report year. The first event occurred in late November through early December 1995, and the second event early in February 1996. In both instances, most of the flood runoff came from the Willamette River and lower Columbia River tributaries. During these floods, special flood control operations were requested at several Treaty projects by the Corps of Engineers to alleviate flooding in the Portland, Oregon, area.

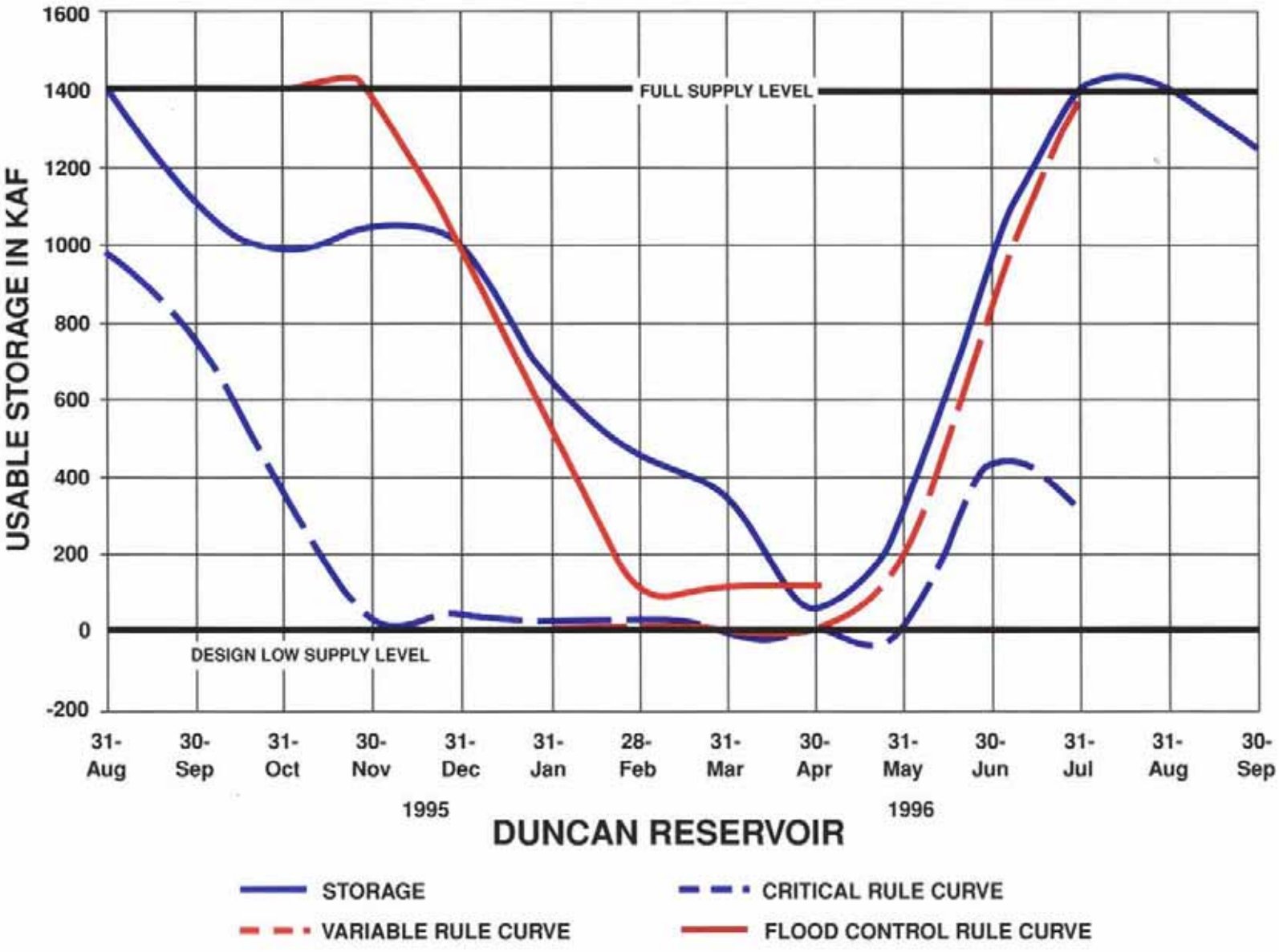
During the first flood, which occurred between late November and early December 1995, requests were made by the Corps of Engineers for special operations at Arrow for flood control. These resulted in reducing the outflow from the project to the natural flow of 25 kcfs. Releases from Duncan and Libby reservoirs were also reduced during this period to assist in the flood control effort.

During the second flood in early February 1996, the system went on daily flood control operations. The outflow from Arrow was reduced to the natural flow of 15 kcfs. The outflow from Libby reservoir was also reduced during this period to alleviate flooding in the Portland, Oregon area as well as due to exceedance of the IJC water level criteria at Kootenay Lake.

During the spring runoff period, slightly below flood stage conditions occurred at Vancouver, Washington, as a result of the significant flood control that was provided by Treaty projects. Earlier minimum fishery releases from Arrow, combined with this year's runoff

pattern, drafted Arrow lakes prior to the spring runoff, resulting in no flood control operation at the project after 30 April 1996, since the flood control guide curves did not control the project operation.

During the 1995–1996 season, outflows from Libby reservoir were adjusted several times in accordance with the IJC water level criteria for Kootenay Lake. This occurred in February, March and April. In addition, the Kootenay Lake IJC Board of Control made a ruling on the method used to calculate the IJC water level at Kootenay Lake for the 1995–1996 operating year. This ruling changed the method by basing the lowering formula at Kootenay Lake on the natural inflow to the lake rather than the observed inflow as had been done in past years. This resulted in a lower allowable Kootenay lake level early in the spring and a higher level during the late spring runoff period. The effect of this on Libby reservoir was lower drafts for flood control and higher lake levels than would have been experienced using the previous method based on observed inflow.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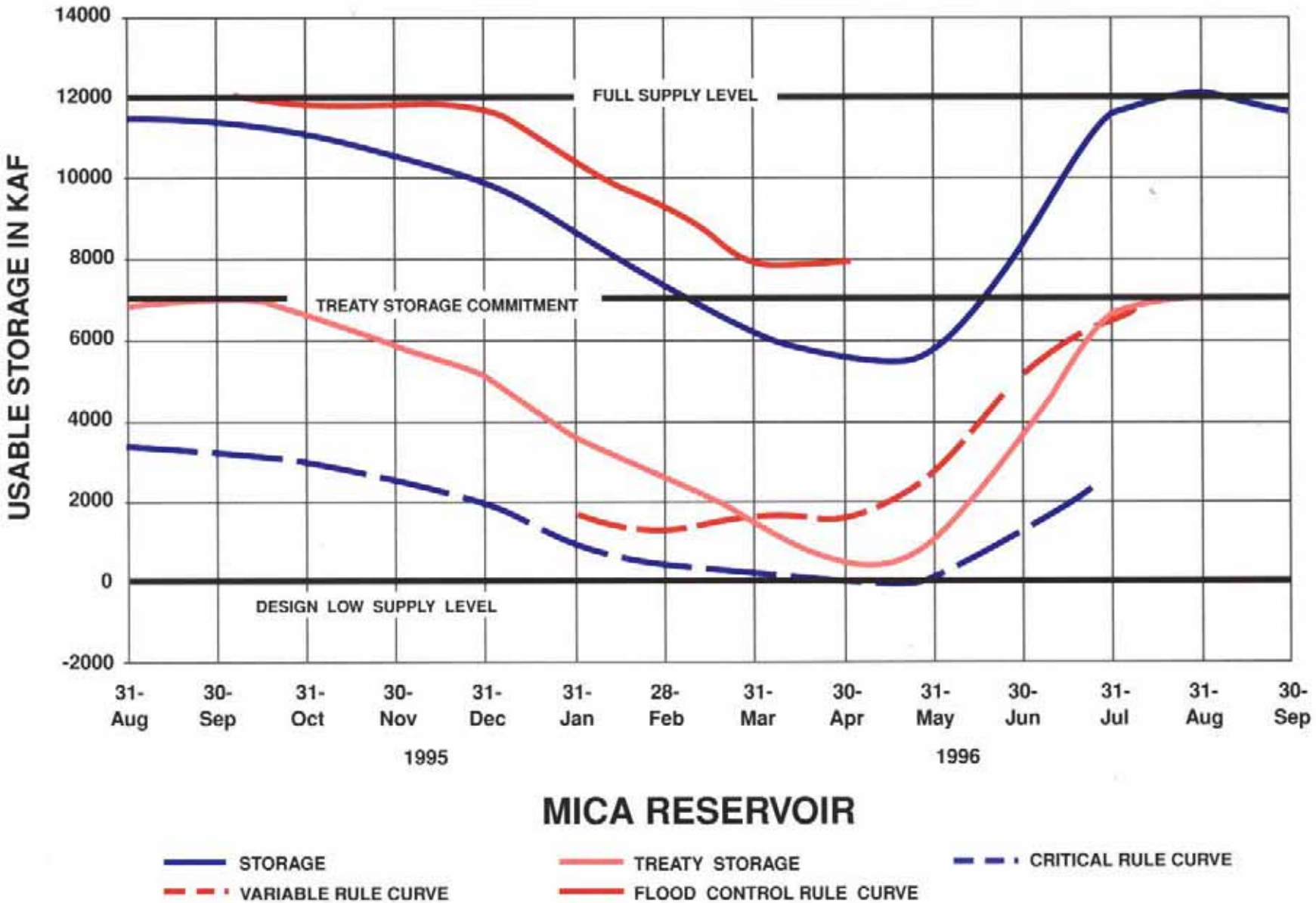
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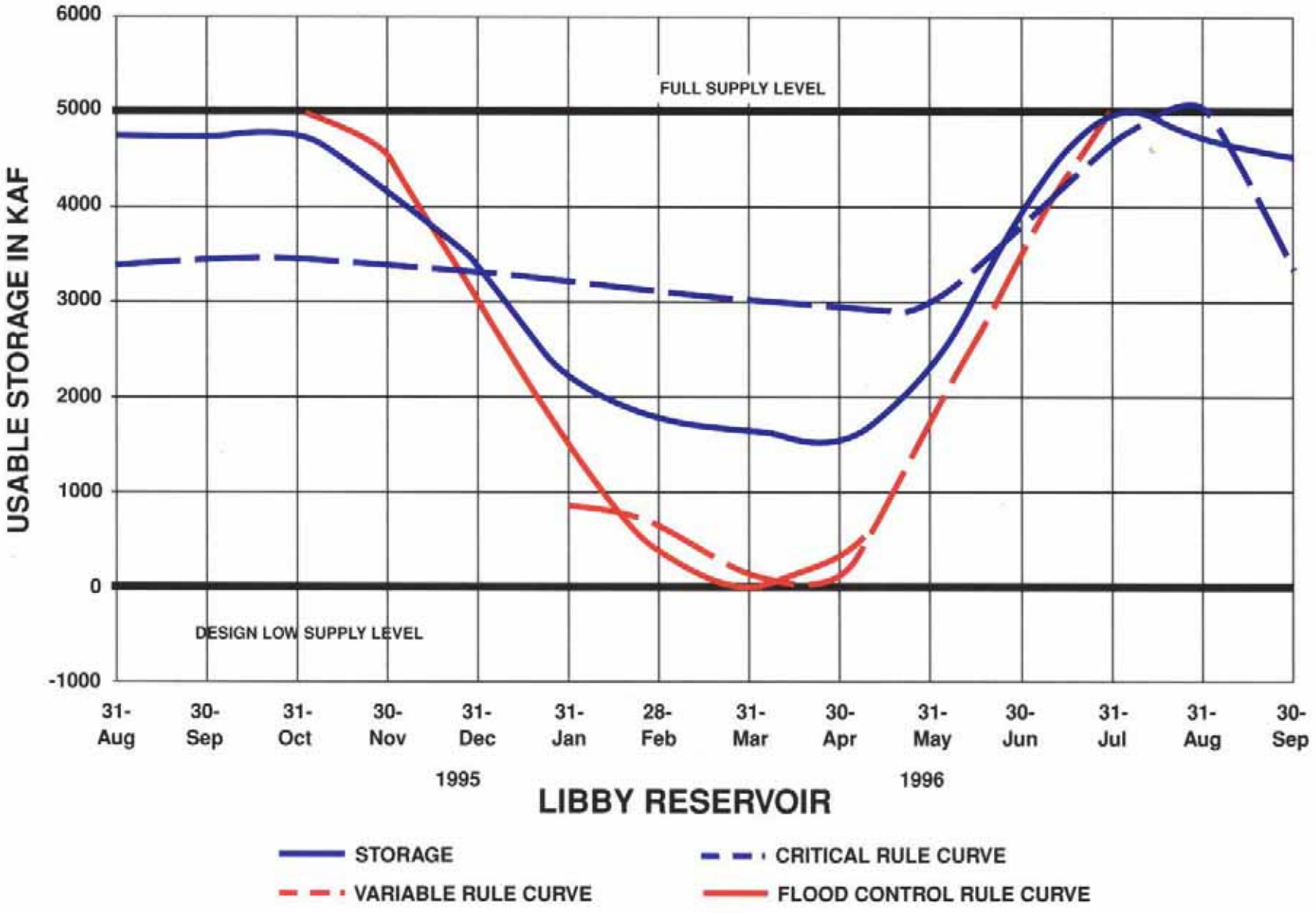
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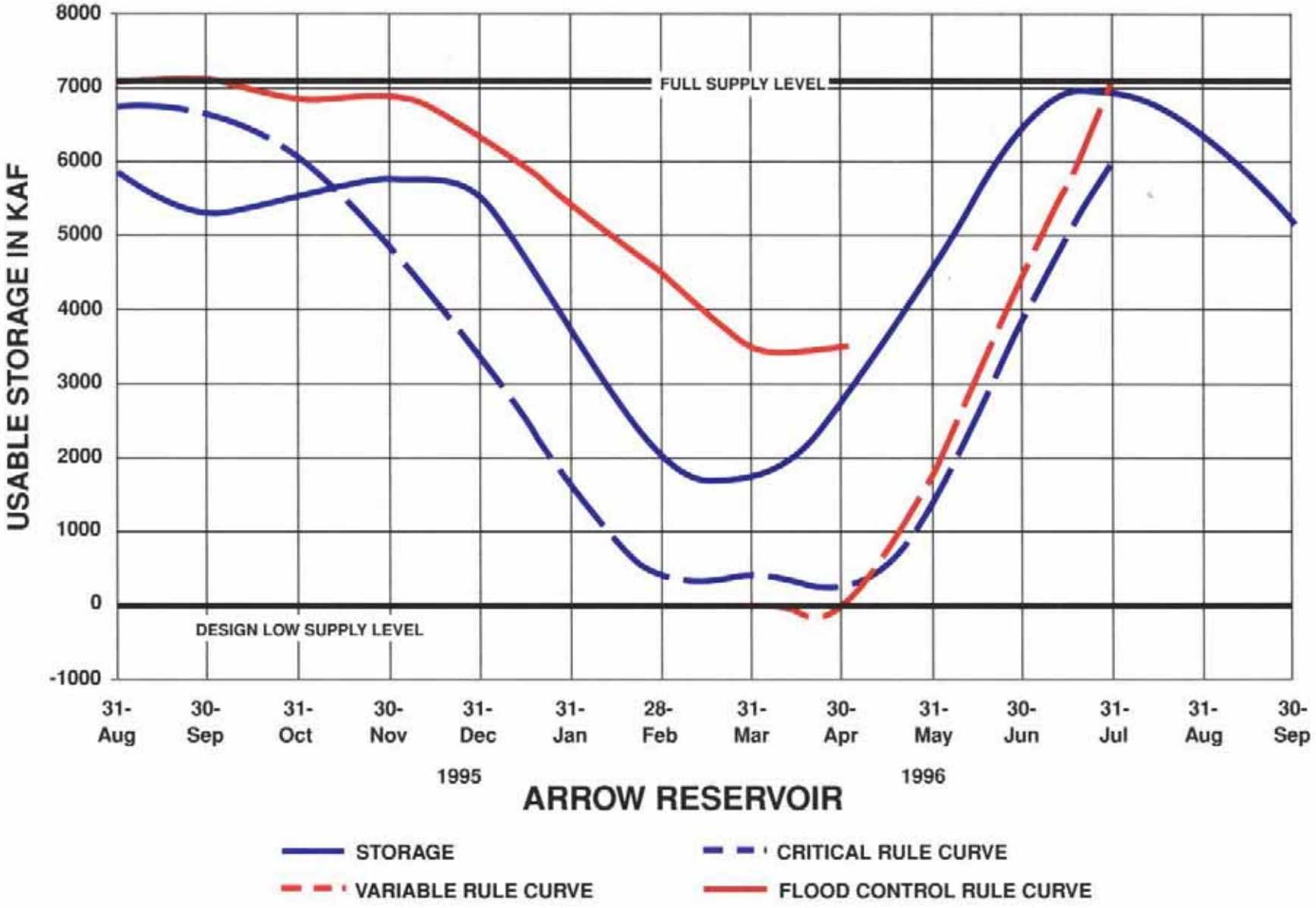
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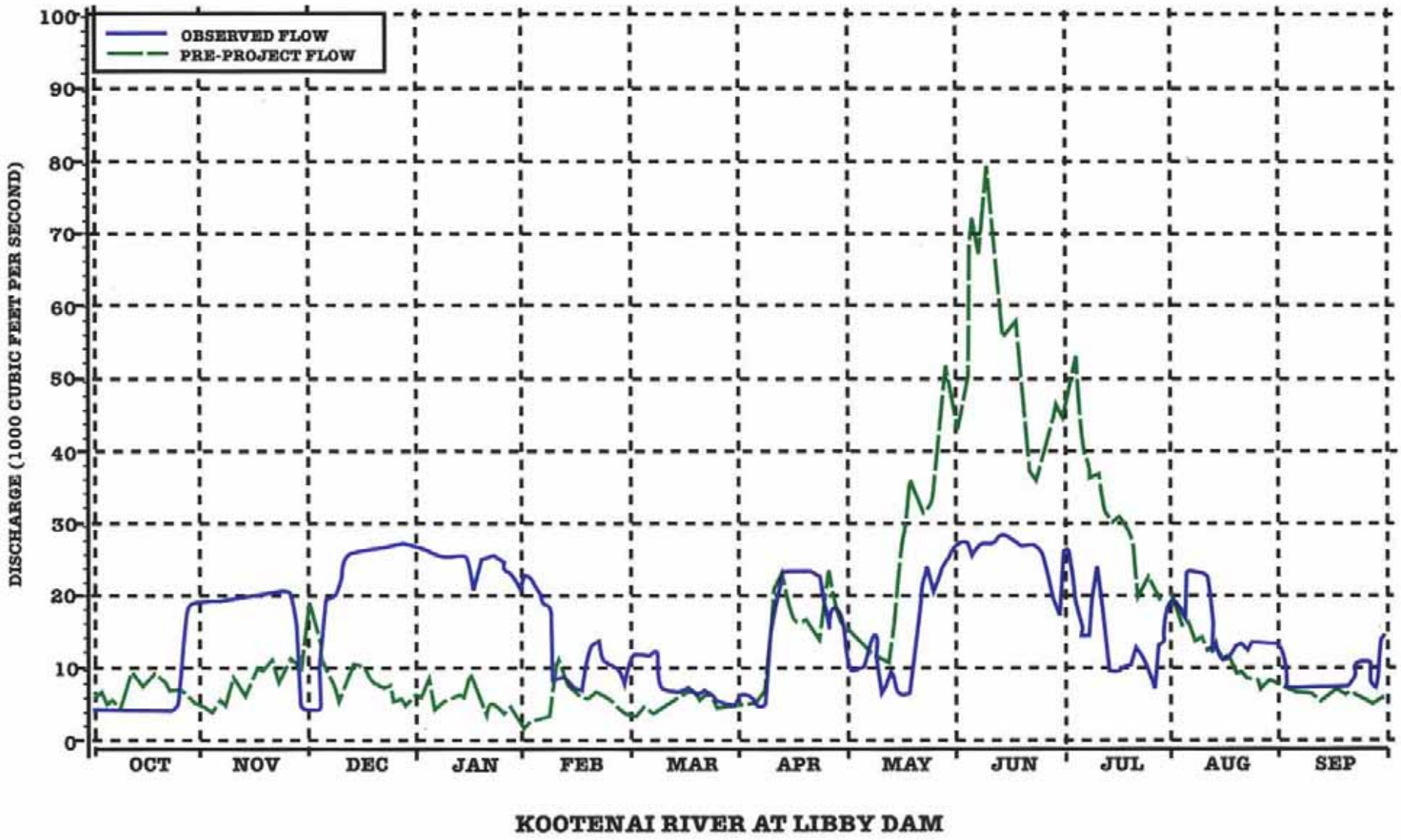
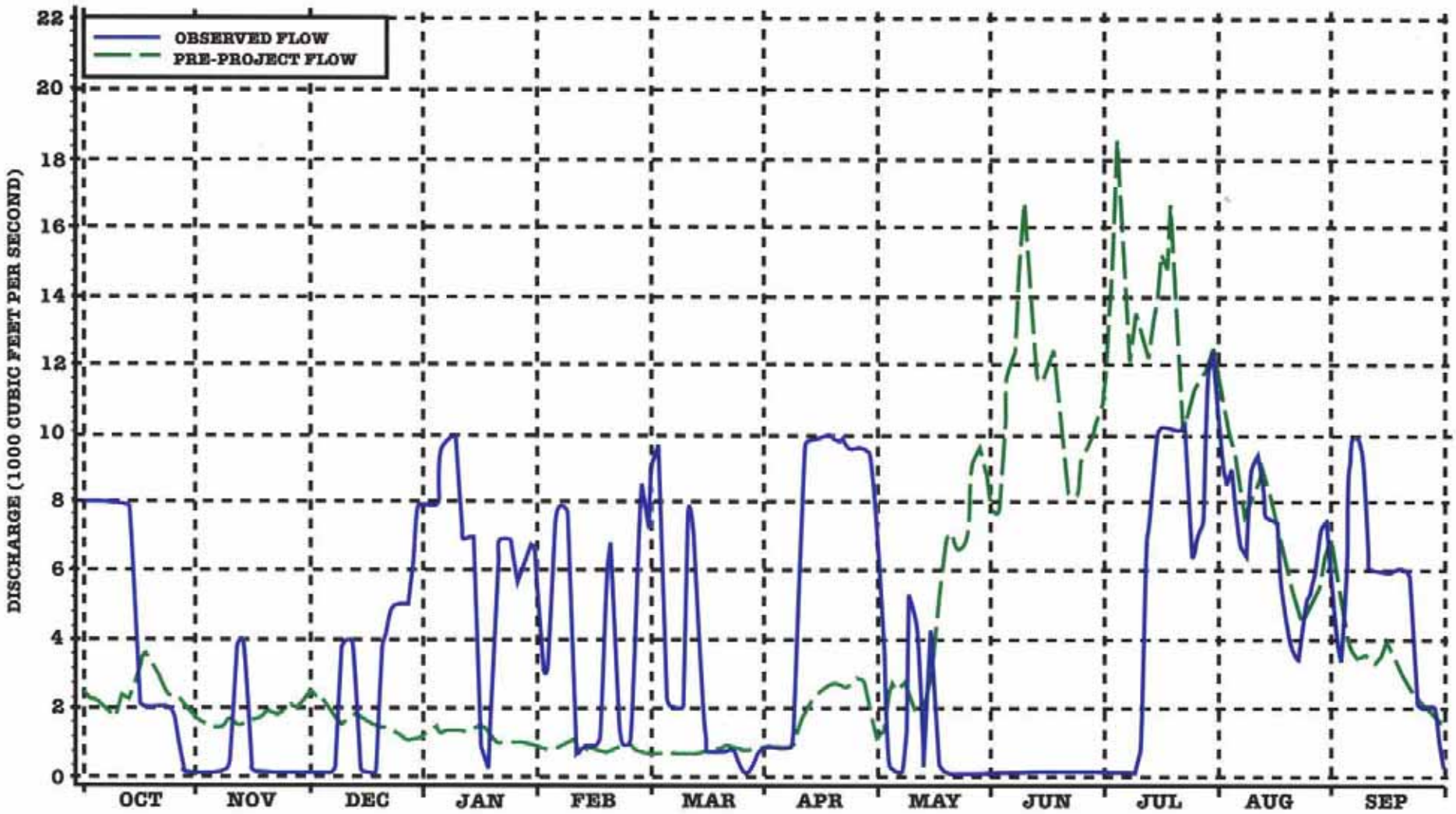


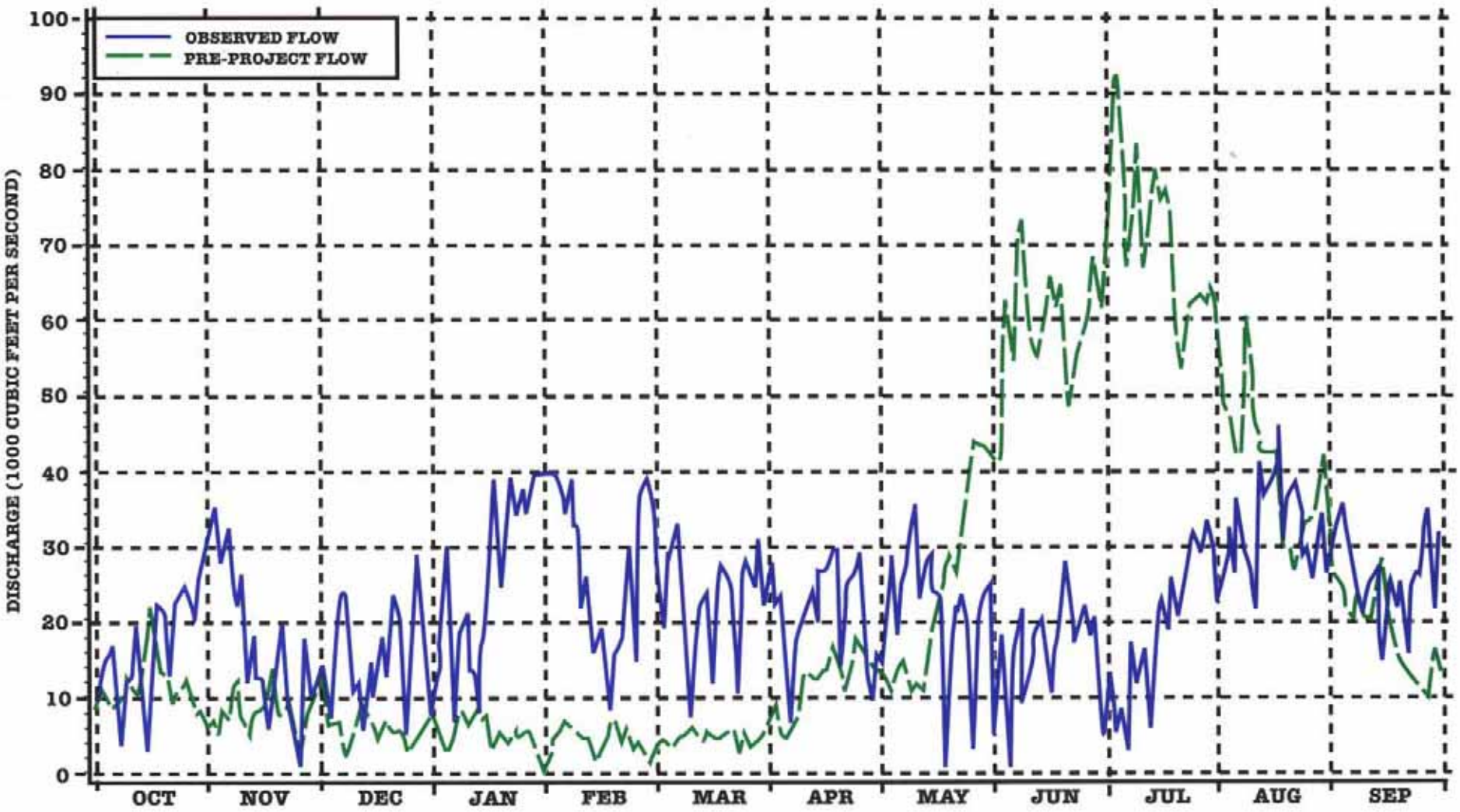
KOOTENAI RIVER AT LIBBY DAM

HYDROGRAPHS: OBSERVED AND PRE-PROJECT FLOWS FOR THE YEAR ENDING 30 SEPTEMBER 1996



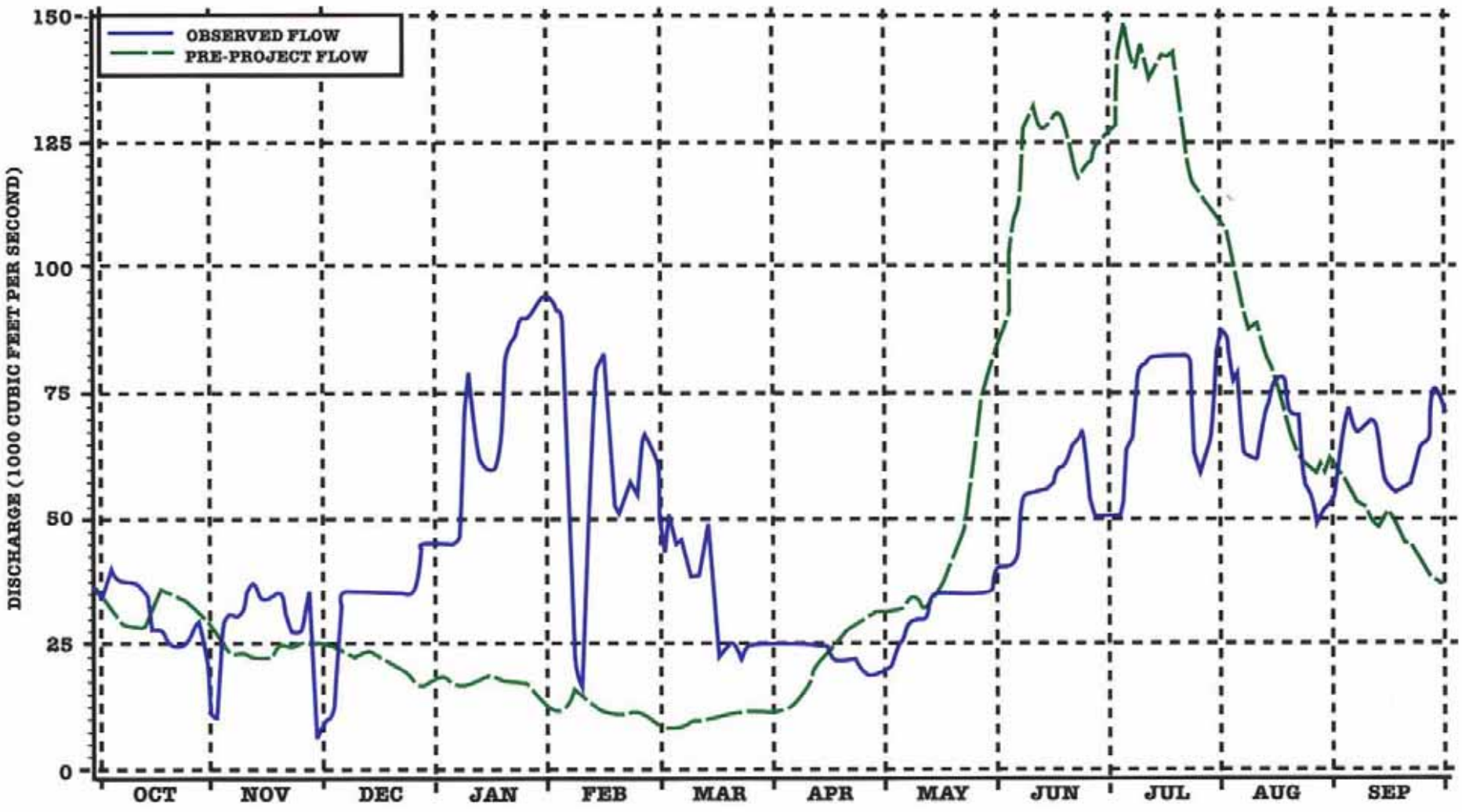
DUNCAN RIVER AT DUNCAN DAM

HYDROGRAPHS: OBSERVED AND PRE-PROJECT FLOWS FOR THE YEAR ENDING 30 SEPTEMBER 1996



COLUMBIA RIVER AT MICA DAM

HYDROGRAPHS: OBSERVED AND PRE-PROJECT FLOWS FOR THE YEAR ENDING 30 SEPTEMBER 1996



COLUMBIA RIVER AT KEENLEYSIDE DAM

HYDROGRAPHS: OBSERVED AND PRE-PROJECT FLOWS FOR THE YEAR ENDING 30 SEPTEMBER 1996

COLUMBIA RIVER AT BIRCHBANK

HYDROGRAPHS: OBSERVED AND PRE-PROJECT FLOWS FOR THE YEAR ENDING 30 SEPTEMBER 1996

BENEFITS

Flood Control Provided

The Columbia River Basin reservoir system, including the Columbia River Treaty projects, was operated for flood control twice during the winter of 1995–1996. In both instances, most of the flood control contribution came from the Willamette River and lower Columbia River tributaries. In addition, during the 1996 spring freshet, above average streamflow levels would have occurred at Trail, British Columbia, and at The Dalles, Oregon, without the regulation provided by upstream reservoirs. Although water levels were maintained below flood stage during this period, flood damages would have occurred in the United States without these projects.

The outflows of the Treaty projects were reduced to alleviate flooding conditions in the Portland-Vancouver harbor twice during the winter of 1995–1996. As a result of these flood control operations, significant flood control benefits occurred, both in terms of stage reductions and prevention of damages. The peak regulated streamflows and stages for the major events experienced throughout the winter and spring are shown in the tables below:

Columbia River Streamflow at The Dalles, Oregon

Date	Peak Regulated Flow-cfs	Date	Peak Unregulated Flow-cfs
3 December 1995	323,600	2 December 1995	446,000
10 February 1996	376,400	11 February 1996	483,000
11 June 1996	455,700	11 June 1996	718,480

Columbia River Stage at Vancouver, Washington
(Flood Stage is 16.0 ft.)

Date	Peak Regulated Stage-ft.	Date	Peak Unregulated Stage-ft.
1 December 1995	18.5	3 December 1995	22.8
9 February 1996	27.2	11 February 1996	29.0
13 June 1996	14.9	12 June 1996	24.4

The operation of Columbia Basin reservoirs for the system as a whole reduced the natural peak discharge of the Columbia River near The Dalles, Oregon, from about 446,000 cfs to 323,600 cfs during the December 1995 flood. This corresponds to a 4.3 foot stage reduction at Vancouver, Washington. For the February 1996 flood, the flood control operation reduced the natural peak discharge at The Dalles from 483,000 cfs to 376,400 cfs, and reduced the stage at Vancouver from a peak unregulated stage of 29.0 feet to a regulated stage of 27.2 feet. In the spring of 1996, the system flood control operation reduced the natural peak discharge at The Dalles from 718,480 cfs to 455,700 cfs, for a stage reduction at Vancouver, Washington of 9.5 feet.

It is estimated that the Duncan and Libby projects reduced the peak stage on Kootenay Lake by about 5.8 feet, and that the Duncan, Arrow, Mica and Libby projects reduced the peak stage of the Columbia River at Trail, British Columbia, by about 9.4 feet. The effect of storage in the Duncan, Arrow, Mica, and Libby reservoirs on flows at the sites, and on flows of the Columbia River at Birchbank, is illustrated by the hydrographs on pages 30 to 34, which show the actual discharges and the flows that would have occurred if the dams had not been built. The hydrograph showing pre-project conditions for Birchbank has been computed on the assumption that the effects of Duncan, Arrow, Mica and Libby regulation, and of the regulation provided by the Corra Linn development on Kootenay Lake, have been removed.

The overall damage prevented by all reservoirs in the Columbia River basin for the period from 1 October 1995 to 30 September 1996 was about $62,000,000.

All payments required by Article VI(1) of the Treaty as compensation for flood control provided by the Canadian Treaty storage have been made by the United States to Canada; the final payment was made on 29 March 1973 when the Mica project was declared operational

Power Benefits

Downstream power benefits in the United States, which arise from operation of the Canadian Treaty storage, were pre-determined for the first thirty years of operation of each project, and the Canadian share was sold in the United States under the terms of the Canadian Entitlement Purchase Agreement. The U.S. Entity delivers capacity and energy to Columbia Storage Power Exchange participants, the purchasers of the Canadian entitlement. The benefits of additional generation made possible on the Kootenay River in Canada as a result of regulation provided by Libby, as well as generation at the Mica and Revelstoke projects, are retained by Canada. The benefits from Libby regulation, which occur downstream in the United States, are not shared under the Treaty.

During the operating year, 1 August 1995 through 31 July 1996, the downstream power benefits accruing to each country from the Treaty storage were determined, according to the procedures set out in the Treaty and Protocol, to be 522 megawatts of average annual energy and 1,062 megawatts of capacity.

The Canadian Entitlement Purchase Agreement expires in stages over the period 1998 to 2003. The portion of Canada's share of downstream power benefits attributable to each of the Treaty projects is the ratio of each project's storage to the whole of the Canadian Treaty storage. The table below summarizes Canada's share of the downstream power benefits returnable from each project:

Treaty Storage	Date Returnable	Share of Canadian Entitlement-%
Duncan	1 April 1998	9.0
Arrow	1 April 1999	45.8
Mica	1 April 2003	45.2

After 1 April 2003, Canada's share of downstream benefits is fully returnable.

Other Benefits

By agreement between the Entities, streamflows are regulated for non-power purposes, such as accommodating construction in river channels and providing water to assist the downstream migration of juvenile fish in the United States. These arrangements are implemented under the Detailed Operating Plan and provide mutual benefits.

CONCLUSIONS

1. The downstream power benefits to each country were 522 megawatts of average annual energy and 1,062 megawatts of capacity for the August 1995 through July 1996 period.

2. Flood control operations at the Treaty storage projects alleviated flooding conditions in the Portland-Vancouver harbor twice during the winter of 1995–1996, and resulted in significant flood control benefits in terms of stage reductions and damage prevention.

3. The Entities continued to operate the hydrometeorological network as required by the Treaty.

4. The Duncan, Arrow and Mica projects were operated in conformity with the Treaty during the 1995–1996 operating year. The operation reflected detailed operating plans developed by the Entities, the flood control operating plan for Treaty reservoirs, and other agreements between the Entities.

5. From September through December 1995, the Libby Dam project was operated for power requirements according to the Entities' report: *Detailed Operating Plan (DOP) for Columbia River Treaty Storage for Operating Year 1995–1996*. For the remainder of the operating year, the U.S. Entity operated Libby in accordance with new U.S. fishery requirements to protect and enhance the white sturgeon and salmon population. The Canadian Entity believes that these fishery operations are inconsistent with the Treaty. The two governments have initiated discussions to resolve the issue.

6. In August 1996, the Entities agreed on a DOP for the operating year 1996–1997 in conformance with the requirements of the Treaty. As in the previous DOP, the Libby project has two sets of operating rule curves, thus reflecting the Entities' disagreement over the operation of the project.

7. The Entities reached an agreement in August 1996 resolving issues related to the calculation of downstream power benefits. As a result, the Entities' reports: *Assured Operating Plan (AOP) and Determination of Downstream Power Benefits (DDPB) for Operating Years 1998–1999 and 1999–2000* were brought into compliance with the Treaty requirements.

8. The Entities have reached an agreement resolving, for the foreseeable future, the long-standing calculation of the downstream power benefits issue. However, the Board is concerned that this issue may come up again since there is a possibility that using both of the Entities' interpretations of the critical streamflow period definition may not lead to a single value of the downstream power benefits. If this issue is raised in the future, the Board will reexamine the matter by using its recommendations (dated 18 October 1995) as guidelines on the appropriate Treaty interpretation and application of the critical streamflow period definition and the established operating procedures.

9. Despite the resolution of the downstream power benefits issue, the Entities were unable to agree on the AOP and DDPB reports for the operating years 2000–2001 and 2001–2002, due to the outstanding Libby operation issue. The Treaty requires the Entities to prepare AOP

and DDPB reports for each operating year six years in advance. The Board therefore concludes that the Entities are not in compliance with the Treaty.

10. Based on the preceding conclusion, the Treaty requirements are not fully met.

APPENDIX A

COLUMBIA RIVER TREATY PERMANENT ENGINEERING BOARD

United States	Canada
Members	
Mr. Steven Stockton, Chair [1] Chief, Engineering Division Directorate of Civil Works H.Q., U.S. Army Corps of Engineers Washington, D.C.	Mr. Daniel Whelan, Chair [2] Director General Energy Resources Branch Department of Natural Resources Ottawa, Ontario
Mr. Ronald Wilkerson Missoula, Montana	Mr. John Allan Deputy Minister Ministry of Environment, Lands and Parks Victoria, British Columbia
Alternates	
Mr. Daniel Burns Chief, Operation, Construction and Readiness Division Directorate of Civil Works H.Q., U.S. Army Corps of Engineers Washington, D.C.	Mr. David Burpee Director, Renewable and Electrical Energy Division Energy Resources Branch Department of Natural Resources Ottawa, Ontario
Mr. Thomas Weaver Lakewood, Colorado	Mr. Jack Farrell [3] Comptroller of Water Rights Ministry of Environment, Lands and Parks Victoria, British Columbia
Secretaries	
Mr. Richard DiBuono Senior Hydraulic Engineer Directorate of Civil Works H.Q., U.S. Army Corps of Engineers Washington, D.C.	Mr. David Burpee Energy Resources Branch Department of Natural Resources Ottawa, Ontario

[1] Vice Mr. John Elmore as of 12 March 1996.
[2] Vice Mr. David Oulton as of 16 April 1996.
[3] Vice Dr. Donald Kasianchuk as of 8 November 1995.

COLUMBIA RIVER TREATY PERMANENT ENGINEERING BOARD

Record of Membership

Members

United States		Canada	
Mr. Wendell Johnson[1]	1964–1970	Mr. Gordon McNabb[1]	1964–1991
Mr. Morgan Dubrow	1964–1970	Mr. Arthur Paget	1964–1973
Mr. John Neuberger	1970–1973	Mr. Valter Raudsepp	1973–1974
Mr. Joseph Caldwell[1]	1971–1973	Mr. Ben Marr	1974–1987
Mr. Homer Willis[1]	1973–1979	Mr. Tom Johnson	1987–1988
Mr. King Mallory	1973–1975	Mr. Douglas Horswill	1989–1991
Mr. Raymond Peck, Jr.	1976–1977	Mr. John Allan	1991–
Mr. Emerson Harper	1978–1988	Mr. David Oulton[1]	1991–1996
Mr. Lloyd Duscha[1]	1979–1990	Mr. Daniel Whelan[1]	1996–
Mr. Ronald Wilkerson	1988–		
Mr. Herbert Kennon[1]	1990–1994		
Mr. John Elmore[1]	1994–1996		
Mr. Steven Stockton[1]	1996–		

Alternates

Mr. Fred Thrall	1964–1974	Mr. Mac Clark	1964–1992
Mr. Emerson Harper	1964–1978	Mr. Jim Rothwell	1964–1965
Mr. Alex Shwaiko	1974–1987	Mr. Hugh Hunt	1966–1988
Mr. Herbert Kennon	1987–1990	Dr. Donald Kasianchuk	1988–1996
Mr. Thomas Weaver	1979–	Mr. Vic Niemela	1992–1994
Mr. John Elmore	1990–1994	Mr. David Burpee	1994–
Mr. Paul Barber	1994–1995	Mr. Jack Farrell	1995–
Mr. Daniel Burns	1995–		

Secretaries

Mr. John Roche	1965–1969	Mr. Mac Clark	1964–1992
Mr. Verle Farrow	1969–1972	Mr. David Burpee	1992–
Mr. Walter Duncan	1972–1978		
Mr. Shapur Zanganeh	1978–1995		
Mr. Richard DiBuono	1995–		

[1] Chair

COLUMBIA RIVER TREATY PERMANENT ENGINEERING BOARD

ENGINEERING COMMITTEE

Current Membership

United States

Mr. Richard DiBuono, Chair
Directorate of Civil Works
H.Q., U.S. Army Corps of Engineers
Washington, D.C.

Mr. Earl Eiker
Directorate of Civil Works
H.Q., U.S. Army Corps of Engineers
Washington, D.C.

Mr. James Barton
Water Management Division
U.S. Army Corps of Engineers
North Pacific Division
Portland, Oregon

Mr. Robert Johnson
Resources and Transmission Planning Division
Western Area Power Administration
Loveland, Colorado

Canada

Mr. David Burpee, Chair
Renewable and Electrical Energy Division
Department of Natural Resources
Ottawa, Ontario

Mr. Bruno Gobeil
Renewable and Electrical Energy Division
Department of Natural Resources
Ottawa, Ontario

Mr. Roger McLaughlin
Power and Projects Section
Ministry of Employment and Investment
Victoria, British Columbia

Dr. Bala Balachandran
Water Management Branch
Ministry of Environment, Lands and Parks
Victoria, British Columbia

Mr. Larry Adamache
Aquatic and Atmospheric Sciences Division
Environment Canada
Vancouver, British Columbia

APPENDIX B

COLUMBIA RIVER TREATY ENTITIES

United States	Canada

Members

Mr. Randall Hardy, Chair
Administrator and Chief Executive Officer
Bonneville Power Administration
Department of Energy
Portland, Oregon

Colonel Bartholomew Bohn[1]
Division Engineer
U.S. Army Engineer Division,
North Pacific
Portland, Oregon

Mr. Brian Smith[2], Chair
British Columbia Hydro and
Power Authority
Vancouver, British Columbia

[1] Vice Major General Russell Fuhrman as of 2 August 1996.
[2] Vice Mr. John Laxton as of 28 February 1996.

APPENDIX C

RECORD OF FLOWS

AT THE

INTERNATIONAL BOUNDARY

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	54.6	41.7	63.7	86.5	135.9	92.9	47.3	76.3	114.8	130.3	132.4	72.0
2	54.6	31.9	63.0	86.9	135.2	85.1	46.6	75.9	118.6	130.3	139.5	73.1
3	52.5	30.9	62.3	87.9	134.9	75.9	47.3	75.6	122.9	131.7	141.2	78.7
4	52.9	36.7	60.0	88.3	132.4	81.2	45.9	77.0	129.6	133.8	136.3	84.4
5	57.1	47.0	59.1	88.6	132.1	81.2	46.3	78.4	132.1	134.2	131.7	87.6
6	57.0	51.4	69.8	87.9	125.0	74.9	46.6	75.9	132.4	139.5	131.4	91.1
7	55.6	51.6	77.2	87.9	104.2	75.2	46.6	73.4	134.5	143.4	126.1	90.7
8	53.8	51.4	76.7	87.6	80.2	75.2	47.3	75.6	147.2	140.9	115.1	87.9
9	53.6	51.8	76.8	93.2	60.0	71.3	49.8	77.3	156.8	146.5	112.6	85.1
10	53.4	54.2	77.1	108.0	55.1	67.8	53.0	77.0	157.1	152.5	112.3	85.5
11	53.8	59.3	77.1	118.6	62.9	67.1	55.4	76.3	156.1	151.1	111.6	86.5
12	54.7	60.8	77.1	119.3	76.3	67.8	58.6	75.6	155.7	149.7	110.9	86.5
13	55.4	65.5	78.2	107.7	89.0	67.4	60.7	74.9	155.0	151.8	118.6	89.3
14	54.6	65.6	77.9	102.0	107.0	70.6	63.9	77.7	154.3	152.2	121.1	83.7
15	53.4	68.3	78.7	102.0	121.5	75.2	66.4	80.9	154.0	152.2	118.3	74.2
16	51.3	67.5	79.3	102.0	124.6	72.0	67.8	85.1	152.9	150.4	119.3	72.7
17	48.1	68.6	79.0	102.4	110.5	57.2	69.6	87.9	152.5	150.1	117.6	73.1
18	48.1	72.6	79.0	101.0	96.0	49.8	70.3	90.0	152.9	149.0	105.2	72.0
19	48.1	77.7	78.8	100.6	87.2	50.5	72.0	91.1	151.1	146.9	112.6	72.0
20	48.3	73.8	78.4	107.0	85.1	51.2	73.1	91.8	148.7	145.5	110.2	72.0
21	53.4	71.3	77.3	118.3	87.9	52.3	73.4	92.5	147.9	141.9	111.2	72.7
22	52.6	68.9	78.7	123.6	90.7	50.5	74.5	94.6	148.7	139.5	108.8	73.4
23	49.5	63.7	79.5	124.6	93.6	51.2	77.0	95.7	147.6	138.1	105.2	73.1
24	45.7	67.5	79.0	124.6	91.8	46.6	80.9	96.4	147.2	135.2	97.5	74.2
25	46.4	69.7	79.4	126.1	90.0	50.1	80.5	98.9	149.0	127.8	89.3	80.2
26	47.4	69.6	79.0	127.5	95.3	49.1	78.4	102.8	145.5	115.5	88.6	80.9
27	48.3	73.2	78.4	132.1	101.0	49.4	79.8	106.6	135.6	109.8	88.6	80.5
28	56.0	79.8	79.8	135.6	97.8	49.1	79.8	109.1	132.8	110.5	83.7	85.8
29	58.5	73.7	87.0	134.5	94.6	47.0	79.1	110.5	131.7	111.6	79.4	91.1
30	51.2	56.1	86.9	135.2		47.3	77.3	110.9	131.0	113.7	83.0	89.0
31	46.5		86.9	136.3		48.4		111.6		122.9	83.7	
Mean	52.1	60.7	76.2	109.2	99.9	62.9	63.8	87.8	143.2	137.0	111.1	80.6

COLUMBIA RIVER AT BIRCHBANK, BRITISH COLUMBIA—Daily discharges in thousands of cubic feet per second for the year ending 30 September 1996

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.1	21.1	38.6	31.9	25.9	19.5	9.9	29.7	50.0	25.1	21.3	15.3
2	6.0	21.0	31.5	31.7	25.9	17.2	10.0	23.5	50.7	31.7	22.5	15.3
3	5.9	21.0	24.6	31.3	25.9	16.9	11.1	22.4	52.3	34.2	21.6	14.5
4	6.2	21.0	20.0	31.4	25.7	16.9	10.9	21.6	55.3	34.2	21.5	10.0
5	6.0	21.0	19.3	31.4	23.2	16.2	10.8	20.9	56.2	29.8	20.3	9.5
6	5.8	21.2	26.3	30.9	23.8	15.8	11.5	20.4	52.3	23.5	23.2	9.5
7	5.8	21.3	30.0	30.3	22.3	16.2	11.2	19.8	50.8	20.5	26.8	9.4
8	5.6	22.0	28.9	30.0	27.1	15.8	14.1	19.4	52.9	19.9	26.9	9.3
9	5.7	33.2	27.0	29.9	46.6	15.3	19.2	23.0	53.1	19.4	26.9	9.3
10	5.9	32.3	26.6	29.5	43.3	11.8	33.2	23.4	50.8	19.5	26.8	9.3
11	7.1	28.0	27.4	29.1	34.6	11.3	38.7	22.7	48.4	27.7	26.7	9.4
12	9.1	26.3	33.1	29.1	27.1	11.6	40.3	15.7	46.8	29.3	26.5	9.3
13	8.4	25.4	38.8	29.2	22.4	12.0	41.2	15.6	46.0	27.8	23.8	9.5
14	7.4	25.3	42.9	29.4	19.1	12.4	39.5	22.3	45.6	19.0	16.2	9.5
15	7.0	26.3	41.6	30.6	17.1	12.8	37.9	33.0	45.1	14.2	16.3	9.4
16	6.7	27.6	39.7	34.3	16.4	13.6	37.3	41.0	44.3	13.7	14.1	9.5
17	6.9	28.3	38.2	33.2	14.8	13.4	38.2	40.5	43.2	13.5	14.0	9.4
18	7.4	28.8	37.0	28.9	14.9	13.7	37.8	39.1	42.2	13.3	13.7	9.5
19	7.6	29.3	36.2	27.1	19.9	13.4	36.9	37.9	40.6	14.1	13.6	9.5
20	7.1	28.4	35.5	30.4	23.9	13.3	35.9	35.4	38.6	14.2	13.8	9.5
21	7.0	27.4	35.0	31.5	24.3	12.5	35.0	36.3	38.1	14.2	15.8	9.5
22	7.0	26.8	34.4	31.0	24.1	12.2	34.8	38.7	38.4	14.1	16.0	9.6
23	6.7	26.5	33.8	30.3	19.3	12.6	35.6	42.8	39.4	16.3	15.9	9.6
24	6.5	27.5	33.3	30.0	18.8	12.4	45.0	46.3	38.8	15.5	15.2	12.7
25	6.5	31.8	32.8	29.5	18.0	11.7	47.9	46.3	38.1	15.4	15.6	13.4
26	6.7	34.3	32.6	29.0	16.0	11.0	38.2	45.2	36.7	13.7	15.3	13.5
27	11.2	32.3	32.3	27.8	16.2	10.3	36.1	46.8	34.4	12.8	15.7	12.7
28	19.2	30.6	32.1	26.6	14.7	10.2	34.3	47.7	33.4	10.7	15.7	9.8
29	21.1	26.8	32.0	25.9	15.3	10.1	33.5	49.2	30.4	11.8	15.7	9.6
30	21.1	37.0	32.4	25.9		10.0	32.0	48.0	27.5	15.7	16.0	9.7
31	21.1		32.2	25.9		9.8		48.9		17.2	15.4	
Mean	8.6	27.0	32.5	29.8	23.0	13.3	29.9	33.0	44.0	19.4	19.0	10.5

KOOTENAY RIVER AT PORTHILL, IDAHO—Daily discharges in thousands of cubic feet per second for the year ending 30 September 1996

APPENDIX D

PROJECT INFORMATION

Power and Storage Projects,

Northern Columbia Basin	Plate No. 1

Project Data

Duncan Project	Table No. 1
Arrow Project	Table No. 2
Mica Project	Table No. 3
Libby Project	Table No. 4

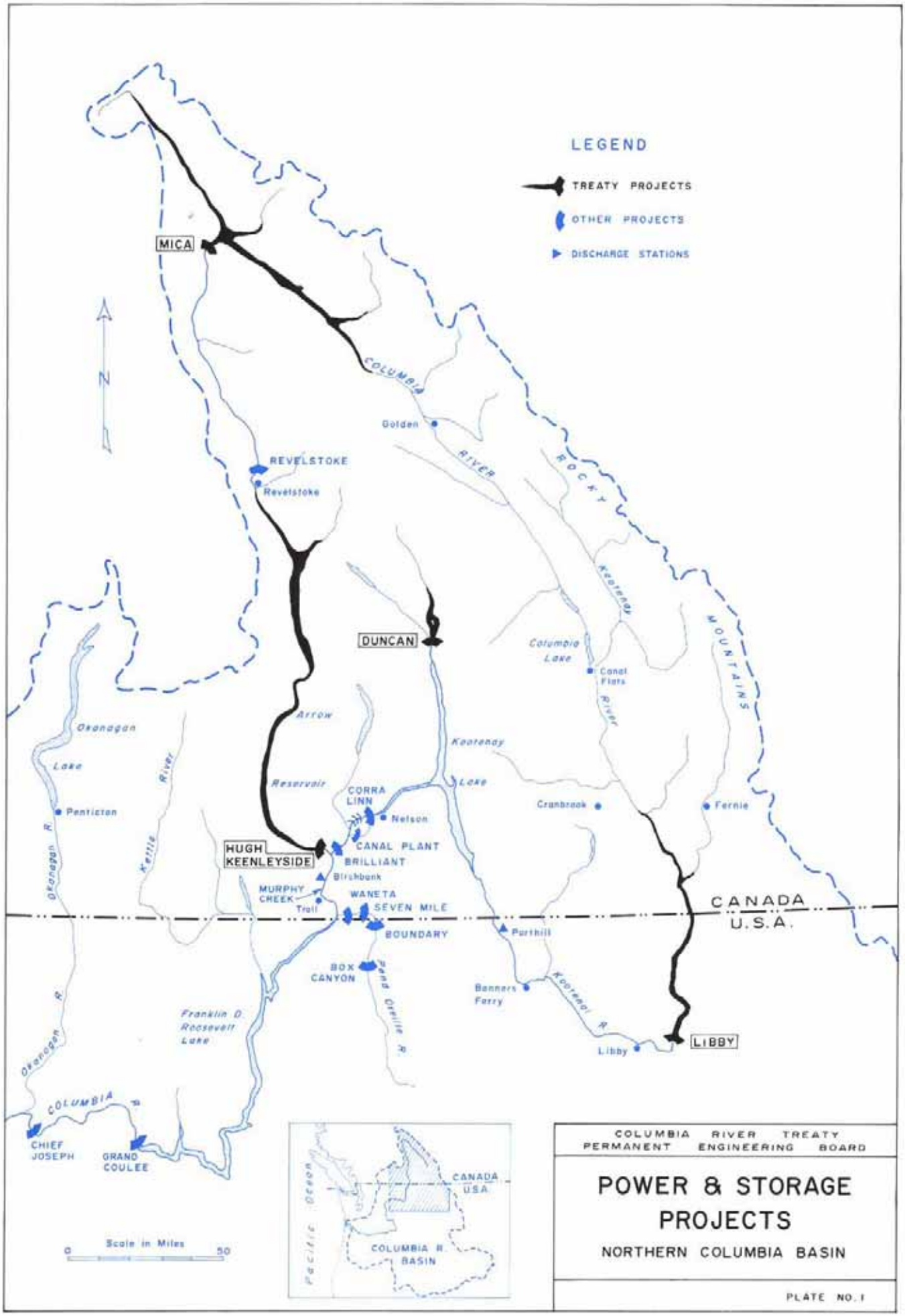

LEGEND
TREATY PROJECTS
OTHER PROJECTS
DISCHARGE STATIONS
MICA
N
COLUMBIA
Golden
RIVER
ROCKY
REVELSTOKE
Revelstoke
DUNCAN
Columbia Lake
Canal Flats
Kootenay
MOUNTAINS
River
Arrow
Reservoir
Okanagan
Lake
Kootenay
Lake
CORRA LINN
Nelson
Cranbrook
Fernie
Penticton
Okanagan R.
Kettle River
HUGH KEENLEYSIDE
CANAL PLANT
BRILLIANT
Birchbank
MURPHY CREEK
Trail
WANETA
SEVEN MILE
BOUNDARY
CANADA
U.S.A.
Porthill
BOX CANYON
Pend Oreille R.
Franklin D. Roosevelt Lake
Okanogan R.
Bonners Ferry
Kootenai R.
Libby
LIBBY
COLUMBIA
CHIEF JOSEPH
GRAND COULEE
Scale in Miles
0
50
CANADA
USA
Pacific Ocean
COLUMBIA R. BASIN
COLUMBIA RIVER TREATY
PERMANENT ENGINEERING BOARD
POWER & STORAGE PROJECTS
NORTHERN COLUMBIA BASIN
PLATE NO. 1

TABLE 1

DUNCAN PROJECT

Duncan Dam and Duncan Lake

Storage Project

Construction began	17 September 1964
Storage became fully operational	31 July 1967

Reservoir

Normal full pool elevation	1,892 feet
Normal minimum pool elevation	1,794.2 feet
Surface area at full pool	18,000 acres
Total storage capacity	1,432,400 acre-feet
Usable storage capacity	1,400,000 acre-feet
Treaty storage commitment	1,400,000 acre-feet

Dam, Earthfill

Crest elevation	1,907 feet
Length	2,600 feet
Approximate height above riverbed	130 feet
Spillway—Maximum capacity	47,700 cfs
Discharge tunnels—Maximum capacity	20,000 cfs

Power Facilities

None

TABLE 2

ARROW PROJECT

Hugh Keenleyside Dam and Arrow Lakes

Storage Project

Construction began	March 1965
Storage became fully operational	10 October 1968

Reservoir

Normal full pool elevation	1,444 feet
Normal minimum pool elevation	1,377.9 feet
Surface area at full pool	130,000 acres
Total storage capacity	8,337,000 acre-feet
Usable storage capacity	7,100,000 acre-feet
Treaty storage commitment	7,100,000 acre-feet

Dam, Concrete Gravity and Earthfill

Crest elevation	1,459 feet
Length	2,850 feet
Approximate height above riverbed	170 feet
Spillway—Maximum capacity	240,000 cfs
Low-level outlets—Maximum capacity	132,000 cfs

Power Facilities

None

TABLE 3

MICA PROJECT

Mica Dam and Kinbasket Lake

Storage Project	
Construction began	September 1965
Storage became fully operational	29 March 1973
Reservoir	
Normal full pool elevation	2,475 feet
Normal minimum pool elevation	2,320 feet
Surface area at full pool	106,000 acres
Total storage capacity	20,000,000 acre-feet
Usable storage capacity	12,000,000 acre-feet
Treaty storage commitment	7,000,000 acre-feet
Dam, Earthfill	
Crest Elevation	2,500 feet
Length	2,600 feet
Approximate height above foundation	800 feet
Spillway—Maximum capacity	150,000 cfs
Outlet works—Maximum capacity	37,400 cfs
Power Facilities	
Designed ultimate installation	
6 units at 434 MW	2,604 MW
Power commercially available	December 1976
Currently installed	
4 units at 434 MW	1,736 MW
Head at full pool	600 feet
Maximum turbine discharge	
of 4 units at full pool	38,140 cfs

TABLE 4

LIBBY PROJECT

Libby Dam and Lake Koocanusa

Storage Project

Construction began	June 1966
Storage became fully operational	17 April 1973

Reservoir

Normal full pool elevation	2,459 feet
Normal minimum pool elevation	2,287 feet
Surface area at full pool	46,500 acres
Total storage capacity	5,869,000 acre-feet
Usable storage capacity	4,980,000 acre-feet

Dam, Concrete Gravity

Deck elevation	2,472 feet
Length	3,055 feet
Approximate height above riverbed	370 feet
Spillway—Maximum capacity	145,000 cfs
Low level outlets—Maximum capacity	61,000 cfs

Power Facilities

Designed ultimate installation	
8 units at 105 MW	840 MW
Power commercially available	24 August 1975
Currently installed	
5 units at 105 MW	525 MW
Head at full pool	352 feet
Maximum turbine discharge	
of 5 units at full pool	26,500 cfs

APPENDIX E

United States Entity

Columbia River Treaty
P.O. Box 3621, Portland, OR 97208-3621

Chairman:
Administrator
Bonneville Power Administration
Department of Energy

Member
Division Engineer
North Pacific Division
Corps of Engineers
Department of the Army

27 November 1996

In reply refer to: PGPL

Mr. Steve Stockton
Chair, U.S. Section
Columbia River Treaty
Permanent Engineering Board
HQ, U.S. Army Corps of Engineers
20 Massachusetts Avenue NW
Washington, D.C. 20314-1000

Dear Mr. Stockton:

Re: **Resolution of Entity Differences**

This letter reports on the status of resolution of various issues which have been in dispute between the Canadian and U.S. Entities. These issues are discussed in the Board's 18 October 1995 letters to the Entities, and are summarized as follows:

- Interpretation of the Treaty definition for "critical stream flow period"
- Principles and procedures for incorporating and revising non-power requirements (NPRs) in AOP/DDPB studies
- Summary description of the changes and impacts of changes to NPRs
- Rights and obligations of the Entities with respect to entitlement delivery, including return to Oliver, provisions for east-west standby, and consideration of alternative delivery points.

As discussed in the 26 September 1996 letter from the Entities to the Board, the Entities consider that the first two issues are resolved or rendered moot by the Entity agreement entitled, "Columbia River Treaty Entity Agreement on Resolving the Dispute on Critical Period Determination, the Capacity Entitlement for the 1998/99, 1999/00 and 2000/01 AOP/DDPB's, and the Operating Procedures for the 2001/02 and Future AOP's", dated 29 August 1996. Copies of this agreement were forwarded to the Board with the 26 September correspondence. The Entities will attach copies of this agreement to the respective AOPs, and will forward copies of the agreement to recipients of those AOPs, to indicate the appropriate DDPB Capacity (Draft for Power) value to use.

The Entities consider further that the issues in respect of entitlement return for the period 1 April 1998 through 15 September 2024 are resolved by the attached agreement, "Columbia River Treaty Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for 1

April 1998 through 15 September 2024, between the Canadian Entity and the United States Entity," dated 20 November 1996. The specific entitlement delivery issues brought forward to the Board by the Canadian Entity in July 1995, following cancellation of the July 1994 Memorandum of Negotiators Agreement (MONA), were as follows:

- The obligations of the US Entity regarding delivery to Oliver.
- The east-west standby transmission obligation under Article X.
- Consideration of alternative delivery points and reliability of delivery.

While this agreement in principle is binding on the Entities for deliveries to the Canada-U.S. border, the Entities also intend to pursue an exchange of notes between the US and Canadian Federal governments by 1 July 1997. The purpose of the exchange of notes is to satisfy Section 1, Article VIII of the Treaty, which requires an exchange of notes setting out conditions and limits for disposal of portions of the Canadian Entitlement in the United States.

As a result of the attached agreement (10 copies), and the previously forwarded agreement, the Entities consider the issues related to interpretation of "critical stream flow period", implementation of non-power requirements in AOP/DDPB studies, and arrangements for entitlement return to be fully addressed. The Canadian Entity will not be pursuing the dispute resolution mechanisms in the Treaty for the afore-mentioned issues and no longer requires the assistance of the Permanent Engineering Board to resolve these issues.

The Entities wish to thank the Board for their time and effort in assisting the Entities to resolve the issues, and in particular for the Board's 18 October 1995 communications in respect to the issues and to clarify the Board's role.

Sincerely,

Randall W. Hardy
Chair, U.S. Entity

Col. Bartholomew B. Bohn II
Member, U.S. Entity

Enclosures: as

cc: Doug Robinson - Secretary, Canadian Entity

BC hydro

proud of our Service

Brian R.D. Smith, Q.C.
Chair

December 9, 1996

Mr. Daniel Whelan
Chair, Canadian Section
Columbia River Treaty
Permanent Engineering Board
Natural Resources Canada
Ottawa, Ontario
K1A 0E4

Dear Mr. Whelan:

Re: Resolution of Entity Differences

This letter reports on the status of resolution of various issues which have been in dispute between the Canadian and U.S. Entities. These issues are discussed in the Board's 18 October 1995 letters to the Entities, and are summarized as follows:

- Interpretation of the Treaty definition for "critical stream flow period".
- Principles and procedures for incorporating and revising non-power requirements (NPRs) in AOP/DDPB studies.
- Summary description of the changes and impacts of changes to NPRs.
- Rights and obligations of the Entities with respect to entitlement delivery, including return to Oliver, provisions for east-west standby, and consideration of alternative delivery points.

As discussed in the 26 September 1996 letter from the Entities to the Board, the Entities consider that the first two issues are resolved or rendered moot by the Entity Agreement entitled, "Columbia River Treaty

Entity Agreement on Resolving the Dispute on Critical Period Determination, the Capacity Entitlement for the 1998/99, 1999/00 and 2000/01 AOP/DDPB's, and the Operating Procedures for the 2001/02 and Future AOP's", dated 29 August 1996. Copies of this Agreement were forwarded to the Board with the 26 September correspondence. The Entities will attach copies of this Agreement to the respective AOPs, and will forward copies of the Agreement to recipients of those AOPs, to indicate the appropriate DDPB Capacity (Draft for Power) value to use.

The Entities consider further that the issues in respect of entitlement return for the period 01 April 1998 through 15 September 2024 are resolved by the attached agreement, "Columbia River Treaty Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for 01 April 1998 through 15 September 2024, between the Canadian Entity and the United States Entity", dated 20 November 1996. The specific entitlement delivery issues brought forward to the Board by the Canadian Entity in July 1995, following cancellation of the July 1994 Memorandum of Negotiators Agreement (MONA), were as follows:

- The obligations of the U.S. Entity regarding delivery to Oliver.
- The east-west standby transmission obligation under Article X.
- Consideration of alternative delivery points and reliability of delivery.

While this agreement in principle is binding on the Entities for deliveries to the Canada-U.S. border, the Entities also intend to pursue an exchange of notes between the U.S. and Canadian Federal governments by 01 July 1997. The purpose of the exchange of notes is to satisfy Section 1, Article VIII of the Treaty, which requires an exchange of notes setting out conditions and limits for disposal of portions of the Canadian Entitlement in the United States.

As a result of the attached agreement (10 copies), and the previously forwarded Agreement, the Entities consider the issues related to interpretation of "critical stream flow period", implementation of non-power requirements in AOP/DDPB studies, and arrangements for entitlement return to be fully addressed. The Canadian Entity will not be pursuing the dispute resolution mechanisms in the Treaty for the aforementioned issues and no longer requires the assistance of the Permanent Engineering Board to resolve these issues.

The Entities wish to thank the Board for their time and effort in assisting the Entities to resolve the issues, and in particular for the Board's 18 October 1995 communications in respect to the issues and to clarify the Board's role.

Yours truly,

Brian R. D. Smith
Chair
Canadian Entity

Enclosures

c: Mr. Tony White, Secretary, U.S. Entity