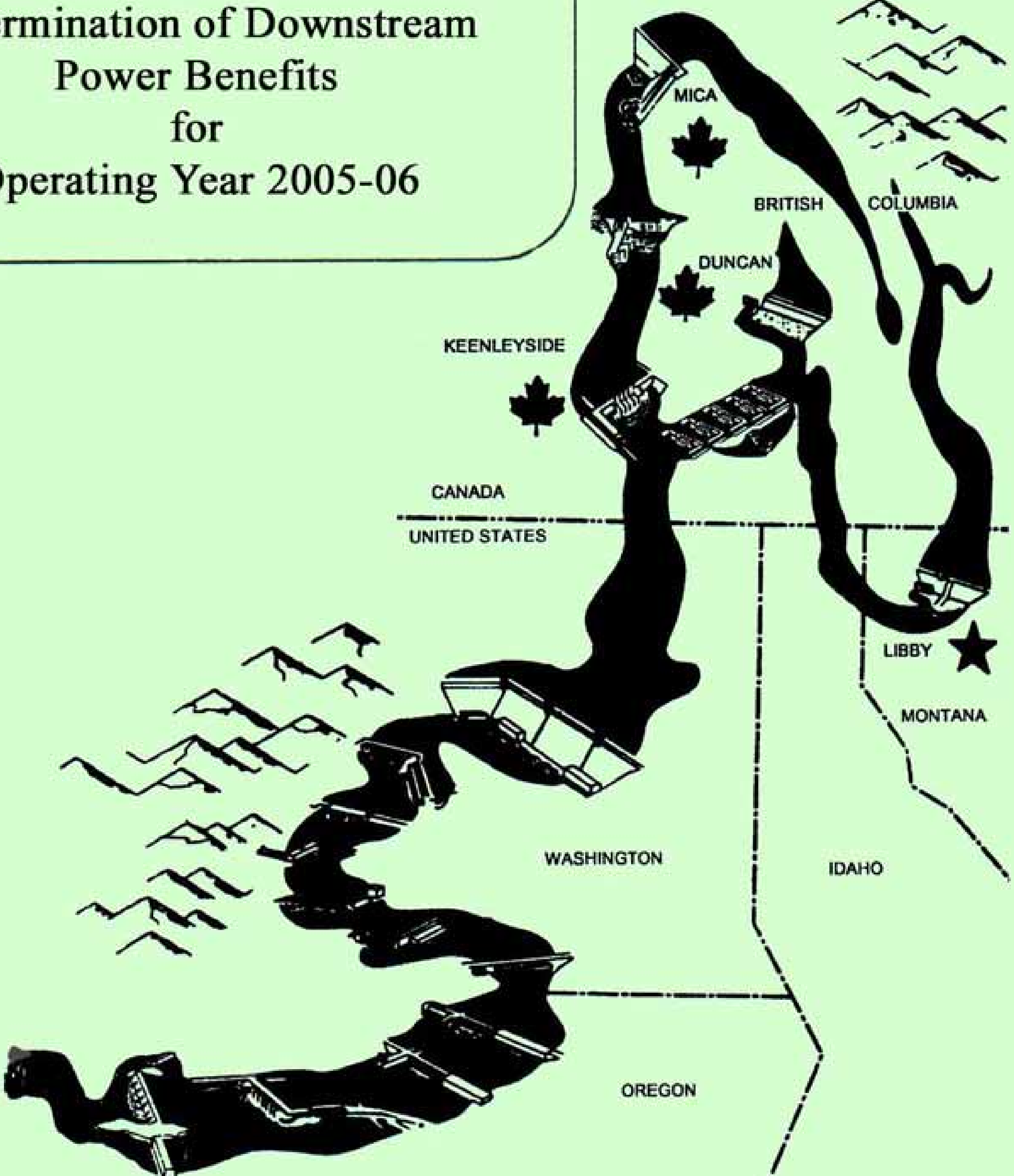
COLUMBIA RIVER TREATY
Assured Operating Plan
and
Determination of Downstream Power Benefits
for
Operating Year 2005-06



Columbia River Treaty Operating Committee

August 2001

COLUMBIA RIVER TREATY ENTITY AGREEMENT ON THE ASSURED OPERATING PLAN AND DETERMINATION OF DOWNSTREAM POWER BENEFITS FOR THE 2005-06 OPERATING YEAR

The Columbia River Treaty between Canada and the United States of America requires that the Entities agree annually on an assured plan of operation for Canadian Treaty storage and the resulting downstream power benefits for the sixth succeeding year.

The Entities agree that the attached reports entitled "Columbia River Treaty Hydroelectric Operating Plan: Assured Operating Plan for Operating Year 2005-06" and "Columbia River Treaty Determination of Downstream Power Benefits for the Assured Operating Plan for Operating Year 2005-06," both dated August 2001, shall be the Assured Operating Plan and Determination of Downstream Power Benefits for the 2005-06 Operating Year.

In witness thereof, the Entities have caused this Agreement to be executed.

Executed for the Canadian Entity this 8th day of AUGUST 2001.

By ______________________
Robert A. Fairweather
Chair

Executed for the United States Entity this 22 day of August 2001.

By ______________________
Stephen J. Wright
Acting Chairman

By ______________________
Brigadier General Carl A. Strock
Member

COLUMBIA RIVER TREATY
HYDROELECTRIC OPERATING PLAN

ASSURED OPERATING PLAN
FOR OPERATING YEAR 2005-06

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HYDROELECTRIC OPERATING PLAN
ASSURED OPERATING PLAN
FOR OPERATING YEAR 2005-06

August 2001

1. Introduction

The treaty between Canada and the United States of America relating to the cooperative development of the water resources of the Columbia River Basin (Treaty) requires that each year an Assured Operating Plan (AOP) be agreed to by the Entities for the operation of the Columbia River Treaty storage in Canada during the sixth succeeding year. This AOP provides the Entities with an operating plan for Canadian storage and information for planning the power systems that are dependent on or coordinated with the operation of the Canadian storage projects.

This AOP was prepared in accordance with the Principles and Procedures for the Preparation and Use of Hydroelectric Operating Plans[1] (POP) and in accordance with the following Entity Agreements, with exceptions noted within Section 8:

- The "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 Operating Procedures for the 2001-02 and Future AOP's," signed 29 August 1996 (29 August 1996 Entity Agreement);
- Principles[2] and Changes to Procedures[3] for the Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies, signed 28 July and 12 August 1988, respectively.

POP is based on criteria contained in Annex A and Annex B of the Columbia River Treaty,[4] the Protocol,[5] the Terms of Sale,[6] and the Columbia River Treaty Flood Control Operating Plan.[7]

In accordance with the Protocol VII (2), this AOP provides a reservoir-balance relationship for each month for the whole of the Canadian storage. This relationship is determined from the following:

(a) The Critical Rule Curve (CRC) for each project, the individual project Upper Rule Curves (URC), and the related rule curves and data used to compute the individual project Operating Rule Curves (ORC).

(b) Operating rules and criteria for operation of the Canadian storage in accordance with the principles contained in the above references.

(c) The supporting data and model used to simulate the 30-year operation for the Step I Joint Optimum (AOP06-41) System Regulation Study.[8]

This AOP includes both English and metric units.[9] The hydroregulation studies and supporting data were based on English units. The metric units are approximations derived by rounding conversions from English units. Metric values are displayed with either one or two decimal places to assure consistency with English units and do not imply that level of precision. The inclusion of metric units complies with U.S. Federal statutory requirements. Tables referred to in the text are in English units. Metric tables use the same numbering system with the letter "M" after the table number.

2. System Regulation Studies

The Columbia River Treaty Operating Committee conducted Step I system regulation studies in accordance with Annex A, paragraph 7, of the Treaty, which requires Canadian storage operation for joint optimum power generation in both Canada and the United States. Downstream power benefits were computed with the Canadian storage operation based on the same criteria for joint optimum power generation as in the Step I study.

System regulation studies for the AOP were based on 2005-06 estimated loads and resources in the United States Pacific Northwest System and hydro resources in the Columbia River Basin in British Columbia. In accordance with the Protocol VIII, the 2005-06 AOP is based on a 30-year streamflow period and the Entities have agreed to use an operating year of 1 August to 31 July. Historical flows for the period August 1928 through July 1958, modified by estimated irrigation depletions for the 1990 level and including the latest Grand Coulee pumping, were used.[10] The 1990 level is considered the best estimate of irrigation depletions for the 2005-06 operating year.

The CRC's were determined from a critical period study of optimum power generation in both Canada and the United States. The study indicated a 42.5-month critical period for the United States system resulting from the low flows during the period from 16 August 1928 through 29 February 1932. With the major exception of Brownlee and Dworshak, it was assumed that all reservoirs, both in the United States and Canada, were full at the beginning of the critical period except where minimum release requirements made this impossible.

The flood control operation at Canadian projects was based on individual project flood control criteria instead of a composite curve. Flood Control and Variable Refill Curves are based on historical inflow volumes. Although only 15.5 million acre-feet (Maf) (19.12 cubic kilometers (km^3)) of usable storage is committed for power operation purposes under the Treaty, the Columbia River Treaty Flood Control Operating Plan provides for the full draft of the total 20.5 Maf (25.29 km^3) of usable storage for on-call flood control purposes.

3. Development of the Assured Operating Plan

This AOP was developed in accordance with Annex A, paragraph 7 of the Treaty which was designed to produce optimum power generation at-site in Canada and downstream in Canada and the United States. The Mica operating criteria specified in Table 1, and changes to the rule curves that are required to balance Canadian storage reoperation, which were used to increase optimum power generation in Canada and the U.S., were evaluated in accordance with subsection 13c of POP using the two limits described below.

(a) Determination of Optimum Generation in Canada and the United States

To determine whether optimum power generation in both Canada and the United States was achieved in the system regulation studies, the firm energy capability, dependable peaking capability, and average annual usable secondary energy were computed for both the Canadian and United States systems. The Canadian storage operation was designed to achieve a weighted sum of these three quantities that was greater than the weighted sum achieved under an operation of Canadian storage for optimum power generation in the United States of America alone.

In order to measure optimum power generation for the 2005-06 AOP, the Columbia River Treaty Operating Committee agreed that the three quantities would be assigned the following relative values:

Quantity	Relative Value
Firm energy capability (aMW)	3
Dependable peaking capability (MW)	1
Average annual usable secondary energy (aMW)	2

The sum of the three weighted quantities showed a net gain to the combined Canadian and United States systems in the study designed to achieve optimum power generation in Canada and the United States. The Entities agree that this result is in accordance with subsection 13c of the POP. The results of these calculations are shown in Table 2.

(b) Maximum Permitted Reduction in Downstream Power Benefits

Separate Step II system regulation studies were developed reflecting (i) storage operation for optimum generation in both Canada and the United States, and (ii) storage operation for optimum generation in the United States alone. Using the storage operation for optimum generation in both Canada and the United States, there is a 1.8 aMW increase in the Canadian Entitlement for average annual usable energy and no change in the dependable capacity compared to the operation for optimum generation in the United States alone.

Since there is no reduction in entitlement, the Entities have determined in Section 3 of the 2005-06 DDPB that these changes are within the maximum permitted reduction in downstream power benefits specified by the Treaty.

4. Rule Curves

The operation of Canadian storage during the 2005-06 Operating Year shall be guided by the ORC and CRC's for the whole of Canadian storage, Flood Control Storage Reservation Curves for the individual projects, and operating rules for specific projects. The ORC's and CRC's are first determined for the individual Canadian projects and then summed to yield the Composite ORC for the whole of Canadian storage, in accordance with paragraph VII (2) of the Protocol. The ORC is derived from the various curves described below.

(a) Critical Rule Curve

The CRC is defined by the end-of-period storage content of Canadian storage during the critical period. It is used to determine proportional draft below the ORC as defined in subsection 5(b). The CRC's are adjusted for crossovers at each project by the hydroregulation model. A tabulation of the CRC's for Duncan, Arrow, Mica, and the Composite CRC for the whole of Canadian storage is included as Table 3.

(b) Refill Curves

There are two types of refill curves, the Assured Refill Curve (ARC) and the Variable Refill Curve (VRC), which are discussed in the following sections. Tabulations of the ARC's and VRC's, and supporting data used in determining the ARC's and VRC's for Mica, Arrow, and Duncan, are provided in Tables 4-6, respectively.

(1) Assured Refill Curve (ARC)

The ARC indicates the August through June end-of-period storage contents required to assure refill of Canadian storage by July 31st. The ARC is based on the 1930-31 water year inflows, upstream storage requirements, and the power discharge requirements (PDR's) determined in accordance with the POP and refill and power criteria. The 1931 water year is the system's second lowest historical January through July volume of inflow, at The Dalles, Oregon, during the 30-year streamflow record.

(2) Variable Refill Curve (VRC)

The VRC indicates the January through June end-of-period storage contents required to refill Canadian storage by July 31st. The VRC is based on the 95% confidence forecasted inflow volume, upstream storage requirements, PDR's determined in accordance with the POP, and VRC lower limits (VRCLL's) defined by studies that optimize power during refill. In the system regulation studies, historical volume inflows, adjusted for the 95% confidence forecast error, were used instead of forecasted inflows. The PDR's and VRCLL's are a function of the unregulated January through July runoff volume at The Dalles, Oregon. In those years when the January through July runoff volume at The Dalles is between 80 Maf (98.68 km^3) and 110 Maf (135.69 km^3), the PDR's and VRCLL's were interpolated linearly between the values shown in Tables 4-6. In those years when the January through July runoff volume at The Dalles was less than 80 Maf (98.68 km^3) or greater than 110 Maf (135.69 km^3), the value used was that specified for 80 and 110 Maf (98.68 km^3 and 135.69 km^3) respectively.

VRC's for Mica, Arrow and Duncan for the 30 years of historical record in Tables 4-6 illustrate the probable range of these curves based on historical conditions. In actual operation in 2005-06, the PDR's and VRCLL's will be based on the forecast of unregulated runoff at The Dalles.

(c) Limiting Rule Curve (LRC) or Energy Content Curve Lower Limit (ECCLL)

The LRC's (also called Energy Content Curve Lower Limits) indicate 31 January through 15 April end-of-period storage contents. These contents must be maintained to protect the ability of the system to meet firm load during the period January through 30 April in the event that the VRC's permit storage to be emptied and sufficient natural flow is not available to carry the load prior to the start of the freshet. Such rule curves shall limit the ORC to be no lower than the LRC's. The LRC is developed for 1936-37 water conditions. The LRC's for Mica, Arrow and Duncan are shown in Tables 4-6 respectively.

(d) Upper Rule Curve (Flood Control)

The URC's indicate the end-of-period storage content to which each individual Canadian storage project shall be evacuated for flood control. The URC's used in the studies were based upon Flood Control Storage Reservation Diagrams contained in the Columbia River Treaty Flood Control Operating Plan and analysis of system flood control simulations.[11] URC's for Mica, Arrow, and Duncan for the 30-year study period are shown on Tables 7-9 respectively. Tables 7 and 8 reflect an agreed transfer of flood control space in Mica and Arrow to maximum drafts of 2.08 and 5.1 Maf (2.57 and 6.29 km^3) respectively. In actual operation, the URC's will be computed as outlined in the Flood Control Operating Plan using the latest forecast of runoff available at that time.

(e) Operating Rule Curve

The ORC's define the normal limit of storage draft to produce secondary energy and provide a high probability of refilling the reservoirs. In general, the Operating Plan does not permit serving secondary loads at the risk of failing to refill storage and thereby jeopardizing the firm load carrying capability of the United States or Canadian systems during subsequent years.

During the period 1 August through 31 December, the ORC is defined as the CRC for the first year of the critical period or the ARC, whichever is higher. During the period 1 January through 31 July, the ORC is defined as the higher of the CRC and the ARC, unless the VRC is lower, then it defines the ORC. During the period 1 January through 15 April, the ORC will not be lower than the LRC. The ORC shall be less than or equal to the URC at each individual project. The composite ORC for the whole of Canadian storage for 30 years of historical record are included in Table 10 to illustrate the probable future range of these curves based on historical conditions.

5. Operating Rules

The AOP06-41 System Regulation Study was utilized to develop and test the operating rules and rule curves. It contains the agreed-upon ORC's and CRC's, and operating procedures and constraints, such as maximum and minimum project elevations, discharges, and draft rates. These constraints are included as part of this operating plan and are listed in Appendixes A1 and A2.

The following rules, used in the AOP06-41 System Regulation Study, will apply to the operation of Canadian storage in the 2005-06 Operating Year.

(a) Operation At or Above ORC

The whole of the Canadian storage will be drafted to its ORC as required to produce optimum generation in Canada and the United States in accordance with Annex A, paragraph 7, of the Treaty, subject to project physical characteristics and operating constraints.

(b) Operation Below ORC

The whole of Canadian storage will be drafted below its ORC as required to produce optimum power generation, to the extent that a System Regulation Study determines that proportional draft below the ORC is required to produce the hydro firm energy load carrying capability (FELCC) of the United States system. FELCC is determined by the applicable Critical Period Regulation study. Proportional draft between rule curves will be determined as described in the POP.

(c) Mica Project Operation

For the purpose of the System Regulation Studies, Mica reservoir will be operated in accordance with operating criteria listed in Table 1, so as to optimize generation at site, downstream at Revelstoke and Keenleyside, and downstream in the United States. In general, the Mica operating criteria in each period is determined by Arrow's storage content at the end of the previous period. Mica outflows will be increased above the values shown in the table in the periods from October through June if required to avoid storage above the URC.

In the event that Mica's operation to the Table 1 operating criteria results in more or less than the project's share of draft from the whole of Canadian storage as described in 5(a) or 5(b) above, compensating changes will be made from Arrow to the extent possible.

Mica storage releases in excess of 7.0 Maf (8.63 km^3) that are required to maintain the Mica outflows specified under this plan will be retained in the Arrow reservoir, subject to flood control and other project operating criteria at Arrow. The total combined storage draft from Mica and Arrow will not exceed 14.1 Maf (17.39 km^3), unless flood control or minimum flow criteria will not permit the additional Mica storage releases to be retained at Arrow. Should storage releases in excess of 14.1 Maf (17.39 km^3) be made, the target Mica operation will remain as specified in Table 1.

Revelstoke, Upper Bonnington, Lower Bonnington, South Slocan, Brilliant, Seven Mile, and Waneta have been included in the 2005-06 AOP and have been operated as run-of-river projects. Generation at Arrow was modeled in the studies. Corra Linn and Kootenay Canal were included and operated in accordance with criteria that closely approximates International Joint Commission rules for Kootenay Lake.

6. Implementation

The Entities have agreed that each year a Detailed Operating Plan (DOP) will be prepared for the immediately succeeding operating year. Such DOP's are made under authority of Article XIV 2.(k) of the Columbia River Treaty, which states:

"...the powers and the duties of the entities include:

(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."

The 2005-06 DOP will reflect the latest available load, resource, and other pertinent data to the extent the Entities agree these data should be included in the plan. The data and criteria contained herein may be reviewed, and updated as agreed by the Entities, to form the basis for a 2005-06 DOP. Failing agreement on updating the data and/or criteria, the 2005-06 DOP for Canadian storage shall include the rule curves, Mica operating criteria, and other data and criteria provided in this AOP. Actual operation of Canadian storage during the 2005-06 Operating Year shall be guided by the DOP.

The values used in the AOP studies to define the various rule curves were period-end values only. In actual operation, it is necessary to operate in such a manner during the course of each period that these period-end values can be achieved in accordance with the operating rules. Due to the normal variation of power load and streamflow during any period, straight-line interpolation between the period-end points should not be assumed. During the storage drawdown season, Canadian storage should not be drafted below its period-end point at any time during the period unless it can be conservatively demonstrated that sufficient inflow is available, in excess of the minimum outflow required to serve power demand, to refill the reservoir to its end-of-period value as required.

During the storage evacuation and refill season, operation will be consistent with the Flood Control Operating Plan. When refill of Canadian storage is being guided by Flood Control Refill Curves, such curves will be computed on a day-by-day basis using the residual volume-of-inflow forecasts depleted by the volume required for minimum outflow, unless higher flows are required to meet firm load, from each day through the end of the refill season.[11]

7. Canadian Entitlement

The amount of Canadian Entitlement is defined in the companion document "Determination of Downstream Power Benefits for the Assured Operating Plan for Operating Year 2005-06."

By 1 April 2003, all of the Canadian Entitlement to downstream power benefits attributed to the operation of Duncan, Arrow, and Mica dams will cease to be covered by the Terms of the Sale of the Canadian Entitlement in the United States of America authorized by an Exchange of Notes between Canada and the United States of America dated 16 September 1964.[12] This AOP has been prepared on the basis that all of the Canadian Entitlement to downstream power benefits belongs to Canada.

The Treaty specifies return of the Canadian Entitlement at a point near Oliver, British Columbia, unless otherwise agreed by the Entities. Because no cross border transmission exists near Oliver, the Entities completed an agreement on Aspects of the Delivery of the Canadian Entitlement for 1 April 1998 through 15 September 2024, dated 29 March 1999.[13] This arrangement covers the full 1 August 2005 through 31 July 2006 period covered by this AOP, and includes transmission losses and scheduling guidelines for delivery of the Canadian Entitlement.

8. Summary of Changes from Previous Year

Data from the five most recent AOP's are summarized in Table 11. An explanation of the more important changes compared to last year's studies follows.

(a) Loads and Non-Hydro Resources

Loads for the 2005-06 AOP were based on the 1998 Whitebook medium case forecast updated by BPA on 13 September 1999 for the 2000 through 2009 operating years. This forecast had an average annual load growth rate of 0.5%. The Pacific Northwest Area (PNWA) firm energy load increased by 342 aMW compared to the 2004-05 operating year. However the 2004-05 AOP used the same loads and hydro regulation studies as the 2003-04 AOP. Other load changes include:

It was assumed that one-half of the Canadian Entitlement was exported to B.C., and the remaining one-half was disposed in the U.S. The estimated disposition of the Entitlement in the Step I system and the computed Canadian Entitlement are shown below:

During 1 August 2005 – 31July 2006

Canadian Entitlement	Energy (aMW)		Capacity (MW)	
Return	Estimated	Computed	Estimated	Computed
Export to BC (1/2)	268.6	267.5	588.2	609.0
Retained in PNW (1/2)	268.6	267.5	588.2	609.0
Total	537.3	535.1	1176.4	1218.0

Iterative studies to correct the load estimate were not performed because updating the Canadian Entitlement estimates would not significantly affect the results of the studies.

Southwest exports decreased by an annual average of 251 aMW. Power sales to Western Area Power Authority (WAPA), California Dept. of Water Resources, and Redding were terminated.

The Surplus Firm Energy Export increased by 502 aMW compared to the 2004-05 AOP study. Surplus Firm Energy was shaped into April 15 through September in the 2005-06 study, compared to only May through July in the 2004-05 AOP study. There was an added purchase of power from California during October through April 15th to help shape more load into the summer months (-251 aMW).

The total annual energy capability of the thermal installations increased by 269 aMW due to the following changes:

- Large Thermal resources increased by 122 aMW due to removal of maintenance at Columbia Generating Station (WNP2) in 2005-06. The project's maintenance was converted to a 24 month cycle with work planned for 2004-05 and 2006-07;
- Thermal Imports decreased by 239 aMW due to a correction of Pacificorp's data from 2004-05 AOP study (-218 aMW) and updated data from Montana Power Company;
- Two projects were retired: PGE's combustion turbine Bethel (-54 aMW), and Puget's small thermal Shuffleton (-32 aMW);
- The plant sale of Longview Fibre to WAPA (36 aMW) was discontinued; and
- Cogeneration increased by 438 aMW due to the addition of a new project at Klamath Falls to be completed by July 2001.

The thermal displacement market increased by 619 aMW due to the combination of increased thermal installations explained above (269 aMW), and the decrease in the minimum thermal generation (-379 aMW) at the Hermiston cogeneration project.

(b) Operating Procedures

Generation plant data tables for Mayfield, McNary, Chief Joseph, Kerr, and Corra Linn were updated. These changes did not significantly effect the system operation. The hydroregulation model calculation of McNary's tailwater was modified to reflect changes in John Day's forebay elevation.

The nonpower requirements for Base system projects were agreed to in the 29 August 1996 Entity Agreement. These requirements are essentially the nonpower requirements included in the 1979-80 and prior AOP/DDPB studies.

Changes from the 2004-05 AOP studies include:

Base System Projects

- The Grand Coulee maximum content limit for developing AOP CRC's of 2 feet down from full during September through November was also applied to the end of the second half of August to be consistent with the start of the critical period.

- The Brownlee storage operation outside the critical period was simulated by using CRC's and ORC's instead of the fixed operation from Idaho Power Company (IPC), used in previous AOP's. The CRC's were based on the IPC's forecast of critical period operation during 1929-1932 for the Step I studies, 1944-45 for Step II, and 1937 for Step III. ORC's were developed from studies showing a 50-year storage operation similar to the IPC operation.

Non-base System Projects

- Round Butte minimum storage limit changed from 82.2 ksfd to 118.7 ksfd.

- Lower Granite, Little Goose, and Lower Monumental critical period spill changed from a percent of outflows to a fixed amount and are now consistent with years outside of the critical period. A turbine limit of 11,500 cfs was included for April through June.

ARC and VRC Calculation

The procedures for developing the ARC's and VRC's in the Step I and II studies were modified to improve power operation consistent with the Treaty requirements.

REFERENCES

1 "Columbia River Treaty Principles and Procedures for the Preparation and Use of Hydroelectric Operating Plans, Columbia River Treaty Operating Committee," dated December 1991.

2 "Columbia River Treaty Entity Agreement on Principles for the Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies," dated 28 July 1988.

3 "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 12 August 1988.

4 "Treaty between the United States of America and Canada relating to Cooperative Development of the Water Resources of the Columbia River Basin," dated 17 January 1961.

5 "Protocol - Annex to Exchange of Notes," dated 22 January 1964.

6 "Attachment Relating to Terms of Sale - Attachment to Exchange of Notes," dated 22 January 1964.

7 "Columbia River Treaty Flood Control Operating Plan," dated October 1999.

8 "BPA Hydroelectric Power Planning Program, Assured Operating Plan 30-year System Regulation Study 06-41," dated 19 June 2001.

9 The conversion factors used are: (a) million acre-feet (Maf) times 1.2335 equals cubic kilometers (km^3); (b) thousand second-foot-days (ksfd) times 2.4466 equals cubic hectometers (hm^3); (c) cubic feet per second (cfs) divided by 35.3147 equals cubic meters per second (m^3/s); and (d) feet (ft) times 0.3048 equals meters (m).

10 "Report on 1990 Level Modified Streamflows, 1928 to 1989, Columbia River and Coastal Basins, prepared for BPA," dated July 1993.

11 Summary of "End-of-Period Reservoir Storage Requirement from Columbia River Flood Regulation Studies," dated July 1996.

12 Exchange of notes "Regarding the Disposal of the Canadian Entitlement to Downstream Power Benefits," dated 16 September 1964.

13 "Columbia River Treaty Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for April 1, 1998 Through September 15, 2024" between the Canadian Entity and the United States Entity, dated 29 March 1999.

TABLE 1
(English Units)
MICA PROJECT OPERATING CRITERIA
2005-06 ASSURED OPERATING PLAN

Period	End of Previous Period Arrow Storage Content (ksfd)	Target Operation: Period Average Outflow (cfs)	Target Operation: End-of-Period Treaty Content 1/ (ksfd)	Minimum Outflow (cfs)	Minimum Treaty Storage Content 2/ (ksfd)
August 1-15	2600 - FULL	-	3499.1	15000	0.0
	2160 - 2600	25000			
	0 - 2160	32000			
August 16-31	3400 - FULL	-	3529.2	15000	0.0
	1950 - 3400	25000			
	0 - 1950	32000			
September	3440 - FULL	-	3524.1	10000	0.0
	1900 - 3440	22000			
	1500 - 1900	27000			
	0 - 1500	32000			
October	3275 - FULL	-	3344.1	10000	0.0
	2530 - 3275	20000			
	1100 - 2530	23000			
	0 - 1100	32000			
November	3030 - FULL	23000		12000	0.0
	2990 - 3030	20000			
	800 - 2990	24000			
	0 - 800	32000			
December	2780 - FULL	25000		21000	4.1
	2450 - 2780	23000			
	600 - 2450	30000			
	0 - 600	32000			
January	2340 - FULL	26000		15000	0.0
	2300 - 2340	24000			
	1240 - 2300	29000			
	0 - 1240	31000			
February	1260 - FULL	22000		15000	0.0
	1070 - 1260	20000			
	760 - 1070	25000			
	0 - 760	26000			
March	700 - FULL	20000		15000	0.0
	495 - 700	19000			
	100 - 495	21000			
	0 - 100	25000			
April 1-15	1550 - FULL	16000		13000	0.0
	995 - 1550	-	104.1		
	730 - 995	-	0.0		
	0 - 730	24000			
April 16-30	1240 - FULL	13000		10000	0.0
	1150 - 1240	12000			
	0 - 1150	10000			
May	755 - FULL	10000		8000	0.0
	395 - 755	8000			
	335 - 395	14000			
	0 - 335	8000			
June	1500 - FULL	10000		8000	0.0
	1075 - 1500	8000			
	630 - 1075	10000			
	0 - 630	18000			
July	2330 - FULL	-	3449.1	10000	0.0
	1870 - 2330	18000			
	0 - 1870	30000			

1/ If the Mica target end-of-period storage content is less than 3529.2 ksfd, then a maximum outflow of 34000 cfs will apply except April 1-15 when the maximum outflow is 29000 cfs.

2/ Mica outflows will be reduced to minimum to maintain the reservoir above the minimum Treaty storage content. This will override any flow target.

TABLE 2
COMPARISON OF 2005-06 ASSURED OPERATING PLAN STUDY RESULTS

Study 06-41 provides Optimum Generation in Canada and in the United States.
Study 06-11 provides Optimum Generation in the United States only.

	Study No. 06-41	Study No. 06-11	Net Gain	Weight	Value
1. Firm Energy Capability (aMW)					
U.S. System 1/	12051.6	12051.7	-0.1		
Canada 2/, 3/	2905.4	2807.8	97.7		
Total	14957.0	14859.5	97.6	3	292.8
2. Dependable Peaking Capacity (MW)					
U.S. System 4/	31158.0	31209.0	-51.0		
Canada 2/, 5/	5644.0	5642.0	2.0		
Total	36802.0	36851.0	-49.0	1	-49.0
3. Average Annual Usable Secondary Energy (aMW)					
U.S. System 6/	3052.3	3041.8	10.5		
Canada 2/, 7/	246.8	302.5	-55.7		
Total	3299.1	3344.3	-45.2	2	-90.4
			Net Change in Value =		153.4

1/ U.S. system firm energy capability was determined over the U.S. system critical period beginning 16 August 1928 and ending 29 February 1932.

2/ Canadian system includes Mica, Arrow, Revelstoke, Kootenay Canal, Corra Linn, Upper Bonnington, Lower Bonnington, South Slocan, Brilliant, Seven Mile and Waneta.

3/ Canadian system firm energy capability was determined over the Canadian system critical period beginning 1 October 1940 and ending 30 April 1946.

4/ U.S. system dependable peaking capability was determined from January 1937.

5/ Canadian system dependable peaking capability was determined from December 1944.

6/ U.S. system 30-year average secondary energy limited to secondary market.

7/ Canadian system 30-year average generation minus firm energy capability.

TABLE 3
(English Units)
CRITICAL RULE CURVES
END OF PERIOD TREATY STORAGE CONTENTS (KSFD)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
							MICA							
1928-29	3529.2	3529.2	3529.2	3374.1	2921.2	2151.3	1364.1	771.5	534.5	220.3	0.0	460.3	2028.4	2968.5
1929-30	3529.2	3264.8	3063.8	2052.4	1842.0	1277.0	419.3	348.3	211.1	301.0	521.4	393.8	825.5	2651.6
1930-31	2887.1	2895.4	2579.7	2398.8	1809.1	1201.4	431.1	141.3	0.0	25.2	0.0	331.0	888.6	1358.9
1931-32	1318.2	1114.6	829.4	1030.8	486.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							ARROW							
1928-29	3579.6	3443.3	3005.8	2800.6	2530.9	2283.5	1213.7	927.0	567.3	566.7	548.7	1430.2	3028.2	3579.4
1929-30	3387.0	3447.8	2759.8	2715.4	1857.2	1151.0	353.7	255.0	50.1	139.8	125.7	1481.9	3083.8	3052.4
1930-31	3191.6	3077.4	2956.8	2107.1	1787.3	1152.3	416.6	32.4	0.0	59.0	13.7	724.9	2401.4	3020.1
1931-32	2935.7	2647.3	2195.1	1102.0	713.3	262.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							DUNCAN							
1928-29	705.8	705.8	694.7	702.1	687.8	504.1	404.6	234.3	142.9	140.1	135.0	252.5	527.3	674.1
1929-30	595.5	656.3	680.3	702.1	447.0	457.8	330.0	164.9	11.5	34.8	58.0	173.0	374.6	500.4
1930-31	499.7	559.9	626.2	656.9	404.4	258.4	230.0	51.4	0.0	13.0	0.0	88.6	102.9	40.3
1931-32	20.0	2.0	1.0	2.0	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							COMPOSITE							
1928-29	7814.6	7678.3	7229.7	6876.8	6139.9	4938.9	2982.4	1932.8	1244.7	927.1	683.7	2143.0	5583.9	7222.0
1929-30	7511.7	7368.9	6503.9	5469.9	4146.2	2885.8	1103.0	768.2	272.7	475.6	705.1	2048.7	4283.9	6204.4
1930-31	6578.4	6532.7	6162.7	5162.8	4000.8	2612.1	1077.7	225.1	0.0	97.2	13.7	1144.5	3392.9	4419.3
1931-32	4273.9	3763.9	3025.5	2134.8	1201.1	262.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 4
(English Units)
MICA
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (KSFD)														
	184.2	748.4	1351.7	1529.9	1595.2	1611.7	1606.6	1439.2	1446.0	1405.4	1468.6	2245.3	3330.0	3529.2
VARIABLE REFILL CURVES (KSFD)														
1928-29							2505.5	2334.0	2232.7	2208.2	2219.0	2602.4	3334.3	3529.2
1929-30							1481.2	1270.4	1159.6	1153.2	1279.7	1995.2	3050.1	"
1930-31							1740.8	1538.9	1423.5	1395.4	1455.5	2015.1	3125.3	"
1931-32							1145.9	1007.3	960.5	963.1	1058.5	1720.8	3005.8	"
1932-33							1050.3	947.0	917.5	918.1	965.7	1618.1	2842.4	"
1933-34							235.5	150.3	115.4	130.4	263.1	1366.4	3095.1	"
1934-35							1377.0	1233.2	1191.9	1200.8	1240.9	1823.7	2920.9	"
1935-36							1172.2	1022.4	963.6	949.0	1014.3	1768.0	3179.9	"
1936-37							2493.7	2301.6	2185.6	2150.3	2209.0	2616.0	3366.6	"
1937-38							1423.5	1301.8	1255.0	1262.1	1325.0	1944.1	3097.3	"
1938-39							1544.9	1411.4	1310.0	1307.8	1389.1	2038.4	3358.1	"
1939-40							1326.7	1154.6	1070.4	1062.0	1161.5	1833.1	3117.9	"
1940-41							1922.7	1741.7	1645.8	1637.1	1784.4	2392.0	3348.1	"
1941-42							1885.7	1742.4	1676.0	1656.7	1702.8	2243.7	3250.4	"
1942-43							2059.4	1915.4	1870.4	1868.2	1990.7	2571.4	3335.7	"
1943-44							2603.0	2393.2	2290.8	2258.7	2297.2	2722.3	3505.3	"
1944-45							2509.3	2344.0	2261.6	2248.9	2268.3	2649.6	3424.3	"
1945-46							842.6	690.4	642.1	632.3	694.0	1416.7	3000.2	"
1946-47							961.4	863.0	843.4	855.3	941.7	1681.1	3070.7	"
1947-48							910.4	791.3	756.5	742.3	792.2	1476.6	2957.4	"
1948-49							2606.9	2462.3	2400.6	2398.1	2445.2	2852.4	3529.2	"
1949-50							1265.9	1107.3	1048.9	1039.4	1093.9	1697.7	2768.7	"
1950-51							1257.1	1146.2	1119.8	1128.1	1211.6	1816.8	3130.2	"
1951-52							1663.9	1510.4	1458.5	1443.4	1494.7	2112.2	3277.5	"
1952-53							1945.1	1809.4	1767.1	1764.7	1794.1	2267.4	3244.4	"
1953-54							820.9	697.4	679.7	683.4	737.0	1392.7	2740.8	"
1954-55							1580.6	1473.2	1447.2	1457.6	1513.7	2038.5	2935.2	"
1955-56							1129.0	1004.0	957.3	950.4	1008.8	1714.7	3044.7	"
1956-57							1297.6	1165.3	1133.2	1138.6	1197.6	1800.9	3375.3	"
1957-58							1131.3	1011.9	986.4	997.0	1072.1	1697.6	3137.8	"
DISTRIBUTION FACTORS							0.9750	0.9770	0.9740	0.9812	0.9650	0.7950	0.4950	N/A
FORECAST ERRORS (KSFD)							652.9	510.3	465.3	444.4	444.4	360.4	360.4	N/A
POWER DISCHARGE REQUIREMENTS (CFS):														
ASSURED REFILL CURVE														
	3000	3000	3000	3000	3000	3000	3000	8569	3001	7388	3000	3003	24021	50053
VARIABLE REFILL CURVES					80 MAF		3000	5000	5000	5000	5000	5000	18000	38000
(BY VOLUME RUNOFF AT THE DALLES)					95 MAF		3000	3000	3000	3000	5000	5000	18000	38000
					110 MAF		3000	3000	3000	3000	5000	5000	18000	38000
VARIABLE REFILL CURVE LOWER LIMITS (KSFD)					80 MAF		224.9	241.3	270.8	331.0	470.1	1460.8	2823.8	3529.2
(BY VOLUME RUNOFF AT THE DALLES)					95 MAF		39.3	0.0	20.7	27.3	0.0	681.8	2297.2	3529.2
					110 MAF		11.9	0.0	0.0	0.0	3.7	658.7	1809.5	3529.2
LIMITING RULE CURVE (KSFD)							306.7	50.9	0.0	0.2				

TABLE 5
(English Units)
ARROW
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (KSFD)														
	0.0	0.0	0.0	0.0	102.8	925.2	1514.3	1610.2	1617.9	1685.6	1747.9	2425.7	3205.6	3579.6
VARIABLE REFILL CURVES (KSFD)														
1928-29							2724.3	2686.1	2542.1	2570.0	2691.4	3148.3	3079.8	3579.6
1929-30							1221.5	1252.4	1317.5	1344.0	1612.7	2799.3	3149.1	"
1930-31							1563.4	1515.4	1422.6	1458.6	1646.3	2616.8	3087.3	"
1931-32							4.8	0.0	17.6	7.1	280.7	1733.4	2758.9	"
1932-33							468.4	447.1	420.8	427.5	661.2	1903.6	2730.0	"
1933-34							2.0	84.9	135.3	285.3	677.0	2312.5	3114.2	"
1934-35							706.7	737.2	830.3	879.2	1080.6	2201.3	2976.4	"
1935-36							764.9	708.6	654.6	646.5	817.2	2197.3	3041.9	"
1936-37							3044.2	2953.2	2808.0	2797.1	2933.8	3331.8	3173.6	"
1937-38							1009.2	989.3	967.6	1008.9	1241.4	2379.9	2950.7	"
1938-39							1357.3	1331.3	1335.1	1345.4	1597.4	2677.2	3238.5	"
1939-40							1082.6	1109.3	1168.2	1292.1	1593.6	2666.0	3160.9	"
1940-41							2196.1	2200.6	2122.8	2289.3	2710.4	3425.1	3395.9	"
1941-42							2150.9	2162.3	2079.7	2102.4	2306.2	2934.6	3190.8	"
1942-43							2649.4	2592.0	2479.3	2484.7	2737.1	3448.7	3202.3	"
1943-44							3550.3	3515.7	3389.6	3388.0	3541.8	3579.6	3579.6	"
1944-45							2913.9	2919.3	2830.0	2879.3	2985.9	3358.0	3327.4	"
1945-46							424.4	368.1	332.9	342.8	595.1	1899.3	2858.8	"
1946-47							901.1	796.5	759.0	788.3	1052.4	2287.1	2944.5	"
1947-48							704.6	638.5	603.3	579.7	768.6	1978.8	2860.6	"
1948-49							2273.7	2237.2	2149.1	2182.8	2403.0	3143.8	3579.6	"
1949-50							618.6	560.9	548.9	558.3	774.1	1919.5	2703.8	"
1950-51							907.1	897.5	892.6	868.8	1122.9	2258.1	3022.9	"
1951-52							1013.1	972.9	893.7	901.8	1092.0	2313.0	2992.2	"
1952-53							1679.7	1662.0	1587.4	1618.6	1759.9	2456.8	2972.0	"
1953-54							140.3	115.6	135.6	160.9	377.9	1608.5	2703.8	"
1954-55							668.8	711.2	680.0	719.6	940.0	1978.0	2921.9	"
1955-56							370.0	337.1	316.0	320.3	562.0	1961.2	2858.7	"
1956-57							422.3	371.4	341.7	334.7	581.8	1803.9	3036.4	"
1957-58							233.4	193.7	208.9	282.9	583.9	1832.0	2883.8	"
DISTRIBUTION FACTORS							0.9710	0.9747	0.9691	0.9741	0.9530	0.7483	0.4631	N/A
FORECAST ERRORS (KSFD)							1233.1	987.3	825.3	715.1	715.1	501.4	501.4	N/A
POWER DISCHARGE REQUIREMENTS (CFS):														
ASSURED REFILL CURVE														
	5000	5000	5000	5000	5000	5000	5000	8363	7189	8892	12138	21175	52482	70098
VARIABLE REFILL CURVES					80 MAF		5000	5000	5000	5000	5000	5000	54000	56000
(BY VOLUME RUNOFF AT THE DALLES)					95 MAF		5000	5000	5000	5000	5000	5000	54000	56000
					110 MAF		5000	5000	5000	5000	5000	5000	54000	56000
VARIABLE REFILL CURVE LOWER LIMITS (KSFD)					80 MAF		138.7	211.9	378.4	553.0	833.0	2118.5	3039.6	3579.6
(BY VOLUME RUNOFF AT THE DALLES)					95 MAF		14.6	0.2	18.9	32.1	26.7	1164.4	2953.5	3579.6
					[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 6M
(Metric Units)
DUNCAN
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (hm^3)														
	0.0	86.1	248.3	323.7	366.5	393.9	418.6	441.1	475.6	507.9	530.4	804.2	1380.1	1726.8
VARIABLE REFILL CURVES (hm^3)														
1928-29							1054.0	1044.2	1036.9	1033.4	1080.9	1183.7	1539.6	1726.8
1929-30							1050.1	1039.3	1031.2	1027.1	1109.3	1233.8	1567.8	"
1930-31							914.3	906.7	907.4	915.5	976.9	1110.3	1539.6	"
1931-32							243.2	238.8	257.6	277.4	381.7	661.3	1324.3	"
1932-33							20.0	4.8	5.0	10.5	14.9	283.6	1107.8	"
1933-34							219.5	256.9	288.7	323.2	495.9	806.9	1466.5	"
1934-35							439.7	450.7	477.1	484.7	543.4	778.8	1317.7	"
1935-36							320.5	318.1	319.8	321.5	387.3	712.7	1401.4	"
1936-37							926.5	916.5	913.6	909.4	956.9	1091.9	1495.9	"
1937-38							416.2	429.6	442.8	460.7	536.1	796.4	1384.5	"
1938-39							552.0	558.1	564.2	569.6	650.1	896.9	1497.6	"
1939-40							511.1	530.4	554.6	583.5	667.9	902.1	1469.4	"
1940-41							712.0	723.5	737.4	769.5	875.6	1089.0	1527.7	"
1941-42							701.7	718.8	733.5	743.8	809.3	1010.2	1478.5	"
1942-43							736.7	738.4	747.2	752.1	829.2	1065.0	1465.3	"
1943-44							1093.6	1096.8	1101.5	1102.9	1155.8	1263.7	1613.5	"
1944-45							903.3	907.9	914.5	916.0	962.5	1091.7	1510.8	"
1945-46							114.5	108.6	116.9	122.6	203.6	530.2	1308.2	"
1946-47							203.8	199.2	211.6	223.1	311.2	634.4	1339.3	"
1947-48							311.5	318.3	333.5	336.9	402.2	675.8	1364.7	"
1948-49							871.5	865.1	865.4	863.4	920.2	1097.1	1614.5	"
1949-50							389.0	385.8	392.7	392.4	452.4	696.8	1227.7	"
1950-51							190.1	205.8	229.0	230.5	314.6	613.9	1303.8	"
1951-52							461.2	461.4	476.1	479.5	545.1	819.4	1414.4	"
1952-53							458.2	459.7	472.2	477.1	538.0	766.8	1331.7	"
1953-54							24.2	28.9	50.9	60.2	130.2	437.5	1161.6	"
1954-55							306.1	312.2	324.7	333.0	395.1	644.9	1254.6	"
1955-56							102.8	95.7	108.1	112.1	189.1	550.0	1298.2	"
1956-57							341.3	332.2	337.9	343.0	416.7	679.2	1455.7	"
1957-58							118.2	117.2	133.6	144.8	223.4	527.5	1337.8	"
DISTRIBUTION FACTORS							0.9720	0.9790	0.9740	0.9790	0.9570	0.7580	0.4690	N/A
FORECAST ERRORS (hm^3)							289.7	266.7	238.5	215.5	215.5	179.3	179.3	N/A
POWER DISCHARGE REQUIREMENTS (m^3/s):														
ASSURED REFILL CURVE														
	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	10.45	44.17	5.18	77.87
VARIABLE REFILL CURVES					98.68 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
(BY VOLUME RUNOFF AT THE DALLES)					117.18 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
					135.69 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
VARIABLE REFILL CURVE LOWER LIMITS					98.68 km^3		466.1	99.3	151.9	200.4	280.9	790.5	1359.1	1726.8
(By VOLUME RUNOFF AT THE DALLES, hm^3)					117.18 km^3		67.5	46.0	41.3	0.0	81.2	500.6	1278.8	1726.8
					135.69 km^3		14.4	0.0	0.7	11.7	7.1	258.1	1087.8	1726.8
LIMITING RULE CURVE (hm^3)							87.8	10.5	0.0	0.0				

TABLE 7
(English Units)
MICA
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (KSFD)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	3529.2	3529.2	3529.2	3428.4	3428.4	3428.4	3377.7	3332.1	3281.5	3281.5	3281.5	3352.6	3439.5	3529.2
1929-30	..	..	..	..	..	..	3348.3	3276.1	3195.9	3195.9	3195.9	3291.6	3408.6	..
1930-31	..	..	..	..	..	..	3428.4	3428.4	3428.4	3428.4	3428.4	3457.3	3492.7	..
1931-32	..	..	..	..	..	..	3105.7	2803.2	2480.5	2480.5	2480.5	2781.5	3149.6	..
1932-33	..	..	..	..	..	..	3101.7	2807.2	..	..	..	..	..	..
1933-34	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1934-35	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1935-36	..	..	..	..	..	..	3105.7	2803.2	..	..	..	..	..	..
1936-37	..	..	..	..	..	..	3325.9	3233.4	3130.9	3130.9	3130.9	3316.1	3393.8	..
1937-38	..	..	..	..	..	..	3101.7	2807.2	2480.5	2480.5	2480.5	2781.5	3149.6	..
1938-39	..	..	..	..	..	..	3190.1	2974.4	2736.1	2736.1	2736.1	2963.8	3242.1	..
1939-40	..	..	..	..	..	..	3263.0	3108.7	2943.4	2943.4	2943.4	3111.5	3317.1	..
1940-41	..	..	..	..	..	..	3428.4	3428.4	3428.4	3428.4	3428.4	3457.3	3492.7	..
1941-42	..	..	..	..	..	..	3101.7	2807.2	2480.5	2480.5	2480.5	2781.5	3149.6	..
1942-43	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1943-44	..	..	..	..	..	..	3428.4	3428.4	3428.4	3428.4	3428.4	3457.3	3492.7	..
1944-45	..	..	..	..	..	..	3177.0	2949.7	2698.3	2698.3	2698.3	2936.8	3228.4	..
1945-46	..	..	..	..	..	..	3101.7	2807.2	2480.5	2480.5	2480.5	2781.5	3149.6	..
1946-47	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1947-48	..	..	..	..	..	..	3105.7	2803.2	..	..	..	..	..	..
1948-49	..	..	..	..	..	..	3101.7	2807.2	..	..	..	..	..	..
1949-50	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1950-51	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1951-52	..	..	..	..	..	..	3105.7	2803.2	..	..	..	..	..	..
1952-53	..	..	..	..	..	..	3101.7	2807.2	..	..	..	..	..	..
1953-54	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1954-55	..	..	..	..	..	..	..	..	..	..	..	..	..	..
1955-56	..	..	..	..	..	..	3105.7	2803.2	..	..	..	2695.5	3172.7	..
1956-57	..	..	..	..	..	..	3101.7	2807.2	..	..	..	2781.5	3149.6	..
1957-58	..	..	..	..	..	..	..	..	..	..	..	..	..	..

TABLE 8
(English Units)
ARROW
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (KSFD)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	3579.6	3579.6	3579.6	3453.6	3453.6	3075.4	3059.9	3045.6	3030.1	3044.3	3069.1	3204.8	3579.6	3579.6
1929-30	..	..	..	..	..	..	2986.9	2906.5	2818.0	2837.8	2872.1	3060.2	..	..
1930-31	..	..	..	..	..	..	3075.4	3075.4	3075.4	3088.5	3111.2	3235.8	..	..
1931-32	..	..	..	..	..	..	2371.6	1712.7	1008.3	1016.0	1126.6	2224.5	..	..
1932-33	..	..	..	..	..	..	2363.5	1720.2	..	1008.3	1036.6	1761.7	3034.5	..
1933-34	..	..	..	..	..	..	..	..	..	..	1784.9	2327.4	3579.6	..
1934-35	..	..	..	..	..	..	..	..	..	..	1008.3	1725.7	3034.5	..
1935-36	..	..	..	..	..	..	2371.6	1712.7	..	1070.0	1373.5	2134.5	3579.6	..
1936-37	..	..	..	..	..	..	2928.6	2795.7	2648.9	2673.1	2723.4	3253.9	..	..
1937-38	..	..	..	..	..	..	2363.5	1720.2	1008.3	1082.9	1278.3	1831.1	3147.6	..
1938-39	..	..	..	..	..	..	2574.9	2123.0	1622.5	1692.9	1818.2	2648.0	3579.6	..
1939-40	..	..	..	..	..	..	2764.0	2472.7	2161.3	2203.8	2303.1	2870.4	..	..
1940-41	..	..	..	..	..	..	3075.4	3075.4	3075.4	3088.5	3111.2	3235.8	..	..
1941-42	..	..	..	..	..	..	2363.5	1720.2	1008.3	1064.9	1149.8	1934.0	..	..
1942-43	..	..	..	..	..	..	..	..	..	1111.2	1322.0	1440.3	2389.1	..
1943-44	..	..	..	..	..	..	3075.4	3075.4	3075.4	3088.5	3111.2	3235.8	3579.6	..
1944-45	..	..	..	..	..	..	2543.4	2063.1	1531.1	1559.7	1635.5	2297.2	3333.8	..
1945-46	..	..	..	..	..	..	2363.5	1720.2	1008.3	1072.6	1242.3	2201.4	3579.6	..
1946-47	..	..	..	..	..	..	..	..	..	1075.2	1360.6	2147.4	..	..
1947-48	..	..	..	..	..	..	2371.6	1712.7	..	1036.6	1183.2	2216.8	..	..
1948-49	..	..	..	..	..	..	2363.5	1720.2	..	1144.6	1376.0	2494.5	..	..
1949-50	..	..	..	..	..	..	..	..	..	1008.3	1008.3	1113.8	2232.3	..
1950-51	..	..	..	..	..	..	..	..	..	..	..	1355.5	3337.9	..
1951-52	..	..	..	..	..	..	2371.6	1712.7	..	1070.0	1345.2	1792.6	3013.9	..
1952-53	..	..	..	..	..	..	2363.5	1720.2	..	1057.2	1172.9	1476.3	..	..
1953-54	..	..	..	..	..	..	..	..	..	..	1134.3	1628.0	1898.0	..
1954-55	..	..	..	..	..	..	..	..	..	1075.2	1090.6	1653.7	3224.8	..
1955-56	..	..	..	..	..	..	2371.6	1712.7	..	1008.3	1216.6	1990.6	2993.4	..
1956-57	..	..	..	..	..	..	2363.5	1720.2	..	1077.8	1224.3	2651.4	3579.6	..
1957-58	..	..	..	..	..	..	..	..	..	1046.9	1190.9	2242.5	..	..

TABLE 9
(English Units)
DUNCAN
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (KSFD)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	705.8	705.8	705.8	705.8	705.8	504.1	418.0	340.3	340.3	340.3	340.3	443.3	574.2	705.8
1929-30	..	..	..	..	..	..	408.7	322.6	322.6	322.6	322.6	430.7	567.9	..
1930-31	..	..	..	..	..	..	390.7	288.3	288.3	288.3	288.3	406.1	555.5	..
1931-32	..	..	..	..	..	..	277.3	65.5	65.5	65.5	65.5	281.3	609.8	..
1932-33	..	..	..	..	..	..	273.7	..	..	..	..	191.6	573.3	..
1933-34	..	..	..	..	..	..	..	..	..	..	127.0	339.6	605.3	..
1934-35	..	..	..	..	..	..	..	..	..	..	65.5	187.2	488.1	..
1935-36	..	..	..	..	..	..	277.3	..	..	..	..	351.7	705.8	..
1936-37	..	..	..	..	..	..	378.0	264.1	264.1	264.1	264.1	388.7	546.8	..
1937-38	..	..	..	..	..	..	293.6	103.3	103.3	103.3	103.3	246.1	552.2	..
1938-39	..	..	..	..	..	..	287.7	92.2	92.2	92.2	92.2	399.0	705.8	..
1939-40	..	..	..	..	..	..	303.0	114.9	114.9	114.9	114.9	410.4	..	..
1940-41	..	..	..	..	..	..	345.5	202.1	202.1	202.1	202.1	344.2	524.5	..
1941-42	..	..	..	..	..	..	329.3	171.4	171.4	171.4	171.4	439.6	705.8	..
1942-43	..	..	..	..	..	..	332.5	177.4	177.4	177.4	220.2	288.4	653.0	..
1943-44	..	..	..	..	..	..	416.4	334.7	334.7	334.7	334.7	439.4	572.2	..
1944-45	..	..	..	..	..	..	384.6	276.8	276.8	276.8	276.8	493.4	705.8	..
1945-46	..	..	..	..	..	..	273.7	65.5	65.5	65.5	65.5	322.3	647.5	..
1946-47	..	..	..	..	..	..	..	..	..	..	..	314.0	629.6	..
1947-48	..	..	..	..	..	..	277.3	..	..	..	..	300.5	705.8	..
1948-49	..	..	..	..	..	..	370.9	250.5	250.5	256.4	276.5	434.0	..	..
1949-50	..	..	..	..	..	..	273.7	65.5	65.5	65.5	65.5	183.9	525.3	..
1950-51	..	..	..	..	..	..	..	..	..	..	..	285.1	534.2	..
1951-52	..	..	..	..	..	..	277.3	..	..	..	..	220.4	383.1	..
1952-53	..	..	..	..	..	..	273.7	..	..	..	..	234.6	522.7	..
1953-54	..	..	..	..	..	..	..	..	..	..	..	237.1	547.6	..
1954-55	..	..	..	..	..	..	..	..	..	..	..	154.5	488.8	..
1955-56	..	..	..	..	..	..	277.3	..	..	..	84.7	266.6	585.4	..
1956-57	..	..	..	..	..	..	273.7	..	..	..	65.5	376.0	655.8	..
1957-58	..	..	..	..	..	..	..	..	..	..	..	359.4	705.8	..

TABLE 10
(English Units)
COMPOSITE OPERATING RULE CURVES
FOR THE WHOLE OF CANADIAN STORAGE
END OF PERIOD TREATY STORAGE CONTENTS (KSFD)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	7814.6	7678.3	7229.7	6876.8	6139.9	4938.9	3525.5	3283.7	3258.3	3298.6	3433.3	4999.7	6973.9	7814.6
1929-30	..	..	..	..	..	..	3107.3	2757.1	2671.5	2704.8	3109.2	4749.6	6763.3	..
1930-31	..	..	..	..	..	..	3494.6	3188.9	3040.5	3061.6	3318.6	4769.5	6768.1	..
1931-32	..	..	..	..	..	..	1518.8	1118.5	1043.6	1035.7	1404.7	3724.5	6306.0	..
1932-33	..	..	..	..	..	..	1554.6	1398.4	1340.3	1349.9	1633.0	3495.7	6025.2	..
1933-34	..	..	..	..	..	..	669.9	300.7	316.2	481.2	1067.1	4007.6	6773.4	..
1934-35	..	..	..	..	..	..	2263.4	2035.9	2087.7	2145.5	2314.7	3736.6	6385.4	..
1935-36	..	..	..	..	..	..	2068.1	1796.5	1683.7	1661.0	1897.0	4193.8	6755.6	..
1936-37	..	..	..	..	..	..	3498.9	3283.7	3258.3	3298.6	3433.3	4999.7	7050.4	..
1937-38	..	..	..	..	..	..	2602.8	2394.4	2325.9	2374.3	2669.7	4021.3	6600.2	..
1938-39	..	..	..	..	..	..	3127.8	2834.9	2737.3	2745.4	3078.7	4792.8	7011.8	..
1939-40	..	..	..	..	..	..	2618.2	2378.8	2353.5	2469.0	2870.0	4587.5	6842.9	..
1940-41	..	..	..	..	..	..	3411.9	3251.5	3258.3	3293.1	3418.6	4999.7	7060.1	..
1941-42	..	..	..	..	..	..	3407.7	3220.8	2625.7	2641.7	2789.8	4506.4	6904.5	..
1942-43	..	..	..	..	..	..	3422.0	3226.8	2631.7	2694.0	3007.4	3974.0	6102.8	..
1943-44	..	..	..	..	..	..	3525.5	3283.7	3258.3	3298.6	3433.3	4999.7	7099.7	..
1944-45	..	..	..	..	..	..	3490.1	3283.7	3171.5	3172.7	3320.9	4871.2	6998.1	..
1945-46	..	..	..	..	..	..	1313.8	1102.9	1022.8	1025.2	1354.6	3532.7	6393.7	..
1946-47	..	..	..	..	..	..	1945.8	1725.0	1667.9	1709.1	2059.6	4087.8	6562.6	..
1947-48	..	..	..	..	..	..	1742.3	1495.3	1425.3	1387.5	1626.3	3731.6	6375.8	..
1948-49	..	..	..	..	..	..	3477.1	3283.7	2648.7	2757.6	3061.4	4999.7	6919.3	..
1949-50	..	..	..	..	..	..	2043.5	1733.7	1663.3	1663.2	1933.5	2995.4	5502.8	..
1950-51	..	..	..	..	..	..	2241.9	2109.2	2077.9	2062.4	2285.4	3423.2	6686.0	..
1951-52	..	..	..	..	..	..	2808.2	2477.6	2405.2	2372.7	2626.1	4125.2	6524.9	..
1952-53	..	..	..	..	..	..	3308.2	3114.9	2519.8	2528.1	2707.0	3956.2	6644.3	..
1953-54	..	..	..	..	..	..	1130.3	824.8	836.1	868.9	1168.1	3180.0	5113.6	..
1954-55	..	..	..	..	..	..	2374.5	2215.9	2191.5	2190.5	2474.1	3846.7	6345.9	..
1955-56	..	..	..	..	..	..	1541.0	1380.2	1317.5	1316.5	1648.1	3900.7	6434.0	..
1956-57	..	..	..	..	..	..	1859.4	1602.2	1540.4	1538.8	1844.9	3882.4	6750.1	..
1957-58	..	..	..	..	..	..	1453.1	1253.5	1249.9	1339.1	1721.5	3745.2	6568.4	..

TABLE 11
(English Units)
COMPARISON OF
RECENT ASSURED OPERATING PLAN STUDIES

	2000-01	2001-02	2002-03	2003-04 2004-05 1/	2005-06
MICA TARGET OPERATION					
(ksfd[xxxx.x] or cfs [xxxxx])					
AUG 15	3486.2	3486.2	3486.2	3499.2	3499.1
AUG 31	FULL	FULL	FULL	FULL	FULL
SEP	FULL	FULL	FULL	FULL	3524.1
OCT	3386.2	3396.2	3396.2	3374.1	3344.1
NOV	3056.2	20000	20000	20000	23000
DEC	25000	22000	22000	23000	25000
JAN	26000	24000	24000	25000	26000
FEB	23000	21000	21000	21000	22000
MAR	22000	22000	18000	19000	20000
APR 15	26000	326.2	281.3	204.1	16000
APR 30	106.2	56.2	15000	15000	13000
MAY	8000	10000	10000	10000	10000
JUN	8000	10000	10000	10000	10000
JUL	3456.2	3456.2	3456.2	3449.2	3449.1
COMPOSITE CRC1 CANADIAN TREATY STORAGE CONTENT (ksfd)					
1928 AUG 31	7814.6	7806.2	7811.1	7808.9	7678.3
1928 DEC	5402.7	5310.4	5811.1	5213.8	4938.9
1929 APR15	1597.9	1458.7	1452.6	1598.5	927.1
1929 JUL	7116.1	7453.0	7426.8	7280.7	7222.0
COMPOSITE CANADIAN TREATY STORAGE CONTENT (ksfd)					
50-yr Average for AOP01 & AOP02, 60-yr average for AOP03~AOP06					
AUG 31	7389.8	7412.3	7414.6	7415.0	7238.3
DEC	5157.8	5236.9	5226.9	4759.5	4437.3
APR15	1150.7	1135.3	1173.1	1097.7	1085.8
JUL	7273.7	7358.2	7339.0	7262.0	7215.5
STEP I GAINS AND LOSSES DUE TO REOPERATION (MW)					
U.S. Firm Energy	-0.3	0.2	-0.3	-1.2	-0.1
U.S. Dependable Peaking Capacity	-2.0	0.0	-18.0	16.0	-51.0
U.S. Average Annual Usable Secondary Energy	16.2	24.9	3.7	12.9	10.5
BCH Firm Energy	60.8	48.3	30.3	43.1	97.7
BCH Dependable Peaking Capacity	-36.0	25.0	26.0	8.0	2.0
BCH Average Annual Usable Secondary Energy	-43.6	-29.7	-17.3	-24.3	-55.7
COORDINATED HYDRO MODEL LOAD (MW)					
AUG 15	10043	10422	10368	10439	11097
AUG 31	10125	10439	10355	10435	11125
SEP	10095	10434	9911	10101	10809
OCT	10046	10388	10051	10186	9742
NOV	11381	11626	11716	11807	10817
DEC	12836	13012	13160	13377	12853
JAN	13484	13382	13707	13122	12735
FEB	12765	12502	12694	12240	11561
MAR	11807	11667	11858	11175	11275
APR 15	11332	11187	11460	10541	10550
APR 30	13025	12575	13101	13065	14061
MAY	14347	14647	14357	13752	14729
JUN	11925	12590	13324	13114	14039
JUL	11275	10493	10457	12079	12383
ANNUAL AVERAGE	11850	11919	11986	11933	12034

1/ The AOP/DDPB 2004-05 utilize the same system regulation studies as were utilized for the 2003-04 AOP/DDPB.

TABLE 1M
(Metric Units)
MICA PROJECT OPERATING CRITERIA
2005-06 ASSURED OPERATING PLAN

Period	End of Previous Period Arrow Storage Content (hm^3)	-------- Target Operation -------- Period Average Outflow (m^3/s)	End-of-Period Treaty Content 1/ (hm^3)	Minimum Outflow (m^3/s)	Minimum Treaty Storage Content 2/ (hm^3)
August 1-15	6361.2 - FULL	-	8560.9	424.75	0.0
	5284.7 - 6361.2	707.92			
	0.0 - 5284.7	906.14			
August 16-31	8318.4 - FULL	-	8634.5	424.75	0.0
	4770.9 - 8318.4	707.92			
	0.0 - 4770.9	906.14			
September	8416.3 - FULL	-	8622.1	283.17	0.0
	4648.5 - 8416.3	622.97			
	3669.9 - 4648.5	764.55			
	0.0 - 3669.9	906.14			
October	8012.6 - FULL	-	8181.7	283.17	0.0
	6189.9 - 8012.6	566.34			
	2691.3 - 6189.9	651.29			
	0.0 - 2691.3	906.14			
November	7413.2 - FULL	651.29		339.80	0.0
	7315.3 - 7413.2	566.34			
	1957.3 - 7315.3	679.60			
	0.0 - 1957.3	906.14			
December	6801.5 - FULL	707.92		594.65	10.0
	5994.2 - 6801.5	651.29			
	1468.0 - 5994.2	849.50			
	0.0 - 1468.0	906.14			
January	5725.0 - FULL	736.24		424.75	0.0
	5627.2 - 5725.0	679.60			
	3033.8 - 5627.2	821.19			
	0.0 - 3033.8	877.82			
February	3082.7 - FULL	622.97		424.75	0.0
	2617.9 - 3082.7	566.34			
	1859.4 - 2617.9	707.92			
	0.0 - 1859.4	736.24			
March	1712.6 - FULL	566.34		424.75	0.0
	1211.1 - 1712.6	538.02			
	244.7 - 1211.1	594.65			
	0.0 - 244.7	707.92			
April 1-15	3792.2 - FULL	453.07		368.12	0.0
	2434.4 - 3792.2	-	254.7		
	1786.0 - 2434.4	-	0.0		
	0.0 - 1786.0	679.60			
April 16-30	3033.8 - FULL	368.12		283.17	0.0
	2813.6 - 3033.8	339.80			
	0.0 - 2813.6	283.17			
May	1847.2 - FULL	283.17		226.53	0.0
	966.4 - 1847.2	226.53			
	819.6 - 966.4	396.44			
	0.0 - 819.6	226.53			
June	3669.9 - FULL	283.17		226.53	0.0
	2630.1 - 3669.9	226.53			
	1541.4 - 2630.1	283.17			
	0.0 - 1541.4	509.70			
July	5700.6 - FULL	-	8438.6	283.17	0.0
	4575.1 - 5700.6	509.70			
	0.0 - 4575.1	849.50			

1/ If the Mica target end-of-period storage content is less than 8634.5 hm^3, then a maximum outflow of 962.77 m^3/s will apply except April 1-15 when the maximum outflow is 821.19 m^3/s.

2/ Mica outflows will be reduced to minimum to maintain the reservoir above the minimum Treaty storage content. This will override any flow target.

TABLE 3M
(Metric Units)
CRITICAL RULE CURVES
END OF PERIOD TREATY STORAGE CONTENTS (hm^3)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
							MICA							
1928-29	8634.5	8634.5	8634.5	8255.1	7147.0	5263.4	3337.4	1887.6	1307.7	539.0	0.0	1126.2	4962.7	7262.7
1929-30	8634.5	7987.7	7495.9	5021.4	4506.6	3124.3	1025.9	852.2	516.5	736.4	1275.7	963.5	2019.7	6487.4
1930-31	7063.6	7083.9	6311.5	5868.9	4426.1	2939.3	1054.7	345.7	0.0	61.7	0.0	809.8	2174.0	3324.7
1931-32	3225.1	2727.0	2029.2	2522.0	1191.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							ARROW							
1928-29	8757.8	8424.4	7354.0	6851.9	6192.1	5586.8	2969.4	2268.0	1388.0	1386.5	1342.4	3499.1	7408.8	8757.4
1929-30	8286.6	8435.4	6752.1	6643.5	4543.8	2816.0	865.4	623.9	122.6	342.0	307.5	3625.6	7544.8	7468.0
1930-31	7808.6	7529.2	7234.1	5155.2	4372.8	2819.2	1019.3	79.3	0.0	144.3	33.5	1773.5	5875.3	7389.0
1931-32	7182.5	6476.9	5370.5	2696.2	1745.2	643.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							DUNCAN							
1928-29	1726.8	1726.8	1699.7	1717.8	1682.8	1233.3	989.9	573.2	349.6	342.8	330.3	617.8	1290.1	1649.3
1929-30	1457.0	1605.7	1664.4	1717.8	1093.6	1120.1	807.4	403.4	28.1	85.1	141.9	423.3	916.5	1224.3
1930-31	1222.6	1369.9	1532.1	1607.2	989.4	632.2	562.7	125.8	0.0	31.8	0.0	216.8	251.8	98.6
1931-32	48.9	4.9	2.4	4.9	2.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
							COMPOSITE							
1928-29	19119.2	18785.7	17688.2	16824.8	15021.9	12083.5	7296.7	4728.8	3045.3	2268.2	1672.7	5243.1	13661.6	17669.3
1929-30	18378.1	18028.8	15912.4	13382.7	10144.1	7060.4	2698.6	1879.5	667.2	1163.6	1725.1	5012.3	10481.0	15179.7
1930-31	16094.7	15982.9	15077.7	12631.3	9788.4	6390.8	2636.7	550.7	0.0	237.8	33.5	2800.1	8301.1	10812.3
1931-32	10456.5	9208.8	7402.2	5223.0	2938.6	643.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 4M
(Metric Units)
MICA
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (hm³)														
	450.7	1831.0	3307.1	3743.1	3902.8	3943.2	3930.7	3521.1	3537.8	3438.5	3593.1	5493.4	8147.2	8634.5
VARIABLE REFILL CURVES (hm³)														
1928-29							6130.0	5710.4	5462.5	5402.6	5429.0	6367.0	8157.7	8634.5
1929-30							3623.9	3108.2	2837.1	2821.4	3130.9	4881.5	7462.4	"
1930-31							4259.0	3765.1	3482.7	3414.0	3561.0	4930.1	7646.4	"
1931-32							2803.6	2464.5	2350.0	2356.3	2589.7	4210.1	7354.0	"
1932-33							2569.7	2316.9	2244.8	2246.2	2362.7	3958.8	6954.2	"
1933-34							576.2	367.7	282.3	319.0	643.7	3343.0	7572.5	"
1934-35							3369.0	3017.1	2916.1	2937.9	3036.0	4461.9	7146.3	"
1935-36							2867.9	2501.4	2357.5	2321.8	2481.6	4325.6	7779.9	"
1936-37							6101.1	5631.1	5347.3	5260.9	5404.5	6400.3	8236.7	"
1937-38							3482.7	3185.0	3070.5	3087.9	3241.7	4756.4	7577.9	"
1938-39							3779.8	3453.1	3205.0	3199.7	3398.6	4987.1	8215.9	"
1939-40							3245.9	2824.8	2618.8	2598.3	2841.7	4484.9	7628.3	"
1940-41							4704.1	4261.2	4026.6	4005.3	4365.7	5852.3	8191.5	"
1941-42							4613.6	4263.0	4100.5	4053.3	4166.1	5489.4	7952.4	"
1942-43							5038.5	4686.2	4576.1	4570.7	4870.4	6291.2	8161.1	"
1943-44							6368.5	5855.2	5604.7	5526.1	5620.3	6660.4	8576.1	"
1944-45							6139.3	5734.8	5533.2	5502.2	5549.6	6482.5	8377.9	"
1945-46							2061.5	1689.1	1571.0	1547.0	1697.9	3466.1	7340.3	"
1946-47							2352.2	2111.4	2063.5	2092.6	2304.0	4113.0	7512.8	"
1947-48							2227.4	1936.0	1850.9	1816.1	1938.2	3612.6	7235.6	"
1948-49							6378.0	6024.3	5873.3	5867.2	5982.4	6978.7	8634.5	"
1949-50							3097.2	2709.1	2566.2	2543.0	2676.3	4153.6	6773.9	"
1950-51							3075.6	2804.3	2739.7	2760.0	2964.3	4445.0	7658.3	"
1951-52							4070.9	3695.3	3568.4	3531.4	3656.9	5167.7	8018.7	"
1952-53							4758.9	4426.9	4323.4	4317.5	4389.4	5547.4	7937.7	"
1953-54							2008.4	1706.3	1663.0	1672.0	1803.1	3407.4	6705.6	"
1954-55							3867.1	3604.3	3540.7	3566.2	3703.4	4987.4	7181.3	"
1955-56							2762.2	2456.4	2342.1	2325.2	2468.1	4195.2	7449.2	"
1956-57							3174.7	2851.0	2772.5	2785.7	2930.0	4406.1	8258.0	"
1957-58							2767.8	2475.7	2413.3	2439.3	2623.0	4153.3	7676.9	"
DISTRIBUTION FACTORS							0.9750	0.9770	0.9740	0.9812	0.9650	0.7950	0.4950	N/A
FORECAST ERRORS (hm³)							1597.4	1248.5	1138.4	1087.3	1087.3	881.8	881.8	N/A
POWER DISCHARGE REQUIREMENTS (m³/s):														
ASSURED REFILL CURVE														
	84.95	84.95	84.95	84.95	84.95	84.95	84.95	242.65	84.98	209.20	84.95	85.04	680.20	1417.34
VARIABLE REFILL CURVES					98.68 km³		84.95	141.58	141.58	141.58	141.58	141.58	509.70	1076.04
(BY VOLUME RUNOFF AT THE DALLES)					117.18 km³		84.95	84.95	84.95	84.95	141.58	141.58	509.70	1076.04
					135.69 km³		84.95	84.95	84.95	84.95	141.58	141.58	509.70	1076.04
VARIABLE REFILL CURVE LOWER LIMITS					98.68 km³		550.2	590.4	662.5	809.8	1150.1	3574.0	6908.7	8634.5
(By VOLUME RUNOFF AT THE DALLES, hm³)					117.18 km³		96.2	0.0	50.6	66.8	0.0	1668.1	5620.3	8634.5
					135.69 km³		29.1	0.0	0.0	0.0	9.1	1611.6	4427.1	8634.5
LIMITING RULE CURVE (hm³)							750.4	124.5	0.0	0.5				

TABLE 5M
(Metric Units)
ARROW
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (hm^3)														
	0.0	0.0	0.0	0.0	251.5	2263.6	3704.9	3939.5	3958.4	4124.0	4276.4	5934.7	7842.8	8757.8
VARIABLE REFILL CURVES (hm^3)														
1928-29							6665.3	6571.8	6219.5	6287.8	6584.8	7702.6	7535.0	8757.8
1929-30							2988.5	3064.1	3223.4	3288.2	3945.6	6848.8	7704.6	"
1930-31							3825.0	3707.6	3480.5	3568.6	4027.8	6402.3	7553.4	"
1931-32							11.7	0.1	43.0	17.3	686.8	4240.9	6749.9	"
1932-33							1146.0	1093.9	1029.5	1045.9	1617.7	4657.3	6679.3	"
1933-34							4.9	207.7	331.0	698.0	1656.3	5657.8	7619.2	"
1934-35							1729.0	1803.6	2031.4	2151.1	2643.8	5385.7	7282.1	"
1935-36							1871.4	1733.7	1601.5	1581.7	1999.4	5375.9	7442.3	"
1936-37							7447.9	7225.3	6870.1	6843.4	7177.8	8151.6	7764.5	"
1937-38							2469.1	2420.4	2367.3	2468.4	3037.2	5822.7	7219.2	"
1938-39							3320.8	3257.2	3266.5	3291.7	3908.2	6550.0	7923.3	"
1939-40							2648.7	2714.0	2858.1	3161.3	3898.9	6522.6	7733.5	"
1940-41							5373.0	5384.0	5193.6	5601.0	6631.3	8379.8	8308.4	"
1941-42							5262.4	5290.3	5088.2	5143.7	5642.3	7179.8	7806.6	"
1942-43							6482.0	6341.6	6065.9	6079.1	6696.6	8437.6	7834.7	"
1943-44							8686.2	8601.5	8293.0	8289.1	8665.4	8757.8	8757.8	"
1944-45							7129.1	7142.4	6923.9	7044.5	7305.3	8215.7	8140.8	"
1945-46							1038.3	900.6	814.5	838.7	1456.0	4646.8	6994.3	"
1946-47							2204.6	1948.7	1857.0	1928.7	2574.8	5595.6	7204.0	"
1947-48							1723.9	1562.2	1476.0	1418.3	1880.5	4841.3	6998.7	"
1948-49							5562.8	5473.5	5258.0	5340.4	5879.2	7691.6	8757.8	"
1949-50							1513.5	1372.3	1342.9	1365.9	1893.9	4696.2	6615.1	"
1950-51							2219.3	2195.8	2183.8	2125.6	2747.3	5524.7	7395.8	"
1951-52							2478.7	2380.3	2186.5	2206.3	2671.7	5659.0	7320.7	"
1952-53							4109.6	4066.2	3883.7	3960.1	4305.8	6010.8	7271.3	"
1953-54							343.3	282.8	331.8	393.7	924.6	3935.4	6615.1	"
1954-55							1636.3	1740.0	1663.7	1760.6	2299.8	4839.4	7148.7	"
1955-56							905.2	824.7	773.1	783.6	1375.0	4798.3	6994.1	"
1956-57							1033.2	908.7	836.0	818.9	1423.4	4413.4	7428.9	"
1957-58							571.0	473.9	511.1	692.1	1428.6	4482.2	7055.5	"
DISTRIBUTION FACTORS							0.9710	0.9747	0.9691	0.9741	0.9530	0.7483	0.4631	N/A
FORECAST ERRORS (hm^3)							3016.9	2415.5	2019.2	1749.6	1749.6	1226.7	1226.7	N/A
POWER DISCHARGE REQUIREMENTS (m^3/s):														
ASSURED REFILL CURVE														
	141.58	141.58	141.58	141.58	141.58	141.58	141.58	236.81	203.57	251.79	343.71	599.61	1486.12	1984.95
VARIABLE REFILL CURVES					98.68 km^3		141.58	141.58	141.58	141.58	141.58	141.58	1529.11	1585.74
(BY VOLUME RUNOFF AT THE DALLES)					117.18 km^3		141.58	141.58	141.58	141.58	141.58	141.58	1529.11	1585.74
					135.69 km^3		141.58	141.58	141.58	141.58	141.58	141.58	1529.11	1585.74
VARIABLE REFILL CURVE LOWER LIMITS					98.68 km^3		339.3	518.4	925.8	1353.0	2038.0	5183.1	7436.7	8757.8

TABLE 6M
(Metric Units)
DUNCAN
ASSURED AND VARIABLE REFILL CURVES
DISTRIBUTION FACTORS AND FORECAST ERRORS
POWER DISCHARGE REQUIREMENTS, VARIABLE REFILL CURVE LOWER LIMITS, AND LIMITING RULE CURVE
2005 - 06 ASSURED OPERATING PLAN

	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
ASSURED REFILL CURVE (hm^3)														
	0.0	86.1	248.3	323.7	366.5	393.9	418.6	441.1	475.6	507.9	530.4	804.2	1380.1	1726.8
VARIABLE REFILL CURVES (hm^3)														
1928-29							1054.0	1044.2	1036.9	1033.4	1080.9	1183.7	1539.6	1726.8
1929-30							1050.1	1039.3	1031.2	1027.1	1109.3	1233.8	1567.8	"
1930-31							914.3	906.7	907.4	915.5	976.9	1110.3	1539.6	"
1931-32							243.2	238.8	257.6	277.4	381.7	661.3	1324.3	"
1932-33							20.0	4.8	5.0	10.5	14.9	283.6	1107.8	"
1933-34							219.5	256.9	288.7	323.2	495.9	806.9	1466.5	"
1934-35							439.7	450.7	477.1	484.7	543.4	778.8	1317.7	"
1935-36							320.5	318.1	319.8	321.5	387.3	712.7	1401.4	"
1936-37							926.5	916.5	913.6	909.4	956.9	1091.9	1495.9	"
1937-38							416.2	429.6	442.8	460.7	536.1	796.4	1384.5	"
1938-39							552.0	558.1	564.2	569.6	650.1	896.9	1497.6	"
1939-40							511.1	530.4	554.6	583.5	667.9	902.1	1469.4	"
1940-41							712.0	723.5	737.4	769.5	875.6	1089.0	1527.7	"
1941-42							701.7	718.8	733.5	743.8	809.3	1010.2	1478.5	"
1942-43							736.7	738.4	747.2	752.1	829.2	1065.0	1465.3	"
1943-44							1093.6	1096.8	1101.5	1102.9	1155.8	1263.7	1613.5	"
1944-45							903.3	907.9	914.5	916.0	962.5	1091.7	1510.8	"
1945-46							114.5	108.6	116.9	122.6	203.6	530.2	1308.2	"
1946-47							203.8	199.2	211.6	223.1	311.2	634.4	1339.3	"
1947-48							311.5	318.3	333.5	336.9	402.2	675.8	1364.7	"
1948-49							871.5	865.1	865.4	863.4	920.2	1097.1	1614.5	"
1949-50							389.0	385.8	392.7	392.4	452.4	696.8	1227.7	"
1950-51							190.1	205.8	229.0	230.5	314.6	613.9	1303.8	"
1951-52							461.2	461.4	476.1	479.5	545.1	819.4	1414.4	"
1952-53							458.2	459.7	472.2	477.1	538.0	766.8	1331.7	"
1953-54							24.2	28.9	50.9	60.2	130.2	437.5	1161.6	"
1954-55							306.1	312.2	324.7	333.0	395.1	644.9	1254.6	"
1955-56							102.8	95.7	108.1	112.1	189.1	550.0	1298.2	"
1956-57							341.3	332.2	337.9	343.0	416.7	679.2	1455.7	"
1957-58							118.2	117.2	133.6	144.8	223.4	527.5	1337.8	"
DISTRIBUTION FACTORS							0.9720	0.9790	0.9740	0.9790	0.9570	0.7580	0.4690	N/A
FORECAST ERRORS (hm^3)							289.7	266.7	238.5	215.5	215.5	179.3	179.3	N/A
POWER DISCHARGE REQUIREMENTS (m^3/s):														
ASSURED REFILL CURVE														
	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	2.83	10.45	44.17	5.18	77.87
VARIABLE REFILL CURVES					98.68 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
(BY VOLUME RUNOFF AT THE DALLES)					117.18 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
					135.69 km^3		2.83	2.83	2.83	2.83	2.83	50.97	56.63	99.11
VARIABLE REFILL CURVE LOWER LIMITS					98.68 km^3		466.1	99.3	151.9	200.4	280.9	790.5	1359.1	1726.8
(By VOLUME RUNOFF AT THE DALLES, hm^3)					117.18 km^3		67.5	46.0	41.3	0.0	81.2	500.6	1278.8	1726.8
					135.69 km^3		14.4	0.0	0.7	11.7	7.1	258.1	1087.8	1726.8
LIMITING RULE CURVE (hm^3)							87.8	10.5	0.0	0.0				

TABLE 7M
(Metric Units)
MICA
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (hm^3)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	8634.5	8634.5	8634.5	8387.9	8387.9	8387.9	8263.9	8152.3	8028.5	8028.5	8028.5	8202.5	8415.1	8634.5
1929-30	"	"	"	"	"	"	8192.0	8015.3	7819.1	7819.1	7819.1	8053.2	8339.5	"
1930-31	"	"	"	"	"	"	8387.9	8387.9	8387.9	8387.9	8387.9	8458.6	8545.2	"
1931-32	"	"	"	"	"	"	7598.4	6858.3	6068.8	6068.8	6068.8	6805.2	7705.8	"
1932-33	"	"	"	"	"	"	7588.6	6868.1	"	"	"	"	"	"
1933-34	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1934-35	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1935-36	"	"	"	"	"	"	7598.4	6858.3	"	"	"	"	"	"
1936-37	"	"	"	"	"	"	8137.1	7910.8	7660.1	7660.1	7660.1	8113.2	8303.3	"
1937-38	"	"	"	"	"	"	7588.6	6868.1	6068.8	6068.8	6068.8	6805.2	7705.8	"
1938-39	"	"	"	"	"	"	7804.9	7277.2	6694.1	6694.1	6694.1	7251.2	7932.1	"
1939-40	"	"	"	"	"	"	7983.3	7605.7	7201.3	7201.3	7201.3	7612.6	8115.6	"
1940-41	"	"	"	"	"	"	8387.9	8387.9	8387.9	8387.9	8387.9	8458.6	8545.2	"
1941-42	"	"	"	"	"	"	7588.6	6868.1	6068.8	6068.8	6068.8	6805.2	7705.8	"
1942-43	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1943-44	"	"	"	"	"	"	8387.9	8387.9	8387.9	8387.9	8387.9	8458.6	8545.2	"
1944-45	"	"	"	"	"	"	7772.8	7216.7	6601.7	6601.7	6601.7	7185.2	7898.6	"
1945-46	"	"	"	"	"	"	7588.6	6868.1	6068.8	6068.8	6068.8	6805.2	7705.8	"
1946-47	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1947-48	"	"	"	"	"	"	7598.4	6858.3	"	"	"	"	"	"
1948-49	"	"	"	"	"	"	7588.6	6868.1	"	"	"	"	"	"
1949-50	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1950-51	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1951-52	"	"	"	"	"	"	7598.4	6858.3	"	"	"	"	"	"
1952-53	"	"	"	"	"	"	7588.6	6868.1	"	"	"	"	"	"
1953-54	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1954-55	"	"	"	"	"	"	"	"	"	"	"	"	"	"
1955-56	"	"	"	"	"	"	7598.4	6858.3	"	"	"	6594.8	7762.3	"
1956-57	"	"	"	"	"	"	7588.6	6868.1	"	"	"	6805.2	7705.8	"
1957-58	"	"	"	"	"	"	"	"	"	"	"	"	"	"

TABLE 8M
(Metric Units)
ARROW
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (hm^3)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	8757.8	8757.8	8757.8	8449.6	8449.6	7524.3	7486.4	7451.4	7413.4	7448.2	7508.9	7840.9	8757.8	8757.8
1929-30	"	"	"	"	"	"	7307.7	7111.0	6894.5	6943.0	7026.9	7487.1	"	"
1930-31	"	"	"	"	"	"	7524.3	7524.3	7524.3	7556.3	7611.9	7916.7	"	"
1931-32	"	"	"	"	"	"	5802.4	4190.3	2466.9	2485.7	2756.3	5442.5	"	"
1932-33	"	"	"	"	"	"	5782.5	4208.6	"	2466.9	2536.1	4310.2	7424.2	"
1933-34	"	"	"	"	"	"	"	"	"	"	4366.9	5694.2	8757.8	"
1934-35	"	"	"	"	"	"	"	"	"	"	2466.9	4222.1	7424.2	"
1935-36	"	"	"	"	"	"	5802.4	4190.3	"	2617.9	3360.4	5222.3	8757.8	"
1936-37	"	"	"	"	"	"	7165.1	6840.0	6480.8	6540.0	6663.1	7961.0	"	"
1937-38	"	"	"	"	"	"	5782.5	4208.6	2466.9	2649.4	3127.5	4480.0	7700.9	"
1938-39	"	"	"	"	"	"	6299.8	5194.1	3969.6	4141.8	4448.4	6478.6	8757.8	"
1939-40	"	"	"	"	"	"	6762.4	6049.7	5287.8	5391.8	5634.8	7022.7	"	"
1940-41	"	"	"	"	"	"	7524.3	7524.3	7524.3	7556.3	7611.9	7916.7	"	"
1941-42	"	"	"	"	"	"	5782.5	4208.6	2466.9	2605.4	2813.1	4731.7	"	"
1942-43	"	"	"	"	"	"	"	"	"	2718.7	3234.4	3523.8	5845.2	"
1943-44	"	"	"	"	"	"	7524.3	7524.3	7524.3	7556.3	7611.9	7916.7	8757.8	"
1944-45	"	"	"	"	"	"	6222.7	5047.6	3746.0	3816.0	4001.4	5620.3	8156.5	"
1945-46	"	"	"	"	"	"	5782.5	4208.6	2466.9	2624.2	3039.4	5385.9	8757.8	"
1946-47	"	"	"	"	"	"	"	"	"	2630.6	3328.8	5253.8	"	"
1947-48	"	"	"	"	"	"	5802.4	4190.3	"	2536.1	2894.8	5423.6	"	"
1948-49	"	"	"	"	"	"	5782.5	4208.6	"	2800.4	3366.5	6103.0	"	"
1949-50	"	"	"	"	"	"	"	"	"	2466.9	2466.9	2725.0	5461.5	"
1950-51	"	"	"	"	"	"	"	"	"	"	"	3316.4	8166.5	"
1951-52	"	"	"	"	"	"	5802.4	4190.3	"	2617.9	3291.2	4385.8	7373.8	"
1952-53	"	"	"	"	"	"	5782.5	4208.6	"	2586.5	2869.6	3611.9	"	"
1953-54	"	"	"	"	"	"	"	"	"	"	2775.2	3983.1	4643.6	"
1954-55	"	"	"	"	"	"	"	"	"	2630.6	2668.3	4045.9	7889.8	"
1955-56	"	"	"	"	"	"	5802.4	4190.3	"	2466.9	2976.5	4870.2	7323.7	"
1956-57	"	"	"	"	"	"	5782.5	4208.6	"	2636.9	2995.4	6486.9	8757.8	"
1957-58	"	"	"	"	"	"	"	"	"	2561.3	2913.7	5486.5	"	"

TABLE 9M
(Metric Units)
DUNCAN
UPPER RULE CURVES (FLOOD CONTROL)
END OF PERIOD TREATY STORAGE CONTENTS (hm^3)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	1726.8	1726.8	1726.8	1726.8	1726.8	1233.3	1022.7	832.6	832.6	832.6	832.6	1084.6	1404.8	1726.8
1929-30	"	"	"	"	"	"	999.9	789.3	789.3	789.3	789.3	1053.8	1389.4	"
1930-31	"	"	"	"	"	"	955.9	705.4	705.4	705.4	705.4	993.6	1359.1	"
1931-32	"	"	"	"	"	"	678.4	160.3	160.3	160.3	160.3	688.2	1491.9	"
1932-33	"	"	"	"	"	"	669.6	"	"	"	"	468.8	1402.6	"
1933-34	"	"	"	"	"	"	"	"	"	"	310.7	830.9	1480.9	"
1934-35	"	"	"	"	"	"	"	"	"	"	160.3	458.0	1194.2	"
1935-36	"	"	"	"	"	"	678.4	"	"	"	"	860.5	1726.8	"
1936-37	"	"	"	"	"	"	924.8	646.1	646.1	646.1	646.1	951.0	1337.8	"
1937-38	"	"	"	"	"	"	718.3	252.7	252.7	252.7	252.7	602.1	1351.0	"
1938-39	"	"	"	"	"	"	703.9	225.6	225.6	225.6	225.6	976.2	1726.8	"
1939-40	"	"	"	"	"	"	741.3	281.1	281.1	281.1	281.1	1004.1	"	"
1940-41	"	"	"	"	"	"	845.3	494.5	494.5	494.5	494.5	842.1	1283.2	"
1941-42	"	"	"	"	"	"	805.7	419.3	419.3	419.3	419.3	1075.5	1726.8	"
1942-43	"	"	"	"	"	"	813.5	434.0	434.0	434.0	538.7	705.6	1597.6	"
1943-44	"	"	"	"	"	"	1018.8	818.9	818.9	818.9	818.9	1075.0	1399.9	"
1944-45	"	"	"	"	"	"	941.0	677.2	677.2	677.2	677.2	1207.2	1726.8	"
1945-46	"	"	"	"	"	"	669.6	160.3	160.3	160.3	160.3	788.5	1584.2	"
1946-47	"	"	"	"	"	"	"	"	"	"	"	768.2	1540.4	"
1947-48	"	"	"	"	"	"	678.4	"	"	"	"	735.2	1726.8	"
1948-49	"	"	"	"	"	"	907.4	612.9	612.9	627.3	676.5	1061.8	"	"
1949-50	"	"	"	"	"	"	669.6	160.3	160.3	160.3	160.3	449.9	1285.2	"
1950-51	"	"	"	"	"	"	"	"	"	"	"	697.5	1307.0	"
1951-52	"	"	"	"	"	"	678.4	"	"	"	"	539.2	937.3	"
1952-53	"	"	"	"	"	"	669.6	"	"	"	"	574.0	1278.8	"
1953-54	"	"	"	"	"	"	"	"	"	"	"	580.1	1339.8	"
1954-55	"	"	"	"	"	"	"	"	"	"	"	378.0	1195.9	"
1955-56	"	"	"	"	"	"	678.4	"	"	"	207.2	652.3	1432.2	"
1956-57	"	"	"	"	"	"	669.6	"	"	"	160.3	919.9	1604.5	"
1957-58	"	"	"	"	"	"	"	"	"	"	"	879.3	1726.8	"

TABLE 10M
(Metric Units)
COMPOSITE OPERATING RULE CURVES
FOR THE WHOLE OF CANADIAN STORAGE
END OF PERIOD TREATY STORAGE CONTENTS (hm^3)
2005 - 06 ASSURED OPERATING PLAN

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
1928-29	19119.2	18785.7	17688.2	16824.8	15021.9	12083.5	8625.5	8033.9	7971.8	8070.4	8399.9	12232.3	17062.3	19119.2
1929-30	"	"	"	"	"	"	7602.3	6745.5	6536.1	6617.6	7607.0	11620.4	16547.1	"
1930-31	"	"	"	"	"	"	8549.9	7802.0	7438.9	7490.5	8119.3	11669.1	16558.8	"
1931-32	"	"	"	"	"	"	3715.9	2736.5	2553.2	2533.9	3436.7	9112.4	15428.2	"
1932-33	"	"	"	"	"	"	3803.5	3421.3	3279.3	3302.7	3995.3	8552.6	14741.3	"
1933-34	"	"	"	"	"	"	1639.0	735.7	773.6	1177.3	2610.8	9805.0	16571.8	"
1934-35	"	"	"	"	"	"	5537.6	4981.0	5107.8	5249.2	5663.1	9142.0	15622.5	"
1935-36	"	"	"	"	"	"	5059.8	4395.3	4119.3	4063.8	4641.2	10260.6	16528.3	"
1936-37	"	"	"	"	"	"	8560.4	8033.9	7971.8	8070.4	8399.9	12232.3	17249.5	"
1937-38	"	"	"	"	"	"	6368.0	5858.1	5690.5	5809.0	6531.7	9838.5	16148.0	"
1938-39	"	"	"	"	"	"	7652.5	6935.9	6697.1	6716.9	7532.3	11726.1	17155.1	"
1939-40	"	"	"	"	"	"	6405.7	5820.0	5758.1	6040.7	7021.7	11223.8	16741.8	"
1940-41	"	"	"	"	"	"	8347.6	7955.1	7971.8	8056.9	8363.9	12232.3	17273.2	"
1941-42	"	"	"	"	"	"	8337.3	7880.0	6424.0	6463.2	6825.5	11025.4	16892.5	"
1942-43	"	"	"	"	"	"	8372.3	7894.7	6438.7	6591.1	7357.9	9722.8	14931.1	"
1943-44	"	"	"	"	"	"	8625.5	8033.9	7971.8	8070.4	8399.9	12232.3	17370.1	"
1944-45	"	"	"	"	"	"	8538.9	8033.9	7759.4	7762.3	8124.9	11917.9	17121.6	"
1945-46	"	"	"	"	"	"	3214.3	2698.4	2502.4	2508.3	3314.2	8643.1	15642.8	"
1946-47	"	"	"	"	"	"	4760.6	4220.4	4080.7	4181.5	5039.0	10001.2	16056.1	"
1947-48	"	"	"	"	"	"	4262.7	3658.4	3487.1	3394.7	3978.9	9129.7	15599.0	"
1948-49	"	"	"	"	"	"	8507.1	8033.9	6480.3	6746.7	7490.0	12232.3	16928.8	"
1949-50	"	"	"	"	"	"	4999.6	4241.7	4069.4	4069.2	4730.5	7328.5	13463.2	"
1950-51	"	"	"	"	"	"	5485.0	5160.4	5083.8	5045.9	5591.5	8375.2	16358.0	"
1951-52	"	"	"	"	"	"	6870.5	6061.7	5884.6	5805.0	6425.0	10092.7	15963.8	"
1952-53	"	"	"	"	"	"	8093.8	7620.9	6164.9	6185.2	6622.9	9679.2	16255.9	"
1953-54	"	"	"	"	"	"	2765.4	2018.0	2045.6	2125.9	2857.9	7780.2	12510.9	"
1954-55	"	"	"	"	"	"	5809.5	5421.4	5361.7	5359.3	6053.1	9411.3	15525.8	"
1955-56	"	"	"	"	"	"	3770.2	3376.8	3223.4	3220.9	4032.2	9543.5	15741.4	"
1956-57	"	"	"	"	"	"	4549.2	3919.9	3768.7	3764.8	4513.7	9498.7	16514.8	"
1957-58	"	"	"	"	"	"	3555.2	3066.8	3058.0	3276.2	4211.8	9163.0	16070.2	"

TABLE 11M
(Metric Units)
COMPARISON OF
RECENT ASSURED OPERATING PLAN STUDIES

	2000-01	2001-02	2002-03	2003-04 2004-05 1/	2005-06
MICA TARGET OPERATION					
(hm³ [xxxx.x] or m³/s [xxxx.xx])					
AUG 15	8529.3	8529.3	8529.3	8561.1	8560.9
AUG 31	FULL	FULL	FULL	FULL	FULL
SEP	FULL	FULL	FULL	FULL	8622.1
OCT	8284.7	8309.1	8309.1	8255.1	8181.7
NOV	7477.3	566.34	566.34	566.34	651.29
DEC	707.92	622.97	622.97	651.29	707.92
JAN	736.24	679.60	679.60	707.92	736.24
FEB	651.29	594.65	594.65	594.65	622.97
MAR	622.97	622.97	509.70	538.02	566.34
APR 15	736.23	798.1	688.2	499.4	453.07
APR 30	259.8	137.5	424.75	424.75	368.12
MAY	226.53	283.17	283.17	283.17	283.17
JUN	226.53	283.17	283.17	283.17	283.17
JUL	8455.9	8455.9	8455.9	8438.8	8438.6
COMPOSITE CRC1 CANADIAN TREATY STORAGE CONTENT (hm³)					
1928 AUG 31	19119.2	19098.6	19110.6	19105.3	18785.7
1928 DEC	13218.2	12992.4	14217.4	12756.1	12083.5
1929 APR15	3909.4	3568.9	3553.9	3910.9	2268.2
1929 JUL	17410.3	18234.5	18170.4	17813.0	17669.3
COMPOSITE CANADIAN TREATY STORAGE CONTENT (hm³)					
50-yr Average for AOP01 & AOP02, 60-yr average for AOP03-AOP06					
AUG 31	18079.9	18134.9	18140.6	18141.5	17709.2
DEC	12619.1	12812.6	12788.1	11644.6	10856.3
APR15	2815.3	2777.6	2870.1	2685.6	2656.5
JUL	17795.8	18002.6	17955.6	17767.2	17653.4
STEP I GAINS AND LOSSES DUE TO REOPERATION (MW)					
U.S. Firm Energy	-0.3	0.2	-0.3	-1.2	-0.1
U.S. Dependable Peaking Capacity	-2.0	0.0	-18.0	16.0	-51.0
U.S. Average Annual Usable Secondary Energy	16.2	24.9	3.7	12.9	10.5
BCH Firm Energy	60.8	48.3	30.3	43.1	97.7
BCH Dependable Peaking Capacity	-36.0	25.0	26.0	8.0	2.0
BCH Average Annual Usable Secondary Energy	-43.6	-29.7	-17.3	-24.3	-55.7
COORDINATED HYDRO MODEL LOAD (MW)					
AUG 15	10043	10422	10368	10439	11097
AUG 31	10125	10439	10355	10435	11125
SEP	10095	10434	9911	10101	10809
OCT	10046	10388	10051	10186	9742
NOV	11381	11626	11716	11807	10817
DEC	12836	13012	13160	13377	12853
JAN	13484	13382	13707	13122	12735
FEB	12765	12502	12694	12240	11561
MAR	11807	11667	11858	11175	11275
APR 15	11332	11187	11460	10541	10550
APR 30	13025	12575	13101	13065	14061
MAY	14347	14647	14357	13752	14729
JUN	11925	12590	13324	13114	14039
JUL	11275	10493	10457	12079	12383
ANNUAL AVERAGE	11850	11919	11986	11933	12034

1/ The 2004-05 AOP/DDPB utilize the same system regulation studies as were utilized for the 2003-04 AOP/DDPB.

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Canadian Projects					
Mica (1890)	Minimum Flow	3000 cfs			In place in AOP79, AOP80, AOP84
Arrow (1831)	Minimum Flow	5000 cfs			In place in AOP79, AOP80, AOP84
	Draft Limit		1 ft/day		
Duncan (1681)	Minimum Flow	100 cfs			In place in AOP79, AOP80, AOP84
	Maximum Flow	10000 cfs			In place in AOP79, AOP80, AOP84
	Draft Limit		1 ft/day		
	Other			Operate to meet IJC orders for Corra Linn	CRTOC agreement on procedures to implement 1938 IJC order
Base System					
Hungry Horse (1530)	Minimum Flow	400 cfs		Minimum project discharge	In place in AOP79, AOP80, AOP84
	Maximum Flow			None	
	Minimum Content			None	
	Other			No VECC limit	VECC limit not in place in AOP79
Kerr (1510)	Minimum Flow	1500 cfs		All periods	In place in AOP80, AOP84
	Maximum Flow			None	
	Minimum Content	614.7 ksfd 426.3 ksfd	2893.0 ft 2890.0 ft	Jun - Sep May	MPC 2-1-92, PNCA submittal similar operation, Jun-Aug 15, in AOP80
		0.0 ksfd	2883.0 ft	Empty Apr 15	FERC, AOP80
	Maximum Content	58.6 ksfd	2884.0 ft	March (Included to help meet the Apr 15 FERC requirement.)	In place in AOP80, and AOP84
	Other	0.0 ksfd	2883.0 ft	Conditions permitted, should be on or about, empty Mar and Apr 15.	FERC, AOP80
Thompson Falls (1490)				None Noted	
Noxon Rapids (1480)	Minimum Content For Step I:	116.3 ksfd 112.3 ksfd 78.7 ksfd 26.5 ksfd 0.0 ksfd	2331.0 ft 2330.0 ft 2321.0 ft 2305.0 ft 2295.0 ft	May - Aug 31, Sep - Jan, Feb, Mar, Empty Apr 15, Apr 30, and for end of CP.	In place in AOP84, similar operation in AOP80
	Minimum & Maximum Content				

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
	For Steps II & III:	116.3 ksfd	2331.0 ft	All periods	In place in AOP79, AOP84
Cabinet Gorge (1475)				None Noted	
Albeni Falls (1465)	Minimum Flow	4000 cfs		All periods	In place in AOP80, AOP84
	Minimum Content	(Dec may fill on restriction, note below)			
		582.4 ksfd	2062.5 ft	Jun - Aug 31	In place in AOP80, AOP84
		465.7 ksfd	2060.0 ft	Sep	
		190.4 ksfd	2054.0 ft	Oct	
		57.6 ksfd	2051.0 ft	Nov-Apr 15	
		190.4 ksfd	2054.0 ft	Apr 30 (empty at end of CP)	
		279.0 ksfd	2056.0 ft	May	
	For Steps I & II:	Optimum to run CP & LT to Jun-Oct SMINs.			
	For Step III:	Keep full at beginning of CP. Often (not always) optimum to run higher than SMIN in CP & LT (except when occasionally drafting below SMIN to meet load).			
		57.6 ksfd	2051.0 ft	Nov - Mar	
		458.4 ksfd	2059.8 ft	May	
		582.4 ksfd	2062.5 ft	Sep	
		465.7 ksfd	2060.0 ft	Oct	
	Kokanee Spawning	Draft no more than 1 ft below Nov 20 elevation through Dec 31. If project fills, draft no more than 0.5 ft. Dec 31 - Mar 31 operate between SMIN and URC within above noted draft limits.			In place before AOP80 and supported by minimum contents noted above.
	Other Spill	50 cfs		All periods	
Box Canyon (1460)				None Noted	
Grand Coulee (1280)	Minimum Flow	30000 cfs		All periods	In place in AOP79, AOP80, AOP84
	Minimum Content				
		0.0 ksfd	1208.0 ft	Empty at end of CP	
	Step I only:	843.9 ksfd	1240.0 ft	May and June	Retain as a power operation (for pumping)
	Steps II & III only:	857.9 ksfd	1240.0 ft	May and June	
	Maximum Content				
	Step I only:		2 ft	Operating room Sep - Nov	In place in AOP89. Retain as a power operation
			3 ft	Operating room Dec - Feb	
	Steps II & III only:	2557.1 ksfd	1288.0 ft	Aug-Nov	
		2518.3 ksfd	1287.0 ft	Dec-Feb	
	Draft Limit		1.3 ft/day	(bank sloughage)	
			1.5 ft/day	(Constraint submitted as 1.5 ft/day interpreted as 1.3 ft/day mo.ave.)	
Chief Joseph (1270)	Other Spill	500 cfs		All periods	

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Wells (1220)	Other Spill	1200 cfs		All periods	With fish ladder
	Fish Spill			Removed	
Rocky Reach (1200)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	200 cfs		Aug 31 - Apr 15 (leakage)	
	Fish Spill			Removed	
Rock Island (1170)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Fish Spill			Removed	
Wanapum (1165)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	2200 cfs		All periods	With fish ladder
	Fish Spill			Removed	
Priest Rapids (1160)	Minimum Flow			Limit removed	
	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	2200 cfs		All periods	With fish ladder
	Fish Spill			Removed	
Brownlee (767)	Minimum Flow	5000 cfs		All periods	In place in AOP79, AOP80, AOP84
	Power Operation			Agree to use "old" power operation (first codes) provided by IPC and used in AOP since AOP97 for CP.	2-1-91 PNCA submittal
				LT run to PDP using rule curves from CP with BECC created from regulation spreadsheet to meet flow requirements at Lime Pt., and Brownlee and mimic the "old" historic first code operation on a 60 year average and median comparison. Consistent w/ TSR.	7-00 J. Hyde
Oxbow (765)	Other Spill	100 cfs		All periods	
Ice Harbor (502)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	740 cfs		All periods	
	Incremental Spill			None	
	Fish Spill			None	
	Minimum Flow			None	
	Other	204.8 ksfd	440.0 ft	Run at all periods	
McNary (488)	Other Spill	3475 cfs		All periods	
	Incremental Spill			None	

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
John Day (440)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	800 cfs		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
	Minimum Flow	50000 cfs 12500 cfs		Mar - Nov Dec - Feb	
	Other Step I:	269.7 ksfd 242.5 ksfd 153.7 ksfd 114.9 ksfd	268.0 ft 267.0 ft 263.6 ft 262.0 ft	June - Aug 15 Aug 31 - Sep Oct - Mar Apr 15 - May	In place AOP80
	Steps II & III:	190.0 ksfd	265.0 ft	Use JDA as run-of-river plant.	
The Dalles (365)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	1300 cfs		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
	Minimum Flow	50000 cfs 12500 cfs		Mar - Nov Dec - Feb	
Bonneville (320)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	8040 cfs		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
Kootenay Lake (Corra Linn (1665))	Minimum Flow	5000 cfs		All periods	BCHydro agreements 1969
	Other			Operate to IJC orders.	CRTOC agreement on procedures to implement 1938 IJC order
Chelan (1210)	Minimum Flow	50 cfs		All periods	In place in AOP79, AOP80, AOP84
	Minimum Content	308.5 ksfd	1098.0 ft	Jul - Sep (except as needed to empty at end of critical period).	In place in AOP79, AOP80, AOP84
Couer d'Alene L (1341)	Minimum Flow	50 cfs		All periods	
	Minimum Content	112.5 ksfd	2128.0 ft	May - Aug	In place in AOP79
Post Falls (1340)	Minimum Flow	50 cfs		All periods	In place in AOP79, AOP80, AOP84

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Other Major Step I Projects					
Libby (1760)					
	Minimum Flow	4000 cfs		All periods	
	Other Spill	200 cfs		All periods	
	Minimum Content	By contract year: Aug-Jul i.e., 1929 = Aug 1928 - Jul 1929			
		776.9 ksfd	2363.0 ft	1929 Dec	2-1-93 PNCA submittal, in place in AOP99
		676.5 ksfd	2355.0 ft	1929 Jan	
		603.6 ksfd	2349.0 ft	1929 Feb	
		2147.7 ksfd	2443.0 ft	1929 Jul	
		652.0 ksfd	2353.0 ft	1930 Dec	
		433.2 ksfd	2334.0 ft	1930 Jan	
		389.3 ksfd	2330.0 ft	1930 Feb	
		348.5 ksfd	2326.0 ft	1930 Mar	
		297.4 ksfd	2321.0 ft	1930 Apr 15	
		444.2 ksfd	2335.0 ft	1930 Apr 30	
		499.1 ksfd	2340.0 ft	1930 May	
		1344.6 ksfd	2402.0 ft	1930 Jun	
		1771.9 ksfd	2425.0 ft	1930 Jul	
		317.8 ksfd	2323.0 ft	1931 Dec	
		192.2 ksfd	2310.0 ft	1931 Jan	
		103.1 ksfd	2300.0 ft	1931 Feb-Apr 30	
		192.2 ksfd	2310.0 ft	1931 May	
		676.5 ksfd	2355.0 ft	1931 Jun	
		868.0 ksfd	2370.0 ft	1931 Jul	
		174.4 ksfd	2308.0 ft	1932 Dec	
		103.1 ksfd	2300.0 ft	1932 Jan	
		0.0 ksfd	2287.0 ft	Empty at end of CP***	
		776.9 ksfd	2363.0 ft	All Dec	
		July 1930 - No more than 373.1 ksfd lower than July 1929 July 1931 - No more than 857.1 ksfd lower than July 1930 March - Implement PNCA 6(c)2(c).			2-1-94 PNCA submittal, in place in AOP00 and AOP01
	Maximum Summer		5 ft		
	Other			Operate to meet IJC orders for Corra Linn	CRTOC agreement on procedures to implement 1938 IJC order

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements					Source
Dworshak (535)	Minimum Flow	1300 cfs			All periods		2-1-99 PNCA submittal
	Maximum Flow	14000 cfs			Apr 15 - Aug31 (model requirement includes 14000 cfs for all period but URC generally overrides.)		2-1-99 PNCA submittal
		25000 cfs			Up to 25 kcfs for flood control all periods.		
	Minimum Content	395.8 ksfd		1520.0 ft	SMIN Apr 15 - Aug 31		
	Start 3 yr CP at:	395.8 ksfd		1520.0 ft	Aug 15		
	End 3 yr CP at:	218.4 ksfd		1490.2 ft	Feb		
	Other	Run on minimum flow or flood control observing maximum & minimum flow requirements all periods except to meet LWG Target flows (based on sliding scale):					2-1-99 PNCA submittal
	LWG Target Flow	75200 cfs	to	88200 cfs	Apr 15 [(2x11500)+(13x85000)]/15 [(2x11500)+(13x100000)]/15		Used for refill studies
		75200 cfs	to	93333 cfs	Apr 15 [(2x11500)+(13x85000)]/15 [(2x50000)+(13x100000)]/15		Used for Long-Term studies
		85000 cfs	to	100000 cfs	Apr 30 - May 30		
		73333 cfs	to	85000 cfs	Jun 30		
		50000 cfs	to	55000 cfs	Jul - Aug 31		
	Other Spill	100 cfs			All periods		
Lower Granite (520)	Bypass Date				None		
	Other Spill	670 cfs			All periods		
	Incremental Spill				Removed		
	Fish Spill	(only if regulated flow ≥ 85000 cfs)					2-1-99 PNCA submittal
				19500 cfs	Apr 15	[22500*13/15]	
				22500 cfs	Apr 30 & May		
				15000 cfs	Jun	[22500*20/30]	
	Maximum Fish Spill	22500 cfs					
	Minimum Flow	11500 cfs			Mar-Nov		
	Other	224.9 ksfd		733 ft	On MOP Apr 15 - Oct 31.		
		245.8 ksfd		738 ft	On full pool Nov 30 - Mar 31.		

Appendix A1
(English Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:
Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements				Source
Little Goose (518)	Bypass Date			None		
	Other Spill	630 cfs		All periods		
	Incremental Spill			Removed		
	Fish Spill	(only if regulated flow at Lower Granite ≥ 85000 cfs)	26000 cfs 30000 cfs 20000 cfs	Apr 15 Apr 30 & May Jun	[30000*13/15] [30000*20/30]	2-1-99 PNCA submittal
	Maximum Fish Spill	30000 cfs				
	Minimum Flow	11500 cfs		Mar - Nov		
	Other	260.5 ksfd 285.0 ksfd	633.0 ft 638.0 ft	On MOP Apr 15 - Aug 31. On full pool Sep 30 - Mar 31.		
Lower Monumental (504)	Bypass Date			A bypass date of 2010 was assumed.		
	Other Spill	750 cfs		All periods		
	Fish Spill	(only if regulated flow at Lower Granite ≥ 85000 cfs)	17333 cfs 20000 cfs 13333 cfs	Apr 15 Apr 30 & May Jun	[20000*13/15] [20000*20/30]	2-1-99 PNCA submittal
	Maximum Fish Spill	20000 cfs				
	Minimum Flow	11500 cfs		Mar-Nov		
	Other	180.5 ksfd 190.1 ksfd	537.0 ft 540.0 ft	On MOP Apr 15 - Aug 31. On full pool Sep 30 - Mar 31.		
Cushman (2206)	Other Spill	100 cfs		All periods		
LaGrande (2188)	Other Spill	30 cfs		All periods		
White River (2160)	Other Spill	130 cfs		All periods		
Round Butte (390)	Other Spill	200 cfs		All periods		
	Minimum Content	118.7 ksfd		All periods		2-1-99 PNCA submittal

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Canadian Projects					
Mica (1890)	Minimum Flow	84.95 m^3/s			In place in AOP79, AOP80, AOP84
Arrow (1831)	Minimum Flow	141.58 m^3/s			In place in AOP79, AOP80, AOP84
	Draft Limit		0.30 m/day		
Duncan (1681)	Minimum Flow	2.83 m^3/s			In place in AOP79, AOP80, AOP84
	Maximum Flow	283.17 m^3/s			In place in AOP79, AOP80, AOP84
	Draft Limit		0.30 m/day		
	Other			Operate to meet IJC orders for Corra Linn	CRTOC agreement on procedures to implement 1938 IJC order
Base System					
Hungry Horse (1530)	Minimum Flow	11.33 m^3/s		Minimum project discharge	In place in AOP79, AOP80, AOP84
	Maximum Flow			None	
	Minimum Content			None	
	Other			No VECC limit	VECC limit not in place in AOP79
Kerr (1510)	Minimum Flow	42.48 m^3/s		All periods	In place in AOP80, AOP84
	Maximum Flow			None	
	Minimum Content	1503.9 hm^3 1043.0 hm^3	881.79 m 880.87 m	Jun - Sep May	MPC 2-1-92, PNCA submittal similar operation, Jun-Aug 15, in AOP80
		0.0 hm^3	878.74 m	Empty Apr 15	FERC, AOP80
	Maximum Content	143.4 hm^3	879.04 m	March (Included to help meet the Apr 15 FERC requirement.)	In place in AOP80, and AOP84
	Other	0.0 hm^3	878.74 m	Conditions permitted, should be on or about, empty Mar and Apr 15.	FERC, AOP80
Thompson Falls (1490)				None Noted	
Noxon Rapids (1480)	Minimum Content For Step I:	284.5 hm^3 274.8 hm^3 192.5 hm^3 64.8 hm^3 0.0 hm^3	710.49 m 710.18 m 707.44 m 702.56 m 699.52 m	May - Aug 31, Sep - Jan, Feb, Mar, Empty Apr 15, Apr 30, and for end of CP.	In place in AOP84, similar operation in AOP80
	Minimum & Maximum Content				

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
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Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
	For Steps II & III:	284.5 hm^3	710.49 m	All periods	In place in AOP79, AOP84
Cabinet Gorge (1475)				None Noted	
Albeni Falls (1465)	Minimum Flow	113.27 m^3/s		All periods	In place in AOP80, AOP84
	Minimum Content	(Dec may fill on restriction, note below)			
		1424.9 hm^3	628.65 m	Jun - Aug 31	In place in AOP80, AOP84
		1139.4 hm^3	627.89 m	Sep	
		465.8 hm^3	626.06 m	Oct	
		140.9 hm^3	625.14 m	Nov-Apr 15	
		465.8 hm^3	626.06 m	Apr 30 (empty at end of CP)	
		682.6 hm^3	626.67 m	May	
	For Steps I & II:	Optimum to run CP & LT to Jun-Oct SMINs.			
	For Step III:	Keep full at beginning of CP. Often (not always) optimum to run higher than SMIN in CP & LT (except when occasionally drafting below SMIN to meet load).			
		140.9 hm^3	625.14 m	Nov - Mar	
		1121.5 hm^3	627.83 m	May	
		1424.9 hm^3	628.65 m	Sep	
		1139.4 hm^3	627.89 m	Oct	
	Kokanee Spawning	Draft no more than 0.30 m below Nov 20 elevation through Dec 31. If project fills, draft no more than 0.15 m. Dec 31 - Mar 31 operate between SMIN and URC within above noted draft limits.			In place before AOP80 and supported by minimum contents noted above.
	Other Spill	1.42 m^3/s		All periods	
Box Canyon (1460)				None Noted	
Grand Coulee (1280)	Minimum Flow	849.50 m^3/s		All periods	In place in AOP79, AOP80, AOP84
	Minimum Content	0.00 m^3/s	368.20 m	Empty at end of CP	
	Step I only:	2064.7 hm^3	377.95 m	May and June	Retain as a power operation (for pumping)
	Steps II & III only:	2098.9 hm^3	377.95 m	May and June	
	Maximum Content Step I only:		0.61 m	Operating room Sep - Nov	In place in AOP89. Retain as a power operation
			0.91 m	Operating room Dec - Feb	
	Steps II & III only:	6256.2 hm^3	392.58 m	Aug-Nov	
		6161.3 hm^3	392.28 m	Dec-Feb	
	Draft Limit		0.40 m/day	(bank sloughage)	
			0.46 m/day	(Constraint submitted as 0.46 m/day interpreted as 0.40 m/day mo. ave.)	
Chief Joseph (1270)	Other Spill	14.16 m^3/s		All periods	

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
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Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Wells (1220)	Other Spill	33.98 m^3/s		All periods	With fish ladder
	Fish Spill			Removed	
Rocky Reach (1200)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	5.66 m^3/s		Aug 31 - Apr 15 (leakage)	
	Fish Spill			Removed	
Rock Island (1170)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Fish Spill			Removed	
Wanapum (1165)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	62.30 m^3/s		All periods	With fish ladder
	Fish Spill			Removed	
Priest Rapids (1160)	Minimum Flow			Limit removed	
	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	62.30 m^3/s		All periods	With fish ladder
	Fish Spill			Removed	
Brownlee (767)	Minimum Flow	141.58 m^3/s		All periods	In place in AOP79, AOP80, AOP84
	Power Operation			Agree to use "old" power operation (first codes) provided by IPC and used in AOP since AOP97 for CP.	2-1-91 PNCA submittal
				LT run to PDP using rule curves from CP with BECC created from regulation spreadsheet to meet flow requirements at Lime Pt., and Brownlee and mimic the "old" historic first code operation on a 60 year average and median comparison. Consistent w/ TSR.	7-00 J. Hyde
Oxbow (765)	Other Spill	2.83 m^3/s		All periods	
Ice Harbor (502)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	20.95 m^3/s		All periods	
	Incremental Spill			None	
	Fish Spill			None	
	Minimum Flow			None	
	Other	501.1 hm^3	134.11 m	Run at all periods	
McNary (488)	Other Spill	98.40 m^3/s		All periods	
	Incremental Spill			None	

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
John Day (440)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	22.65 m^3/s		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
	Minimum Flow	1415.84 m^3/s 353.96 m^3/s		Mar - Nov Dec - Feb	
	Other Step I:	659.8 hm^3 593.3 hm^3 376.0 hm^3 281.1 hm^3	81.69 m 81.38 m 80.35 m 79.86 m	June - Aug 15 Aug 31 - Sep Oct - Mar Apr 15 - May	In place AOP80
	Steps II & III:	464.9 hm^3	80.77 m	Use JDA as run-of-river plant.	
The Dalles (365)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	36.81 m^3/s		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
	Minimum Flow	1415.84 m^3/s 353.96 m^3/s		Mar - Nov Dec - Feb	
Bonneville (320)	Fish Bypass			Bypass not modeled (installation date set to year 2010 in input file).	
	Other Spill	227.67 m^3/s		All periods	
	Incremental Spill			None	
	Fish Spill			Removed	
Kootenay Lake (Corra Linn (1665))	Minimum Flow	141.58 m^3/s		All periods	BCHydro agreements 1969
	Other			Operate to IJC orders.	CRTOC agreement on procedures to implement 1938 IJC order
Chelan (1210)	Minimum Flow	1.42 m^3/s		All periods	In place in AOP79, AOP80, AOP84
	Minimum Content	754.8 hm^3	334.67 m	Jul - Sep (except as needed to empty at end of critical period).	In place in AOP79, AOP80, AOP84
Couer d'Alene L (1341)	Minimum Flow	1.42 m^3/s		All periods	In place in AOP79, AOP80, AOP84
	Minimum Content	275.2 hm^3	648.61 m	May - Aug	In place in AOP79
Post Falls (1340)	Minimum Flow	1.42 m^3/s		All periods	In place in AOP79, AOP80, AOP84

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Other Major Step I Projects					
Libby (1760)					
	Minimum Flow	113.27 m^3/s		All periods	
	Other Spill	5.66 m^3/s		All periods	
	Minimum Content	By contract year: Aug-Jul i.e., 1929 = Aug 1928 - Jul 1929			
		1900.8 hm^3	720.24 m	1929 Dec	2-1-93 PNCA submittal, in place in AOP99
		1655.1 hm^3	717.80 m	1929 Jan	
		1476.8 hm^3	715.98 m	1929 Feb	
		5254.6 hm^3	744.63 m	1929 Jul	
		1595.2 hm^3	717.19 m	1930 Dec	
		1059.9 hm^3	711.40 m	1930 Jan	
		952.5 hm^3	710.18 m	1930 Feb	
		852.6 hm^3	708.96 m	1930 Mar	
		727.6 hm^3	707.44 m	1930 Apr 15	
		1086.8 hm^3	711.71 m	1930 Apr 30	
		1221.1 hm^3	713.23 m	1930 May	
		3289.7 hm^3	732.13 m	1930 Jun	
		4335.1 hm^3	739.14 m	1930 Jul	
		777.5 hm^3	708.05 m	1931 Dec	
		470.2 hm^3	704.09 m	1931 Jan	
		252.2 hm^3	701.04 m	1931 Feb-Apr 30	
		470.2 hm^3	704.09 m	1931 May	
		1655.1 hm^3	717.80 m	1931 Jun	
		2123.6 hm^3	722.38 m	1931 Jul	
		426.7 hm^3	703.48 m	1932 Dec	
		252.2 hm^3	701.04 m	1932 Jan	
		0.0 hm^3	697.08 m	Empty at end of CP***	
		1900.8 hm^3	720.24 m	All Dec	
		July 1930 - No more than 912.8 hm^3 lower than July 1929 July 1931 - No more than 2097.0 hm^3 lower than July 1930 March - Implement PNCA 6(c)2(c).			2-1-94 PNCA submittal, in place in AOP00 and AOP01
	Maximum Summer		1.52 m		
	Other			Operate to meet IJC orders for Corra Linn	CRTOC agreement on procedures to implement 1938 IJC order

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements			Source
Dworshak (535)	Minimum Flow	36.81 m^3/s		All periods	2-1-99 PNCA submittal
	Maximum Flow	396.44 m^3/s		Apr 15 - Aug31 (model requirement includes 396.44 m^3/s for all period but URC generally overrides.)	2-1-99 PNCA submittal
		707.92 m^3/s		Up to 707.92 m^3/s for flood control all periods.	
	Minimum Content	968.4 hm^3	463.30 m	SMIN Apr 15 - Aug 31	
	Start 3 yr CP at:	968.4 hm^3	463.30 m	Aug 15 (0.03 m) higher than AOP03	
	End 3 yr CP at:	534.3 hm^3	454.21 m	Feb Same as AOP03.	
	Other	Run on minimum flow or flood control observing maximum & minimum flow requirements all periods except to meet LWG Target flows (based on sliding scale):			2-1-99 PNCA submittal
	LWG Target Flow	2129.42 m^3/s to	2497.544 m^3/s	Apr 15 [(2x325.64)+(13x2406.93)]/15 [(2x325.64)+(13x2831.68)]/15	Used for refill studies
		2129.42 m^3/s to	2642.894 m^3/s	Apr 15 [(2x325.64)+(13x2406.93)]/15 [(2x1415.84)+(13x2831.68)]/15	Used for Long-Term studies
		2406.93 m^3/s to	2831.68 m^3/s	Apr 30 - May 30	
		2076.56 m^3/s to	2406.93 m^3/s	Jun 30	
		1415.84 m^3/s to	1557.43 m^3/s	Jul - Aug 31	
	Other Spill	2.83 m^3/s		All periods	
Lower Granite (520)	Bypass Date			None	
	Other Spill	18.97 m^3/s		All periods	
	Incremental Spill			Removed	
	Fish Spill	(Only if regulated flow $\geq$ 2406.93 m^3/s)			2-1-99 PNCA submittal
			552.18 m^3/s	Apr 15 [637.13*13/15]	
			637.13 m^3/s	Apr 30 & May	
			424.75 m^3/s	Jun [637.13*20/30]	
	Maximum Fish Spill	637.13 m^3/s			
	Minimum Flow	325.64 m^3/s		Mar-Nov	
	Other	550.2 hm^3	223.42 m	On MOP Apr 15 - Oct 31.	
		601.4 hm^3	224.94 m	On full pool Nov 30 - Mar 31.	

Appendix A2
(Metric Units)
Project Operating Procedures for the 2005-06
Assured Operating Plan and Determination of Downstream Power Benefits

Definition of split months:

Apr (April 1-30); Apr 15 (April 1-April 15); Apr30 (April 15-April 30); Aug (August 1-31); Aug 15 (August 1-15); Aug 31 (August 16-31).

Project Name (Number)	Constraint Type	Requirements				Source
Little Goose (518)	Bypass Date			None		
	Other Spill	17.84 m^3/s		All periods		
	Incremental Spill			Removed		
	Fish Spill	(Only if regulated flow at Lower Granite ≥ 2406.93 m^3/s)				2-1-99 PNCA submittal
			736.24 m^3/s	Apr 15	[849.50*13/15]	
			849.50 m^3/s	Apr 30 & May		
			566.34 m^3/s	Jun	[849.50*20/30]	
	Maximum Fish Spill	849.50 m^3/s				
	Minimum Flow	325.64 m^3/s		Mar - Nov		
	Other	637.3 hm^3	192.94 m	On MOP Apr 15 - Aug 31.		
		697.3 hm^3	194.46 m	On full pool Sep 30 - Mar 31.		
Lower Monumental (504)	Bypass Date			A bypass date of 2010 was assumed.		
	Other Spill	21.24 m^3/s		All periods		
	Fish Spill	(Only if regulated flow at Lower Granite ≥ 2406.93 m^3/s)				2-1-99 PNCA submittal
			490.82 m^3/s	Apr 15	[566.34*13/15]	
			566.34 m^3/s	Apr 30 & May		
			377.55 m^3/s	Jun	[566.34*20/30]	
	Maximum Fish Spill	566.34 m^3/s				
	Minimum Flow	325.64 m^3/s		Mar-Nov		
	Other	441.6 hm^3	163.68 m	On MOP Apr 15 - Aug 31.		
		465.1 hm^3	164.59 m	On full pool Sep 30 - Mar 31.		
Cushman (2206)	Other Spill	2.83 m^3/s		All periods		
LaGrande (2188)	Other Spill	0.85 m^3/s		All periods		
White River (2160)	Other Spill	3.68 m^3/s		All periods		
Round Butte (390)	Other Spill	5.66 m^3/s		All periods		
	Minimum Content	3.36 m^3/s		All periods		2-1-99 PNCA submittal

COLUMBIA RIVER TREATY
DETERMINATION OF DOWNSTREAM POWER BENEFITS

FOR THE ASSURED OPERATING PLAN
FOR OPERATING YEAR 2005-06

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DETERMINATION OF DOWNSTREAM POWER BENEFITS (DDPB) FOR THE ASSURED OPERATING PLAN FOR OPERATING YEAR 2005-06

August 2001

1. Introduction

The treaty between Canada and the United States of America relating to the cooperative development of the water resources of the Columbia River Basin (Treaty) requires that downstream power benefits from the operation of Canadian Treaty storage be determined in advance by the two Entities. The purpose of this document is to describe the results of the downstream power benefit computations developed from the 2005-06 Assured Operating Plan (AOP).

The procedures followed in the benefit studies are those provided in Article VII; Annex A, paragraph 7, and Annex B of the Treaty; in paragraphs VIII, IX, and X of the Protocol; and in the following Entity agreements, with exceptions noted within Section 7:

- The "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 Operating Procedures for the 2001-02 and Future AOP's," signed 29 August 1996;
- The "Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans" (POP), dated December 1991; and
- The Entity Agreements, signed 28 July and 12 August 1988, on Principles and on Changes to Procedures for the Preparation of the Assured Operating Plan and Determination of Downstream Power Benefit Studies (1988 Entity Agreements).

The Canadian Entitlement Benefits were computed from the following studies:[1]

Step I -- Operation of the total United States of America planned hydro and thermal system, with 15.5 million acre-feet (Maf) (19.12 cubic kilometers (km^3)) of Canadian storage operated for flood control and optimum power generation in both countries.

Step II -- Operation of the Step I thermal system, the United States base hydro system, and 15.5 Maf (19.12 km^3) of Canadian storage operated for flood control and optimum power generation in both countries.

Step III -- Operation of the Step I thermal system and the United States base hydro system operated for flood control and optimum power generation in the United States.

As part of the DDPB for the operating year 2005-06, separate determinations were carried out relating to the limit of year-to-year change in benefits attributable to the

[1] The Treaty defines the Canadian storage in English units. The metric conversion is a rounded approximation.

operation of Canadian Treaty storage in operating plans designed to achieve optimum power generation at-site in Canada and downstream in Canada and the United States of America (Joint Optimum).

2. Results of Canadian Entitlement Computations

The Canadian Entitlement to the downstream power benefits in the United States of America attributable to operation in accordance with Treaty Annex A, paragraph 7, for optimum power generation in Canada and the United States of America, which is one-half the total computed downstream power benefits, was computed to be (see Table 5 Joint Optimum):

Dependable Capacity	=	1218.0 MW
Average Annual Usable Energy	=	535.1 aMW

All downstream power benefits computations are rounded to the nearest tenth of a megawatt.

3. Computation of Maximum Allowable Reduction in Downstream Power Benefits

In accordance with the Treaty Annex A, paragraph 7 and Part III, paragraph 15c(2) of POP, the computation of the maximum allowable reduction in downstream power benefits and the resulting minimum permitted Canadian Entitlement to downstream power benefits for the 2005-06 operating year are based on the formula: Minimum Canadian Entitlement = X - (Y - Z). The quantities X, Y, and Z, expressed in terms of entitlement to downstream power benefits, are computed as follows:

X = One-half of the downstream power benefits derived from the difference between the 2004-05 Step II Joint Optimum study and the 2004-05 Step III study.

Y = One-half of the downstream power benefits derived from the difference between the 2004-05 Step II U.S. Optimum study and the 2004-05 Step III study.

Z = One-half of the downstream power benefits derived from the difference between the 2005-06 Step II U.S. Optimum study with 15 Maf (18.50 km^3) of Canadian storage and the 2005-06 Step III study.

The purpose of this formula is to set a lower limit on the Canadian Entitlement for the re-operation of Canadian storage. This minimum is based on the previous operating year Canadian Entitlement, plus the effect of removing 0.5 Maf (0.62 km^3) of Canadian storage, and taking out the effect due to changes in loads, resources, and other operating procedures.

The quantities X and Y were obtained from Table 5 of the 2004-05 DDPB. The quantity Z is computed in Table 5 of this report. The computation of the Minimum Canadian Entitlement is as follows:

Dependable Capacity	= 1176.4 - (1177.3-1190.5) =	1189.6 MW
Average Annual Usable Energy	= 537.3 - (538.4 -529.3) =	528.2 aMW

The computed Canadian Entitlement exceeds these amounts.

4. Effect on Sale of Canadian Entitlement

Since the sale of the downstream power benefits under the Canadian Entitlement Purchase Agreement (CEPA) expires 31 March 2003, the United States Entity is not entitled to compensation during the 2005-06 operating year for any decrease in the Canadian Entitlement that may exist from the difference between studies for optimum power generation only in the United States of America (U.S. Optimum) and studies for optimum power generation at-site in Canada and downstream in Canada and the United States of America (Joint Optimum).

5. Delivery of the Canadian Entitlement

See Section 7 of the 2005-06 AOP.

6. Summary of Information Used For Canadian Entitlement Computations

The following tables and chart summarize the study results.

Table 1A & Table 1B — Determination of Firm Hydro Loads for Step I Studies:

These tables show the loads and resources used in the Step I studies and the computation of the coordinated hydro model load for the Step I hydroregulation study. These tables follow the definition of Step I loads and resources defined by Treaty Annex B, paragraph 7, and clarified by the 1988 Entity Agreements. Table 1A shows the Step I energy loads and resources while Table 1B shows the Step I peak loads and resources.

Table 2 — Determination of Thermal Displacement Market:

This table shows the computation of the thermal displacement market for the downstream power benefit determination of average annual usable energy. The thermal displacement market was limited to the thermal installations with reductions for minimum thermal generation and system sales, which are the thermal resources used to meet load outside the Pacific Northwest Area (PNWA).

Table 3 — Determination of Loads for Step II and Step III Studies:

This table shows the computation of the Step II and III loads. The monthly loads for Step II and III studies have the same ratio between each month and the annual average as the PNWA load. The PNWA firm loads were based on the BPA 1998 Whitebook load forecast. The Grand Coulee pumping load is included in this estimate. The method for computing the firm load for the Step II and III studies is described in the 1988 Entity Agreements and in POP.

Table 4 Summary of Power Regulations from 2005-06 Assured Operating Plan:

This table summarizes the results of the Step I, II, and III power regulation studies for each project and the total system. The determination of the Step I, II, and III loads and thermal installations is shown in Tables 1 and 3. The hydro maintenance is summed with the reserves in the Step I system load as an adjustment to resources.

Table 5 Computation of Canadian Entitlement For 2005-06 Assured Operating Plan:

A. Joint Optimum Generation in Canada and the U.S.
B. Optimum Generation in the U.S. Only
C. Optimum Generation in the U.S. and a 0.5 Million Acre-Feet ($0.62\ km^3$) Reduction in Total Canadian Treaty Storage

The essential elements used in the computation of the Canadian Entitlement to downstream power benefits and the computation of maximum allowable reduction in downstream power benefits are shown on this table.

Table 6 Comparison of Recent DDPB Studies

Chart 1 Duration Curves of 30 Years Monthly Hydro Generation:

This chart shows duration curves of the hydro generation from the Step II and III studies, which graphically illustrates the change in average annual usable energy. Usable energy is firm energy plus usable secondary energy. Secondary energy is the energy capability each month that exceeds the firm hydro loads shown in Table 3. The usable secondary energy in average megawatts for the Step II and III studies is computed in accordance with Annex B, paragraphs 3(b) and 3(c), as the portion of secondary energy which can displace thermal resources that were used to meet PNWA loads plus the other usable secondary generation. The Entities have agreed that the other usable secondary is computed on the basis of 40 percent of the secondary energy remaining after thermal displacement.

7. Summary of Changes from Previous Year

Data from the five most recent DDPB's are summarized in Table 6. An explanation of the more important changes which impact computation of the entitlement compared to last year's studies follows.

(a) Loads and Non-Hydro Resources

Loads for the 2005-06 AOP were based on the 1998 Whitebook medium case forecast updated by BPA on 13 September 1999 for the 2000 through 2009 operating years. This forecast had an average annual load growth rate of 0.5%. The PNWA firm energy load increased by 342 aMW compared to the 2004-05 AOP. However the 2004-05 AOP/DDPB used the same loads and hydro regulation studies as the 2003-04 AOP/DDPB. Other load changes include:

It was assumed that one-half of the Canadian Entitlement was exported to B.C. and the remaining one-half was disposed in the U.S. The estimated disposition of the Entitlement in the Step I system and the computed Canadian Entitlement are shown below:

During 1 August 2005 – 31 July 2006

Canadian Entitlement	Energy (aMW)		Capacity (MW)	
Return	Estimated	Computed	Estimated	Computed
Export to BC (1/2)	268.6	267.5	588.2	609.0
Retained in PNW (1/2)	268.6	267.5	588.2	609.0
Total	537.3	535.1	1176.4	1218.0

Iterative studies to correct the load estimate were not performed because updating the Canadian Entitlement Return estimates would not significantly affect the results of the studies.

The Surplus Firm Energy Export increased by 502 aMW compared to the 2004-05 AOP study. The Surplus Firm Energy was shaped into April 15 through September in the 2005-06 AOP study, compared to only May through July in the 2004-05 AOP study. There was an added purchase of power from the California during October through April 15th to help shape more load into the summer months (-251 aMW).

The total annual energy capability of the thermal installations increased by 269 aMW due to the following changes:

- Large Thermal resources increased by 122 aMW due to removal of maintenance at Columbia Generating Station (WNP2) in 2005-06. The project's maintenance was converted to a 24 month cycle with work planned for 2004-05 and 2006-07;
- Thermal Import data decreased by 239 aMW due to a correction of Pacificorp's data from 2004-05 AOP study (-218 aMW) and updated data from Montana Power Company;
- Two projects were retired: PGE's combustion turbine Bethel (-54 aMW), and Puget's small thermal Shuffleton (-32 aMW);
- The plant sale of Longview Fibre to WAPA (36 aMW) was discontinued; and
- Cogeneration increased by 438 aMW due to the addition of a new project at Klamath Falls to be completed by July 2001.

The thermal displacement market (TDM) increased by 619 aMW due to the combination of increased thermal installations explained above (269 aMW), and the decrease in the minimum thermal generation (-379 aMW) at the Hermiston cogeneration project.

(b) Operating Procedures

Generation plant data tables for Mayfield, McNary, Chief Joseph, Kerr, and Corra Linn were updated. These changes did not significantly effect the system operation. McNary's tailwater was modified to reflect changes in John Day's forebay elevation.

The nonpower requirements for Base System projects were agreed to in the 29 August 1996 Entity Agreement. These requirements are essentially the nonpower requirements included in the 1979-80 and prior AOP/DDPB studies.

Changes from the 2004-05 studies include:

Base System Projects

- The Grand Coulee maximum content limit for developing AOP CRC's of 2 feet down from full during September through November was also applied to the end of the second half of August to be consistent with the start of the critical period.
- The Brownlee storage operation outside the critical period was simulated by using CRC's and ORC's instead of the fixed operation from Idaho Power Company (IPC), used in previous AOP's. The CRC's were based on the IPC operation during the 1929-1932 Step I CP, 1944-45 Step II CP, and 1937 for the Step III CP. ORC's were determined from studies showing a 50-year storage operation similar to the IPC operation.

ARC and VRC Calculation

The procedures for developing the ARC's and VRC's in the Step I and II studies were modified to improve power operation consistent with the Treaty requirements.

(c) Step III Critical Streamflow Period

The Step III study critical streamflow period was a 5.5-month critical period, 1 November 1936 through 15 April 1937. The critical period ended one-half period sooner than the 2004-05 DDPB due mainly to the change in Columbia Generating Station (WNP2) maintenance outages.

(d) Downstream Power Benefits Computation

The Capacity Entitlement increased from 1176.4 MW in the 2004-05 DDPB to 1218.0 MW in the 2005-06 DDPB for a gain of 41.5 MW. The average critical period generation in the Step II study increased by 54 MW and the Step III average generation decreased by 48 MW. The Step II average critical period generation increased mostly due to the operation of Grand Coulee which was operated higher in March because of a higher ARC. The Step III average critical period generation decreased due to the shorter critical period. The average critical period load factor increased by 1.6 percent since the peak Federal Diversity load adjustment increased by 632 MW.

The Canadian Energy Entitlement decreased from 537.3 aMW in the 2004-05 DDPB to 535.1 aMW in the 2005-06 DDPB for a decrease of 2.2 aMW. The TDM increased by 619 aMW, which tends to decrease the energy entitlement (roughly 2 aMW decrease for each 100 MW increase in TDM). This was offset by changes to the procedures used to develop ARC's and VRC's, and the decreased length of the Step III critical period.

TABLE 1A

2005-06 ASSURED OPERATING PLAN

DETERMINATION OF FIRM ENERGY HYDRO LOADS FOR STEP I STUDIES (aMW) 1/

	Aug15	Aug31	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr15	Apr30	May	June	July	Annual Average	CP Ave 2/ (42.5 Mon)
1. **Pacific Northwest Area (PNWA) Load 3/**	20911	20833	20401	21068	23016	24625	25199	24129	22794	21566	21655	21028	20876	21052	22214.7	22318.9
a) Annual Load Shape in Percent	94.13	93.78	91.83	94.84	103.61	110.85	113.43	108.62	102.61	97.08	97.48	94.66	93.97	94.76	100.0	100.5
2. **Flows-Out of firm power from PNWA**																
a) Canadian Entitlement Export (south+north) 4/	269	269	269	269	269	269	269	269	269	269	269	269	269	269	268.6	268.6
b) Exports to the East	155	155	141	119	141	141	142	120	115	118	118	104	159	163	134.9	135.0
c) SW Seasonal Exchange Exports	195	195	229	14	0	0	0	0	0	0	0	24	155	166	65.6	63.6
d) Other SW Exports	574	574	568	514	471	479	481	462	388	385	421	469	594	594	500.0	500.3
e) Plant Sale Exports	106	106	106	106	106	106	106	106	106	106	101	88	106	106	104.5	104.8
f) Surplus Firm Energy Exports	700	700	600	0	0	0	0	0	0	0	2070	3740	2540	1845	876.9	765.2
g) Thermal Install. power used outside region 5/	328	411	550	175	205	206	98	11	370	225	242	182	568	299	273.1	265.6
h) ...Subtotal	2327	2411	2462	1197	1192	1200	1095	967	1247	1103	3221	4876	4391	3443	2223.6	2103.2
i) Exclude Plant Sales	-106	-106	-106	-106	-106	-106	-106	-106	-106	-106	-101	-88	-106	-106	-104.5	-104.8
j) ...Total	2221	2304	2356	1091	1086	1094	989	861	1141	997	3120	4788	4285	3337	2119.1	1998.4
3. **Load served by Flows-In of firm power except Step I thermal installations**																
a) Non-thermal firm imports from north 6/	-20	-20	-15	-21	-37	-47	-60	-69	-61	-29	-29	-28	-38	-26	-37.4	-37.7
b) Flows-in from SW seasonal exchanges	0	0	-1	-1	-162	-209	-179	-187	-39	-15	-6	0	0	0	-65.0	-72.3
c) Non-Coord. Thermal Resc. from SW (not TI) 7/	-18	-18	-21	-33	-41	-41	-41	-41	-32	-31	-2	0	-7	-18	-25.8	-27.3
d) Added purchase/import of Sys Pwr from CA 8/	0	0	0	-500	-1078	-678	-1325	-1450	-925	-900	0	0	0	0	-528.0	-564.7
e) ...Total	-38	-38	-37	-554	-1318	-975	-1606	-1748	-1057	-975	-38	-28	-45	-44	-656.2	-702.0
4. **Load served by non-Step I resources located within the PNWA**																
a) Hydro Independents (1929 water)	-1282	-1255	-1175	-1201	-1231	-1159	-1102	-924	-1045	-1281	-1327	-1772	-1727	-1426	-1279.8	-1143.9
b) Non-Step I Coordinated Hydro (1929 water)	-511	-471	-556	-943	-956	-1007	-1046	-593	-688	-760	-789	-634	-1305	-792	-816.3	-842.5
c) Non-Thermal PURPA/NUGS	-107	-107	-99	-88	-95	-93	-94	-99	-96	-108	-107	-118	-117	-115	-102.4	-101.3
d) Miscellaneous Resources	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-26.8	-26.8
e) ...Total (1929 water)	-1927	-1859	-1857	-2259	-2309	-2286	-2268	-1642	-1855	-2176	-2250	-2551	-3177	-2359	-2225.3	-2114.5
5. **Total Step I System Firm Loads (1929 water) 9/**	21167	21240	20863	19345	20474	22459	22314	21599	21022	19412	22486	23237	21939	21986	21452.4	21500.8
6. **Step I Thermal Installations**																
a) Large Thermal (includes plant sales)	4822	4822	4822	4822	4822	4822	4822	4822	4635	4587	4587	4275	4373	4822	4703.0	4721.2
b) Small Thermal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0.2
c) Combustion Turbines	2026	2026	2029	2043	2045	2047	2057	2055	2052	1595	1243	1516	1748	1853	1907.4	1928.3
d) Cogeneration (includes plant sales)	1980	1979	1996	1985	1984	1980	1981	1983	1986	1994	1994	1763	1485	1975	1924.4	1933.5
e) Exclude Plant Sales	-106	-106	-106	-106	-106	-106	-106	-106	-106	-106	-101	-88	-106	-106	-104.5	-104.8
f) Thermal PURPA/NUGS	161	161	148	132	143	140	141	148	143	162	161	177	176	172	153.5	152.0
g) Thermals classified as Renewables	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63.2	63.2
h) Thermal Installation Imports from the East	1667	1667	1667	1616	1667	1667	1667	1667	1667	1335	1275	1457	1481	1667	1599.6	1608.7
i) ...Total	10612	10611	10619	10555	10617	10612	10625	10632	10440	9628	9222	9163	9219	10445	10246.8	10302.4
7. **Total Step I Hydro Load (1929 water) 10/**	10555	10629	10244	8790	9857	11846	11689	10968	10582	9783	13265	14075	12720	11541	11205.5	11198.4
a) Hydro Maintenance included as load	31	26	9	9	4	0	0	0	5	7	8	20	14	50	12.4	11.3
b) Coordinated Hydro Model Load (1929 water) 11/	11097	11125	10809	9742	10817	12853	12735	11561	11275	10550	14061	14729	14039	12383	12034.2	12052.1

1/ Step I Loads and Resources for the U.S. Optimum Study (06-11) as defined by Treaty Annex B-7 and clarified by the 1988 Entity Agreements. Total regional firm load plus pumping.

2/ The Step I critical period begins 16 August 1928 and ends 29 February 1932.

3/ Source is the 1998 BPA Whitebook.

4/ Includes uniform export of 1/2 Canadian Entitlement, 1/2 remained in region.

5/ Amount of import thermal installation capacity that is not used in the PNWA.

6/ Skagit River Treaty power from BC Hydro.

7/ Flows of Power into the region from thermal resources not identified with a specific thermal installation and not coordinated with PNWA.

8/ Added shaping of surplus; combined with firm surplus exports, line 2f.

9/ Line 1+ line 2(j) + line 3(e) + line 4(e).

10/ Hydro load for U.S. projects located upstream of Bonneville Dam (except hydro independents), line 5 minus line 6(i).

11/ The Coordinated Hydro Model Load is the Step I Hydro Load plus Hydro Maintence minus (subtracting a negative number) Non-Step I Coordianted Hydro, line 7 + line 7a - line 4b.

TABLE 1B
2005-06 ASSURED OPERATING PLAN
DETERMINATION OF FIRM PEAK HYDRO LOADS FOR STEP I STUDIES (MW) 1/

	Aug15	Aug31	Sept	Oct	Nov	Dec	Jan	Feb	March	Apr15	Apr30	May	June	July
1. **Pacific Northwest Area (PNWA) Load 2/**	25829	25791	25657	28275	30423	32940	33621	32952	30597	28963	29035	27366	26356	25917
a) Annual Load Shape in Percent	80.80	80.80	79.51	74.51	75.65	74.76	74.95	73.22	74.50	74.43	74.43	76.84	79.21	81.23
2. **Flows-Out of firm power from PNWA**														
a) Canadian Entitlement Export (south+north) 3/	588	588	588	588	588	588	588	588	588	588	588	588	588	588
b) Exports to the East	210	210	181	158	187	196	199	192	170	153	153	141	220	236
c) SW Seasonal Exchange Exports	465	465	465	120	15	15	15	15	15	15	15	60	450	465
d) Other SW Exports	937	937	970	944	843	810	810	769	769	769	819	920	927	927
e) Plant Sale Exports	122	122	122	122	122	122	122	122	122	122	122	51	122	122
f) Surplus Firm Peak Exports	866	866	755	0	0	0	0	0	0	0	2781	4867	3207	2271
g) Thermal Install. power used outside region 4/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
h) Subtotal	3188	3188	3080	1932	1755	1731	1734	1686	1664	1647	4478	6627	5513	4610
i) Exclude Plant Sales	-122	-122	-122	-122	-122	-122	-122	-122	-122	-122	-122	-51	-122	-122
j) ...Total	3066	3066	2959	1810	1633	1609	1612	1564	1542	1525	4356	6577	5392	4488
3. **Load served by Flows-In of firm power except Step I thermal installations**														
a) Non-thermal firm imports from north 5/	-146	-146	-146	-146	-155	-184	-207	-210	-212	-146	-146	-146	-146	-146
b) Flows-in from SW seasonal exchanges	0	0	0	0	-355	-376	-376	-376	-46	-12	-12	0	0	0
c) Non-Coord. Thermal Resc. from SW (not TI) 6/	0	0	0	0	-3	-3	-3	-3	0	0	0	0	0	0
d) Added purchase/import of Sys Pwr from CA 7/	0	0	0	0	0	0	0	0	0	0	0	0	0	0
e) ...Total	-146	-146	-146	-146	-513	-563	-586	-589	-258	-158	-158	-146	-146	-146
4. **Load served by non-Step I resources located within the PNWA**														
a) Hydro Independents (1937 water)	-2050	-2028	-1937	-1787	-1633	-1594	-1548	-1664	-1787	-1995	-2003	-2169	-2209	-2116
b) Non-Step I Coordinated Hydro (1937 water)	-2579	-2495	-2598	-2548	-2447	-2372	-2241	-2054	-2048	-2074	-2113	-2228	-2395	-2581
c) Non-Thermal PURPA/NUGS	-114	-114	-108	-99	-102	-99	-98	-102	-105	-117	-117	-127	-129	-121
d) Miscellaneous Resources	-29	-29	-29	-29	-329	-329	-329	-329	-329	-29	-29	-29	-29	-29
e) ...Total (1937)	-4772	-4666	-4672	-4463	-4511	-4394	-4217	-4149	-4268	-4215	-4262	-4553	-4761	-4846
5. **Total Step I System Firm Loads (1937water) 8/**	23978	24046	23798	25477	27032	29593	30431	29778	27613	26116	28972	29244	26841	25413
6. **Step I Thermal Installations**														
a) Large Thermal (includes plant sales)	5365	5365	5365	5365	5365	5365	5365	5365	5100	5047	5047	4939	4847	5365
b) Small Thermal	38	38	38	41	41	41	41	41	41	38	38	38	38	38
c) Combustion Turbines	2125	2125	2134	2365	2376	2383	2396	2389	2380	2344	1905	1966	2139	2131
d) Cogeneration (includes plant sales)	2029	2029	2029	2018	2018	2018	2018	2018	2018	2029	2029	1784	1545	2029
e) Exlude Plant Sales	-122	-122	-122	-122	-122	-122	-122	-122	-122	-122	-122	-51	-122	-122
f) Thermal PURPA/NUGS	171	171	162	149	153	148	147	153	157	175	175	191	193	181
g) Thermals classified as Renewables	64	64	64	64	64	64	64	64	64	64	64	64	64	64
h) Thermal Installation Imports from the East	1463	1463	1407	1417	1524	1491	1578	1643	1320	1114	1114	1395	1084	1422
i) ...Total	11133	11133	11076	11296	11418	11387	11486	11550	10957	10689	10250	10326	9787	11108
7. **Step I Hydro Load (1937 water) 9/**	12845	12913	12722	14181	15614	18206	18944	18229	16656	15427	18722	18918	17054	14305
a) Hydro Maintenance included as load	4606	4043	3787	3208	2935	2037	1561	2289	2633	2751	2483	2360	2202	3721
b) Coordinated Hydro Model Load (1937 water) 10/	20030	19451	19107	19937	20995	22615	22747	22572	21337	20251	23318	23505	21651	20607

1/ Step I Loads and Resources for the U.S. Optimum Study (06-11) as defined by Treaty Annex B-7 and clarified by the 1988 Entity Agreements. Total regional firm load plus pumping

2/ Source is the 1998 BPA Whitebook.

3/ Includes uniform export of 1/2 Canadian Entitlement, 1/2 remained in region.

4/ Amount of import thermal installation capacity that is not used in the PNWA.

5/ Skagit River Treaty power from BC Hydro.

6/ Flows of Power into the region from thermal resources not identified with a specific thermal installation and not coordinated with PNWA.

7/ Added shaping of surplus; combined with firm surplus exports, line 2f.

8/ Line 1+ line 2(j) + line 3(e) + line 4(e).

9/ Hydro load for U.S. projects located upstream of Bonneville Dam (except hydro independents), line 5 minus line 6(i).

10/ The Coordinated Hydro Model Load is the Step I Hydro Load plus Hydro Maintence minus (subtracting a negative number) Non-Step I Coordianted Hydro, line 7+ line 7a - line 4b

TABLE 2

2005-06 ASSURED OPERATING PLAN
DETERMINATION OF THERMAL DISPLACEMENT MARKET
(Energy in aMW)

	Aug15	Aug31	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr15	Apr30	May	June	July	Annual Average	CP Ave (42.5 Mon)
1. STEP I THERMAL INSTALLATIONS																
a) From Table 1A, line 6(i)	10612	10611	10619	10555	10617	10612	10625	10632	10440	9628	9222	9163	9219	10445	10246.8	10302.4
2. MINIMUM THERMAL GENERATION																
a) Large Thermal Min. Generation	147	147	147	147	147	147	147	147	147	147	147	147	147	147	147.0	147.0
b) Cogen & Small Therm Min Gen	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32.0	32.0
c) NUGS Thermal Min Generation	54	54	49	44	48	47	47	49	48	54	54	59	59	57	51.2	50.7
d) ...Total Minimum Generation	233	233	228	223	227	226	226	228	227	233	233	238	238	236	230.2	229.7
3. DISPLACEABLE THERMAL RESOURCES	10379	10378	10390	10332	10391	10387	10399	10404	10213	9396	8989	8925	8982	10209	10016.7	10072.7
4. SYSTEM SALES																
a) Total Flows-Out (Table 1A, Line 2(h))	2327	2411	2462	1197	1192	1200	1095	967	1247	1103	3221	4876	4391	3443	2223.6	2103.2
b) Exclude Seasonal Exchange Exports	-195	-195	-229	-14	0	0	0	0	0	0	0	-24	-155	-166	-65.6	-63.6
c) Exclude Plant Sales Exports	-106	-106	-106	-106	-106	-106	-106	-106	-106	-106	-101	-88	-106	-106	-104.5	-104.8
d) Exclude Flows-Through Transfers	-17	-17	-21	-533	-1119	-719	-1366	-1491	-956	-930	-1	1	-6	-17	-553.2	-591.3
e) Exclude Can Entitlement (out of the PNWA)	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-269	-268.6	-268.6
f) ...Total System Sales	1740	1823	1837	275	-301	107	-645	-898	-84	-202	2850	4496	3854	2885	1231.7	1074.8
g) Uniform Average Annual System Sales	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1232	1231.7	1231.7
5. THERMAL DISPLACEMENT MARKET	9148	9147	9159	9100	9159	9155	9167	9172	8982	8164	7757	7693	7750	8977	8784.9	8841.0

Notes:

Line 2a Large Thermal minimum generation consists of Jim Bridger.
Line 2b Cogen & Small Thermal Minimum Generation includes Spokane Muni Solid Waste, Tacoma Steam Plant, and EWEB Weyerhauser cogen.
Line 2c 60% of the total NUGS is thermal. Non-displaceable NUGS generation is 1/3 of the thermal NUGS.
Line 2d Total Minimum Thermal Generation, the sum of lines 2(a) through line 2(c).
Line 3 Step I Thermal Installation Resources that are displaceable, line 1(a) minus line 2(d).
Line 4c Plant sales include approximately 22 percent of Boardman.
Line 4d Flow-through transfers include Flows-In that support Flows-Out, i.e., SW imports and the net of seasonal exchange imports and exports.
Line 4f System Sales are total exports excluding exchanges, plant sales, flow-through transfers, and the Canadian Entitlement. The sum of lines 4(a) through line 4(e).
Line 4g Average Annual System Sales shaped uniformly per 1988 Entity Agreement assumption that shaping is supported by hydro system.
Line 5 PNWA Thermal Displacement Market is the Total Displaceable Thermal Resources used to meet PNWA firm loads, lines 3 minus line 4(g).

TABLE 3

2005-06 ASSURED OPERATING PLAN
DETERMINATION OF LOADS FOR STEP II AND STEP III STUDIES

PACIFIC NORTHWEST AREA (PNWA) LOAD						STEP II STUDY		STEP III STUDY		
Period	PNWA Energy Load 1/ (aMW)	Annual Energy Load Shape (Percent)	Peak Load (MW)	Load Factor (Percent)	Energy Capability of Thermal Installations 2/ (aMW)	Total Load 3/ (aMW)	Hydro Load 4/ (aMW)	Total Load 3/ (aMW)	Hydro Load 4/ (aMW)	Period
August 1-15	20911	94.13	25829	80.80	10612	17999.1	7387.1	15548.7	4936.6	August 1-15
August 16-31	20833	93.78	25791	80.80	10611	17932.0	7321.0	15490.7	4879.7	August 16-31
September	20401	91.83	25657	79.51	10619	17560.1	6941.2	15169.4	4550.5	September
October	21068	94.84	28275	74.51	10555	18134.1	7579.3	15665.3	5110.5	October
November	23016	103.61	30423	75.65	10617	19810.9	9193.6	17113.8	6496.5	November
December	24625	110.85	32940	74.76	10612	21196.3	10584.0	18310.6	7698.3	December
January	25199	113.43	33621	74.95	10625	21690.4	11065.6	18737.4	8112.7	January
February	24129	108.62	32952	73.22	10632	20768.9	10137.2	17941.4	7309.6	February
March	22794	102.61	30597	74.50	10440	19619.9	9179.6	16948.8	6508.5	March
April 1-15	21566	97.08	28963	74.43	9628	18563.2	8934.7	16035.9	6407.5	April 1-15
April 16-30	21655	97.48	29035	74.43	9222	18639.5	9417.6	16101.9	6880.0	April 16-30
May	21028	94.66	27366	76.84	9163	18099.8	8937.2	15635.7	6473.1	May
June	20876	93.97	26356	79.21	9219	17969.4	8750.1	15523.0	6303.7	June
July	21052	94.76	25917	81.23	10445	18120.5	7675.4	15653.5	5208.5	July
Annual Average 5/	22214.7	100.00		76.66	10246.8	19121.6	8874.7	16518.3	6271.5	Annual Average 5/
SI CP Average (42.5)	22318.9			76.54	10302.4					
SII CP Average (20)	22472.3				10324.8	19343.3	9018.5	←		Sep-Ap2
SIII CP Average (5.5)	23739.2				10497.8			17651.9	7154.1	← Nov-Ap1
						Input 6/ = →	**9018.5**	Input 7/ = →	**7154.1**	
August 1-31	20870.4	93.9	25829.2	80.80	10611.5	17964.5	7353.0	15518.7	4907.3	Aug. 1-31
April 1-30	21610.4	97.3	29034.9	74.43	9425.1	18601.3	9176.2	16068.9	6643.8	Apr. 1-30

1/ The PNWA load does not include the exports, but does include pumping. The computation of the load shape for Step II/III studies used these loads.

2/ The thermal installations include all thermal used to meet the Step I system load. (Table 2, line 1(a)).

3/ The total firm load for the Step II/III studies is computed to have the same shape as the load of the PNWA.

4/ The hydro load is equal to the total load minus the Step I study thermal installations for each period.

5/ The Annual Average is for 2005-06 operating year. The CP averages are for the historic water years.

6/ Input is the assumed critical period (CP) average generation for the Step II hydro studies and is used to calculate the residual hydro loads.

7/ Input is the assumed CP average generation for the Step III hydro studies and is used to calculate the residual hydro loads.

TABLE 4
(English Units)
SUMMARY OF POWER REGULATIONS
FROM 2005-06 ASSURED OPERATING PLAN

PROJECTS	BASIC DATA		STEP I			STEP II				STEP III		
	NUMBER OF UNITS	MAXIMUM INSTALLED PEAKING CAPACITY MW	USABLE STORAGE ksf	JANUARY 1937 PEAKING CAP MW	CRITICAL PERIOD AVERAGE GEN. MW	USABLE STORAGE ksf	JANUARY 1945 PEAKING CAP MW	CRITICAL PERIOD AVERAGE GEN. MW	50 YEAR AVERAGE ANNUAL GEN MW	USABLE STORAGE ksf	JANUARY 1937 PEAKING CAP MW	CRITICAL PERIOD AVERAGE GEN. MW
HYDRO RESOURCES												
CANADIAN												
Mica			7000			7000						
Arrow			7100			7100						
Duncan			1400			1400						
Subtotal			15500			15500						
BASE SYSTEM												
Hungry Horse	4	428	3072	337	103	3008	197	114	103	3008	321	251
Kerr	3	160	1219	179	116	1219	175	112	129	1219	174	160
Thompson Falls	6	85	0	85	53	0	85	53	58	0	85	66
Noxon Rapids	5	554	231	549	153	0	554	134	202	0	554	181
Cabinet Gorge	4	239	0	239	100	0	239	91	119	0	239	117
Albeni Falls	3	50	1155	21	22	1155	19	22	21	1155	15	16
Box Canyon	4	74	0	71	45	0	70	45	48	0	69	57
Grand Coulee	24+3SS	6684	5185	6365	2057	5072	6364	1842	2393	5072	5678	1243
Chief Joseph	27	2535	0	2535	1069	0	2535	974	1308	0	2535	718
Wells	10	840	0	840	421	0	840	390	490	0	840	292
Chelan	2	54	677	51	36	676	51	38	44	676	51	51
Rocky Reach	11	1267	0	1267	575	0	1267	533	694	0	1267	393
Rock Island	18	513	0	513	256	0	513	240	302	0	513	178
Wanapum	10	986	0	986	518	0	986	482	606	0	986	346
Priest Rapids	10	912	0	912	510	0	912	477	577	0	912	352
Brownlee	5	675	975	675	240	974	675	313	323	974	675	274
Oxbow	4	220	0	220	99	0	220	124	128	0	220	121
Ice Harbor	6	693	0	693	212	0	693	231	302	0	693	168
McNary	14	1127	0	1127	622	0	1127	604	770	0	1127	465
John Day	16	2484	535	2484	939	0	2484	920	1254	0	2484	696
The Dalles	22+2F	2074	0	2074	747	0	2074	730	992	0	2074	569
Bonneville	18+2F	1088	0	1047	566	0	1047	551	684	0	1047	440
Kootenay Lake	0	0	673	0	0	673	0	0	0	673	0	0
Coeur d'Alene Lake	0	0	223	0	0	223	0	0	0	223	0	0
Total Base and Canadian System Hydro 1/		23742	29445	23268	9459	28500	23126	9018	11546	13000	22559	7154
ADDITIONAL STEP I PROJECTS												
Libby	5	600	4980	532	192	NOT APPLICABLE TO STEP II & III						
Boundary	6	1055	0	855	368							
Spokane River Plants 2/	24	173	104	166	100							
Hells Canyon	3	450	0	450	192							
Dworshak	3	450	2015	443	145							
Lower Granite	6	932	0	930	212							
Little Goose	6	932	0	928	204							
Lower Monumental	6	932	0	922	211							
Pelton, Rereg., & RE	7	423	274	420	128							
Total added step 1		5947	7373	5649	1751							
THERMAL INSTALLATION 3/				11486	10302		11486	10325			11486	10496
RESERVES, HYDRO MAINTENANCE 4/				-4251	-11		-2289	0			-1872	0
TOTAL RESOURCES				36152	21501		32323	19343			32174	17652
STEP I, II, & III LOADS 5/				30431	21501		28608	19343			23394	17652
SURPLUS				5721	0		3715	0			8780	0
CRITICAL PERIOD	Starts		August 16, 1928			September 1, 1943				November 1, 1936		
	Ends		February 29, 1932			April 30, 1945				April 15, 1937		
	Length (Months)		42.5 Months			20 Months				5.5 Months		
	Study Identification		06-41			06-42				06-13		

1/ The above totals are correct, but may not equal the sum of the above values due to rounding.

2/ Spokane River Plants include: Little Falls, Long Lake, Nine Mile, Monroe, U Falls, and Post Falls.

3/ From Tables 1 and 3

4/ Peak reserves for Step I, II, III are 8 percent of January peak load from Table 3. Energy reserve deductions only include the hydro maintenance for Step I study (reserves have been included in included in thermal plant energy capability) from Table 1A, line 7(a).

5/ Step I energy load from Table 1A, line 5 and January peak load fromTable 1B, line 5. Step II & III energy load from Table 3. Step II & III peak load is equal to the step II or step III annual average load multiplied by the ratio of the PNWA January peak load to the PNW annual average load.

TABLE 4M
(Metric Units)
SUMMARY OF POWER REGULATIONS FROM 2005-06 ASSURED OPERATING PLAN

	BASIC	DATA	STEP I			STEP II				STEP III 4/			
PROJECTS	NUMBER OF UNITS	NOMINAL INSTALLED PEAKING CAPACITY MW	USABLE STORAGE hm³	JANUARY 1937 PEAKING CAP. MW	CRITICAL PERIOD AVERAGE GEN. MW	USABLE STORAGE hm³	JANUARY 1944 PEAKING CAP. MW	CRITICAL PERIOD AVERAGE GEN. MW	30 YEAR AVERAGE ANNUAL GEN. MW	USABLE STORAGE hm³	JANUARY 1937 PEAKING CAP. MW	CRITICAL PERIOD AVERAGE GEN. MW	30 YEAR AVERAGE ANNUAL GEN. MW
HYDRO RESOURCES													
CANADIAN													
Mica			8635			8635							
Arrow			8756			8758							
Duncan			1727			1727							
Subtotal			19119			19119							
BASE SYSTEM													
Hungry Horse	4	428	3789	337	103	3710	197	114	103	3710	321	251	105
Kerr	3	160	1504	179	116	1504	175	112	129	1504	174	160	123
Thompson Falls	6	85	0	85	53	0	85	53	58	0	85	66	57
Noxon Rapids	5	554	285	549	153	0	554	134	202	0	554	181	201
Cabinet Gorge	4	239	0	239	100	0	239	91	119	0	239	117	117
Albeni Falls	3	50	1425	21	22	1425	19	22	21	1425	15	16	20
Box Canyon	4	74	0	71	45	0	70	45	48	0	69	57	47
Grand Coulee	24+3SS	6684	6396	6365	2057	6256	6364	1842	2393	6256	5678	1243	2288
Chief Joseph	27	2535	0	2535	1069	0	2535	974	1308	0	2535	718	1239
Wells	10	840	0	840	421	0	840	390	490	0	840	292	443
Chelan	2	54	835	51	36	834	51	38	44	834	51	51	42
Rocky Reach	11	1267	0	1267	575	0	1267	533	694	0	1267	393	646
Rock Island	18	513	0	513	256	0	513	240	302	0	513	178	279
Wanapum	10	986	0	986	518	0	986	482	606	0	986	346	539
Priest Rapids	10	912	0	912	510	0	912	477	577	0	912	352	510
Brownlee	5	675	1203	675	240	1201	675	313	323	1201	675	274	321
Oxbow	4	220	0	220	99	0	220	124	128	0	220	121	128
Ice Harbor	6	693	0	693	212	0	693	231	302	0	693	168	302
McNary	14	1127	0	1127	622	0	1127	604	770	0	1127	465	718
John Day	16	2484	660	2484	939	0	2484	920	1254	0	2484	696	1216
The Dalles	22+2F	2074	0	2074	747	0	2074	730	992	0	2074	569	970
Bonneville	18+2F	1088	0	1047	566	0	1047	551	684	0	1047	440	642
Kootenay Lake	0	0	830	0	0	830	0	0	0	830	0	0	0
Coeur d'Alene Lake	0	0	275	0	0	275	0	0	0	275	0	0	0
Total Base and Canadian System Hydro 1/		23742	36320	23268	9459	35155	23126	9018	11546	16036	22559	7154	10953
ADDITIONAL STEP I PROJECTS													
Libby	5	600	6143	532	192								
Boundary	6	1055	0	855	368								
Spokane River Plants 2/	24	173	128	168	100								
Hells Canyon	3	450	0	450	192	NOT APPLICABLE TO STEP II & III							
Dworshak	3	450	2486	443	145								
Lower Granite	6	932	0	930	212								
Little Goose	6	932	0	928	204								
Lower Monumental	6	932	0	922	211								
Pelton, Rereg., & RE	7	423	338	420	128								
Total added step 1		5947	9095	5649	1751								
THERMAL INSTALLATION 3/				11486	10302		11486	10325			11486	10498	
RESERVES, HYDRO MAINTENANCE 4/				-4251	-11		-2289	0			-1872	0	
TOTAL RESOURCES				36152	21501		32323	19343			32174	17652	
STEP I, II, & III LOADS 5/				30431	21501		28608	19343			23394	17652	
SURPLUS				5721	0		3715	0			8780	0	
CRITICAL PERIOD	Starts			August 16, 1928			September 1, 1943				November 1, 1936		
	Ends			February 29, 1932			April 30, 1945				April 15, 1937		
	Length (Months)			42.5 Months			20 Months				5.5 Months		
	Study Identification			06-41			06-42				06-13		

1/ The above totals are correct, but may not equal the sum of the above values due to rounding.

2/ Spokane River Plants include: Little Falls, Long Lake, Nine Mile, Monroe, U Falls, and Post Falls.

3/ From Tables 1 and 3

4/ Peak reserves for Step I, II, III are 8 percent of January peak load from Table 3. Energy reserve deductions only include the hydro maintenance for Step I study (reserves have been included in thermal plant energy capability) from Table 1A, line 7(a).

5/ Step I energy load from Table 1A, line 5 and January peak load fromTable 1B, line 5. Step II & III energy load from Table 3. Step II & III peak load is equal to the step II or step III annual average load multiplied by the ratio of the PNWA January peak load to the PNW annual average load.

TABLE 5
(English & Metric Units)
COMPUTATION OF CANADIAN ENTITLEMENT FOR 2005-06 ASSURED OPERATING PLAN

A. Joint Optimum Power Generation in Canada and the U.S. (From 06-42)
B. Optimum Power Generation in the U.S. Only (From 06-12)
C. Optimum Power Generation in the U.S. and a 0.5 Million Acre-Feet (0.6 km^3) Reduction in Total Canadian Treaty Storage (From 06-22)

Determination of Dependable Capacity Credited to Canadian Storage (MW)	CAPACITY ENTITLEMENT		
	(A)	(B)	(C)
Step II - Critical Period Average Generation 1/	9018.5	9018.5	8976.4
Step III - Critical Period Average Generation 2/	7154.1	7154.1	7154.1
Gain Due to Canadian Storage	1864.4	1864.4	1822.3
Average Critical Period Load Factor in percent 3/	76.54	76.54	76.54
Dependable Capacity Gain 4/	2436.0	2436.0	2381.0
Canadian Share of Dependable Capacity 5/	1218.0	1218.0	1190.5

Determination of Increase in Average Annual Usable Energy (aMW)	ENERGY ENTITLEMENT		
Step II (with Canadian Storage) 1/	(A)	(B)	(C)
Annual Firm Hydro Energy 6/	8875.5	8875.5	8833.9
Thermal Displacement Energy 7/	2473.7	2469.7	2500.8
Other Usable Secondary Energy 8/	78.6	78.9	81.3
System Annual Average Usable Energy	11427.8	11424.1	11416.0
Step III (without Canadian Storage) 2/			
Annual Firm Hydro Energy 6/	6272.1	6272.1	6272.1
Thermal Displacement Energy 7/	3688.7	3688.7	3688.7
Other Usable Secondary Energy 8/	396.7	396.7	396.7
System Annual Average Usable Energy	10357.5	10357.5	10357.5
Average Annual Usable Energy Gain 9/	1070.3	1066.6	1058.5
Canadian Share of Average Annual Energy Gain 5/	535.1	533.3	529.3

1/ Step II values were obtained from the 06-42, 06-12, and 06-22 studies, respectively.
2/ Step III values were obtained from the 06-13 study and Table 3.
3/ Critical period load factor from Table 3.
4/ Dependable Capacity Gain credited to Canadian storage equals gain in critical period average generation divided by the average critical period load factor.
5/ One-half of Dependable Capacity or Usable Energy Gain.
6/ From 30-year average firm load served, which includes 7 leap years (29 days in February).
7/ Average secondary generation limited to Potential Thermal Displacement market.
8/ Forty percent (40%) of the remaining secondary energy.
9/ Difference between Step II and Step III Annual Average Usable Energy.

TABLE 6
(English & Metric Units)
COMPARISON OF RECENT DDPB STUDIES

	2000-01	2001-02	2002-03	2003-04 2004-05 1/	2005-06
AVERAGE PNWA ENERGY LOAD					
Annual Load (MW)	21107.8	21641.7	21769.7	21872.9	22214.7
Annual/January Load (%)	87.4	88.0	88.0	88.1	88.2
Critical Period (CP) Load Factor (%)	75.1	76.7	76.4	74.9	76.5
Annual Firm Exports 2/	1067.1	1156.3	1317.3	1322.1	1073.5
Annual Firm Surplus (MW) 3/	739.7	313.7	323.7	374.7	876.9
THERMAL INSTALLATIONS (MW) 4/					
January Peak Capability	11520	11433	11545	11312	11486
CP Energy	9521	9496	10081	10053	10302
CP Minimum Generation	858	853	622	611	230
Average Annual System Export Sales	1413	997	1419	1203	1232
Average Annual Displaceable Market	7179	7493	7958	8166	8785
HYDRO CAPACITY (MW)					
Total Installed	29836	29827	29827	29689	29689
Base System	23889	23880	23880	23742	23742
STEP I/II/III CP (MONTHS)	42/20/7	42.5/20/6.5	42.5/20/6	42.5/20/6	42.5/20/5.5
BASE STREAMFLOWS AT THE DALLES (cfs) 5/					
Step I 50-yr. Average Streamflow	181663	181663	181663	181663	181663
Step I CP Average	114496	114401	114401	114401	114401
Step II CP Average	101525	101525	101525	101525	101525
Step III CP Average	64959	58482	64878	64878	57184
BASE STREAMFLOWS AT THE DALLES (m^3/s) 5/					
Step I 50-yr. Average Streamflow	5144.12	5144.12	5144.12	5144.12	5144.12
Step I CP Average	3242.16	3239.47	3239.47	3239.47	3239.47
Step II CP Average	2874.87	2874.87	2874.87	2874.87	2874.87
Step III CP Average	1839.43	1656.01	1837.14	1837.14	1619.26
CAPACITY BENEFITS (MW)					
Step II CP Generation	9032.9	9055.6	9049.2	8964.6	9018.5
Step III CP Generation	6859.6	6865.3	7260.6	7201.6	7154.1
Step II Gain over Step III	2173.3	2190.3	1788.6	1763.0	1864.4
CANADIAN ENTITLEMENT	1447.3	1427.1	1170.7	1176.4	1218.0
Change due to Mica Reoperation	0.0	0.0	-0.7	-0.9	0.0
Benefit in Sales Agreement	192.0	187.0	167.0	0.0	0.0
ENERGY BENEFITS (aMW)					
Step II Annual Firm Hydro	8967.3	8966.5	8942.9	8855.1	8875.5
Step II Thermal Displacement	2183.3	2306.6	2343.6	2395.1	2473.7
Step II Other Usable Secondary	148.7	135.8	129.6	105.3	78.6
Step II System Annual Average Usable	11299.3	11408.9	11416.1	11355.5	11427.8
Step III Annual Firm Hydro	6541.1	6573.9	6448.1	6392.4	6272.1
Step III Thermal Displacement	3239.8	3294.0	3431.4	3455.4	3688.7
Step III Other Usable Secondary	501.5	475.9	467.7	433.1	396.7
Step III System Annual Average Usable	10282.4	10343.8	10347.2	10280.9	10357.5
CANADIAN ENTITLEMENT	508.4	532.6	534.5	537.3	535.1
Change due to Mica Reoperation	0.7	0.4	1.7	-1.1	1.8
ENTITLEMENT in Sales Agreement	99.0	95.0	93.0	0.0	0.0
STEP II PEAK CAPABILITY (MW)	32481	32501	32544	32062	32323
STEP II PEAK LOAD (MW)	28779	27650	28734	28924	28608
STEP III PEAK CAPABILITY (MW)	32268	32260	32352	31867	32174
STEP III PEAK LOAD (MW)	24983	24034	24949	25141	23394

FOOTNOTES FOR TABLE 6

1. The 2004-05 AOP/DDPB utilize the same system regulation studies as were utilized for the 2003-04 AOP/DDPB.

2. Average annual firm exports do not include the firm surplus shape or the new thermal installation power used outside the Region (exports to shape thermal installations).

3. Average annual firm surplus is the additional shaped load including the surplus shaped in the following periods:

AOP Study	Amount Shaped (MW)
2000-01	471 1 August through April 30 and
	1537 May through July.
2001-02	1877 May and June.
2002-03	1937 May and June.
2003-04 & 2004-05	1491 May through July.
2005-06	700 August, 600 September, 2070 April 30,
	3740 May, 2540 June, and 1845 July.

4. Thermal installations include thermal imports, all existing and planned thermal resources, combustion turbines, cogeneration, renewable thermal, thermal PURPA/NUGS, minus seasonal exchange imports and plant sales.

5. The 1990 level modified flows were used and no additional irrigation depletions were anticipated for the 2005-06 level. There is, however, an adjustment for Grand Coulee pumping and return flow.

CHART 1
2005-06 DDBP STUDIES
DURATION CURVES OF 30 YEARS MONTHLY HYDRO GENERATION (aMW)