

COLUMBIA RIVER TREATY

AGREEMENT

on

DETAILED OPERATING PLAN FOR CANADIAN STORAGE

DURING THE OPERATING YEAR 1 JULY 1969 THROUGH 31 JULY 1970

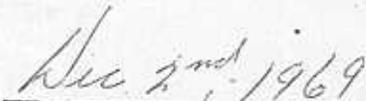
The Principles and Procedures for the Preparation and Use of Hydroelectric Operating Plans for Canadian Treaty Storage, agreed by the Entities on 25 July 1967, provide that the Entities develop a Detailed Operating Plan for each year's actual operation. The Canadian Entity and the United States Entity herewith agree that the Canadian storage will be operated in accordance with the attached "Columbia River Treaty Detailed Operating Plan for Canadian Storage -- 1 July 1969 through 31 July 1970," dated 2 October 1969.

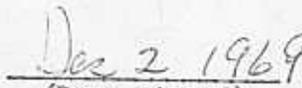


Ray G. Williston  
Chairman  
Canadian Entity



H. R. Richmond  
Chairman  
United States Entity

  
(Date signed)

  
(Date signed)

2 October 1969

COLUMBIA RIVER TREATY  
DETAILED OPERATING PLAN FOR CANADIAN STORAGE  
1 July 1969 through 31 July 1970

1. INTRODUCTION

The Detailed Operating Plan for Canadian Storage has been developed from the Assured Operating Plan previously agreed for the operating year 1 July 1969 through 31 July 1970 pursuant to Part III of the Principles and Procedures for the Preparation and Use of Hydroelectric Operating Plans for Canadian Storage. The Principles and Procedures provide that the Entities develop a Detailed Operating Plan for each year's actual operation. This operating plan consists of the data and criteria required for the formulation and use of Operating Rule Curves for each of the Canadian Storage reservoirs Duncan and Arrow and for the combined storage. The usable storage content available for the operating year is 711,400 second-foot-days at Duncan and 3,602,300 second-foot-days at Arrow.

2. REFERENCES

The Canadian and United States Entities have agreed on the following related documents:

- (a) "Columbia River Treaty Hydroelectric Operating Plans for Canadian Storage," dated February 15, 1969, hereinafter referred to as the "Assured Operating Plans";
- (b) "Principles and Procedures for the Preparation and Use of Hydro-Electric Operating Plans for Canadian Treaty Storage," dated July 25, 1967, hereinafter referred to

as the "Principles and Procedures";

- (c) "Interim Flood Control Operating Plan for Duncan and Arrow Reservoirs," dated November 12, 1968; hereinafter referred to as the "Flood Control Plan."

3. OPERATING RULE CURVE

The Operating Rule Curve for each of Duncan and Arrow reservoirs during the period 1 July 1969 through 31 July 1970, to be determined in accordance with the reference documents of Section 2, is defined as follows:

- (a) During 1 July 1969 through 31 December 1969, it is the higher of the Critical Rule Curve and the Assured Refill Curve, except that under no conditions shall it be higher than the Upper Rule Curve.
- (b) During 1 January 1970 through 31 July 1970, it is the lower of the Assured Refill Curve, the Variable Refill Curve and the Upper Rule Curve provided, however, that during the period 1 March 1970 through 31 March 1970 the Upper Rule Curve for Arrow Reservoir shall be zero usable storage contents.

4. OPERATION

The operation of Canadian Storage during the period 1 July 1969 through 31 July 1970 will be in accordance with the reference documents of Section 2, and the following operating guides:

- (a) Critical Rule Curve and Assured Refill Curve for Duncan, Arrow and the whole of Canadian Storage      Exhibit 1

- (b) Flood Control Storage Reservation Diagram for Duncan Exhibit 2
- (c) Flood Control Storage Reservation Diagram for Arrow Exhibit 3
- (d) Maximum and Minimum Operating Range from "A Study of 30 Hydro Conditions 1969-70 Operating Year." Exhibit 4

NOTE

- (1) The seasonal volume inflow forecast for the Columbia River at The Dalles supplied by the United States Section of the Operating Committee shall be used to obtain the upper rule curve for Arrow.
- (2) The volume inflow forecasting and variable refill curve procedures for Duncan as set out in document entitled "Runoff Volume Forecast Program for Canadian Columbia River Treaty Reservoirs" dated 15 August 1969, shall be used.
- (3) The variable refill curve for the whole of Canadian storage is the sum of the month-end storage contents as given by Duncan variable refill curve and the Arrow assured refill curve.

5. SCHEDULING STORAGE REGULATION

- (a) The Entities will exchange all current operating data necessary to the regulation of Canadian Storage content.
- (b) Unless otherwise agreed, requests by the United States Entity for the regulation of the whole of the Canadian Storage water will be made to the Canadian Entity on a regular weekly basis in accordance with the following procedures:

(i) Timing of Weekly Requests

- (1) A preliminary request will be made not later than noon each Thursday, followed by a final request by noon Friday.
- (2) Written confirmation of the request will be dispatched on Friday in accordance with the following format:

"This message will confirm our verbal re-storage request of this date for the ( draft ) in of \_\_\_\_\_ KSF ( from ) the whole of Canadian storage for the period ( date ) through ( date ). This request is based on an estimated average inflow of \_\_\_\_\_ KCFS to Arrow Lakes and of \_\_\_\_\_ KCFS to Duncan Lake during the above mentioned period. It is our understanding that during this period the Canadian Entity plans to discharge an average of \_\_\_\_\_ KCFS from the Arrow Lakes project and \_\_\_\_\_ KCFS from the Duncan project.

(ii) Period covered by Request

From 0800 hours on the Sunday following the weekly request to 0800 hours on the following Sunday.

(iii) Discrepancies

The Canadian Entity will release or store

as nearly as possible the amounts specified in the request for that week. Each request is to take into account adjustments if any, which the United States Entity considers necessary for previous inadvertent over or under releases of water from storage.

(iv) Release Determinations

The amount of water released or stored during the period of the request will be determined by the changes in reservoir elevation at Duncan and Arrow. The change in Arrow storage content will be determined using the gauge near Fauquier, B. C. for the Lower Arrow Lake and using the gauge near Nakusp, B. C. for the Upper Arrow Lake. The reservoir volume tables which will be used are for Duncan dated 24 April 1968 and for Upper Arrow and Lower Arrow dated April 1968.

(v) Delivery

Requested storage releases will be made effective at the Canadian-United States border. The request will be deemed to

have been fulfilled if the total amount of storage water requested is released from Duncan and Arrow reservoirs, provided an amount equal to or greater than the Duncan storage water release is concurrently discharged past Corra Linn dam. Requests of the United States Entity will recognize that at the lower elevation, discharge of storage from Arrow reservoir may be limited because of the restrictions between the Upper and Lower Lakes.

(vi) Modifications

If any modification to a written request is agreed between the Entities, a further written request superseding the original written request will be dispatched immediately by the U. S. Entity to the Canadian Entity.

(vii) Non-Routine Operation

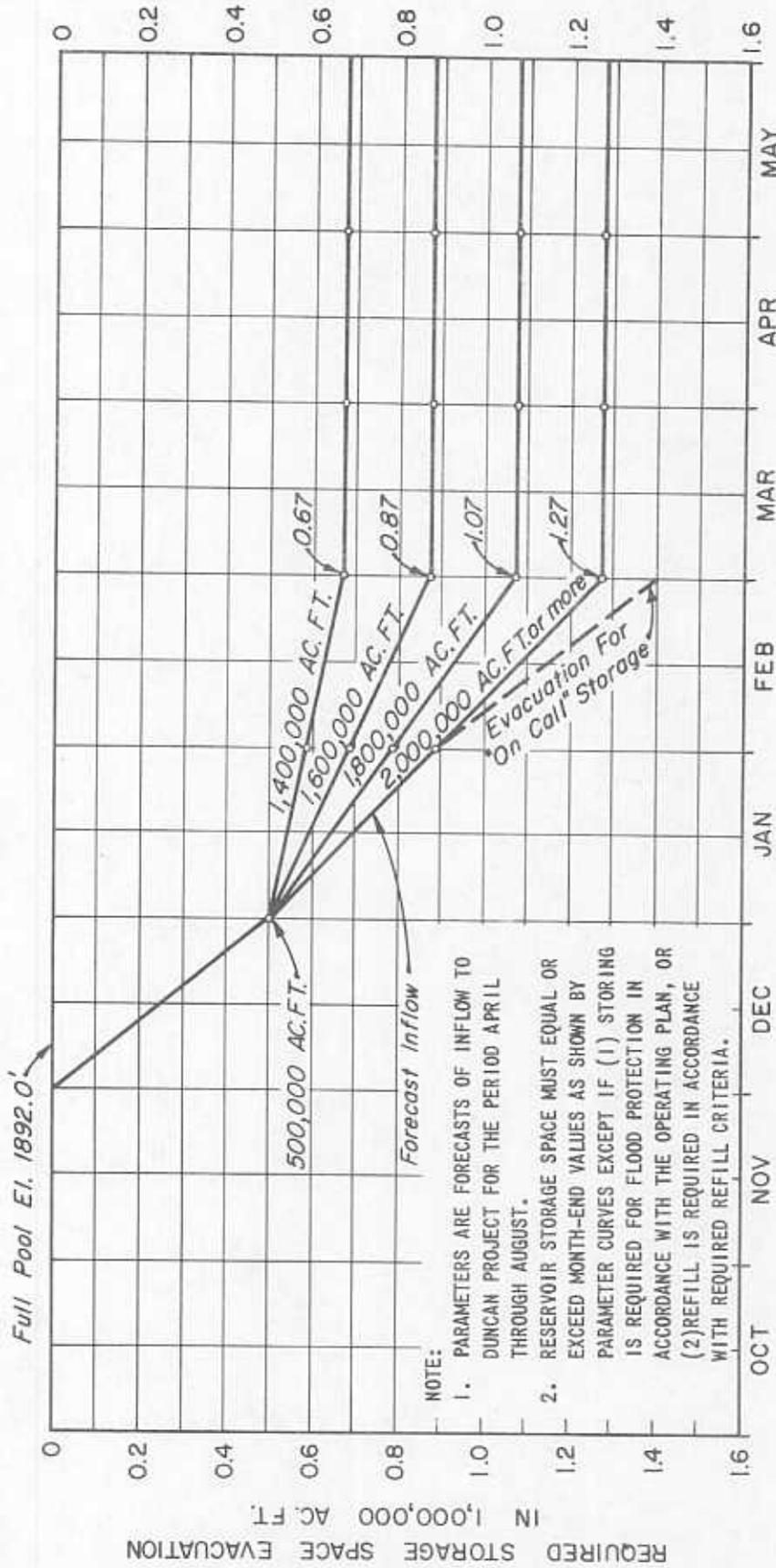
Any out of the ordinary operations which is agreed by the Operating Committee will be suitably documented.

DETAILED OPERATING PLAN FOR CANADIAN STORAGE  
 CRITICAL RULE CURVE & ASSURED REFILL CURVE  
 1969-70

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Critical Rule Curve</u>			<u>Assured Refill Curve</u>		
	<u>Duncan</u>	<u>Arrow</u>	<u>Total</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Total</u>
July	711.4	3602.3	4313.7	-	-	-
August	711.4	3531.2	4242.6	-	-	-
September	601.4	3278.0	3879.4	-	-	-
October	491.4	2959.5	3450.9	-	-	-
November	311.4	2224.6	2536.0	-	-	-
December	161.4	1140.1	1301.5	-	-	-
January	0.0	0.0	0.0	102.6	0.0	102.6
February	0.0	0.0	0.0	108.7	0.0	108.7
March	0.0	0.0	0.0	117.8	0.0	117.8
April	2.6	0.0	2.6	134.6	0.0	134.6
May	131.3	318.9	450.2	251.8	318.9	570.7
June	379.7	3042.9	3422.6	525.7	3042.9	3568.6
July	628.8	3602.3	4231.1	711.4	3602.3	4313.7

DUNCAN PROJECT  
 FLOOD CONTROL  
 STORAGE RESERVATION DIAGRAM  
 FLOOD CONTROL OPERATING PLAN  
 COLUMBIA RIVER TREATY  
 JULY 1968

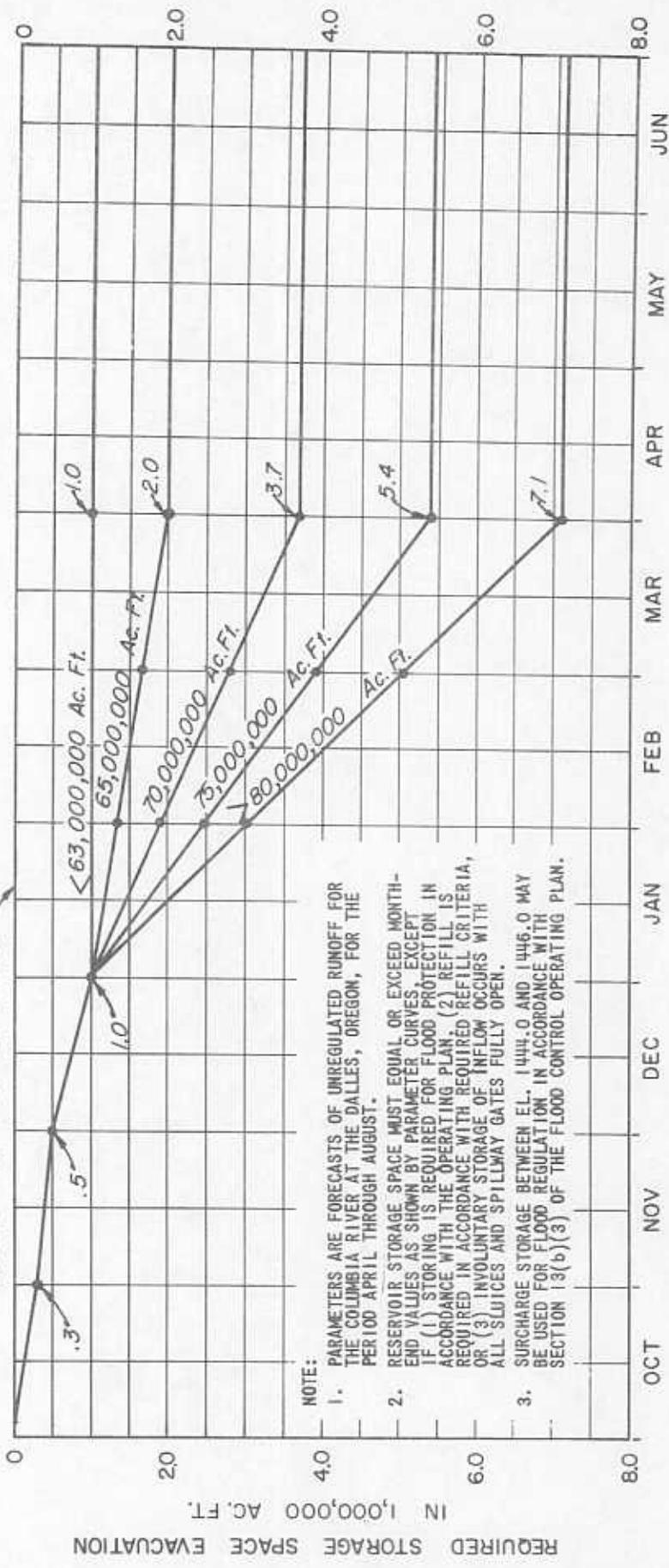


NOTE:

- PARAMETERS ARE FORECASTS OF INFLOW TO DUNCAN PROJECT FOR THE PERIOD APRIL THROUGH AUGUST.
- RESERVOIR STORAGE SPACE MUST EQUAL OR EXCEED MONTH-END VALUES AS SHOWN BY PARAMETER CURVES EXCEPT IF (1) STORING IS REQUIRED FOR FLOOD PROTECTION IN ACCORDANCE WITH THE OPERATING PLAN, OR (2) REFILL IS REQUIRED IN ACCORDANCE WITH REQUIRED REFILL CRITERIA.

Surcharge Pool El. 1446.0'

Normal Full Pool El. 1444.0'



NOTE:

1. PARAMETERS ARE FORECASTS OF UNREGULATED RUNOFF FOR THE COLUMBIA RIVER AT THE DALLES, OREGON, FOR THE PERIOD APRIL THROUGH AUGUST.
2. RESERVOIR STORAGE SPACE MUST EQUAL OR EXCEED MONTH-END VALUES AS SHOWN BY PARAMETER CURVES EXCEPT IF (1) STORING IS REQUIRED FOR FLOOD PROTECTION IN ACCORDANCE WITH THE OPERATING PLAN, (2) REFILL IS REQUIRED IN ACCORDANCE WITH REQUIRED REFILL CRITERIA, OR (3) INVOLUNTARY STORAGE OF INFLOW OCCURS WITH ALL SLUICES AND SPILLWAY GATES FULLY OPEN.
3. SURCHARGE STORAGE BETWEEN EL. 1444.0 AND 1446.0 MAY BE USED FOR FLOOD REGULATION IN ACCORDANCE WITH SECTION 13(b)(3) OF THE FLOOD CONTROL OPERATING PLAN.

ARROW PROJECT  
 FLOOD CONTROL  
 STORAGE RESERVATION DIAGRAM  
 PRE-MICA CONDITIONS  
 FLOOD CONTROL OPERATING PLAN  
 COLUMBIA RIVER TREATY  
 JULY 1968

DETAILED OPERATING PLAN FOR CANADIAN STORAGE  
MAXIMUM AND MINIMUM OPERATING RANGE FROM A STUDY OF 30 HYDRO CONDITIONS  
1969-70 OPERATING YEAR

