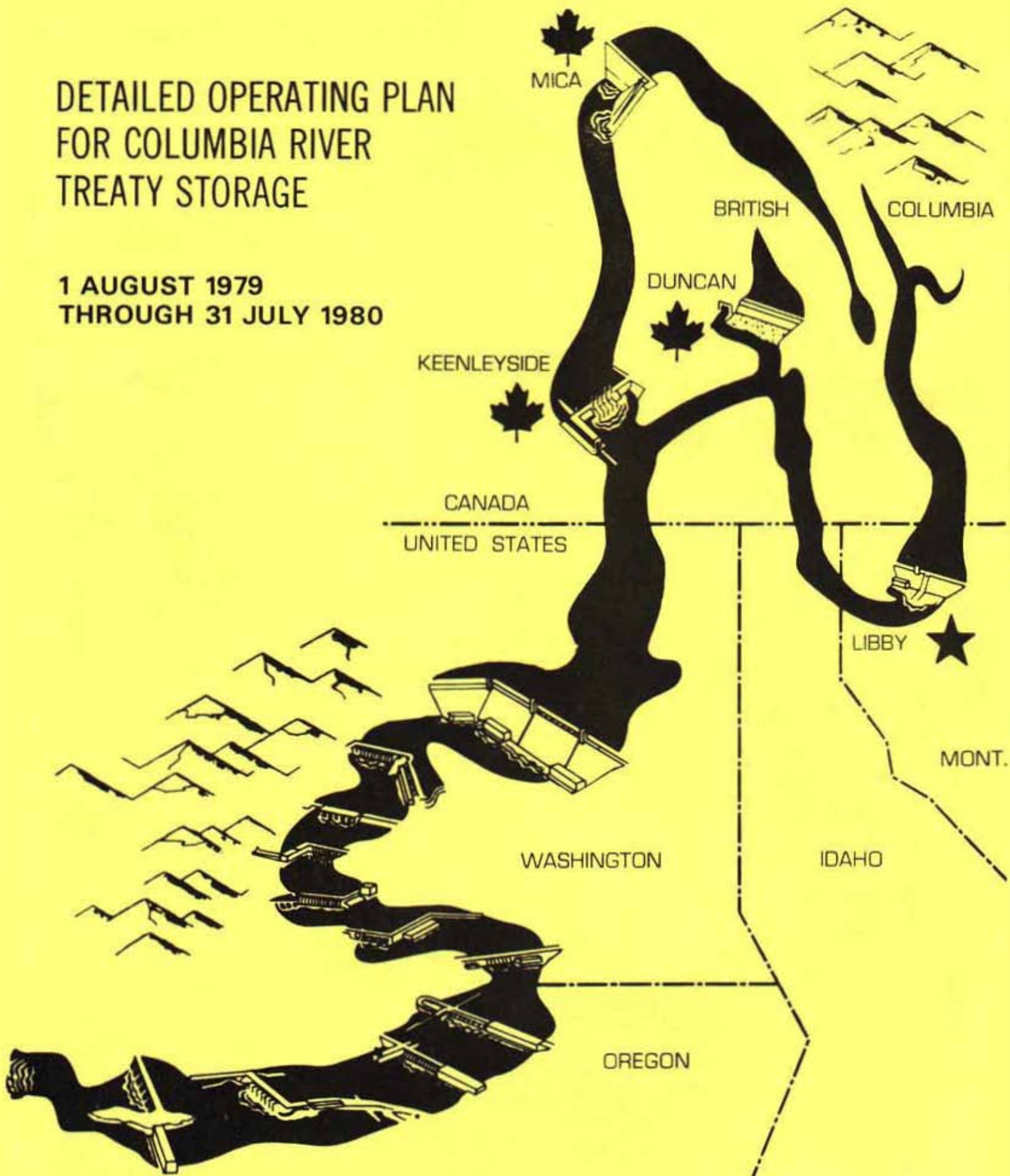


# DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE

1 AUGUST 1979  
THROUGH 31 JULY 1980



DETAILED OPERATING PLAN  
FOR COLUMBIA RIVER TREATY STORAGE  
1 AUGUST 1979 THROUGH 31 JULY 1980

1. REFERENCES AND INTERPRETATION

In this document

- (a) "Principles and Procedures" means the document "Principles and Procedures for the Preparation and Use of Hydroelectric Operating Plans for Canadian Treaty Storage," dated 1 May 1979;
- (b) "Assured Operating Plan" means the document "Columbia River Treaty Hydroelectric Operating Plan-Assured Operating Plan for Operating Year 1979-1980," dated September 1974;
- (c) "Flood Control Plan" means the document "Columbia River Treaty Flood Control Operating Plan," October 1972;
- (d) "Operating Year" means the period from 1 August 1979 through 31 July 1980;
- (e) "Operating Committee" means the Columbia River Treaty Operating Committee;
- (f) "Detailed Operating Plan" means a detailed operating plan prepared for the Operating Year by the Operating Committee pursuant to the Principles and Procedures and consisting of the contents of this document;
- (g) "Runoff Volume Forecast Program for Canadian Columbia River Treaty Reservoirs" means the document of that title dated 15 August 1969, with subsequent modifications as agreed by the Operating Committee; and
- (h) "Upper Rule Curve" means the upper reservoir elevation that reflects flood control criteria and other mandatory limitations.

2. PREPARATION AND SCOPE

This Detailed Operating Plan has been developed from the Coordinated System's final regulation for the 1979-80 Operating Year. System load and resource estimates, duration of critical period, flood control and other criteria have been reviewed and revised in accordance with the Principles and Procedures as necessary. The Critical Period duration is 20 months extending from 16 August 1979 through 15 April 1981 with hydro capability based on the 1943-44 through 1944-45 water years.

The data, criteria, and procedures presented herein will be used as described for the formation and use of Operating Rule Curves for each of the Canadian storage reservoirs, Duncan, Arrow, and McNaughton Lake (Mica), and for the whole of Canadian storage as well as Lake Kocanusa (Libby).

The usable Columbia River Treaty storage space available for power purposes during the Operating Year is 15.5 million acre-feet in Canada and 4.9336 million acre-feet at Libby in the United States, distributed as follows:

Duncan Reservoir

1.4 million acre-feet (705.8 thousand second-foot-days) between elevations 1892.0 feet and 1794.2 feet measured at Duncan forebay. (Based on B.C. Hydro table dated 21 February 1973.)

Arrow Reservoir

7.1 million acre-feet (3579.6 thousand second-foot-days) between elevations 1444.0 feet and 1377.9 feet measured at Fauquier, B.C. (Based on B.C. Hydro table dated 28 February 1974.)

McNaughton Lake (Mica)

7.0 million acre-feet (3529.2 thousand second-foot-days) measured at Mica forebay. (Based on B.C. Hydro table dated 25 March 1974.)

Lake Koocanusa (Libby)

4.9336 million acre-feet (2487.3 thousand second-foot-days) between elevation 2459.0 feet and 2287.0 feet measured at Libby forebay. (Based on Corps of Engineers DM #4 File No. E53-49-21.)

The usable Canadian storage available for normal flood-control purposes for the Operating Year is 1.27 million acre-feet in Duncan Reservoir below elevation 1892.0 feet; 5.1 million acre-feet in Arrow Reservoir below elevation 1444.0 feet; and 2.08 million acre-feet in McNaughton Lake (Mica Reservoir) except that additional storage may also be operated for flood control purposes under special circumstances, as described in the Flood Control Plan. The foregoing assumes a 2.0 million acre-feet transfer of flood-control storage from Arrow Reservoir to McNaughton Lake as detailed in the Flood Control Plan.

3. OPERATING RULE CURVE

The Operating Rule Curve for the whole of Canadian Storage shall be the sum of the Operating Rule Curves for each of Duncan, Arrow, and Mica. The Operating Rule Curve for each of the Duncan, Arrow, and Mica Reservoirs during the period 1 August 1979 through 31 July 1980 to be determined in accordance with the reference documents of Section 1, is defined as follows:

- a. During the period 1 August 1979 through 31 December 1979, it is the higher of the First Critical Rule Curve and the Assured Refill Curve.
- b. During the period 1 January 1980 through 31 March 1980 it is the higher of the First Critical Rule Curve or the Assured Refill Curve, unless the Variable Refill Curve is below the higher of the above two curves; then it is defined by the Variable Refill Curve.
- c. During the period 1 January 1980 through 31 March 1980 it will not be lower than a rule curve developed for the 1977-78 Operating Year using 1936-37 hydro conditions (Exhibit 5).
- d. During the period 1 April 1980 through 31 July 1980, it is the higher of the First Critical Rule Curve or the Assured Refill Curve unless the Flood Control Refill Curve is below the higher of the above two curves; then it is defined by the Flood Control Refill Curve.
- e. During any period in the 1979-80 Operating Year, it will not be higher than the Upper Rule Curve, defined as the maximum elevation of each reservoir established by flood control requirements and may be modified on mutual agreement for construction and other contingency requirements.
- f. Operation of Mica will be in accordance with the monthly average outflows tabulated with specified qualifications under Operating Limits. The obligation to operate Mica to produce optimum benefits in Canada and downstream in the United States will be deemed to have been fulfilled by operating to these criteria.
- g. The Variable Refill Curve for Mica shall be constructed based on the power discharge requirement specified in Exhibit 6.
  - (1) If the live Mica Storage Content is less than that specified by this rule curve the Variable Refill Curve for Mica and Arrow will be calculated using:
    - (a) The forecast volume of inflow for Arrow excluding the volume of inflow above the Mica project. This volume will be reduced by a forecast error such that there is a 95 percent probability that the reduced forecast is equalled or exceeded.
    - (b) The total Mica Power discharge requirement from Mica as specified in Exhibit 6 will be added to the forecast volume described in (1) above.
    - (c) In computing water available for refill of Arrow Reservoir the power discharge requirements for Arrow as specified in Exhibit 6 will be deducted from the volume calculated in (2).

(d) For the purpose of calculating the rule curve for the whole of Canadian storage, the Variable Refill Curve for Mica will be set equal to the live Mica Storage content.

(2) If the live Mica Storage content is greater than that specified by the Variable Refill Curve for Mica, the Variable Refill Curve for Arrow and for the whole of Canadian Storage will be determined in accordance with the reference documents of Section 1.

The Operating Rule Curve for Libby Reservoir is defined in a manner similar to that for Canadian storage.

#### 4. OPERATIONS

The operation of Treaty storage by the Columbia River Treaty Operating Committee during the period 1 August 1979 through 31 July 1980 will be in accordance with the reference documents of Section 1, and the following operating guides:

- a. 1979-80 First Critical Rule Curve and Assured Refill Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 1
- b. 1979-80 Second Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 2
- c. 1979-80 Third Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 3
- d. 1979-80 Fourth Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 4
- e. 1979-80 Lowest Rule Curve based on 1936-37 Hydro Conditions. Exhibit 5
- f. 1979-80 Flood Control Refill Curve and Variable Refill Curve Procedures. Exhibit 6
- g. 1980-81 Second Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 7
- h. 1980-81 Third Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 8
- i. 1981-82 Fourth Critical Rule Curve for Duncan, Arrow, and Mica and the whole of Canadian storage. Exhibit 9
- j. The First, Second, Third, and Fourth Critical Rule Curves and Energy Content Curve for Libby. Exhibit 10
- k. Duncan Reservoir, Storage Above Elevation 1794.2 feet. (Based on B.C. Hydro table dated 21 February 1973.) Exhibit 11

- l. Arrow Lakes, 7.1 million acre-feet below elevation 1444 feet. (Based on B.C. Hydro Combined Storage Table dated 28 February 1974.) Exhibit 12
- m. McNaughton Lake Storage Above Elevation 1865 feet. (Based on B.C. Hydro table dated 25 March 1974.) Exhibit 13
- n. Libby Storage Above Elevation 2287 feet. (Based on U.S. Corps of Engineers' DM #4, File No. E53-49-21.) Exhibit 14

5. SCHEDULING STORAGE REGULATION

- a. The Operating Committee will exchange all current operating data necessary for the regulation of Canadian storage projects as soon as available, including the beginning and end of the flood control season.
- b. Seasonal runoff volume forecasts for Canadian Treaty Projects shall be made available by the Canadian Section no later than the seventh of each month, as required. Forecasts of seasonal runoff volume at periods other than those representing month-end conditions may be requested by the Operating Committee if hydrologic conditions warrant. Seasonal runoff volume forecasts for the Columbia River at The Dalles, Oregon, shall be made available by the U.S. Section on the second working day of each month as required.
- c. Unless otherwise agreed, requests by the U.S. Section of the Operating Committee for the regulation of the Canadian Storage content will be made to the Canadian Section of the Operating Committee on a regular basis in accordance with the following procedures:
  - (1) Weekly Requests for Storage Regulation During the Storage Drawdown Season
    - (a) Timing of Requests. A preliminary request will be made not later than noon each Thursday, followed by a final request by noon Friday, if necessary.
    - (b) Confirmation of Requests. Written confirmation of the request will be dispatched on Friday in accordance with the following format unless otherwise agreed: This message will confirm our verbal request of this date for the (storing/drafting) of \_\_\_\_\_ ksf (in/from) the whole of Canadian storage for the period \_\_\_\_\_ through \_\_\_\_\_. (This request is based on an estimated average regulated inflow of \_\_\_\_\_ kcfs to Arrow Reservoir, \_\_\_\_\_ kcfs to Duncan Reservoir, \_\_\_\_\_ kcfs to Mica Reservoir, and \_\_\_\_\_ kcfs to Libby Reservoir during the above mentioned period, and an average discharge of \_\_\_\_\_ kcfs from the Arrow Project, \_\_\_\_\_ kcfs from the Duncan Project,

\_\_\_\_\_ kcfs from the Mica Project, and \_\_\_\_\_ kcfs from the Libby Project.)

- (c) Period Covered by Request. The period covered by the request shall be from 0800 hours on the Sunday following the date of weekly request to 0800 hours on the Sunday a week later.
  - (d) Release Determination. The amount of water released or stored during the period of the request will be determined by the changes in reservoir contents based on the recorded lake stage and storage capacity tables for Duncan (Exhibit 12), Arrow (Exhibit 13), and Mica (Exhibit 14). The change in Arrow storage content will be determined using the recorded lake stage at the gauge near Fauquier, B.C.
  - (e) 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, Arrow, and Mica reservoirs, provided an amount equal to or greater than the storage water release from Duncan reservoir is concurrently discharged from Kootenay Lake.
  - (f) Modification. If any modification to a written request is agreed by the Operating Committee, a further written request superseding the original written request will be dispatched immediately by the U.S. Section of the Operating Committee to the Canadian Section of the Operating Committee.
  - (g) Nonroutine Operation. Any special operation which is agreed by the Operating Committee will be suitably documented.
- (2) Daily Request for Storage Regulation During the Flood Control Season
- (a) Forecasts. Day-to-day streamflow forecasts will be accomplished by use of computer simulation by the Columbia River Forecasting Service. The regulation center required by the Flood Control Plan for the flood regulation will be located in the North Pacific Division Office, Corps of Engineers, Portland, Oregon.
  - (b) Daily Requests for Project Outflows. Pursuant to the operating rules in the Flood Control Plan, the outflows from individual Canadian storage projects are specified on a day-to-day basis. Requests will

be coordinated by telephone daily or on an as needed basis, by conference calls between members of the Operating Committee or their representatives. The requests will normally prescribe the requested outflows as a mean daily discharge in cubic feet per second, for the 24-hour period from noon to noon of each day. Daily requests for project outflows will be documented by message dispatched on the Columbia Basin Teletype Circuit from the regulation center in Portland, Oregon. Acknowledgment of the teletype request will be made by the Canadian authority by teletype message. The project outflows from Canadian projects will be determined by methods as agreed upon for the Hydrometeorological Reporting Network. Any modification of the documented daily request shall be agreed by the Operating Committee before being put into effect, and shall be documented by teletype immediately thereafter.

- (3) Regulation During Winter Floods. Daily requests for project outflows from Canadian projects are normally confined to the flood control refill period. During periods of high winter flows in the Lower Columbia River, if a special regulation of Arrow storage becomes necessary to preserve the natural flood control storage effect, the outflows from Arrow will be regulated on a day-to-day basis in accordance with the requests of the U.S. Section of the Operating Committee. The requests for such regulation will be in accordance with procedures described above.

## 6. OPERATING LIMITS

### a. Duncan Project

- (1) Maximum outflow - 20,000 cfs through outlets
- (2) Minimum average weekly outflow - 100 cfs
- (3) Maximum rate of change in outflow - 4,000 cfs per day
- (4) Normal full pool elevation 1,892.0 feet
- (5) Normal minimum pool elevation - 1,794.2 feet.

### b. Arrow Project

- (1) Maximum outflow - Physical limits only
- (2) Minimum average weekly outflow - 5,000 cfs
- (3) Maximum rate of change in outflow - 25,000 cfs per day
- (4) Normal full pool elevation - 1,444.0 feet
- (5) Normal minimum pool elevation - 1,377.9 feet
- (6) Advance notice for changes in outflow for:

(a) Drop in downstream level of:

1/2 foot	None
1 foot	1 hour
2 feet	2 hours
3 feet	24 hours

(b) Rise in downstream level of:

1/2 foot	None	
1 foot	1 hour	
2 feet	2 hours	
3 feet	7 hours	only if notice is received early (before 1000 hours) in the day, otherwise 24-hour notice is required.

c. Mica Project

In accordance with the 1979-80 Assured Operating Plan, the Mica Project will be operated to the following monthly average target outflows specified in (2) below except as qualified in (3) - (6) below:

(1) Variable Refill Curves

Variable Refill Curves (VRCs) shall be constructed based on a power discharge requirement as indicated in Exhibit 6 with a target 31 July Treaty Storage content of 3,529.2 KSF.

(2) Mica Project Operating Criteria

Month	Target End-of-Period Treaty Storage Content (KSF)	Target Average Outflow (CFS)	Minimum Outflow (CFS)	Maximum Outflow (CFS)
August 1-15	3529.2	--	10,000	--
August 16-31	3529.2	--	10,000	--
September	3529.2	--	10,000	--
October	--	15,000	10,000	34,000
November	--	18,000	10,000	34,000
December	--	28,000	15,000	34,000
January	--	29,000	15,000	34,000
February	--	29,000	10,000	34,000
March	--	15,000	10,000	34,000
April 1-15	--	15,000	10,000	34,000
April 16-30	--	15,000	10,000	34,000
May	--	10,000	10,000	34,000
June	--	10,000	10,000	34,000
July	3529.2	--	10,000	--

- (3) Mica monthly outflows will be increased in the months from October to June if required to avoid violation of the Flood Control Storage Reservation Curve.
- (4) Mica monthly average outflows will be increased in the months from August to March and the months of June and July if the Arrow Reservoir storage in the previous month is within the following limits:

Month	Arrow Reservoir End-of-Month Storage Content (KSF)	Mica Outflow In Next Month (CFS)
August	0 - 1000 1001 - 2100	30,000 20,000
September	0 - 2000	20,000
October	0 - 1700	23,000
November	0 - 300 301 - 1500	34,000 31,000
December	0 - 1000	32,000
January	0 - 1000	32,000
February	0 - 1000	17,000
March	---	--
April	---	--
May	0 - 500	24,000
June	0 - 1000 1001 - 2100	34,000 20,000
July	0 - 1000 1001 - 2100	34,000 20,000

If the table indicates the Mica outflow in August should be increased, the higher outflow applies in the first half only, and the second half of August will be examined using the 15 August Arrow content and the same criteria as for the first half.

- (5) Unless an adjustment to the Mica target outflows during January, February, March, or June is required as specified in (4) above, Mica outflow will be reduced to minimum values to maintain the reservoir above the following live treaty storage contents:

January	1439.0 ksf
February	1099.6 ksf
March	533.6 ksf
April	318.0 ksf
May	837.2 ksf
June	2195.9 ksf

- (6) Storage releases from Mica in excess of 7 million acre-feet that result from operating Mica under the criteria described in (2) to (5) above will be retained in the Arrow reservoir, subject to flood control criteria at

Arrow. The total combined storage draft from Mica and Arrow will not exceed 14.1 million acre-feet, and the 31 July target content for Mica storage will remain as specified in (2) above.

d. Libby Project

- (1) Maximum Outflow - When the spillway capacity is insufficient to pass the required flow, the regulating outlets may be used. Maximum gate opening permitted is 14.0 feet.

<u>Forebay Elevation</u>	<u>One Sluice</u>	<u>Three Sluices</u>
2459 ft.	13,300 cfs	39,900 cfs
2425 ft.	12,400 cfs	37,200 cfs
2405 ft.	11,800 cfs	35,400 cfs
2350 ft.	10,200 cfs	30,600 cfs
2287 ft.	7,800 cfs	23,400 cfs

- (2) Minimum instantaneous outflow - 2,000 cfs; for refill in critical years desirable minimum daily outflow - 3,000 cfs; desirable minimum daily outflow - 4,000 cfs.
- (3) Maximum rate of change
- (a) May - September - 1 ft. per hour  
4 ft. per 24 hours
- (b) October - April - 1 ft. per 1/2 hour  
6 ft. per 24 hours
- (4) Normal full pool elevation - 2459.0 feet
- (5) Minimum pool elevation - 2287.0 feet

DETAILED OPERATING PLAN FOR CANADIAN TREATY STORAGE  
FIRST CRITICAL RULE CURVE AND ASSURED REFILL CURVE FOR 1979-80

End-of-Month Usable Storage Content in 1000 SFD

Month	Critical Rule Curve <sup>1/</sup>				Assured Refill Curve <sup>2/</sup>		
	Duncan	Arrow	Mica	Total	Duncan	Arrow	Mica
August 15	705.8	3579.6	3529.2	7814.6	37.8	0.0	1059.5
August 31	705.6	3579.5	3529.2	7814.3	98.4	0.0	1526.4
September	630.2	3548.0	3529.2	7707.4	165.3	0.0	1920.6
October	592.3	3389.4	3411.3	7393.0	196.0	0.0	1874.1
November	585.3	3395.8	3017.9	6999.0	213.5	0.0	1722.0
December	392.3	3033.9	2229.8	5656.0	224.7	0.0	1355.9
January	4.5	2343.5	1439.0	3787.0	234.8	361.0	975.5
February	15.6	1315.8	1099.6	2431.0	244.0	721.7	767.7
March	2.1	977.9	698.2	1678.2	258.1	1206.5	555.1
April	32.9	570.5	416.6	1020.0	236.5	1425.1	401.8
May	158.0	1298.2	820.9	2277.1	343.8	2180.8	935.6
June	386.6	2172.4	1909.0	4468.0	532.8	3415.3	2317.1
July	532.8	1992.0	2807.7	5332.5	705.8	3579.6	3529.2

<sup>1/</sup> Source: Pacific Northwest Coordination Agreement 1979-80 Final Regulation

<sup>2/</sup> The Assured Refill Curve indicates the end-of-month storage content required to assure refill of Canadian storage by 31 July based on 1931 historical volume of inflow for the whole or remaining portion of the refill period. The year 1931 represents the second lowest historical January-July volume inflow for the system as measured at The Dalles, Oregon. The natural volume of inflow at each reservoir is reduced by deducting the Power Discharge Requirement, nonpower requirements at site and upstream, and water required for refill at upstream reservoirs.

The Power Discharge Requirement for each reservoir for the period January-July is defined in Exhibit 6, assuming 80 maf January through July volume at The Dalles. Project minimum discharges are used for the period August through December.

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
SECOND CRITICAL RULE CURVE FOR 1979-80

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	589.9	2735.1	3529.2	6863.2
September	505.5	2409.3	3529.2	6444.0
October	380.6	1748.2	3302.8	5431.6
November	363.1	1330.8	2870.4	4564.3
December	303.8	1008.9	2001.7	3314.4
January	160.1	222.5	1067.4	1450.0
February	74.4	287.9	231.9	594.2
March	60.2	449.5	0.0	509.7
April	69.8	626.5	75.5	771.8
May	184.5	1307.7	476.6	1968.8
June	373.1	1751.0	1813.8	3937.9
July	548.4	2095.6	3134.0	5778.0

Source: Pacific Northwest Coordinated System 1978-79 Final Regulation

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
THIRD CRITICAL RULE CURVE  
1979-80

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	269.5	1040.0	2605.8	3915.3
September	297.8	693.0	2484.1	3474.9
October	96.7	159.9	2120.4	2377.0
November	44.6	150.0	1649.3	1843.9
December	23.5	127.9	689.2	840.6
January	10.5	30.9	58.6	100.0
February	0.0	9.7	0.0	9.7
March	0.0	0.0	0.0	0.0

Source: Pacific Northwest Coordinated System 1977-78 Final Regulation

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
FOURTH CRITICAL RULE CURVE  
1979-80

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	75.7	250.5	2433.1	2759.3
September	75.7	169.2	2347.5	2592.4
October	75.7	50.4	2080.8	2206.9
November	0.0	214.1	1633.4	1847.5
December	0.0	261.7	718.2	979.9
January	0.0	271.0	0.0	271.0
February	0.0	23.8	0.0	23.8
March	0.0	0.0	0.0	0.0

Source: Pacific Northwest Coordinated System 1976-77 Final Regulation

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
LOWEST RULE CURVE BASED ON 1936-37 HYDRO CONDITIONS

End-of-Month Usable Storage Contents in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>	<u>Libby</u>
January	139.8	683.6	1074.0	1897.4	548.1
February	72.6	353.1	534.8	960.5	342.2
March	20.2	89.9	111.3	221.4	64.1

Source: Pacific Northwest Coordination Group Memo, dated August 11, 1976

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
1979-80 FLOOD CONTROL REFILL CURVE  
AND VARIABLE REFILL CURVE PROCEDURES

The Flood Control and Variable Refill Curves indicate the end-of-month storage content required to refill Canadian storage based on forecasts of natural inflow volume. The probable forecast volume at each reservoir is reduced by deducting the 95 percent confidence forecast error, project discharge requirement, nonpower requirements upstream, and water required for refill at upstream reservoirs. Studies made for the U.S. Coordinated System Operation for 1979-80 indicate that the Power Discharge Requirement for all cyclic reservoirs must be greater than project minimum release to allow filling in accordance with the Principles and Procedures coincident with carrying system firm load when The Dalles natural January-July runoff volume is lower than 95 million acre-feet. The following schedule for Power Discharge Requirements will apply for 1979-80.

POWER DISCHARGE REQUIREMENT, CFS  
FOR JANUARY-JULY VOLUME, THE DALLES, OREGON

Project	80 MAF							95 MAF All Periods Same as 80 MAF
	Jan.	Feb.	Mar.	Apr.	May	June	July	
Mica	15,000	10,000	10,000	10,000	10,000	10,000	10,000	
Arrow	5,000	5,000	5,000	17,500	26,500	26,500	43,500	
Duncan	100	100	100	1,700	1,700	1,700	1,700	
Libby	3,000	3,000	3,000	4,200	4,200	4,200	4,200	
	90 MAF							
Mica	Same as 80 MAF							
Arrow	5,000	5,000	5,000	9,600	9,600	9,600	14,000	5,000
Duncan	100	100	100	900	900	900	900	100
Libby	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000

If the forecasted natural January through July volume at The Dalles is less than 80 MAF, the Power Discharge Requirement in the 80 MAF schedule will be used. If the forecasted natural volume at The Dalles is greater than 95 MAF, the Power Discharge Requirement will be project minimum release. For intermediate forecasted volumes, the Power Discharge Requirement will be interpolated linearly between the values shown above. The Dalles volume forecast made at the beginning of each applicable month shall be recognized in computing the Variable Refill Curve.

It is recognized that the Canadian Section has the right to make changes to the refill curves for individual projects provided the effect of these changes is consistent with the composite refill curve for Total Canadian storage.

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
 SECOND CRITICAL RULE CURVE  
 1980-81

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	532.8	1786.7	3271.7	5591.2
September	560.0	1388.6	3401.7	5350.3
October	520.0	1160.4	3155.9	4836.3
November	480.0	985.6	2690.1	4155.7
December	300.0	666.4	1850.1	2816.5
January	150.0	468.1	951.9	1570.0
February	8.7	864.0	134.3	1007.0
March	5.0	324.0	0.0	329.0
April 15	0.0	0.0	0.0	0.0

Source: Pacific Northwest Coordinated System 1979-80 Final Regulation

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
 THIRD CRITICAL RULE CURVE  
 1980-81

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	664.4	1798.9	3529.2	5992.5
September	661.8	1457.7	3529.2	5648.7
October	605.4	911.2	3174.9	4691.5
November	569.2	1116.2	2634.4	4319.8
December	383.9	480.2	1773.6	2637.7
January	158.2	64.3	867.4	1089.9
February	49.1	182.4	44.6	276.1
March	2.5	25.7	0.0	28.2
April	0.2	26.5	0.0	26.7
May	157.1	620.8	0.0	777.9
June	234.7	805.9	1358.0	2398.6
July	163.5	1237.1	1818.4	3219.0

Source: Pacific Northwest Coordinated System 1978-79 Final Regulation

DETAILED OPERATING PLAN FOR COLUMBIA RIVER TREATY STORAGE  
FOURTH CRITICAL RULE CURVE  
1981-82

End-of-Month Usable Storage Content in 1000 SFD

<u>Month</u>	<u>Duncan</u>	<u>Arrow</u>	<u>Mica</u>	<u>Total</u>
August	29.6	1619.3	2758.2	4407.1
September	26.6	1149.1	3293.4	4469.1
October	15.4	869.9	2875.5	3760.8
November	0.6	1313.6	2084.9	3399.1
December	0.0	96.4	1171.9	1268.3
January	0.0	75.8	205.3	281.1
February	0.0	0.0	0.0	0.0

Source: Pacific Northwest Coordinated System 1978-79 Final Regulation

CRITICAL RULE CURVE AND ENERGY CONTENT CURVE  
LIBBY RESERVOIR

End-of-Month Usable Storage Content in 1000 SFD

Month	Critical Rule Curve							Energy Content Curve 1979-80
	1st 1979-80	2nd 1979-80	3rd 1979-80	4th 1979-80	2nd 1980-81	3rd 1980-81	4th 1981-82	
August 15	2487.3	2487.3	1762.2	2408.3	530.6	2487.3	1751.7	2487.3
August 31	2450.3	2487.3	1790.2	2436.3	486.6	2487.3	1609.4	2450.3
September	2278.9	2487.3	1832.3	2176.3	449.8	2337.3	1352.5	2278.9
October	2031.5	2334.0	1765.5	1671.3	394.1	2212.3	1002.1	2031.5
November	1480.3	1764.2	1255.8	1187.3	338.3	1777.3	569.0	1480.3
December	1066.4	1335.5	833.3	787.3	282.6	1385.5	551.4	1384.1
January	1029.1	1219.3	437.3	387.3	92.7	1169.7	253.0	1364.7
February	804.1	1038.5	49.5	0.0	34.1	811.9	0.0	1340.8
March	328.6	979.8	0.0	0.0	8.2	592.2	0.0	1319.7
April	274.2	1031.9	0.0	0.0	0.0	565.4	0.0	1295.4
May	374.6	1542.8	0.0	0.0	0.0	1052.1	0.0	1744.9
June	887.9	2460.5	0.0	0.0	0.0	1627.4	0.0	2284.6
July	593.2	2487.3	0.0	0.0	0.0	1866.1	0.0	2487.3

NOTE: Critical Rule Curves are from Pacific Northwest Coordinated System Final Regulations.

DUNCAN RESERVOIR  
STORAGE ABOVE ELEV 1794.2  
IN 1000 S.F.O.<sup>1/</sup>

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
1895	732.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1895
1894	723.7	724.6	725.5	726.4	727.3	728.2	729.1	729.9	730.8	731.7	.90	1894
1893	714.7	715.6	716.5	717.4	718.3	719.2	720.1	721.0	721.9	722.8	.89	1893
1892	705.8	706.7	707.6	708.5	709.4	710.3	711.2	712.1	712.9	713.8	.89	1892
1891	696.9	697.8	698.7	699.6	700.5	701.4	702.2	703.1	704.0	704.9	.89	1891
1890	688.0	688.9	689.8	690.7	691.6	692.5	693.4	694.2	695.1	696.0	.89	1890
1889	679.2	680.1	680.9	681.8	682.7	683.6	684.5	685.4	686.3	687.1	.89	1889
1888	670.4	671.2	672.1	673.0	673.9	674.8	675.6	676.5	677.4	678.3	.88	1888
1887	661.5	662.4	663.3	664.2	665.1	665.9	666.8	667.7	668.6	669.5	.88	1887
1886	652.8	653.6	654.5	655.4	656.3	657.2	658.0	658.9	659.8	660.7	.88	1886
1885	644.0	644.9	645.8	646.6	647.5	648.4	649.3	650.1	651.0	651.9	.88	1885
1884	635.3	636.1	637.0	637.9	638.8	639.6	640.5	641.4	642.3	643.1	.87	1884
1883	626.6	627.4	628.3	629.2	630.0	630.9	631.8	632.7	633.5	634.4	.87	1883
1882	617.9	618.7	619.6	620.5	621.3	622.2	623.1	624.0	624.8	625.7	.87	1882
1881	609.2	610.1	610.9	611.8	612.7	613.5	614.4	615.3	616.1	617.0	.87	1881
1880	600.6	601.4	602.3	603.2	604.0	604.9	605.8	606.6	607.5	608.4	.86	1880
1879	592.0	592.8	593.7	594.6	595.4	596.3	597.1	598.0	598.9	599.7	.86	1879
1878	583.4	584.2	585.1	586.0	586.8	587.7	588.5	589.4	590.3	591.1	.86	1878
1877	574.8	575.7	576.5	577.4	578.3	579.1	580.0	580.8	581.7	582.5	.86	1877
1876	566.3	567.1	568.0	568.9	569.7	570.6	571.4	572.3	573.1	574.0	.85	1876
1875	557.8	558.6	559.5	560.3	561.2	562.0	562.9	563.7	564.6	565.4	.85	1875
1874	549.3	550.2	551.0	551.8	552.7	553.5	554.4	555.2	556.1	556.9	.85	1874
1873	540.9	541.7	542.5	543.4	544.2	545.1	545.9	546.8	547.6	548.5	.85	1873
1872	532.4	533.3	534.1	535.0	535.8	536.6	537.5	538.3	539.2	540.0	.84	1872
1871	524.0	524.9	525.7	526.5	527.4	528.2	529.1	529.9	530.7	531.6	.84	1871
1870	515.7	516.5	517.3	518.2	519.0	519.8	520.7	521.5	522.3	523.2	.84	1870
1869	507.3	508.1	509.0	509.8	510.6	511.5	512.3	513.1	514.0	514.8	.83	1869
1868	499.0	499.8	500.6	501.5	502.3	503.1	504.0	504.8	505.6	506.5	.83	1868
1867	490.7	491.5	492.4	493.2	494.0	494.8	495.7	496.5	497.3	498.2	.83	1867
1866	482.4	483.3	484.1	484.9	485.7	486.6	487.4	488.2	489.0	489.9	.83	1866
1865	474.2	475.0	475.8	476.7	477.5	478.3	479.1	480.0	480.8	481.6	.82	1865
1864	466.0	466.8	467.6	468.5	469.3	470.1	470.9	471.7	472.6	473.4	.82	1864
1863	457.9	458.6	459.5	460.3	461.1	461.9	462.7	463.5	464.4	465.2	.82	1863
1862	449.7	450.5	451.3	452.1	452.9	453.7	454.6	455.4	456.2	457.0	.81	1862
1861	441.6	442.4	443.2	444.0	444.8	445.6	446.4	447.2	448.0	448.9	.81	1861
1860	433.5	434.3	435.1	435.9	436.7	437.5	438.3	439.1	439.9	440.7	.81	1860
1859	425.4	426.2	427.0	427.8	428.6	429.4	430.2	431.0	431.9	432.7	.81	1859
1858	417.4	418.2	419.0	419.8	420.6	421.4	422.2	423.0	423.8	424.6	.80	1858
1857	409.4	410.2	411.0	411.8	412.6	413.4	414.2	415.0	415.8	416.6	.80	1857
1856	401.4	402.2	403.0	403.8	404.6	405.4	406.2	407.0	407.8	408.6	.80	1856

<sup>1/</sup> Table taken directly from B.C. Hydro's table dated Feb. 21, 1973. Storage below elevation 1794.2 feet has been subtracted out.

DUNCAN RESERVOIR  
STORAGE ABOVE ELEV 1794.2  
IN 1000 S.F.O.1/

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
1855	393.5	394.3	395.1	395.9	396.7	397.5	398.3	399.0	399.8	400.6	.79	1855
1854	385.6	386.4	387.2	388.0	388.8	389.5	390.3	391.1	391.9	392.7	.79	1854
1853	377.7	378.5	379.3	380.1	380.9	381.7	382.4	383.2	384.0	384.8	.79	1853
1852	369.9	370.7	371.5	372.2	373.0	373.8	374.6	375.4	376.2	376.9	.78	1852
1851	362.1	362.9	363.7	364.4	365.2	366.0	366.8	367.6	368.3	369.1	.78	1851
1850	354.3	355.1	355.9	356.7	357.4	358.2	359.0	359.8	360.5	361.3	.78	1850
1849	346.6	347.4	348.1	348.9	349.7	350.5	351.2	352.0	352.8	353.6	.77	1849
1848	338.9	339.7	340.4	341.2	342.0	342.7	343.5	344.3	345.1	345.8	.77	1848
1847	331.2	332.0	332.8	333.5	334.3	335.1	335.8	336.6	337.4	338.1	.77	1847
1846	323.6	324.4	325.1	325.9	326.6	327.4	328.2	328.9	329.7	330.5	.76	1846
1845	316.0	316.8	317.5	318.3	319.0	319.8	320.6	321.3	322.1	322.8	.76	1845
1844	308.5	309.2	310.0	310.7	311.5	312.2	313.0	313.7	314.5	315.3	.76	1844
1843	300.9	301.7	302.4	303.2	303.9	304.7	305.4	306.2	306.9	307.7	.75	1843
1842	293.5	294.2	294.9	295.7	296.4	297.2	297.9	298.7	299.4	300.2	.75	1842
1841	286.0	286.7	287.5	288.2	289.0	289.7	290.5	291.2	292.0	292.7	.74	1841
1840	278.6	279.3	280.1	280.8	281.6	282.3	283.0	283.8	284.5	285.3	.74	1840
1839	271.2	272.0	272.7	273.4	274.2	274.9	275.6	276.4	277.1	277.9	.74	1839
1838	263.9	264.6	265.4	266.1	266.8	267.6	268.3	269.0	269.8	270.5	.73	1838
1837	256.6	257.3	258.1	258.8	259.5	260.3	261.0	261.7	262.4	263.2	.73	1837
1836	249.4	250.1	250.8	251.5	252.3	253.0	253.7	254.4	255.2	255.9	.72	1836
1835	242.2	242.9	243.6	244.3	245.0	245.8	246.5	247.2	247.9	248.7	.72	1835
1834	235.0	235.7	236.4	237.2	237.9	238.6	239.3	240.0	240.7	241.5	.72	1834
1833	227.9	228.6	229.3	230.0	230.7	231.4	232.2	232.9	233.6	234.3	.71	1833
1832	220.8	221.5	222.2	222.9	223.6	224.3	225.1	225.8	226.5	227.2	.71	1832
1831	213.8	214.5	215.2	215.9	216.6	217.3	218.0	218.7	219.4	220.1	.70	1831
1830	206.8	207.5	208.2	208.9	209.6	210.3	211.0	211.7	212.4	213.1	.70	1830
1829	199.9	200.5	201.2	201.9	202.6	203.3	204.0	204.7	205.4	206.1	.69	1829
1828	193.0	193.6	194.3	195.0	195.7	196.4	197.1	197.8	198.5	199.2	.69	1828
1827	186.1	186.8	187.5	188.2	188.8	189.5	190.2	190.9	191.6	192.3	.68	1827
1826	179.3	180.0	180.7	181.4	182.0	182.7	183.4	184.1	184.8	185.4	.68	1826
1825	172.6	173.2	173.9	174.6	175.3	175.9	176.6	177.3	178.0	178.6	.67	1825
1824	165.9	166.5	167.2	167.9	168.6	169.2	169.9	170.6	171.2	171.9	.67	1824
1823	159.2	159.9	160.6	161.2	161.9	162.6	163.2	163.9	164.5	165.2	.66	1823
1822	152.6	153.3	154.0	154.6	155.3	155.9	156.6	157.3	157.9	158.6	.66	1822
1821	146.1	146.8	147.4	148.1	148.7	149.4	150.0	150.7	151.3	152.0	.65	1821
1820	139.6	140.3	140.9	141.6	142.2	142.9	143.5	144.2	144.8	145.5	.65	1820
1819	133.2	133.9	134.5	135.1	135.8	136.4	137.1	137.7	138.3	139.0	.64	1819
1818	126.8	127.5	128.1	128.8	129.4	130.0	130.7	131.3	131.9	132.6	.64	1818
1817	120.5	121.2	121.8	122.4	123.1	123.7	124.3	125.0	125.6	126.2	.63	1817
1816	114.3	114.9	115.6	116.2	116.8	117.4	118.0	118.7	119.3	119.9	.62	1816

EXHIBIT 11  
Page 2 of 3

1/ Table taken directly from B.C. Hydro's table dated Feb. 21, 1973. Storage below elevation 1794.2 feet has been subtracted out.

DUNCAN RESERVOIR  
STORAGE ABOVE ELEV. 1794.2  
IN 1000 S.F.D.<sup>1/</sup>

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
1815	108.1	108.7	109.4	110.0	110.6	111.2	111.8	112.4	113.1	113.7	.62	1815
1814	102.0	102.6	103.2	103.8	104.5	105.1	105.7	106.3	106.9	107.5	.61	1814
1813	96.0	96.6	97.2	97.8	98.4	99.0	99.6	100.2	100.8	101.4	.60	1813
1812	90.0	90.6	91.2	91.8	92.4	93.0	93.6	94.2	94.8	95.4	.60	1812
1811	84.1	84.7	85.3	85.9	86.5	87.0	87.6	88.2	88.8	89.4	.59	1811
1810	78.3	78.9	79.4	80.0	80.6	81.2	81.8	82.4	82.9	83.5	.58	1810
1809	72.5	73.1	73.7	74.3	74.8	75.4	76.0	76.6	77.1	77.7	.57	1809
1808	66.9	67.4	68.0	68.6	69.1	69.7	70.3	70.8	71.4	72.0	.57	1808
1807	61.3	61.8	62.4	63.0	63.5	64.1	64.6	65.2	65.7	66.3	.56	1807
1806	55.8	56.3	56.9	57.4	58.0	58.5	59.1	59.6	60.2	60.7	.55	1806
1805	50.4	50.9	51.5	52.0	52.6	53.1	53.6	54.2	54.7	55.3	.54	1805
1804	45.1	45.6	46.2	46.7	47.2	47.7	48.3	48.8	49.3	49.9	.53	1804
1803	39.9	40.4	40.9	41.5	42.0	42.5	43.0	43.5	44.1	44.6	.52	1803
1802	34.8	35.3	35.8	36.3	36.8	37.3	37.9	38.4	38.9	39.4	.51	1802
1801	29.8	30.3	30.8	31.3	31.8	32.3	32.8	33.3	33.8	34.3	.50	1801
1800	25.0	25.5	26.0	26.4	26.9	27.4	27.9	28.4	28.9	29.4	.48	1800
1799	20.3	20.7	21.2	21.7	22.1	22.6	23.1	23.6	24.0	24.5	.47	1799
1798	15.7	16.2	16.6	17.1	17.5	18.0	18.4	18.9	19.4	19.8	.46	1798
1797	11.3	11.7	12.2	12.6	13.0	13.5	13.9	14.4	14.8	15.3	.44	1797
1796	7.1	7.5	7.9	8.3	8.7	9.2	9.6	10.0	10.4	10.9	.42	1796
1795	3.0	3.4	3.8	4.2	4.6	5.0	5.4	5.8	6.3	6.7	.40	1795
1794	.7	.4	0.0	.4	.7	1.1	1.5	1.9	2.3	2.7	.38	1794
1793	4.2	3.9	3.6	3.2	2.9	2.5	2.2	1.8	1.5	1.1	.35	1793
1792	7.4	7.1	6.8	6.5	6.2	5.8	5.5	5.2	4.9	4.6	.31	1792
1791	10.2	9.9	9.6	9.4	9.1	8.8	8.5	8.2	8.0	7.7	.28	1791
1790	12.6	12.4	12.1	11.9	11.7	11.4	11.2	10.9	10.7	10.4	.24	1790
1789	14.6	14.5	14.3	14.1	13.9	13.7	13.4	13.2	13.0	12.8	.21	1789
1788	16.4	16.2	16.0	15.9	15.7	15.5	15.4	15.2	15.0	14.8	.17	1788

<sup>1/</sup>Table taken directly from B.C. Hydro's table dated Feb. 21, 1973. Storage below elevation 1794.2 feet has been subtracted out.

ARROW LAKES  
7.1 MAF STORAGE BELOW ELEVATION 1444.0  
IN 1000 S.F.U.

PAGE 1 OF 2

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET	
	0	1	2	3	4	5	6	7	8	9			
1450	3479.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1450
1449	3512.3	3419.1	3425.8	3432.6	3439.3	3446.1	3452.8	3459.6	3466.4	3473.1	6.75	1449	
1448	3845.1	3651.8	3858.6	3865.3	3872.0	3878.7	3885.4	3892.1	3898.9	3905.6	6.72	1448	
1447	3778.3	3784.4	3791.6	3798.3	3805.0	3811.7	3818.3	3825.0	3831.7	3838.4	6.69	1447	
1446	3711.7	3718.4	3725.0	3731.6	3738.3	3745.0	3751.6	3758.3	3764.9	3771.6	6.65	1446	
1445	3645.5	3652.1	3658.7	3665.3	3672.0	3678.6	3685.2	3691.8	3698.5	3705.1	6.62	1445	
1444	3579.6	3586.2	3592.8	3599.4	3605.9	3612.5	3619.1	3625.7	3632.3	3638.9	6.59	1444	
1443	3514.1	3520.6	3527.2	3533.7	3540.3	3546.8	3553.4	3559.9	3566.5	3573.1	6.55	1443	
1442	3448.9	3455.4	3461.9	3468.4	3474.9	3481.4	3488.0	3494.5	3501.0	3507.6	6.52	1442	
1441	3384.0	3390.5	3397.0	3403.4	3409.9	3416.4	3422.9	3429.4	3435.9	3442.4	6.49	1441	
1440	3319.5	3325.9	3332.3	3338.8	3345.2	3351.7	3358.1	3364.6	3371.1	3377.5	6.45	1440	
1439	3255.2	3261.7	3268.1	3274.5	3280.9	3287.3	3293.7	3300.2	3306.6	3313.0	6.42	1439	
1438	3191.4	3197.7	3204.1	3210.5	3216.9	3223.3	3229.7	3236.0	3242.4	3248.8	6.39	1438	
1437	3127.8	3134.2	3140.5	3146.8	3153.2	3159.5	3165.9	3172.3	3178.6	3185.0	6.35	1437	
1436	3064.6	3070.9	3077.2	3083.5	3089.8	3096.2	3102.5	3108.8	3115.1	3121.5	6.32	1436	
1435	3001.7	3008.0	3014.3	3020.6	3026.8	3033.1	3039.4	3045.7	3052.0	3058.3	6.29	1435	
1434	2939.2	2945.4	2951.7	2957.9	2964.2	2970.4	2976.7	2982.9	2989.2	2995.5	6.25	1434	
1433	2877.0	2883.2	2889.4	2895.6	2901.8	2908.0	2914.2	2920.5	2926.7	2932.9	6.22	1433	
1432	2815.1	2821.2	2827.4	2833.6	2839.8	2846.0	2852.2	2858.4	2864.6	2870.8	6.19	1432	
1431	2753.5	2759.7	2765.8	2772.0	2778.1	2784.3	2790.4	2796.6	2802.7	2808.9	6.15	1431	
1430	2692.3	2698.4	2704.5	2710.6	2716.8	2722.9	2729.0	2735.1	2741.3	2747.4	6.12	1430	
1429	2631.5	2637.5	2643.6	2649.7	2655.8	2661.8	2667.9	2674.0	2680.1	2686.2	6.08	1429	
1428	2570.9	2577.0	2583.0	2589.1	2595.1	2601.2	2607.2	2613.3	2619.3	2625.4	6.05	1428	
1427	2510.7	2516.7	2522.7	2528.8	2534.8	2540.8	2546.8	2552.8	2558.9	2564.9	6.02	1427	
1426	2450.8	2456.8	2462.8	2468.8	2474.7	2480.7	2486.7	2492.7	2498.7	2504.7	5.99	1426	
1425	2391.2	2397.2	2403.1	2409.1	2415.0	2421.0	2426.9	2432.9	2438.9	2444.8	5.96	1425	
1424	2331.9	2337.8	2343.7	2349.6	2355.6	2361.5	2367.4	2373.4	2379.3	2385.3	5.94	1424	
1423	2272.8	2278.7	2284.6	2290.5	2296.4	2302.3	2308.2	2314.1	2320.0	2325.9	5.90	1423	
1422	2214.1	2220.0	2225.8	2231.7	2237.5	2243.4	2249.3	2255.2	2261.0	2266.9	5.87	1422	
1421	2155.7	2161.5	2167.4	2173.2	2179.0	2184.9	2190.7	2196.5	2202.4	2208.2	5.84	1421	
1420	2097.7	2103.5	2109.3	2115.1	2120.9	2126.7	2132.5	2138.3	2144.1	2149.9	5.80	1420	
1419	2040.1	2045.9	2051.6	2057.4	2063.1	2068.9	2074.6	2080.4	2086.2	2091.9	5.76	1419	
1418	1982.9	1988.6	1994.3	2000.0	2005.8	2011.5	2017.2	2022.9	2028.7	2034.4	5.72	1418	
1417	1926.1	1931.8	1937.4	1943.1	1948.8	1954.5	1960.1	1965.8	1971.5	1977.2	5.68	1417	
1416	1869.6	1875.2	1880.9	1886.5	1892.2	1897.8	1903.5	1909.1	1914.8	1920.4	5.65	1416	
1415	1813.5	1819.1	1824.7	1830.3	1835.9	1841.5	1847.1	1852.7	1858.4	1864.0	5.61	1415	
1414	1757.8	1763.3	1768.9	1774.4	1780.0	1785.6	1791.2	1796.7	1802.3	1807.9	5.57	1414	
1413	1702.4	1707.9	1713.4	1719.0	1724.5	1730.0	1735.6	1741.1	1746.7	1752.2	5.54	1413	
1412	1647.4	1652.8	1658.3	1663.8	1669.3	1674.8	1680.3	1685.8	1691.3	1696.9	5.50	1412	
1411	1592.7	1598.1	1603.6	1609.1	1614.5	1620.0	1625.4	1630.9	1636.4	1641.9	5.47	1411	

EXHIBIT 12  
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ARPCW LAKES  
7.1 MAF STORAGE BELOW ELEVATION 1444.0  
IN 1000 S.F.D.

PAGE 2 OF 2

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
1410	1538.4	1543.8	1549.2	1554.6	1560.1	1565.5	1570.9	1576.4	1581.9	1587.2	5.43	1410
1409	1484.5	1489.9	1495.2	1500.6	1506.0	1511.4	1516.8	1522.2	1527.6	1533.0	5.39	1409
1408	1430.9	1436.3	1441.6	1446.9	1452.3	1457.7	1463.0	1468.4	1473.7	1479.1	5.36	1408
1407	1377.7	1383.0	1388.3	1393.6	1398.9	1404.3	1409.6	1414.9	1420.2	1425.6	5.32	1407
1406	1324.7	1330.0	1335.3	1340.6	1345.9	1351.2	1356.5	1361.8	1367.1	1372.4	5.29	1406
1405	1272.1	1277.4	1282.6	1287.9	1293.1	1298.4	1303.7	1308.9	1314.2	1319.5	5.26	1405
1404	1219.5	1224.8	1230.0	1235.3	1240.5	1245.8	1251.0	1256.3	1261.6	1266.8	5.26	1404
1403	1167.2	1172.5	1177.7	1182.9	1188.2	1193.4	1198.6	1203.8	1209.1	1214.3	5.22	1403
1402	1115.4	1120.6	1125.8	1130.9	1136.1	1141.3	1146.5	1151.7	1156.9	1162.1	5.19	1402
1401	1063.9	1069.0	1074.2	1079.2	1084.5	1089.6	1094.8	1099.9	1105.1	1110.2	5.15	1401
1400	1012.1	1017.9	1023.0	1028.1	1033.2	1038.3	1043.4	1048.5	1053.7	1058.8	5.11	1400
1399	962.5	967.6	972.6	977.6	982.6	987.6	992.7	997.7	1002.7	1007.8	5.03	1399
1398	912.7	917.6	922.6	927.6	932.6	937.6	942.6	947.5	952.5	957.5	4.99	1398
1397	863.2	868.1	873.1	878.0	882.9	887.9	892.8	897.8	902.8	907.7	4.95	1397
1396	814.1	819.0	823.9	828.8	833.7	838.6	843.5	848.4	853.3	858.3	4.91	1396
1395	765.2	770.1	775.0	779.8	784.7	789.6	794.5	799.4	804.3	809.2	4.88	1395
1394	716.2	721.1	726.0	730.9	735.8	740.7	745.6	750.5	755.4	760.3	4.90	1394
1393	667.5	672.4	677.2	682.1	687.0	691.8	696.7	701.6	706.4	711.3	4.87	1393
1392	619.3	624.1	628.9	633.7	638.5	643.3	648.2	653.0	657.8	662.7	4.83	1392
1391	571.4	576.2	581.0	585.7	590.5	595.3	600.1	604.9	609.7	614.5	4.78	1391
1390	524.2	528.9	533.6	538.3	543.0	547.7	552.5	557.2	562.0	566.7	4.73	1390
1389	477.9	482.5	487.1	491.8	496.4	501.0	505.6	510.2	514.9	519.5	4.63	1389
1388	432.3	436.8	441.4	445.9	450.5	455.0	459.6	464.2	468.8	473.3	4.57	1388
1387	387.2	391.6	396.1	400.6	405.1	409.6	414.2	418.7	423.2	427.7	4.51	1387
1386	342.2	347.0	351.4	355.9	360.3	364.8	369.3	373.7	378.2	382.7	4.46	1386
1385	298.5	302.9	307.2	311.6	316.0	320.5	324.9	329.3	333.7	338.1	4.41	1385
1384	254.6	259.0	263.3	267.7	272.1	276.5	280.9	285.3	289.7	294.1	4.39	1384
1383	211.2	215.5	219.9	224.2	228.5	232.8	237.2	241.5	245.9	250.2	4.34	1383
1382	168.4	172.6	176.9	181.2	185.4	189.7	194.0	198.3	202.6	206.9	4.29	1382
1381	126.1	130.3	134.5	138.7	142.9	147.1	151.4	155.6	159.9	164.1	4.23	1381
1380	84.3	88.5	92.6	96.8	100.9	105.1	109.3	113.5	117.7	121.9	4.17	1380
1379	43.2	47.3	51.4	55.5	59.6	63.7	67.8	71.9	76.1	80.2	4.11	1379
1378	2.7	6.7	10.8	14.8	18.8	22.9	26.9	31.0	35.1	39.1	4.05	1378
1377	-37.1	-33.1	-29.2	-25.2	-21.2	-17.2	-13.3	-9.3	-5.3	-1.3	3.98	1377
1376	-76.2	-72.3	-68.4	-64.5	-60.6	-56.7	-52.8	-48.9	-45.0	-41.0	3.91	1376
1375	-114.2	-110.3	-106.4	-102.5	-98.6	-94.7	-90.8	-86.9	-83.0	-79.1	3.84	1375

EXHIBIT 12  
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MC NAUGHTEN LAKE  
STORAGE ABOVE ELEVATION 1865  
IN 1000 S.F.D.

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET	
	0	1	2	3	4	5	6	7	8	9			
2475	10121.1	C.C	C.C	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2475
2474	10067.5	10072.9	10078.2	10083.6	10089.0	10094.3	10099.7	10105.1	10110.4	10115.8	5.36	2474	
2473	10014.1	10019.4	10024.8	10030.1	10035.5	10040.8	10046.1	10051.5	10056.8	10062.2	5.34	2473	
2472	9960.8	9966.2	9971.5	9976.8	9982.1	9987.5	9992.8	9998.1	10003.4	10008.8	5.33	2472	
2471	9907.8	9913.1	9918.4	9923.7	9929.0	9934.3	9939.6	9944.9	9950.2	9955.5	5.31	2471	
2470	9854.8	9860.1	9865.4	9870.7	9876.0	9881.3	9886.6	9891.9	9897.2	9902.5	5.29	2470	
2469	9802.1	9807.3	9812.6	9817.9	9823.2	9828.4	9833.7	9839.0	9844.3	9849.5	5.28	2469	
2468	9749.5	9754.7	9760.0	9765.2	9770.5	9775.6	9781.0	9786.3	9791.5	9796.8	5.26	2468	
2467	9697.1	9702.3	9707.5	9712.8	9718.0	9723.2	9728.5	9733.7	9739.0	9744.2	5.24	2467	
2466	9644.8	9650.0	9655.2	9660.5	9665.7	9670.9	9676.1	9681.4	9686.6	9691.8	5.23	2466	
2465	9592.7	9597.9	9603.1	9608.3	9613.5	9618.7	9623.9	9629.2	9634.4	9639.6	5.21	2465	
2464	9540.8	9546.0	9551.2	9556.3	9561.5	9566.7	9571.9	9577.1	9582.3	9587.5	5.19	2464	
2463	9489.0	9494.2	9499.4	9504.5	9509.7	9514.9	9520.1	9525.2	9530.4	9535.6	5.18	2463	
2462	9437.4	9442.6	9447.8	9452.9	9458.1	9463.2	9468.4	9473.5	9478.7	9483.9	5.16	2462	
2461	9386.0	9391.2	9396.3	9401.4	9406.6	9411.7	9416.9	9422.0	9427.1	9432.3	5.14	2461	
2460	9334.8	9339.9	9345.0	9350.1	9355.3	9360.4	9365.5	9370.6	9375.8	9380.9	5.13	2460	
2459	9283.7	9288.8	9293.9	9299.0	9304.1	9309.2	9314.3	9319.4	9324.5	9329.7	5.11	2459	
2458	9232.8	9237.9	9242.9	9248.0	9253.1	9258.2	9263.3	9268.4	9273.5	9278.6	5.09	2458	
2457	9182.0	9187.1	9192.2	9197.2	9202.3	9207.4	9212.4	9217.5	9222.6	9227.7	5.08	2457	
2456	9131.4	9136.5	9141.5	9146.6	9151.6	9156.7	9161.8	9166.8	9171.9	9177.0	5.06	2456	
2455	9081.0	9086.1	9091.1	9096.1	9101.2	9106.2	9111.2	9116.3	9121.3	9126.4	5.04	2455	
2454	9030.8	9035.8	9040.8	9045.8	9050.8	9055.9	9060.9	9065.9	9071.0	9076.0	5.02	2454	
2453	8980.7	8985.7	8990.7	8995.7	9000.7	9005.7	9010.7	9015.7	9020.7	9025.8	5.01	2453	
2452	8930.6	8935.6	8940.7	8945.7	8950.7	8955.7	8960.7	8965.7	8970.7	8975.7	4.99	2452	
2451	8881.0	8886.0	8891.0	8895.9	8900.9	8905.9	8910.9	8915.8	8920.8	8925.8	4.97	2451	
2450	8831.4	8836.4	8841.3	8846.3	8851.3	8856.2	8861.2	8866.1	8871.1	8876.1	4.96	2450	
2449	8782.0	8787.0	8791.9	8796.8	8801.6	8806.7	8811.7	8816.6	8821.5	8826.5	4.94	2449	
2448	8732.8	8737.7	8742.6	8747.5	8752.5	8757.4	8762.3	8767.2	8772.2	8777.1	4.92	2448	
2447	8683.7	8688.6	8693.5	8698.4	8703.3	8708.2	8713.1	8718.0	8722.9	8727.9	4.91	2447	
2446	8634.6	8639.5	8644.4	8649.4	8654.3	8659.2	8664.1	8669.0	8673.9	8678.8	4.89	2446	
2445	8586.0	8590.9	8595.8	8600.6	8605.5	8610.4	8615.3	8620.1	8625.0	8629.9	4.87	2445	
2444	8537.5	8542.3	8547.2	8552.0	8556.9	8561.7	8566.6	8571.4	8576.3	8581.2	4.86	2444	
2443	8489.1	8493.9	8498.7	8503.6	8508.4	8513.2	8518.1	8522.9	8527.8	8532.6	4.84	2443	
2442	8440.8	8445.6	8450.4	8455.3	8460.1	8464.9	8469.7	8474.6	8479.4	8484.2	4.82	2442	
2441	8392.7	8397.5	8402.3	8407.1	8411.9	8416.7	8421.6	8426.4	8431.2	8436.0	4.81	2441	
2440	8344.8	8349.6	8354.4	8359.2	8364.0	8368.8	8373.5	8378.3	8383.1	8387.9	4.79	2440	
2439	8297.1	8301.8	8306.6	8311.4	8316.2	8320.9	8325.7	8330.5	8335.3	8340.0	4.77	2439	
2438	8249.5	8254.2	8259.0	8263.8	8268.5	8273.3	8278.0	8282.8	8287.5	8292.3	4.76	2438	
2437	8202.1	8206.8	8211.6	8216.3	8221.0	8225.6	8230.5	8235.3	8240.0	8244.8	4.74	2437	
2436	8154.8	8159.5	8164.3	8169.0	8173.7	8178.4	8183.2	8187.9	8192.6	8197.4	4.72	2436	

MC NAUGHTON LAKE  
STORAGE ABOVE ELEVATION 1800  
IN 1000 S.F.O.

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
2435	8107.8	8112.5	8117.2	8121.9	8126.6	8131.3	8136.0	8140.7	8145.4	8150.1	4.71	2435
2434	8060.9	8065.5	8070.2	8074.9	8079.6	8084.3	8089.0	8093.7	8098.4	8103.1	4.69	2434
2433	8014.1	8018.8	8023.4	8028.1	8032.8	8037.5	8042.1	8046.8	8051.5	8056.2	4.67	2433
2432	7967.5	7972.2	7976.8	7981.5	7986.2	7990.8	7995.5	8000.1	8004.8	8009.4	4.66	2432
2431	7921.1	7925.8	7930.4	7935.0	7939.7	7944.3	7949.0	7953.6	7958.2	7962.9	4.64	2431
2430	7874.5	7879.5	7884.1	7888.6	7893.4	7898.0	7902.6	7907.2	7911.9	7916.5	4.62	2430
2429	7828.8	7833.4	7838.0	7842.6	7847.2	7851.8	7856.4	7861.1	7865.7	7870.3	4.61	2429
2428	7782.9	7787.5	7792.1	7796.7	7801.3	7805.8	7810.4	7815.0	7819.6	7824.2	4.59	2428
2427	7737.2	7741.7	7746.3	7750.9	7755.4	7760.0	7764.6	7769.2	7773.7	7778.3	4.57	2427
2426	7691.6	7696.1	7700.7	7705.2	7709.8	7714.4	7718.9	7723.5	7728.0	7732.6	4.56	2426
2425	7646.2	7650.7	7655.3	7659.8	7664.3	7668.9	7673.4	7677.9	7682.5	7687.0	4.54	2425
2424	7600.9	7605.5	7610.0	7614.5	7619.0	7623.5	7628.1	7632.6	7637.1	7641.6	4.52	2424
2423	7555.9	7560.4	7564.9	7569.4	7573.9	7578.4	7582.9	7587.4	7591.9	7596.4	4.51	2423
2422	7511.0	7515.4	7519.9	7524.4	7528.9	7533.4	7537.9	7542.4	7546.9	7551.4	4.49	2422
2421	7466.2	7470.7	7475.2	7479.6	7484.1	7488.6	7493.0	7497.5	7502.0	7506.5	4.47	2421
2420	7421.6	7426.1	7430.5	7435.0	7439.4	7443.9	7448.4	7452.8	7457.3	7461.8	4.46	2420
2419	7377.2	7381.7	7386.1	7390.5	7395.0	7399.4	7403.9	7408.3	7412.7	7417.2	4.44	2419
2418	7333.0	7337.4	7341.8	7346.2	7350.7	7355.1	7359.5	7363.9	7368.4	7372.8	4.42	2418
2417	7288.9	7293.3	7297.7	7302.1	7306.5	7310.9	7315.3	7319.8	7324.2	7328.6	4.41	2417
2416	7245.0	7249.4	7253.8	7258.2	7262.6	7266.9	7271.3	7275.7	7280.1	7284.5	4.39	2416
2415	7201.3	7205.6	7210.0	7214.4	7218.7	7223.1	7227.5	7231.9	7236.2	7240.6	4.37	2415
2414	7157.7	7162.0	7166.4	7170.7	7175.1	7179.5	7183.8	7188.2	7192.5	7196.9	4.36	2414
2413	7114.3	7118.6	7122.9	7127.3	7131.6	7136.0	7140.3	7144.7	7149.0	7153.3	4.34	2413
2412	7071.0	7075.4	7079.7	7084.0	7088.3	7092.6	7097.0	7101.3	7105.6	7109.9	4.32	2412
2411	7028.0	7032.3	7036.6	7040.9	7045.2	7049.5	7053.8	7058.1	7062.4	7066.7	4.31	2411
2410	6985.1	6989.3	6993.6	6997.9	7002.2	7006.5	7010.8	7015.1	7019.4	7023.7	4.29	2410
2409	6942.3	6946.6	6950.8	6955.1	6959.4	6963.7	6967.9	6972.2	6976.5	6980.8	4.27	2409
2408	6899.7	6904.0	6908.2	6912.5	6916.7	6921.0	6925.3	6929.5	6933.8	6938.0	4.26	2408
2407	6857.3	6861.6	6865.8	6870.0	6874.3	6878.5	6882.8	6887.0	6891.2	6895.5	4.24	2407
2406	6815.1	6819.3	6823.5	6827.7	6832.0	6836.2	6840.4	6844.6	6848.9	6853.1	4.22	2406
2405	6773.0	6777.2	6781.4	6785.6	6789.8	6794.0	6798.2	6802.4	6806.7	6810.9	4.21	2405
2404	6731.1	6735.3	6739.5	6743.7	6747.8	6752.0	6756.2	6760.4	6764.6	6768.8	4.19	2404
2403	6689.4	6693.5	6697.7	6701.9	6706.0	6710.2	6714.4	6718.6	6722.7	6726.9	4.17	2403
2402	6647.8	6651.9	6656.1	6660.2	6664.4	6668.5	6672.7	6676.9	6681.0	6685.2	4.16	2402
2401	6606.4	6610.5	6614.6	6618.8	6622.9	6627.0	6631.2	6635.3	6639.5	6643.6	4.14	2401
2400	6565.1	6569.2	6573.4	6577.5	6581.6	6585.7	6589.8	6594.0	6598.1	6602.2	4.12	2400
2399	6524.1	6528.1	6532.2	6536.3	6540.4	6544.5	6548.6	6552.8	6556.9	6561.0	4.11	2399
2398	6483.4	6487.4	6491.5	6495.5	6499.6	6503.7	6507.7	6511.8	6515.9	6520.0	4.07	2398
2397	6443.0	6447.0	6451.0	6455.1	6459.1	6463.1	6467.2	6471.2	6475.3	6479.3	4.03	2397
2396	6403.0	6407.0	6411.0	6415.0	6419.0	6423.0	6427.0	6431.0	6435.0	6439.0	4.00	2396

MC NAUGHTON LAKE  
STORAGE ABOVE ELEVATION 1800  
IN 1000 S.F.D.

LAKE ELEVATION IN FEET	TENTHS OF FEET										AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET
	0	1	2	3	4	5	6	7	8	9		
2395	6363.4	6367.3	6371.3	6375.2	6379.2	6383.1	6387.1	6391.1	6395.1	6399.0	3.96	2395
2394	6324.1	6328.0	6331.9	6335.8	6339.7	6343.7	6347.6	6351.5	6355.5	6359.4	3.93	2394
2393	6285.1	6289.0	6292.9	6296.7	6300.6	6304.5	6308.4	6312.3	6316.2	6320.1	3.90	2393
2392	6246.4	6250.3	6254.1	6258.0	6261.9	6265.7	6269.6	6273.5	6277.3	6281.2	3.86	2392
2391	6206.1	6211.0	6215.8	6219.6	6223.4	6227.2	6231.1	6234.9	6238.8	6242.6	3.83	2391
2390	6170.1	6173.9	6177.7	6181.5	6185.3	6189.1	6192.9	6196.7	6200.5	6204.3	3.80	2390
2389	6132.4	6136.2	6140.0	6143.7	6147.5	6151.2	6155.0	6158.8	6162.6	6166.3	3.77	2389
2388	6095.1	6098.8	6102.5	6106.3	6110.0	6113.7	6117.5	6121.2	6124.9	6128.7	3.74	2388
2387	6058.0	6061.7	6065.4	6069.1	6072.8	6076.5	6080.2	6083.9	6087.6	6091.4	3.71	2387
2386	6021.2	6024.9	6028.6	6032.2	6035.9	6039.6	6043.3	6046.9	6050.6	6054.3	3.68	2386
2385	5984.8	5988.4	5992.0	5995.7	5999.3	6003.0	6006.6	6010.3	6013.9	6017.6	3.65	2385
2384	5946.6	5952.2	5955.8	5959.4	5963.0	5966.6	5970.3	5973.9	5977.5	5981.1	3.62	2384
2383	5912.7	5916.3	5919.8	5923.4	5927.0	5930.6	5934.2	5937.8	5941.4	5945.0	3.59	2383
2382	5877.1	5880.6	5884.2	5887.7	5891.3	5894.8	5898.4	5902.0	5905.5	5909.1	3.56	2382
2381	5841.7	5845.2	5848.8	5852.3	5855.8	5859.4	5862.9	5866.4	5870.0	5873.5	3.53	2381
2380	5806.7	5810.1	5813.6	5817.1	5820.6	5824.2	5827.7	5831.2	5834.7	5838.2	3.51	2380
2379	5771.9	5775.3	5778.8	5782.3	5785.7	5789.2	5792.7	5796.2	5799.7	5803.2	3.48	2379
2378	5737.3	5740.8	5744.2	5747.6	5751.1	5754.5	5758.0	5761.5	5764.9	5768.4	3.45	2378
2377	5703.0	5706.4	5709.9	5713.3	5716.7	5720.1	5723.6	5727.0	5730.4	5733.9	3.43	2377
2376	5669.0	5672.4	5675.8	5679.2	5682.6	5686.0	5689.4	5692.8	5696.2	5699.6	3.40	2376
2375	5635.2	5638.6	5642.0	5645.3	5648.7	5652.1	5655.5	5658.8	5662.2	5665.6	3.38	2375
2374	5601.7	5605.0	5608.4	5611.7	5615.1	5618.4	5621.8	5625.1	5628.5	5631.9	3.35	2374
2373	5568.4	5571.7	5575.0	5578.4	5581.7	5585.0	5588.3	5591.7	5595.0	5598.3	3.33	2373
2372	5535.3	5538.6	5541.9	5545.2	5548.5	5551.8	5555.1	5558.5	5561.8	5565.1	3.31	2372
2371	5502.5	5505.8	5509.1	5512.3	5515.6	5518.9	5522.2	5525.5	5528.8	5532.0	3.28	2371
2370	5469.9	5473.2	5476.4	5479.7	5482.9	5486.2	5489.5	5492.7	5496.0	5499.2	3.26	2370
2369	5437.6	5440.8	5444.0	5447.2	5450.5	5453.7	5456.9	5460.2	5463.4	5466.7	3.24	2369
2368	5405.4	5408.6	5411.8	5415.0	5418.2	5421.4	5424.7	5427.9	5431.1	5434.3	3.21	2368
2367	5373.5	5376.7	5379.8	5383.0	5386.2	5389.4	5392.6	5395.8	5399.0	5402.2	3.19	2367
2366	5341.7	5344.9	5348.1	5351.2	5354.4	5357.6	5360.8	5363.9	5367.1	5370.3	3.17	2366
2365	5310.2	5313.4	5316.5	5319.7	5322.8	5326.0	5329.1	5332.3	5335.4	5338.6	3.15	2365
2364	5278.9	5282.0	5285.2	5288.3	5291.4	5294.6	5297.7	5300.8	5304.0	5307.1	3.13	2364
2363	5247.8	5250.9	5254.0	5257.1	5260.2	5263.3	5266.5	5269.6	5272.7	5275.8	3.11	2363
2362	5216.9	5220.0	5223.1	5226.2	5229.3	5232.3	5235.4	5238.5	5241.6	5244.7	3.09	2362
2361	5186.2	5189.3	5192.3	5195.4	5198.5	5201.5	5204.6	5207.7	5210.8	5213.8	3.07	2361
2360	5155.7	5158.7	5161.6	5164.8	5167.9	5170.9	5174.0	5177.0	5180.1	5183.1	3.05	2360
2359	5125.3	5128.4	5131.4	5134.4	5137.4	5140.5	5143.5	5146.6	5149.6	5152.6	3.03	2359
2358	5095.2	5098.2	5101.2	5104.2	5107.2	5110.2	5113.3	5116.3	5119.3	5122.3	3.02	2358
2357	5065.2	5068.2	5071.2	5074.2	5077.2	5080.2	5083.2	5086.2	5089.2	5092.2	3.00	2357
2356	5035.4	5038.4	5041.4	5044.3	5047.3	5050.3	5053.3	5056.2	5059.2	5062.2	2.98	2356

MC NAUGHTON LAKE  
STORAGE ABOVE ELEVATION 1865  
IN 1000 S.F.D.

LAKE ELEVATION IN FEET	TENTHS OF FEET									AVERAGE DIFFERENCE PER TENTH	LAKE ELEVATION IN FEET	
	0	1	2	3	4	5	6	7	8			9
2355	5005.8	5008.7	5011.7	5014.7	5017.6	5020.6	5023.5	5026.5	5029.5	5032.4	2.96	2355
2354	4976.3	4979.3	4982.2	4985.1	4988.1	4991.0	4994.0	4996.9	4999.9	5002.8	2.95	2354
2353	4947.0	4950.0	4952.9	4955.8	4958.7	4961.7	4964.6	4967.5	4970.5	4973.4	2.93	2353
2352	4917.9	4920.8	4923.7	4926.6	4929.5	4932.4	4935.4	4938.3	4941.2	4944.1	2.91	2352
2351	4886.9	4891.8	4894.7	4897.6	4900.5	4903.4	4906.3	4909.2	4912.1	4915.0	2.90	2351
2350	4860.1	4862.0	4865.9	4868.8	4871.6	4874.5	4877.4	4880.3	4883.2	4886.1	2.88	2350
2349	4831.5	4834.3	4837.2	4840.1	4842.9	4845.8	4848.6	4851.5	4854.4	4857.3	2.87	2349
2348	4803.0	4805.8	4808.7	4811.5	4814.3	4817.2	4820.1	4822.9	4825.8	4828.6	2.85	2348
2347	4774.6	4777.4	4780.3	4783.1	4785.9	4788.8	4791.6	4794.4	4797.3	4800.1	2.84	2347
2346	4746.4	4749.2	4752.0	4754.8	4757.7	4760.5	4763.3	4766.1	4768.9	4771.8	2.82	2346
2345	4718.3	4721.1	4723.9	4726.7	4729.5	4732.3	4735.1	4738.0	4740.8	4743.6	2.81	2345
2344	4690.4	4693.2	4696.0	4698.7	4701.5	4704.3	4707.1	4709.9	4712.7	4715.5	2.79	2344
2343	4662.6	4665.4	4668.1	4670.9	4673.7	4676.5	4679.2	4682.0	4684.8	4687.6	2.78	2343
2342	4634.9	4637.7	4640.4	4643.2	4646.0	4648.7	4651.5	4654.3	4657.0	4659.8	2.77	2342
2341	4607.4	4610.1	4612.9	4615.6	4618.4	4621.1	4623.9	4626.6	4629.4	4632.2	2.75	2341
2340	4580.0	4582.7	4585.4	4588.2	4590.9	4593.7	4596.4	4599.1	4601.9	4604.6	2.74	2340
2339	4552.7	4555.4	4558.1	4560.8	4563.6	4566.3	4569.0	4571.6	4574.5	4577.2	2.73	2339
2338	4525.4	4528.1	4530.9	4533.6	4536.3	4539.0	4541.7	4544.5	4547.2	4549.9	2.72	2338
2337	4498.3	4501.0	4503.7	4506.4	4509.1	4511.8	4514.5	4517.3	4520.0	4522.7	2.72	2337
2336	4471.2	4473.9	4476.6	4479.3	4482.0	4484.7	4487.4	4490.1	4492.8	4495.5	2.71	2336
2335	4444.1	4446.8	4449.5	4452.2	4454.9	4457.6	4460.3	4463.1	4465.8	4468.5	2.70	2335
2334	4417.2	4419.9	4422.6	4425.3	4428.0	4430.7	4433.4	4436.1	4438.8	4441.4	2.69	2334
2333	4390.3	4393.0	4395.7	4398.4	4401.1	4403.8	4406.5	4409.1	4411.8	4414.5	2.69	2333
2332	4363.6	4366.2	4368.9	4371.6	4374.3	4376.9	4379.6	4382.3	4385.0	4387.7	2.68	2332
2331	4336.8	4339.5	4342.2	4344.9	4347.5	4350.2	4352.9	4355.5	4358.2	4360.9	2.67	2331
2330	4310.2	4312.9	4315.5	4318.2	4320.9	4323.5	4326.2	4328.8	4331.5	4334.2	2.66	2330
2329	4283.6	4286.3	4289.0	4291.6	4294.3	4296.9	4299.6	4302.2	4304.9	4307.6	2.66	2329
2328	4257.2	4259.8	4262.5	4265.1	4267.8	4270.4	4273.0	4275.7	4278.3	4281.0	2.65	2328
2327	4230.8	4233.4	4236.0	4238.7	4241.3	4244.0	4246.6	4249.2	4251.9	4254.5	2.64	2327
2326	4204.4	4207.1	4209.7	4212.3	4215.0	4217.6	4220.2	4222.9	4225.5	4228.1	2.63	2326
2325	4178.2	4180.8	4183.4	4186.1	4188.7	4191.3	4193.9	4196.6	4199.2	4201.8	2.62	2325
2324	4152.0	4154.6	4157.2	4159.9	4162.5	4165.1	4167.7	4170.3	4172.9	4175.6	2.62	2324
2323	4125.9	4128.5	4131.1	4133.7	4136.3	4139.0	4141.6	4144.2	4146.8	4149.4	2.61	2323
2322	4099.9	4102.5	4105.1	4107.7	4110.3	4112.9	4115.5	4118.1	4120.7	4123.3	2.60	2322
2321	4074.0	4076.6	4079.1	4081.7	4084.3	4086.9	4089.5	4092.1	4094.7	4097.3	2.59	2321
2320	4048.1	4050.7	4053.3	4055.9	4058.4	4061.0	4063.6	4066.2	4068.8	4071.4	2.59	2320
2319	4022.3	4024.9	4027.5	4030.1	4032.6	4035.2	4037.8	4040.4	4042.9	4045.5	2.58	2319
2318	3996.6	3999.2	4001.8	4004.3	4006.9	4009.5	4012.0	4014.6	4017.2	4019.8	2.57	2318
2317	3971.0	3973.6	3976.1	3978.7	3981.3	3983.8	3986.4	3988.9	3991.5	3994.1	2.56	2317
2316	3945.5	3948.0	3950.6	3953.1	3955.7	3958.2	3960.8	3963.4	3965.9	3968.5	2.55	2316

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STORAGE ABOVE ELEVATION 2287.0  
IN 1000 S.F.D.

ELEV FEET	TENTHS OF FEET									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2459.0	2487.3	2489.7	2492.0	2494.4	2496.7	2499.1	2501.4	2503.8	2506.1	2508.5
2458.0	2463.9	2466.3	2468.6	2470.9	2473.3	2475.6	2478.0	2480.3	2482.6	2485.0
2457.0	2440.7	2443.0	2445.3	2447.6	2450.0	2452.3	2454.6	2456.9	2459.3	2461.6
2456.0	2417.5	2419.8	2422.1	2424.5	2426.8	2429.1	2431.4	2433.7	2436.0	2438.4
2455.0	2394.5	2396.8	2399.1	2401.4	2403.7	2406.0	2408.3	2410.6	2412.9	2415.2
2454.0	2371.6	2373.9	2376.2	2378.4	2380.7	2383.0	2385.3	2387.6	2389.9	2392.2
2453.0	2348.8	2351.1	2353.3	2355.6	2357.9	2360.2	2362.5	2364.7	2367.0	2369.3
2452.0	2326.1	2328.4	2330.6	2332.9	2335.2	2337.4	2339.7	2342.0	2344.2	2346.5
2451.0	2303.6	2305.8	2308.1	2310.3	2312.6	2314.8	2317.1	2319.3	2321.6	2323.9
2450.0	2281.1	2283.3	2285.6	2287.8	2290.1	2292.3	2294.6	2296.8	2299.1	2301.3
2449.0	2258.8	2261.0	2263.2	2265.5	2267.7	2269.9	2272.2	2274.4	2276.6	2278.9
2448.0	2236.6	2238.8	2241.0	2243.2	2245.5	2247.7	2249.9	2252.1	2254.3	2256.6
2447.0	2214.5	2216.7	2218.9	2221.1	2223.3	2225.5	2227.8	2230.0	2232.2	2234.4
2446.0	2192.6	2194.8	2197.0	2199.2	2201.4	2203.5	2205.7	2207.9	2210.1	2212.3
2445.0	2170.8	2173.0	2175.1	2177.3	2179.5	2181.7	2183.8	2186.0	2188.2	2190.4
2444.0	2149.1	2151.3	2153.4	2155.6	2157.8	2159.9	2162.1	2164.3	2166.4	2168.6
2443.0	2127.5	2129.7	2131.8	2134.0	2136.1	2138.3	2140.4	2142.6	2144.8	2146.9
2442.0	2106.1	2108.2	2110.4	2112.5	2114.7	2116.8	2118.9	2121.1	2123.2	2125.4
2441.0	2084.8	2086.9	2089.0	2091.2	2093.3	2095.4	2097.6	2099.7	2101.8	2104.0
2440.0	2063.6	2065.7	2067.8	2069.9	2072.1	2074.2	2076.3	2078.4	2080.5	2082.7
2439.0	2042.5	2044.6	2046.7	2048.8	2050.9	2053.0	2055.2	2057.3	2059.4	2061.5
2438.0	2021.6	2023.7	2025.8	2027.8	2029.9	2032.0	2034.1	2036.2	2038.3	2040.4
2437.0	2000.7	2002.8	2004.9	2007.0	2009.0	2011.1	2013.2	2015.3	2017.4	2019.5
2436.0	1980.0	1982.1	1984.1	1986.2	1988.3	1990.3	1992.4	1994.5	1996.6	1998.6
2435.0	1959.4	1961.4	1963.5	1965.5	1967.6	1969.7	1971.7	1973.8	1975.9	1977.9
2434.0	1938.9	1940.9	1943.0	1945.0	1947.0	1949.1	1951.1	1953.2	1955.3	1957.3
2433.0	1918.5	1920.5	1922.5	1924.6	1926.6	1928.6	1930.7	1932.7	1934.8	1936.8
2432.0	1898.2	1900.2	1902.2	1904.2	1906.3	1908.3	1910.3	1912.4	1914.4	1916.4
2431.0	1878.0	1880.0	1882.0	1884.0	1886.0	1888.1	1890.1	1892.1	1894.1	1896.1
2430.0	1857.9	1859.9	1861.9	1863.9	1865.9	1867.9	1869.9	1872.0	1874.0	1876.0
2429.0	1838.0	1839.9	1841.9	1843.9	1845.9	1847.9	1849.9	1851.9	1853.9	1855.9
2428.0	1818.1	1820.1	1822.1	1824.0	1826.0	1828.0	1830.0	1832.0	1834.0	1836.0
2427.0	1798.4	1800.3	1802.3	1804.3	1806.3	1808.2	1810.2	1812.2	1814.2	1816.1

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TENTHS OF FEET

ELEV FEET	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2426.0	1778.7	1780.7	1782.7	1784.6	1786.6	1788.5	1790.5	1792.5	1794.4	1796.4
2425.0	1759.2	1761.2	1763.1	1765.1	1767.0	1769.0	1770.9	1772.9	1774.8	1776.8
2424.0	1739.8	1741.8	1743.7	1745.6	1747.6	1749.5	1751.5	1753.4	1755.3	1757.3
2423.0	1720.5	1722.5	1724.4	1726.3	1728.2	1730.2	1732.1	1734.0	1736.0	1737.9
2422.0	1701.4	1703.3	1705.2	1707.1	1709.0	1710.9	1712.9	1714.8	1716.7	1718.6
2421.0	1682.3	1684.2	1686.1	1688.0	1689.9	1691.8	1693.7	1695.6	1697.5	1699.5
2420.0	1663.3	1665.2	1667.1	1669.0	1670.9	1672.8	1674.7	1676.6	1678.5	1680.4
2419.0	1644.5	1646.4	1648.2	1650.1	1652.0	1653.9	1655.8	1657.7	1659.6	1661.4
2418.0	1625.7	1627.6	1629.5	1631.4	1633.2	1635.1	1637.0	1638.9	1640.7	1642.6
2417.0	1607.1	1609.0	1610.8	1612.7	1614.6	1616.4	1618.3	1620.1	1622.0	1623.9
2416.0	1588.6	1590.5	1592.3	1594.1	1596.0	1597.8	1599.7	1601.6	1603.4	1605.3
2415.0	1570.2	1572.0	1573.9	1575.7	1577.6	1579.4	1581.2	1583.1	1584.9	1586.8
2414.0	1551.9	1553.7	1555.6	1557.4	1559.2	1561.0	1562.9	1564.7	1566.5	1568.4
2413.0	1533.7	1535.5	1537.4	1539.2	1541.0	1542.8	1544.6	1546.4	1548.3	1550.1
2412.0	1515.7	1517.5	1519.3	1521.1	1522.9	1524.7	1526.5	1528.3	1530.1	1531.9
2411.0	1497.7	1499.5	1501.3	1503.1	1504.9	1506.7	1508.5	1510.3	1512.1	1513.9
2410.0	1479.8	1481.6	1483.4	1485.2	1487.0	1488.8	1490.5	1492.3	1494.1	1495.9
2409.0	1462.1	1463.9	1465.6	1467.4	1469.2	1471.0	1472.7	1474.5	1476.3	1478.1
2408.0	1444.5	1446.2	1448.0	1449.7	1451.5	1453.3	1455.0	1456.8	1458.6	1460.3
2407.0	1426.9	1428.7	1430.4	1432.2	1433.9	1435.7	1437.4	1439.2	1440.9	1442.7
2406.0	1409.5	1411.2	1413.0	1414.7	1416.5	1418.2	1420.0	1421.7	1423.4	1425.2
2405.0	1392.2	1393.9	1395.7	1397.4	1399.1	1400.8	1402.6	1404.3	1406.0	1407.8
2404.0	1375.0	1376.7	1378.4	1380.1	1381.9	1383.6	1385.3	1387.0	1388.7	1390.5
2403.0	1357.9	1359.6	1361.3	1363.0	1364.7	1366.4	1368.1	1369.8	1371.6	1373.3
2402.0	1340.9	1342.6	1344.3	1346.0	1347.7	1349.4	1351.1	1352.8	1354.5	1356.2
2401.0	1324.0	1325.7	1327.4	1329.0	1330.7	1332.4	1334.1	1335.8	1337.5	1339.2
2400.0	1307.2	1308.9	1310.5	1312.2	1313.9	1315.6	1317.3	1318.9	1320.6	1322.3
2399.0	1290.5	1292.2	1293.8	1295.5	1297.2	1298.8	1300.5	1302.2	1303.8	1305.5
2398.0	1273.9	1275.6	1277.2	1278.9	1280.5	1282.2	1283.9	1285.5	1287.2	1288.8
2397.0	1257.4	1259.1	1260.7	1262.4	1264.0	1265.7	1267.3	1269.0	1270.6	1272.3
2396.0	1241.1	1242.7	1244.3	1246.0	1247.6	1249.2	1250.9	1252.5	1254.1	1255.8
2395.0	1224.8	1226.4	1228.0	1229.6	1231.3	1232.9	1234.5	1236.2	1237.8	1239.4
2394.0	1208.6	1210.2	1211.8	1213.4	1215.1	1216.7	1218.3	1219.9	1221.5	1223.2
2393.0	1192.5	1194.1	1195.7	1197.3	1198.9	1200.5	1202.1	1203.8	1205.4	1207.0
2392.0	1176.5	1178.1	1179.7	1181.3	1182.9	1184.5	1186.1	1187.7	1189.3	1190.9

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EXHIBIT 14  
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LIBBY  
STORAGE ABOVE ELEVATION 2287.0  
IN 1000 S.F.D.

ELEV FEET	TENTHS OF FEET									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2391.0	1160.7	1162.2	1163.8	1165.4	1167.0	1168.6	1170.2	1171.8	1173.3	1174.9
2390.0	1144.9	1146.4	1148.0	1149.6	1151.2	1152.8	1154.3	1155.9	1157.5	1159.1
2389.0	1129.2	1130.8	1132.3	1133.9	1135.5	1137.0	1138.6	1140.2	1141.7	1143.3
2388.0	1113.6	1115.2	1116.7	1118.3	1119.8	1121.4	1123.0	1124.5	1126.1	1127.6
2387.0	1098.1	1099.7	1101.2	1102.8	1104.3	1105.9	1107.4	1109.0	1110.5	1112.1
2386.0	1082.8	1084.3	1085.8	1087.4	1088.9	1090.4	1092.0	1093.5	1095.1	1096.6
2385.0	1067.5	1069.0	1070.5	1072.1	1073.6	1075.1	1076.6	1078.2	1079.7	1081.2
2384.0	1052.3	1053.8	1055.4	1056.9	1058.4	1059.9	1061.4	1062.9	1064.5	1066.0
2383.0	1037.3	1038.8	1040.3	1041.8	1043.3	1044.8	1046.3	1047.8	1049.3	1050.8
2382.0	1022.3	1023.8	1025.3	1026.8	1028.3	1029.8	1031.3	1032.8	1034.3	1035.8
2381.0	1007.4	1008.9	1010.4	1011.9	1013.4	1014.8	1016.3	1017.8	1019.3	1020.8
2380.0	992.6	994.1	995.6	997.1	998.5	1000.0	1001.5	1003.0	1004.5	1005.9
2379.0	978.0	979.4	980.9	982.4	983.8	985.3	986.8	988.2	989.7	991.2
2378.0	963.4	964.9	966.3	967.8	969.2	970.7	972.1	973.6	975.0	976.5
2377.0	948.9	950.4	951.8	953.3	954.7	956.2	957.6	969.1	960.5	962.0
2376.0	934.6	936.0	937.4	938.9	940.3	941.7	943.2	944.6	946.1	947.5
2375.0	920.3	921.7	923.2	924.6	926.0	927.4	928.9	930.3	931.7	933.1
2374.0	906.1	907.6	909.0	910.4	911.8	913.2	914.6	916.0	917.5	918.9
2373.0	892.1	893.5	894.9	896.3	897.7	899.1	900.5	901.9	903.3	904.7
2372.0	878.1	879.5	880.9	882.3	883.7	885.1	886.5	887.9	889.3	890.7
2371.0	864.3	865.6	867.0	868.4	869.8	871.2	872.6	874.0	875.3	876.7
2370.0	850.5	851.9	853.2	854.6	856.0	857.4	858.7	860.1	861.5	862.9
2369.0	836.8	838.2	839.6	840.9	842.3	843.7	845.0	846.4	847.8	849.1
2368.0	823.3	824.6	826.0	827.3	828.7	830.0	831.4	832.8	834.1	835.5
2367.0	809.8	811.2	812.5	813.8	815.2	816.5	817.9	819.2	820.6	821.9
2366.0	796.5	797.8	799.1	800.5	801.8	803.1	804.5	805.8	807.1	808.5
2365.0	783.2	784.5	785.8	787.2	788.5	789.8	791.1	792.5	793.8	795.1
2364.0	770.1	771.4	772.7	774.0	775.3	776.6	777.9	779.2	780.6	781.9
2363.0	757.0	758.3	759.6	760.9	762.2	763.5	764.8	766.1	767.4	768.7
2362.0	744.0	745.3	746.6	747.9	749.2	750.5	751.8	753.1	754.4	755.7
2361.0	731.2	732.5	733.8	735.0	736.3	737.6	738.9	740.2	741.5	742.8
2360.0	718.4	719.7	721.0	722.3	723.5	724.8	726.1	727.4	728.6	729.9
2359.0	705.8	707.0	708.3	709.6	710.8	712.1	713.4	714.6	715.9	717.2
2358.0	693.2	694.5	695.7	697.0	698.2	699.5	700.7	702.0	703.3	704.5
2357.0	680.8	682.0	683.2	684.5	685.7	687.0	688.2	689.5	690.7	692.0

U.S. Army, Corps of Engineers  
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STORAGE ABOVE ELEVATION 2287.0  
IN 1000 S.F.D.

ELEV FEET	TENTHS OF FEET									
	<u>.01</u>	<u>.1</u>	<u>.2</u>	<u>.3</u>	<u>.4</u>	<u>.5</u>	<u>.6</u>	<u>.7</u>	<u>.8</u>	<u>.9</u>
2356.0	668.4	669.6	670.9	672.1	673.3	674.6	675.8	677.0	678.3	679.5
2355.0	656.1	657.3	658.6	659.8	661.0	662.2	663.5	664.7	665.9	667.2
2354.0	643.9	645.2	646.4	647.6	648.8	650.0	651.2	652.5	653.7	654.9
2353.0	631.9	633.1	634.3	635.5	636.7	637.9	639.1	640.3	641.5	642.7
2352.0	619.9	621.1	622.3	623.5	624.7	625.9	627.1	628.3	629.5	630.7
2351.0	608.0	609.2	610.4	611.6	612.7	613.9	615.1	616.3	617.5	618.7
2350.0	596.2	597.4	598.6	599.7	600.9	602.1	603.3	604.5	605.6	606.8
2349.0	584.5	585.7	586.8	588.0	589.2	590.3	591.5	592.7	593.9	595.0
2348.0	572.9	574.0	575.2	576.4	577.5	578.7	579.8	581.0	582.2	583.3
2347.0	561.3	562.5	563.6	564.8	565.9	567.1	568.2	569.4	570.6	571.7
2346.0	549.9	551.0	552.2	553.3	554.4	555.6	556.7	557.9	559.0	560.2
2345.0	538.5	539.6	540.8	541.9	543.0	544.2	545.3	546.4	547.6	548.7
2344.0	527.2	528.3	529.4	530.6	531.7	532.8	534.0	535.1	536.2	537.4
2343.0	516.0	517.1	518.2	519.3	520.4	521.6	522.7	523.8	524.9	526.1
2342.0	504.8	505.9	507.1	508.2	509.3	510.4	511.5	512.6	513.7	514.9
2341.0	493.8	494.9	496.0	497.1	498.2	499.3	500.4	501.5	502.6	503.7
2340.0	482.8	483.9	485.0	486.1	487.2	488.3	489.4	490.5	491.6	492.7
2339.0	471.9	473.0	474.1	475.2	476.2	477.3	478.4	479.5	480.6	481.7
2338.0	461.1	462.1	463.2	464.3	465.4	466.5	467.6	468.6	469.7	470.8
2337.0	450.3	451.4	452.5	453.5	454.6	455.7	456.8	457.8	458.9	460.0
2336.0	439.6	440.7	441.8	442.8	443.9	445.0	446.0	447.1	448.2	449.2
2335.0	429.0	430.1	431.2	432.2	433.3	434.3	435.4	436.5	437.5	438.6
2334.0	418.5	419.6	420.6	421.7	422.7	423.8	424.8	425.9	426.9	428.0
2333.0	408.1	409.1	410.2	411.2	412.2	413.3	414.3	415.4	416.4	417.5
2332.0	397.7	398.7	399.8	400.8	401.8	402.9	403.9	405.0	406.0	407.0
2331.0	387.4	388.4	389.5	390.5	391.5	392.5	393.6	394.6	395.6	396.7
2330.0	377.2	378.2	379.2	380.2	381.3	382.3	383.3	384.3	385.4	386.4
2329.0	367.0	368.1	369.1	370.1	371.1	372.1	373.1	374.1	375.2	376.2
2328.0	357.0	358.0	359.0	360.0	361.0	362.0	363.0	364.0	365.0	366.0
2327.0	347.0	348.0	349.0	350.0	351.0	352.0	353.0	354.0	355.0	356.0
2326.0	337.0	338.0	339.0	340.0	341.0	342.0	343.0	344.0	345.0	346.0
2325.0	327.2	328.1	329.1	330.1	331.1	332.1	333.1	334.1	335.0	336.0
2324.0	317.4	318.3	319.3	320.3	321.3	322.3	323.2	324.2	325.2	326.2
2323.0	307.6	308.6	309.6	310.6	311.5	312.5	313.5	314.4	315.4	316.4
2322.0	298.0	299.0	299.9	300.9	301.8	302.8	303.8	304.7	305.7	306.7

LIBBY  
STORAGE ABOVE ELEVATION 2287.0  
IN 1000 S.F.D.

ELEV FEET	TENTHS OF FEET									
	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
2321.0	288.4	289.4	290.3	291.3	292.2	293.2	294.2	295.1	296.1	297.0
2320.0	278.9	279.8	280.8	281.7	282.7	283.6	284.6	285.6	286.5	287.5
2319.0	269.5	270.4	271.3	272.3	273.2	274.2	275.1	276.1	277.0	278.0
2318.0	260.1	261.0	261.9	262.9	263.8	264.8	265.7	266.6	267.6	268.5
2317.0	250.7	251.7	252.6	253.5	254.5	255.4	256.3	257.3	258.2	259.1
2316.0	241.5	242.4	243.3	244.2	245.2	246.1	247.0	248.0	248.9	249.8
2315.0	232.3	233.2	234.1	235.0	235.9	236.9	237.8	238.7	239.6	240.6
2314.0	223.1	224.0	225.0	225.9	226.8	227.7	228.6	229.5	230.4	231.4
2313.0	214.0	215.0	215.9	216.8	217.7	218.6	219.5	220.4	221.3	222.2
2312.0	205.0	205.9	206.8	207.7	208.6	209.5	210.4	211.3	212.2	213.1
2311.0	196.1	197.0	197.8	198.7	199.6	200.5	201.4	202.3	203.2	204.1
2310.0	187.2	188.0	188.9	189.8	190.7	191.6	192.5	193.4	194.3	195.2
2309.0	178.3	179.2	180.1	181.0	181.8	182.7	183.6	184.5	185.4	186.3
2308.0	169.5	170.4	171.3	172.2	173.0	173.9	174.8	175.7	176.6	177.4
2307.0	160.8	161.7	162.6	163.4	164.3	165.2	166.0	166.9	167.8	168.7
2306.0	152.2	153.0	153.9	154.7	155.6	156.5	157.3	158.2	159.1	159.9
2305.0	143.6	144.4	145.3	146.1	147.0	147.8	148.7	149.6	150.4	151.3
2304.0	135.0	135.9	136.7	137.6	138.4	139.3	140.1	141.0	141.8	142.7
2303.0	126.5	127.4	128.2	129.1	129.9	130.8	131.6	132.5	133.3	134.2
2302.0	118.1	119.0	119.8	120.6	121.5	122.3	123.2	124.0	124.9	125.7
2301.0	109.8	110.6	111.4	112.3	113.1	113.9	114.8	115.6	116.4	117.3
2300.0	101.5	102.3	103.1	103.9	104.8	105.6	106.4	107.3	108.1	108.9
2299.0	93.2	94.1	94.9	95.7	96.5	97.3	98.2	99.0	99.8	100.6
2298.0	85.1	85.9	86.7	87.5	88.3	89.1	90.0	90.8	91.6	92.4
2297.0	77.0	77.8	78.6	79.4	80.2	81.0	81.8	82.6	83.4	84.3
2296.0	69.0	69.8	70.6	71.4	72.2	73.0	73.8	74.6	75.4	76.2
2295.0	61.0	61.8	62.6	63.4	64.2	65.0	65.8	66.6	67.4	68.2
2294.0	53.1	53.9	54.7	55.5	56.3	57.1	57.9	58.6	59.4	60.2
2293.0	45.3	46.1	46.9	47.7	48.5	49.2	50.0	50.8	51.6	52.4
2292.0	37.6	38.4	39.1	39.9	40.7	41.5	42.2	43.0	43.8	44.6
2291.0	29.9	30.7	31.5	32.2	33.0	33.8	34.5	35.3	36.1	36.8
2290.0	22.3	23.1	23.9	24.6	25.4	26.1	26.9	27.6	28.4	29.2
2289.0	14.8	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6
2288.0	7.3	8.1	8.8	9.6	10.3	11.1	11.8	12.6	13.3	14.1
2287.0	0.0	0.7	1.4	2.2	2.9	3.6	4.4	5.1	5.9	6.6