

**COLUMBIA RIVER TREATY ENTITY AGREEMENT ON THE  
DETAILED OPERATING PLAN  
FOR CANADIAN STORAGE  
1 AUGUST 2012 THROUGH 31 JULY 2013**

Article XIV 2.(k) of the Columbia River Treaty between Canada and the United States of America (Treaty) provides that the power and duties of the Entities include “*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 [Assured Operating Plans (AOP)] referred to in Annexes A and B.*”


The Entities agree that Canadian storage shall be operated and electric power delivered in accordance with the attached “Detailed Operating Plan for Canadian Storage – 1 August 2012 through 31 July 2013” (the 2012-13 Detailed Operating Plan), dated June 2012.

The Entities agree that the “Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans for Canadian Treaty Storage,” dated November 2003, or any future document the Entities agree supersedes the 2003 document, and any Appendices approved by the Operating Committee, will guide the Entities in implementing the 2012-13 Detailed Operating Plan.

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

Executed for the Canadian Entity this 27<sup>th</sup> day of MAY, 2012.

By

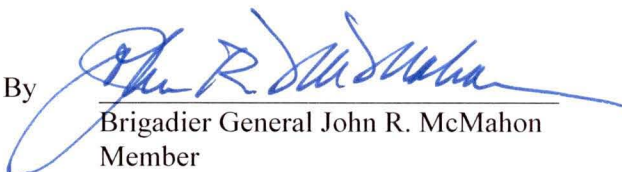
  
Chris O'Riley  
Chair

Executed for the United States Entity this 8<sup>th</sup> day of June, 2012.

By

  
Stephen J. Wright  
Chairman

By

  
Brigadier General John R. McMahon  
Member

## TABLE OF CONTENTS

<b>I.</b>	<b>REFERENCES AND INTERPRETATION .....</b>	<b>1</b>
<b>II.</b>	<b>PREPARATION AND SCOPE.....</b>	<b>2</b>
	A. GENERAL.....	2
	B. STORAGE AMOUNTS .....	2
	C. FLOOD CONTROL .....	3
	D. PREPARATION OF THE TREATY STORAGE REGULATION STUDY .....	4
	E. AUTHORIZATION FOR CHANGES TO THE TSR.....	6
	F. LIBBY .....	6
<b>III.</b>	<b>POWER DELIVERIES .....</b>	<b>6</b>
	A. DELIVERY OF THE CANADIAN ENTITLEMENT .....	6
	B. LCA POWER .....	7
	C. OPERATIONAL AGREEMENT POWER .....	7
<b>IV.</b>	<b>STORAGE OPERATION .....</b>	<b>7</b>
	A. OPERATION AUTHORITY .....	7
	B. CANADIAN STORAGE OPERATION .....	7
	C. OBJECTIVES FOR SUPPLEMENTAL OPERATING AGREEMENTS .....	7
	D. PROVISIONAL DRAFT AT ARROW .....	8
	E. GENERAL STORAGE OPERATION GUIDELINES .....	8
<b>V.</b>	<b>SCHEDULING STORAGE REGULATION.....</b>	<b>9</b>
	A. OPERATING DATA.....	9
	B. VOLUME RUNOFF FORECASTS .....	9
	C. TREATY STORAGE REGULATION STUDY .....	9
	D. SCHEDULING AGREEMENTS .....	10
<b>VI.</b>	<b>OPERATING GUIDES .....</b>	<b>12</b>
	A. OPERATING RULE CURVE .....	12
	B. RULE CURVES AND OPERATING DATA.....	13
	C. RESERVOIR CAPACITY TABLES.....	14
<b>VII.</b>	<b>OPERATING LIMITS .....</b>	<b>14</b>
	A. DUNCAN PROJECT .....	14
	B. ARROW PROJECT .....	15
	TABLE 1 ARROW PROJECT OPERATION CRITERIA .....	16
	TABLE 2 DISTRIBUTION FACTORS FOR THE DALLES.....	17
	C. MICA PROJECT.....	17
	TABLE 3 MICA PPROJECT OPERATING CRITERIA (ENGLISH) .....	19
	TABLE 3M MICA PROJECT OPERATING CRITERIA (SI) .....	20
	<b>EXHIBITS.....</b>	<b>21</b>
	EXHIBIT 1 - ASSURED REFILL CURVES (ENGLISH) 1/.....	21
	EXHIBIT 1M - ASSURED REFILL CURVES (SI) 1/.....	21
	EXHIBIT 2 - FIRST CRITICAL RULE CURVES (ENGLISH & SI) .....	22
	EXHIBIT 3 - SECOND CRITICAL RULE CURVES (ENGLISH & SI) .....	22
	EXHIBIT 4 - THIRD CRITICAL RULE CURVES (ENGLISH & SI) .....	23
	EXHIBIT 5 - FOURTH CRITICAL RULE CURVES (ENGLISH & SI) .....	23
	EXHIBIT 6 - OPERATING RULE CURVE LOWER LIMITS (ENGLISH & SI) .....	24
	EXHIBIT 7 - VARIABLE REFILL CURVE PROCEDURES (ENGLISH) .....	25
	EXHIBIT 7M - VARIABLE REFILL CURVE PROCEDURES (SI).....	26

EXHIBIT 8 - COORDINATED SYSTEM LOADS AND RESOURCES USED IN THE TSR.....	27
EXHIBIT 9 - TSR CRITICAL RULE CURVES AND ARCS FOR OTHER MAJOR PROJECTS (ENGLISH) ....	28
EXHIBIT 9M - TSR CRITICAL RULE CURVES AND ARCS FOR OTHER MAJOR PROJECTS (SI) .....	30
EXHIBIT 10 - PDRs IN CFS AND VRC LOWER LIMITS (ENGLISH).....	32
EXHIBIT 10M - PDRs IN M <sup>3</sup> /S AND VRC LOWER LIMITS (SI) .....	33
EXHIBIT 11 - U.S. OPERATING RULE CURVE LOWER LIMITS (ENGLISH & SI) .....	34
EXHIBIT 12 - COMPOSITE CANADIAN STORAGE CONTENTS (ENGLISH) .....	35
EXHIBIT 12M - COMPOSITE CANADIAN STORAGE CONTENTS (SI) .....	36
EXHIBIT 13 - DUNCAN RESERVOIR CAPACITY TABLE, DATED 21 FEB. 1973 .....	39
EXHIBIT 13M - DUNCAN RESERVOIR CAPACITY TABLE, DATED 21 FEB. 1973 .....	40
EXHIBIT 14 - ARROW RESERVOIR CAPACITY TABLE, DATED 28 FEB. 1974.....	43
EXHIBIT 14M - ARROW RESERVOIR CAPACITY TABLE, DATED 28 FEB. 1974 .....	45
EXHIBIT 15 - MICA RESERVOIR CAPACITY TABLE, DATED 25 MAR. 1974.....	47
EXHIBIT 15M - MICA RESERVOIR CAPACITY TABLE, DATED 25 MAR. 1974 .....	51

**COLUMBIA RIVER TREATY  
DETAILED OPERATING PLAN  
FOR CANADIAN STORAGE  
1 AUGUST 2012 THROUGH 31 JULY 2013**

**I. REFERENCES AND INTERPRETATION**

In this document:

- A. “Aspects Agreement” means the Entity Agreement on Aspects of the Delivery of the Canadian Entitlement for 1 April 1998 through 15 September 2024 between the Canadian Entity and the United States Entity, dated 29 March, 1999, together with its Attachment A – Points of Delivery and Attachment B - Scheduling Guidelines, as those Guidelines may be subsequently modified or amended by the Operating Committee.
- B. “Assured Operating Plan” (AOP) means the hydroelectric operating plan developed in accordance with the Columbia River Treaty (Treaty) for the Operating Year as further described in the document “Columbia River Treaty Hydroelectric Operating Plan - Assured Operating Plan for Operating Year 2012-13 (AOP13) dated January 2008.”
- C. “Canadian storage” and “Canadian Treaty Storage” mean the storage provided by Canada under Article II of the Treaty, which is a total of 19.119 cubic kilometers ( $\text{km}^3 = 10^9$  cubic meters) (15.5 million acre feet (Maf)) at the Mica, Duncan, and Arrow reservoirs.
- D. “Detailed Operating Plan” (DOP) means a detailed operating plan prepared for the Operating Year by the Operating Committee pursuant to the guidelines provided in the Principles and Procedures and consisting of the contents of this document.
- E. “Flood Control Operating Plan” (FCOP) means the document “Columbia River Treaty Flood Control Operating Plan, dated May 2003”, including any published updates.
- F. “Libby Coordination Agreement (LCA)” means the “Columbia River Treaty Entity Agreement Coordinating the Operation of the Libby Project With the Operation Of Hydroelectric Plans on the Kootenay River and Elsewhere in Canada”, dated 16 February 2000.
- G. “Libby Operating Plan” (LOP) means the operating plan prepared by the U.S. Army Corps of Engineers (“Corps of Engineers”) on behalf of the U.S. Entity for the Libby project in accordance with Section 9 of the LCA, and incorporated as Attachment B to the LCA.
- H. “Operating Committee” means the Columbia River Treaty Operating Committee.
- I. “Operating Year” means the period from 1 August 2012 through 31 July 2013.

- J. “Principles and Procedures” (POP) means the document “Columbia River Treaty Principles and Procedures for Preparation and Use of Hydroelectric Operating Plans for Canadian Treaty Storage,” dated October 2003, or any future document the Entities agree supersedes the 2003 document, and any updated Appendices approved by the Operating Committee.
- K. “Supplemental Operating Agreement” (SOA) means any operating agreement(s) (signed either by the Entities or the Operating Committee) that authorize Canadian storage operations above or draft below the Treaty Storage Regulation levels as described in Section IV(A) of this DOP and Section 11 of the LCA, but not including Section 10 of the LCA.
- L. “Treaty Storage Regulation” (TSR) means the Coordinated System hydro regulation study performed for the Operating Committee by Bonneville Power Administration (BPA) staff using actual and forecasted streamflow conditions and implementing operating criteria contained in this DOP, including any changes agreed to under subsection II(E), but excluding subsections IV(D) and SOA operations authorized under subsection IV(A). The TSR is used in accordance with POP and this DOP to determine operational Treaty rights to monthly regulation of Treaty storage.
- M. “Weekly Treaty Storage Operation Agreement” means the note electronically transferred (e-mail or Fax) the last working day of each week from the U.S. Section to the Canadian Section of the Operating Committee to confirm the verbal agreement by the Operating Committee for the weekly Treaty storage changes and outflows that implement this DOP, including any changes agreed to under subsection II(E) and Section IV.

Other capitalized terms used in this document, not defined above, should be interpreted to have the meaning ascribed to them in POP (either in the definitions or the text), the FCOP or the generally accepted meaning within the industry in the Columbia River Basin.

## **II. PREPARATION AND SCOPE**

### **A. General**

This DOP for Canadian storage is based on the operating criteria contained in the AOP13 and its supporting hydro regulation studies with agreed revisions noted in subsection II(D) below, together with scheduling procedures and mutually beneficial changes from the AOP13 data agreed to by the Entities.

This DOP was developed in accordance with the procedures outlined in the POP and incorporates the use of the International System of Units (SI, or Metric); however, for operational purposes, reliance should be placed on measurements in the English system.

### **B. Storage Amounts**

The usable Canadian storage space available for power purposes during the Operating Year is 19.119 km<sup>3</sup> (15.5 Maf) in Canada distributed as follows:

#### Duncan Reservoir

1.727 km<sup>3</sup> (1.4 Maf or 705.8 thousand second-foot-days (ksfd)) between elevations

576.68 meters (m) (1892.0 feet) and 546.87 m (1794.2 feet) as measured at Duncan forebay, and based on British Columbia Hydro and Power Authority (B.C. Hydro) table dated 21 February 1973.

Arrow Reservoir

8.758 km<sup>3</sup> (7.1 Maf or 3579.6 ksf) between elevations 440.13 m (1444.0 feet) and 419.98 m (1377.9 feet) as measured at Fauquier, B.C., and based on B.C. Hydro table dated 28 February 1974.

Mica Reservoir

8.634 km<sup>3</sup> (7 Maf or 3529.2 ksf) between elevations 754.38 m (2475.0 feet) and 707.41 m (2320.9 feet) as measured at Mica forebay, and based on B.C. Hydro table dated 25 March 1974. The total available storage between these elevations is 14.802 km<sup>3</sup> (12 Maf, 6050.0 ksf), but only 8.634 km<sup>3</sup> (7 Maf, 3529.2 ksf) of this storage is utilized for power purposes, except as described in paragraph VII(C)6.

**C. Flood Control**

The requirements for flood control operations are defined in the Treaty and the FCOP. In accordance with Section 6-6 of the FCOP, the Canadian Entity selected for the AOP13 a reallocation of Mica/Arrow system flood control space to be 5.033 km<sup>3</sup> (4.08 Maf) at Mica and 4.441 km<sup>3</sup> (3.6 Maf) at Arrow for the Operating Year. The usable Canadian storage available for normal flood control purposes during the Operating Year will be 1.567 km<sup>3</sup> (1.27 Maf) in Duncan Reservoir below elevation 576.68 m (1892.0 feet), 4.441 km<sup>3</sup> (3.6 Maf) in Arrow Reservoir below elevation 440.13 m (1444.0 feet), and 5.033 km<sup>3</sup> (4.08 Maf) in Mica Reservoir. Additional storage may also be operated for flood control purposes under special circumstances, as described in Section 3-2 of the FCOP.

During the 2012-13 Operating Year, the Canadian Entity may request a different allocation of Mica/Arrow system flood space. To the extent that the flood control storage allocation differs from that included in the AOP13, the Operating Committee will develop and execute an agreement that will result in the same Treaty flows at the U.S.-Canadian border as that provided in the AOP13 as modified in subsection II(D), unless otherwise agreed by the Operating Committee.

During the refill period, the Canadian Section of the Operating Committee may request local flood control elevations for Arrow with the intent to minimize the occurrence of flows above 165 kcfs at Trail (as measured at Birchbank). This local flood control objective which is below 225 kcfs will be included in the flood control rule curve and input as the Upper Rule Curve in the TSR studies only to the extent that it does not jeopardize system flood control needs.

In order to accommodate local minimum flow requirements downstream of Duncan Dam, the Canadian Entity has requested a permanent variance beginning with the 2009-10 Operating Year and beyond to the February Duncan flood control draft requirements in the May 2003 FCOP. The Corps of Engineers has agreed to the permanent variance as described in subsection II(D)2 below.

**D. Preparation of the Treaty Storage Regulation Study**

The TSR study uses DOP operating criteria for both Canadian and U.S. projects to define a Canadian storage operation. The TSR13 study shall be based on the loads, thermal and other resources, rule curves, non-power constraints, and other plant and operating data contained in the AOP13 Step I hydro regulation study, except for the following changes agreed to by the Entities.

1. Flood control rule curves for Canadian projects defined as noted in subsection II(C) above unless otherwise agreed by the Operating Committee.
2. Limiting Duncan end of February flood control rule curve to no lower than 1812.5 feet (usable content 93.2 ksf). This change does not affect the critical period studies.
3. Use of the hydro-independent (HI) generation included in the Actual Energy Regulation (AER) (28 projects) plus the 70-year median values from the AOP13 for HIs not updated in the AER. To make this process more consistent with the PNCA AER, the HI operation of the eight Willamette projects will be added to the TSR hydro-regulation model and the same inflow and elevation data as submitted for the AER will be used.
4. In accordance with Attachment C to the LCA, the maximum January outflow at Arrow in the TSR is limited to 2,265 m<sup>3</sup>/s (80,000 cfs). However, the AOP13 value of 1,982 m<sup>3</sup>/s (70,000 cfs) overrides this requirement as shown in Table 1.
5. Forecast errors and distribution factors will be based on the September 2010 update to Appendix 8 of the 2003 POP. The Operating Committee may revise forecast errors and distribution factors in accordance with subsection II(E).
6. The Feb. 1, 2012 PNCA data submittal for Grand Coulee pumping flows (based on net flow from pumping and generation at the pumps/generators) or current forecast values if available will be used for current and future months. Actual values for after-the-fact months will be used. Adjustments to return flows are not needed because the observed streamflows and streamflow forecasts include return flows.
7. Updated plant data for Mica storage/elevation table, Arrow maximum generation, and an additional data point to the Duncan storage/elevation table, based on the Feb. 1, 2008 PNCA data submittal, and for Mica (generation), Revelstoke (generation), and Brilliant unit updates and expansion, based on the Feb. 1, 2010 PNCA data submittal. Use of updated surcharge storage/elevation tables for the Canadian Storage projects.
8. Updated Grand Coulee and Hungry Horse storage/elevation tables to the Feb. 1, 2008 PNCA data submittal, which includes a reduction in total usable storage at Hungry Horse of 45.1 ksf due to no longer including the assumption of 3% bank storage. The AOP13 rule curves for Hungry Horse (CRC, ARC, VRC, ORCLL, & URC) will be adjusted to subtract 45.1 ksf from all values, limited to empty, to avoid impact on system storage operation due to the updated data. In the event that

the adjustment to Hungry Horse rule curves causes additional Canadian draft in the TSR, which might happen during system operation below the 3<sup>rd</sup> year critical rule curve, the Operating Committee shall agree on a procedure to modify the TSR to prevent the additional Canadian draft.

9. Forecasted streamflows as a percentage of 71-year medians from the 2000 Modified Flows without Grand Coulee pumping will be used.
10. The hydro regulation model used will be PCHYDSIM version 28, or later version if agreed by the Operating Committee.
11. During the flood control evacuation period, the flood control curves at Grand Coulee may be adjusted to recognize drafts below the flood control levels at upstream storage reservoirs (including Canadian Treaty projects) in accordance with the latest update to the “Standard Operating Procedure for Computation of Flood Control Criteria for Treaty Storage Regulation and Actual Energy Regulation Models” agreed to by the Operating Committee.
12. The Dworshak operation will be updated as defined by the Feb. 1, 2012 PNCA data submittal with total minimum outflow of 45.31 m<sup>3</sup>/s (1600 cfs). This represents a minimum release of 42.47 m<sup>3</sup>/s (1500 cfs) through the powerhouse and 2.83 m<sup>3</sup>/s (100 cfs) of miscellaneous flow for the hatchery.
13. Updated 70-year Energy Content Curves for Ross, based on the Feb. 1, 2011, PNCA data submittal and as updated in the PNCA AER.
14. The operation of Mossyrock, Mayfield, Swift #1, Swift #2, Merwin, Alder, and Yale will be based on past actual inflows and elevations, and median inflows and median Variable Energy Content Curves for future months.
15. Use of updated plant data including H/K values, storage elevation tables, tailwater rating curves, maximum generation table and full gate h/k values for 14 federal projects based on the PNCA Feb 1, 2011 data submittal.

Although not changed from the AOP13, some notable assumptions for this TSR include:

16. U.S. flood control curves will include VarQ at Hungry Horse but not at Libby, and will not include Variable End-of-December flood control rule curves at Libby or shifted flood control from Brownlee and/or Dworshak to Grand Coulee.
17. The Canadian flood control curves will not include impacts due to VarQ and Variable End-of-December flood control rule curves at Libby or any impacts related to shifting of flood control from Brownlee and/or Dworshak to Grand Coulee unless otherwise agreed by the Operating Committee.
18. Arrow Project Operating Criteria (APOC) will be updated based on the procedures defined in subsection VII(B)7 of this DOP. This includes minimum flow limits at Arrow of 283.16 m<sup>3</sup>/s (10,000 cfs) for all months from July to January and April 15-30 to May, 566.33 m<sup>3</sup>/s (20,000 cfs) from February through March,



424.75 m<sup>3</sup>/s (15000 cfs) for April 1-15, and 141.58 m<sup>3</sup>/s (5000 cfs) for June. This operating limit may be reduced as needed to as low as 141.58 m<sup>3</sup>/s (5000 cfs) to avoid drafting the combined Mica and Arrow storage beyond 17.39 km<sup>3</sup> (14.1 Maf).

19. Brownlee's storage operation will be based on critical rule curves and energy content curves included in the AOP13, but the project minimum outflows will be calculated based on the minimum flow requirement at Lime Point.
20. The Variable Refill Curve Lower Limits (VRCLLs) were eliminated for all projects except Grand Coulee, which used a fixed VRCLL for all three forecast levels, 98.7, 117.2 and 135.7 km<sup>3</sup> (80, 95, and 110 Maf). The January and February Grand Coulee VRCLL values are the same as its ORCLL and are based on historic minimum elevations for firm power operation of 373.38 m (1225 feet) in March-April, 377.95 m (1240 feet) in May, and 391.67 m (1285 feet) in June.

The TSR includes the operating guides and limits listed in Sections VI and VII of this DOP.

**E. Authorization for Changes to the TSR**

The Operating Committee is authorized to modify the TSR only as needed to correct errors or omissions, update forecast data and procedures, and update the hydroregulation model.

**F. Libby**

Libby operating limits and the expected operation of the Libby project are not included in the DOP. That information is available in the Libby Operating Plan that will be updated by the U.S. Entity when planned operations change. The operation of Libby in the TSR13 will be based on the AOP13 Step 1 operating criteria.

### **III. POWER DELIVERIES**

**A. Delivery of the Canadian Entitlement**

The obligation of the United States to return the Canadian Entitlement to Canada for the Operating Year based on the AOP13 is:

Capacity Entitlement = 1,320.8 MW  
Energy Entitlement = 504.5 annual aMW

Arrangement for the delivery of this Canadian entitlement power, including the point of delivery, transmission losses, and scheduling guidelines, are defined by the Aspects Agreement, and Articles V and VIII of the Columbia River Treaty. Section 11 of Attachment B to the Aspects Agreement delegates to the Operating Committee the responsibility for modifying or amending Attachment B - Scheduling Guidelines, as needed from time to time.

**B. LCA Power**

In accordance with Section 7(b) of the LCA, the Canadian Entity shall deliver to the U.S. Entity one (1) average MW, shaped flat, during the Operating Year. In accordance with Section 10 of the LCA, the Entities shall deliver and receive power relating to the provisional draft of Arrow reservoir. The Entities hereby authorize and direct B.C. Hydro and BPA to make suitable arrangements for delivery of LCA power at the points of interconnection between B.C. Hydro and the Federal Columbia River Transmission System.

In the event of transmission limitations which curtail deliveries of energy under the LCA, curtailed deliveries shall be rescheduled for delivery as soon as it is practical after clearance of the limitation(s), but in no event longer than 168 hours later, unless mutually agreed otherwise.

**C. Operational Agreement Power**

In accordance with Section IV of this DOP, the Entities shall make arrangements to deliver and/or receive power required by any SOA. The Entities hereby authorize and direct B.C. Hydro and BPA to make suitable arrangements for delivery of Operational Agreement Power at the points of interconnection between B.C. Hydro and the Federal Columbia River Transmission System.

**IV. STORAGE OPERATION**

**A. Operation Authority**

The operation of Canadian storage by the Operating Committee during the period 1 August 2012 through 31 July 2013 shall be in accordance with this DOP, the FCOP, the LCA, and any SOA applicable to this Operating Year. Consistent with the operating objectives in this section, the Operating Committee is authorized to enter into SOAs consistent with the objectives defined in subsection IV(C) that store above or draft below end-of-month TSR levels, and may include the delivery of power, for mutual benefits that occur during the period covered by this DOP.

**B. Canadian Storage Operation**

The Weekly Treaty Storage Operation Agreements shall be based on operating Canadian storage to the end-of-month contents contained in the current TSR study, and any operations under SOAs and the LCA (as described in subsections C and D below), or as required by the FCOP.

From time to time, due to updated forecasts or differences between forecast and actual inflows, the actual operation of Treaty composite storage will differ from the end of period storage prescribed by the TSR as modified by SOA, LCA, or flood control operations. The Operating Committee will make reasonable efforts to correct these inadvertent differences via the regular Weekly Treaty Storage Operation Agreements in a timely manner without exceeding the specified project limits for discharges and ramp-rates.

**C. Objectives for Supplemental Operating Agreements**

Consistent with the FCOP and operating limits defined in Section VII of this DOP, the

objectives for SOAs include the following.

1. Power Objectives:

Power objectives include minimizing spill and optimizing energy production, power marketing, and purchase decisions. Operations for power objectives may be combined with non-power objectives. When appropriate, the Operating Committee will make suitable arrangements for delivery of power relating to sharing of benefits from operational agreements.

2. Non-power Objectives:

Potential Canadian non-power objectives may include, but are not limited to, whitefish and trout spawning downstream of Arrow, dust storm avoidance upstream of Arrow, and recreation needs. Potential U.S. non-power objectives may include, but are not limited to, storage of water up to 1.233 km<sup>3</sup> (1 Maf) for anadromous fish flow augmentation, minimum flows at Bonneville dam and at Vernita Bar for fish spawning, and recreation needs. Non-power objectives considered in this section do not include flood control and operating limits in Section VII.

Recognizing that it may not be possible to meet all non-power objectives, the Operating Committee shall in general attempt to share equally the risk and amount of failure. The parties shall make reasonable efforts to use available flexibility at their projects prior to requesting changes to the Treaty storage operation.

Operations designed to help meet non-power objectives do not imply that either Entity acknowledges any obligation, domestic or international, to meet those objectives. The Entities agree that operations for non-power objectives do not set a precedent concerning any current or future dispute over Treaty rights and obligations, nor do they set a precedent for non-power objectives or flow objectives and contents.

**D. Provisional Draft at Arrow**

The Canadian Section of the Operating Committee may provisionally draft from Arrow reservoir below TSR levels in accordance with Section 10 of the LCA.

**E. General Storage Operation Guidelines**

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 values as required.

**V. SCHEDULING STORAGE REGULATION****A. Operating Data**

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. Volume Runoff Forecasts**

Seasonal runoff volume forecasts for Canadian Treaty Projects shall be made available by the Canadian Section no later than the fifth working day of each month, as required. The Operating Committee may request forecasts of seasonal runoff volume at periods other than those representing month-end conditions 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 no later than the fifth working day of each month, as required.

**C. Treaty Storage Regulation Study**

The TSR study is performed at least twice each month (within the first nine working days and the last eight working days of each month, unless otherwise agreed by the Operating Committee). Actual unregulated streamflows and forecasted unregulated streamflows will be updated for each TSR study. Variable refill curves, flood control storage evacuation requirements, and variable flood control refill curves will be updated for the first TSR of the month. At the request of either section of the Operating Committee, additional TSR studies shall be performed to reflect the most current unregulated streamflow forecasts and rule curves. The Operating Committee shall agree on procedures for developing streamflow forecasts and rule curves at that time.

Errors and omissions in the TSR will be handled as follows, unless otherwise agreed:

1. All identified errors, omissions, or revisions in the TSR issued during the current Operating Year should be documented and reported to the Operating Committee.
2. Errors/omissions identified within two working days of the initial TSR distribution which, in the view of either Section, may affect the final TSR for the previous operation period or which may impact operations prior to issuance of the next TSR, should be corrected immediately and the TSR re-run. If such errors/omissions are identified after the two-day review period, the TSR will be corrected only if requested by either Section of the Operating Committee.
3. Errors/omissions that do not affect the final TSR for the previous period or impact operations prior to issuance of the next TSR should be corrected in the subsequent TSR.
4. Errors/omissions that affect periods previously finalized and which result in a significant impact to the TSR in future periods, should be brought to the attention of the Operating Committee for resolution.

During the Flood Control Storage Evacuation Period and the Flood Control Refill period,

project Flood Control Curves will be determined in August 2012 and January through July 2013 by the Columbia Basin Water Management Division, Northwestern Division, U.S. Army Corps of Engineers, in accordance with the FCOP. These curves will be computed consistent with the timing of the TSR Schedule.

#### **D. Scheduling Agreements**

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 on a regular basis in accordance with the following procedures:

##### **1. Storage Regulation for Power Operations**

- a) **Timing:** A preliminary request will be made during a weekly conference call or other agreed means not later than noon each Thursday, followed by a final agreement by noon Friday, or the last working day of the week.
- b) **Confirmation:** The agreed operation will be confirmed in a Weekly Treaty Storage Operation Agreement transmitted via electronic mail or fax on Friday, or the last working day of the week, in accordance with the following format unless otherwise agreed:

This message confirms our verbal agreement on \_\_\_\_\_ (date)  
that the \_\_\_\_\_ (storing/drafting) of an estimated \_\_\_\_\_ ksf/d \_\_\_\_\_ (in/from)  
the whole of Canadian storage for the Period \_\_\_\_\_ through \_\_\_\_\_ is  
consistent with the Detailed Operating Plan (DOP).

This agreement is based on an estimated average inflow during the above-mentioned period of \_\_\_\_\_ kcfs to Duncan Reservoir,

\_\_\_\_\_ kcfs to Libby Reservoir,  
\_\_\_\_\_ kcfs to Mica Reservoir, and

Estimated average regulated inflow of

\_\_\_\_\_ kcfs to Arrow Reservoir, and an

Estimated regulated outflow of

\_\_\_\_\_ kcfs from the Libby Project,

That will result in average weekly Treaty discharges of

\_\_\_\_\_ kcfs from the Duncan Project,  
\_\_\_\_\_ kcfs from the Mica Project, and  
\_\_\_\_\_ kcfs from the Arrow Project.

This operation of the whole of Canadian storage is based on the \_\_\_\_\_ (date)  
DOP TSR expected end-of-\_\_\_\_\_ (month, except split April & August) storage  
level for the whole of Canadian storage of \_\_\_\_\_ ksf/d.

This operation includes expected \_\_\_\_\_ (storage above/draft below) the  
end-of-\_\_\_\_\_ (month, except April & August) DOP TSR level for the whole of  
Canadian storage of \_\_\_\_\_ ksf/d.

Treaty discharges will be made effective at the Canadian-United States border. The Weekly Treaty Storage Operation Agreement will be deemed to have been fulfilled if the total amount of Treaty water agreed to is released from Arrow plus Duncan reservoir provided an amount equal to or greater than the water released from Duncan reservoir is concurrently discharged from Kootenay Lake.

- c) SOAs and LCA: The Weekly Treaty Storage Operation Agreements shall indicate storage operations under any SOA or LCA activity.
- d) Period Covered by Weekly Treaty Storage Operation Agreement: The period covered by the agreement shall be from Saturday following the date of the weekly request to the following Friday.
- e) Release Determination: The amount of water released or stored during the period of the Weekly Treaty Operation Storage Agreement will be determined by the changes in reservoir contents based on the recorded reservoir elevation and storage capacity tables for Duncan (Exhibit 13), Arrow (Exhibit 14), and Mica (Exhibit 15). The change in Arrow storage content will be determined using the recorded reservoir elevation at the gauge near Fauquier, B.C.
- f) Modification: If any modification to a written Weekly Treaty Storage Operation Agreement is agreed by the Operating Committee, a further written Storage Agreement superseding the original will be dispatched immediately by the U.S. Section of the Operating Committee to the Canadian Section of the Operating Committee. In accordance with Section 12 of the LCA, the Canadian Section shall implement at the request of the U.S. Section, up to five (5) mid-week requests for changes to the Canadian storage operation, consistent with this DOP and operating agreements entered into pursuant to this DOP. In addition, upon receipt of the preliminary weekly request each Thursday, the Canadian Section may request a modification to the current week's Treaty Storage Operation as may be necessary to meet flow ramping and fish salvage requirements in transitioning project releases from one Treaty week into the next, subject to agreement by the U.S. Section.
- g) Provisional Draft: A preliminary request by the Canadian Section for provisional draft from Arrow reservoir, in accordance with Section 10 of the LCA, shall be made concurrent with the preliminary flow request. The provisional draft request will be confirmed not later than 2:00 pm on Thursday, and subsequently documented in the Weekly Treaty Storage Operation Agreement.
- h) Non-routine Operation: Any special operation that is agreed to by the Operating Committee will be suitably documented.

2. Storage Regulation during Flood Control

- a) Forecasts: Daily time-step streamflow forecasts will be accomplished by use of computer simulation by the National Weather Service River Forecast Center. The regulation center required by the FCOP for the flood regulation will be located in the Columbia Basin Water Management Division, Northwestern Division, U.S. Army Corps of Engineers offices in Portland, Oregon.
- b) Requests for Project Outflows: Pursuant to the operating rules in the FCOP, the outflows from individual Canadian storage projects may be specified, as outlined in the FCOP. 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. Requests for project outflows will be determined by methods as agreed upon, and documented with a confirmation agreement by a message transmitted via e-mail or Fax from the Corps of Engineers, in Portland, Oregon. The Canadian Section of the Operating Committee or their representative will make acknowledgment of this agreement via e-mail or Fax. Any modification of the documented daily request shall be agreed by the Operating Committee before being put into effect, and shall be documented immediately using the procedure described above.

- c) Regulation during Winter Floods: Daily requests for project outflows from Canadian projects are normally implemented in the flood control refill period. During the occurrence of winter floods (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, then the outflows from Arrow will be regulated on a day-to-day basis by agreement of the Operating Committee in accordance with the requests of the U.S. Section of the Operating Committee. Insofar as possible the outflows from Arrow will not exceed the calculated natural lake outflows until the space obligated for this purpose as shown on Chart 5 of the FCOP is filled. The requests for such regulation will be in accordance with procedures described above. If, as a result of operation for winter flood control, a reservoir ends up above its flood control rule curve, then an appropriate outflow schedule for that reservoir will be determined to ensure that the reservoir will be drafted to its flood control rule curve as soon as feasible.

## **VI. OPERATING GUIDES**

### **A. Operating Rule Curve**

The ORC for the whole of Canadian storage shall be the sum of the ORCs for each of Duncan, Arrow, and Mica. The ORC for each of the Duncan, Arrow, and Mica Reservoirs during the period 1 August 2012 through 31 July 2013 is determined in accordance with the reference documents of Section I, and is defined as follows:

1. During the period 1 August 2012 through 31 December 2013, the ORC is the higher of the First Critical Rule Curve or the Assured Refill Curve.
2. During the period 1 January 2013 through 31 July 2013, the ORC is the higher of the First Critical Rule Curve or the Assured Refill Curve, unless the Variable Refill Curve (VRC) is below the higher of the above two curves (but no lower than the VRCLL), then it is defined by the VRC.
3. During the period 1 January 2013 through 15 April 2013, the ORC will not be lower than the Operating Rule Curve Lower Limit designed to protect firm loads with recurrence of 1936-37 hydro conditions unless a lower reservoir elevation is required for flood control (Exhibit 6).

4. During any month in the Operating Year, the ORC will not be higher than the Flood Control 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.
5. Operation of Mica will be in accordance with the Mica Project Operating Criteria tabulated with specified qualifications in Section VII(C). Differences between Mica's storage operation and its ORC (or Proportional Draft Point (PDP) if different) shall be balanced with equal and opposite changes to Arrow's ORC (or PDP) to the extent possible within agreed Operating Limits. The obligation to operate Mica and Arrow to produce optimum benefits in Canada and downstream in the United States will be deemed to have been fulfilled by operating to these criteria.
6. The VRCs for Arrow, Duncan, and Mica shall be constructed based on procedures, power discharge requirements as specified in Exhibit 7 (Total Inflow Method), except that the Operating Committee, in consideration of mutually beneficial operating arrangements, may agree to use an alternate procedure for Arrow which uses Arrow local inflows (Arrow Local Inflow Method) as follows.
  - a) If the current TSR study shows for the end of the current month that 1) the projected Mica Treaty storage content is lower than its ORC, and 2) the Coordinated System draft point is on the ORC, then the TSR shall be rerun with Arrow's VRC calculated as follows:
    - i) The forecast volume of inflow for Arrow will exclude the volume of inflow above the Mica project. This Arrow local inflow volume will be reduced by a forecast error such that there is a 95 percent probability that the reduced forecast is equaled or exceeded.
    - ii) The total Mica target outflow as specified in VII(C) will be added to the forecast volume described in a(i) above.
    - iii) In computing water available for refill of Arrow Reservoir the power discharge requirements for Arrow as specified in Exhibit 7 will be deducted from the volume calculated in a(ii).
  - b) During any period when the Arrow Local Inflow Method is used, the Mica/Arrow balancing (as described in subsection VI(A)5) is not used. This is implemented in BPA's hydro regulation model by setting the composite ORC for Canadian storage equal to the Mica Treaty storage content as defined in subsection VII(C), plus the ORC at Arrow and Duncan.

## **B. Rule Curves and Operating Data**

Rule Curves and operating data are shown in both English and SI (Metric) units. SI values are displayed with either one or two decimal places to assure consistency with English units and do not imply that level of precision.

1. Assured Refill Curve for Duncan, Arrow, and Mica.

Exhibit 1



- |     |  |            |
|-----|--|------------|
| 2.  | First Critical Rule Curve for Duncan, Arrow, Mica, and the whole of Canadian storage.            | Exhibit 2  |
| 3.  | Second Critical Rule Curve for Duncan, Arrow, Mica, and the whole of Canadian storage.           | Exhibit 3  |
| 4.  | Third Critical Rule Curve for Duncan, Arrow, Mica, and the whole of Canadian storage.            | Exhibit 4  |
| 5.  | Fourth Critical Rule Curve for Duncan, Arrow, Mica, and the whole of Canadian storage.           | Exhibit 5  |
| 6.  | Operating Rule Curve Lower Limits based on 1936-37 Hydro Conditions.                             | Exhibit 6  |
| 7.  | Variable Refill Curve Procedures.  | Exhibit 7  |
| 8.  | Coordinated System Loads and Resources Used in the TSR.  | Exhibit 8  |
| 9.  | TSR Critical Rule Curves and ARCs for Other Major Projects.                                      | Exhibit 9  |
| 10. | U.S. PDRs and VRC Lower Limits.  | Exhibit 10 |
| 11. | U.S. Operating Rule Curve Lower Limits based on 1936-37 Hydro Conditions.                        | Exhibit 11 |
| 12. | Composite Canadian Storage Contents from the DOP13 70-Year Continuous TSR hydroregulation study. | Exhibit 12 |

**C. Reservoir Capacity Tables**

The following tables shall be considered to be the official storage for the projects:

- |    |   |            |
|----|---|------------|
| 1. | Duncan Reservoir Capacity Table (based on B.C. Hydro Table dated 21 February 1973).                 | Exhibit 13 |
| 2. | Arrow Reservoir Capacity Table (based on B.C. Hydro Combined Storage Table dated 28 February 1974). | Exhibit 14 |
| 3. | Mica Reservoir Capacity Table (based on B.C. Hydro Table dated 25 March 1974).                      | Exhibit 15 |

**VII. OPERATING LIMITS**

**A. Duncan Project**

1. Maximum outflow is  $566.34 \text{ m}^3/\text{s}$  (20,000 cfs) through outlets but limited to  $283.17 \text{ m}^3/\text{s}$  (10,000 cfs) each month in the TSR model.

2. Minimum average weekly outflow is 2.83 m<sup>3</sup>/s (100 cfs).
3. Maximum rate of change in outflow is normally 113.27 m<sup>3</sup>/s (4,000 cfs) per day unless a larger change is necessary to accomplish the objectives of the FCOP.
4. Normal full pool elevation is 576.68 m (1,892.0 feet).
5. Normal minimum pool elevation is 546.87 m (1,794.2 feet).
6. Normal maximum reservoir average monthly draft rate in elevation during any month is limited to 0.30 m (1 foot) per day.

## **B. Arrow Project**

1. Maximum outflow is limited to physical capability, except during January when Attachment C to the LCA requires that outflows in actual operations be limited to a maximum of 2,265 m<sup>3</sup>/s (80,000 cfs). This January outflow limit applies to average weekly flows and may be exceeded if otherwise agreed or higher outflows are needed to meet flood control requirements or compensate for Duncan underruns.
2. Minimum average weekly outflow is 141.58 m<sup>3</sup>/s (5,000 cfs).
3. Maximum rate of change in outflow is normally 424.75 m<sup>3</sup>/s (15,000 cfs) per day unless a larger change is necessary to accomplish the objectives of the FCOP.
4. Normal full pool elevation is 440.13 m (1,444.0 feet).
5. Normal minimum pool elevation is 419.98 m (1,377.9 feet).
6. Normal maximum reservoir average monthly draft rate in elevation during any month is limited to 0.30 m (1 foot) per day.
7. The Arrow reservoir storage operation in the TSR will be limited by a maximum outflow, minimum outflow, or a maximum storage level as defined by the Arrow Project Operating Criteria (APOC) as shown in Table 1. The APOC includes the following:
  - a) Arrow's outflows will be limited, under all water conditions, to a maximum monthly outflow of 1,982 m<sup>3</sup>/s (70,000 cfs) in January and 1,699 m<sup>3</sup>/s (60,000 cfs) in February, subject to flood control requirements.
  - b) The minimum average monthly outflow is increased from 142 m<sup>3</sup>/s (5,000 cfs) to 283 m<sup>3</sup>/s (10,000 cfs) for July through January, 566 m<sup>3</sup>/s (20,000 cfs) for February and March, 425 m<sup>3</sup>/s (15,000 cfs) for April 1-15, 283 m<sup>3</sup>/s (10,000 cfs) for April 15-30 and May, except that the minimum monthly outflow will be decreased as needed (but limited to no lower than 142 m<sup>3</sup>/s (5,000 cfs)) to prevent the combined draft of Mica and Arrow from exceeding 17.39 km<sup>3</sup> (14.1 Maf).
  - c) Arrow's storage contents during February through June are limited to a

calculated maximum level depending on the forecast for The Dalles residual unregulated runoff for the current month through July.

- d) APOC Implementation: In the DOP, the default implementation of the APOC will use the distribution factors shown in Table 2. These distribution factors are multiplied by the current month through July forecast volumes at The Dalles, to calculate future month through July volume forecasts. The resulting residual month-July volumes are then used to determine the maximum storage levels from the criteria provided in Table 1.

**TABLE 1**  
**ARROW PROJECT OPERATING CRITERIA 1/**

Period	Volume Runoff Period	The Dalles Volume Runoff				Maximum Storage Limit 2/ & 3/		Maximum Outflow Limit 4/		Minimum Outflow Limit 5/	
		km <sup>3</sup>	Maf	Maf	km <sup>3</sup>	ksfd	hm <sup>3</sup>	kcfs	m <sup>3</sup> /s	kcfs	m <sup>3</sup> /s
January						URC	URC	70	1982	10	283
February	1 Feb - 31 Jul					URC	URC	60	1699	20	566
		>86.3	>70	to	<80 <98.7	URC to	1800 4403.8				
					80 98.7		1800 4403.8				
March	1 Mar - 31 Jul					URC	URC			20	566
		>80.2	>65	to	<75 <92.5	URC to	900 2201.9				
					75 92.5		900 2201.9				
April 15	1 Apr - 31 Jul					URC	URC			15	425
		>75.2	>61	to	<70 <86.3	URC to	900 2201.9				
					70 86.3		900 2201.9				
April 30	1 Apr - 31 Jul					URC	URC			10	283
		>75.2	>61	to	<70 <86.3	URC to	1000 2446.6				
					70 86.3		1000 2446.6				
May	1 May - 31 Jul					URC	URC			10	283
		>83.9	>68	to	<70 <86.3	URC to	2100 5137.8				
					70 86.3		2100 5137.8				
June	1 Jun - 31 Jul					URC	URC			5	142
		>40.7	>33	to	<35 <43.2	URC to	3400 8318.4				
					35 43.2		3400 8318.4				
July - December						URC	URC			10	283

**Notes:**

1. All APOC limits apply to the TSR study only.
2. If the Maximum Storage Limit is computed to be above the URC, then the URC will apply.
3. Interpolate when there are two values. For example, if the February-July volume runoff is between 86.3 km<sup>3</sup> (70 Maf) and 98.7 km<sup>3</sup> (80 Maf), then the Maximum Storage Limit is interpolated between February's URC and 4403.8 km<sup>3</sup> (1800 ksfd).
4. The Maximum Average Monthly Outflow Limit takes precedence over the Maximum Storage Limit. However, the Maximum Outflow Limit may be exceeded to avoid storage above the URC.
5. The Minimum Average Monthly Outflow Limit is an operating limit and may be reduced to as low as 142 m<sup>3</sup>/s (5,000 cfs) (Treaty minimum) to avoid drafting Mica+Arrow storage beyond 17.39 km<sup>3</sup> (14.1 Maf).

TABLE 2

## APOC IMPLEMENTATION: DISTRIBUTION FACTORS FOR THE DALLES

Forecast Date	Forecast Period	The Dalles Distribution Factors					
		Jan-Jul	Feb-Jul	Mar-Jul	Apr-Jul	May-Jul	Jun-Jul
1-Jan	1 Jan - 31 July	1.0000	0.9392	0.8589	0.7735	0.7174	0.4393
1-Feb	1 Feb - 31 July		1.0000	0.9145	0.8235	0.7638	0.4677
1-Mar	1 Mar - 31 July			1.0000	0.9005	0.8352	0.5114
1-Apr	1 Apr - 31 July				1.0000	0.9275	0.5679
1-May	1 May - 31 July					1.0000	0.6123
1-Jun	1 Jun - 31 July						1.0000

**Notes:**

1. Unless otherwise agreed, the DOP13 will apply these distribution factors to the monthly volume forecast at The Dalles for computing the Month-July runoff volumes required by the APOC.
2. These distribution factors are calculated from the median 71 year Jan-Jul, Feb-Jul, etc., volumes. For example, if the 1 May volume runoff forecast equals 80.2 km<sup>3</sup> (65 Maf), then based on the June-July distribution factor of 0.6123, the estimated June-July volume runoff is 49.1 km<sup>3</sup> (39.8 Maf), and from Table 1, the Arrow maximum storage limits in May and June are the URC and 8318.4 hm<sup>3</sup> (3400 ksfd) respectively.

**C. Mica Project**

The Mica Project Treaty storage operation in the TSR will be according to the Mica Project Operating Criteria shown in Table 3 (and Table 3M) except as qualified in subsections VII(C)1 through VII(C)6.

1. VRCs shall be constructed according to Exhibit 7 with the 31 July Treaty storage content of 8,634.5 hm<sup>3</sup> (3,529.2 ksfd). However, the Operating Committee may agree to set Mica's VRC July refill target equal to the Mica End of Month Storage Content of 8,482.8 hm<sup>3</sup> (3,467.2 ksfd) indicated on the following "Mica Project Operating Criteria" table.
2. Mica project operation will be determined by the End of Previous Month Arrow Storage Content as shown in Table 3 (and Table 3M), except for the limitations or changes required by subsections VII(C)3 through VII(C)6. The End of Previous Month Arrow Storage Content shall be determined from the current TSR study, except when the Arrow Local Inflow Method was used for the prior month the TSR with the Arrow Total Inflow Method shall be used. Mica's target operation will be defined either by a Target End of Month Storage Content or a Target Month Average Outflow.
3. Mica operation to the Target End-of-Month Treaty Storage Contents shall be limited by the Minimum and Maximum Outflows shown in Table 3 (and Table 3M),

unless needed to accomplish the objectives of the FCOP.

4. Mica operation to the Target Month Average Outflow shall be limited by the Minimum Target Treaty Content shown in Table 3 (and Table 3M). Mica outflows shall be reduced as required down to a lower limit of the Minimum Outflow shown in the table below, to prevent draft below the Minimum Target Treaty Storage Content. Minimum Outflows may cause the reservoir to draft below the Minimum Target Treaty Content.
5. Mica outflows will be increased during the months October through July as required to avoid violation of the Flood Control Rule Curve.
6. Treaty storage releases from Mica in excess of 8.634 km<sup>3</sup> (7 Maf) that result from operating Mica under the criteria described in VII(C)2 through VII(C)5 above will be retained in the Arrow reservoir, subject to flood control and minimum flow requirements at Arrow, and Mica will be reduced to Minimum Outflow as required to minimize releases in excess of 8.634 km<sup>3</sup> (7 Maf). The total combined storage draft from Mica and Arrow will not exceed 17.392 km<sup>3</sup> (14.1 Maf) unless flood control or minimum flow criteria at Arrow will not permit the excess Mica storage releases to be retained at Arrow. If such a release should occur, the target Mica operation will remain as specified in Mica Project Operating Criteria, and the excess release will be returned as soon as the operating criteria permit.

Table 3

## MICA PROJECT OPERATING CRITERIA (ENGLISH)

Month	Target Operation			Target Operation Limits		
	End of Previous Month Arrow Storage Content (KSFD)	Month Average Outflow (CFS)	End-of-Month Storage Content 1/ (KSFD)	Minimum Target Treaty Content at Mica 2/ (KSFD)	Maximum Outflow (CFS)	Minimum Outflow 3/ (CFS)
August 1-15	3,300 - FULL	-	3,364.2	-	34,000	15,000
	2,170 - 3,300	25,000	-	0.0	-	15,000
	1500 - 2,170	20,000	-	0.0	-	15,000
	0 - 1,500	32,000	-	0.0	-	15,000
August 16-31	2,710 - FULL	-	3,529.2	-	34,000	15,000
	1,950 - 2,710	25,000	-	0.0	-	15,000
	0 - 1,950	32,000	-	0.0	-	15,000
September	3,530 - FULL	-	3,529.2	-	34,000	10,000
	3,400 - 3,530	24,000	-	0.0	-	10,000
	2,800 - 3,400	27,000	-	0.0	-	10,000
	0 - 2,800	32,000	-	0.0	-	10,000
October	3,440 - FULL	-	3,428.4	-	34,000	10,000
	2,600 - 3,440	19,000	-	0.0	-	10,000
	2,000 - 2,600	22,000	-	0.0	-	10,000
	0 - 2,000	32,000	-	0.0	-	10,000
November	3,340 - FULL	21,000	-	0.0	-	10,000
	3,130 - 3,340	19,000	-	0.0	-	10,000
	420 - 3,130	25,000	-	0.0	-	10,000
	0 - 420	32,000	-	0.0	-	10,000
December	2,740 - FULL	25,000	-	204.1	-	10,000
	1,800 - 2,740	22,000	-	204.1	-	10,000
	300 - 1,800	27,000	-	204.1	-	10,000
	0 - 300	32,000	-	204.1	-	10,000
January	2,640 - FULL	24,000	-	204.1	-	12,000
	2,180 - 2,640	27,000	-	204.1	-	12,000
	1,350 - 2,180	25,000	-	204.1	-	12,000
	0 - 1,350	29,000	-	204.1	-	12,000
February	1,370 - FULL	21,000	-	0.0	-	12,000
	900 - 1,370	26,000	-	0.0	-	12,000
	500 - 900	21,000	-	0.0	-	12,000
	0 - 500	26,000	-	0.0	-	12,000
March	800 - FULL	17,000	-	0.0	-	12,000
	770 - 800	26,000	-	0.0	-	12,000
	510 - 770	22,000	-	0.0	-	12,000
	0 - 510	25,000	-	0.0	-	12,000
April 1-15	890 - FULL	20,000	-	0.0	-	12,000
	350 - 890	10,000	-	0.0	-	12,000
	220 - 350	12,000	-	0.0	-	12,000
	0 - 220	22,000	-	0.0	-	12,000
April 16-30	570 - FULL	10,000	-	0.0	-	10,000
	110 - 570	15,000	-	0.0	-	10,000
	20 - 110	10,000	-	0.0	-	10,000
	0 - 20	15,000	-	0.0	-	10,000
May	640 - FULL	8,000	-	0.0	-	8,000
	520 - 640	12,000	-	0.0	-	8,000
	220 - 520	8,000	-	0.0	-	8,000
	0 - 220	10,000	-	0.0	-	8,000
June	1,610 - FULL	8,000	-	0.0	-	8,000
	1,020 - 1,610	10,000	-	0.0	-	8,000
	810 - 1,020	14,000	-	0.0	-	8,000
	0 - 810	18,000	-	0.0	-	8,000
July	3,180 - FULL	-	3,467.2	-	34,000	10,000
	2,670 - 3,180	-	3,405.2	-	34,000	10,000
	1,160 - 2,670	20,000	-	0.0	-	10,000
	0 - 1,160	31,000	-	0.0	-	10,000

Notes:

1/ If the Mica target End-of-Month Storage Content is less than 3529.2 ksfd, then a maximum outflow of 34,000 cfs will apply. These maximum flows may be exceeded for flood control.

2/ For month average outflow target operation, Mica outflows will be reduced to minimum to maintain the reservoir above the Minimum Target Treaty Storage Content.

3/ Minimum outflow only applies if the Target Operation Month Average Outflow would result in a Mica content below the Minimum Target Treaty Content.

**Table 3M**  
**MICA PROJECT OPERATING CRITERIA (SI)**

Month	Target Operation			Target Operation Limits		
	End of Previous Month Arrow Storage Content (hm <sup>3</sup> )	Month Average Outflow (m <sup>3</sup> /s)	End-of-Month Storage Content 1/ (hm <sup>3</sup> )	Minimum Target Treaty Content at Mica 2/ (hm <sup>3</sup> )	Maximum Outflow (m <sup>3</sup> /s)	Minimum Outflow 3/ (m <sup>3</sup> /s)
August 1-15	8,073.8 - FULL	-	8,230.9	-	962.77	424.75
	5,309.1 - 8,073.8	707.92	-	0.0	-	424.75
	3,669.9 - 5,309.1	566.34	-	0.0	-	424.75
	0.0 - 3,669.9	906.14	-	0.0	-	424.75
August 16-31	6,630.3 - FULL	-	8,634.5	-	962.77	424.75
	4,770.9 - 6,630.3	707.92	-	0.0	-	424.75
	0.0 - 4,770.9	906.14	-	0.0	-	424.75
September	8,636.5 - FULL	-	8,634.5	-	962.77	283.17
	8,318.4 - 8,636.5	679.60	-	0.0	-	283.17
	6,850.5 - 8,318.4	764.55	-	0.0	-	283.17
	0.0 - 6,850.5	906.14	-	0.0	-	283.17
October	8,416.3 - FULL	-	8,387.9	-	962.77	283.17
	6,361.2 - 8,416.3	538.02	-	0.0	-	283.17
	4,893.2 - 6,361.2	622.97	-	0.0	-	283.17
	0.0 - 4,893.2	906.14	-	0.0	-	283.17
November	8,171.6 - FULL	594.65	-	0.0	-	283.17
	7,657.9 - 8,171.6	538.02	-	0.0	-	283.17
	1,027.6 - 7,657.9	707.92	-	0.0	-	283.17
	0.0 - 1,027.6	906.14	-	0.0	-	283.17
December	6,703.7 - FULL	707.92	-	499.4	-	283.17
	4,403.9 - 6,703.7	622.97	-	499.4	-	283.17
	734.0 - 4,403.9	764.55	-	499.4	-	283.17
	0.0 - 734.0	906.14	-	499.4	-	283.17
January	6,459.0 - FULL	679.60	-	499.4	-	339.80
	5,333.6 - 6,459.0	764.55	-	499.4	-	339.80
	3,302.9 - 5,333.6	707.92	-	499.4	-	339.80
	0.0 - 3,302.9	821.19	-	499.4	-	339.80
February	3,351.8 - FULL	594.65	-	0.0	-	339.80
	2,201.9 - 3,351.8	736.24	-	0.0	-	339.80
	1,223.3 - 2,201.9	594.65	-	0.0	-	339.80
	0.0 - 1,223.3	736.24	-	0.0	-	339.80
March	1,957.3 - FULL	481.39	-	0.0	-	339.80
	1,883.9 - 1,957.3	736.24	-	0.0	-	339.80
	1,247.8 - 1,883.9	622.97	-	0.0	-	339.80
	0.0 - 1,247.8	707.92	-	0.0	-	339.80
April 1-15	2,177.5 - FULL	566.34	-	0.0	-	339.80
	856.3 - 2,177.5	283.17	-	0.0	-	339.80
	538.3 - 856.3	339.80	-	0.0	-	339.80
	0.0 - 538.3	622.97	-	0.0	-	339.80
April 16-30	1,394.6 - FULL	283.17	-	0.0	-	283.17
	269.1 - 1,394.6	424.75	-	0.0	-	283.17
	48.9 - 269.1	283.17	-	0.0	-	283.17
	0.0 - 48.9	424.75	-	0.0	-	283.17
May	1,565.8 - FULL	226.53	-	0.0	-	226.53
	1,272.2 - 1,565.8	339.80	-	0.0	-	226.53
	538.3 - 1,272.2	226.53	-	0.0	-	226.53
	0.0 - 538.3	283.17	-	0.0	-	226.53
June	3,939.0 - FULL	226.53	-	0.0	-	226.53
	2,495.5 - 3,939.0	283.17	-	0.0	-	226.53
	1,981.7 - 2,495.5	396.44	-	0.0	-	226.53
	0.0 - 1,981.7	509.70	-	0.0	-	226.53
July	7,780.2 - FULL	-	8,482.9	-	962.77	283.17
	6,532.4 - 7,780.2	-	8,331.2	-	962.77	283.17
	2,838.1 - 6,532.4	566.34	-	0.0	-	283.17
	0.0 - 2,838.1	877.82	-	0.0	-	283.17

**Notes:**

1/ If the Mica target End-of-Month Storage Content is less than 8634.5 hm<sup>3</sup>, then a maximum outflow of 962.77 m<sup>3</sup>/s will apply. These maximum flows may be exceeded for flood control.

2/ For month average outflow target operation, Mica outflows will be reduced to minimum to maintain the reservoir above the Minimum Target Treaty Storage Content.

3/ Minimum outflow only applies if the Target Operation Month Average Outflow would result in a Mica content below the Minimum Target Treaty Content.

## EXHIBITS

### Exhibit 1 - Assured Refill Curves (English) 1/

Month	MICA						ARROW						DUNCAN				
	1931	PDR	Water Available		CRC1	ARC	1931	PDR	Water Available		MICA	ARC	1931	PDR	Water Available		ARC
	Inflow		for Refill				for Refill		Refill	Inflow			PDR		for Refill		
	CFS	CFS 4/	CFS	KSFD	KSFD	KSFD	CFS	CFS 4/	CFS	KSFD	KSFD 2/	KSFD	CFS 3/	CFS 4/	CFS	KSFD	KSFD
Aug1	52209	3000	49209	738.1	3529.2	51.4	81724	5000	76724	1150.9	3529.2	0.0	5228	100	5128	76.9	36.9
Aug2	39436	3000	36436	583.0	3529.2	634.4	61741	5000	56741	907.9	0.0	0.0	3875	100	3775	60.4	97.3
Sep	23080	3000	20080	602.4	3522.6	1236.8	38807	5000	33807	1014.2	-6.6	0.0	2310	100	2210	66.3	163.6
Oct	8761	3000	5761	178.6	3409.0	1415.4	14427	5000	9427	292.2	-113.6	0.0	1089	100	989	30.7	194.2
Nov	5176	3000	2176	65.3	3002.9	1480.7	9369	5000	4369	131.1	-406.1	0.0	684	100	584	17.5	211.8
Dec	3531	3000	531	16.5	2274.1	1497.1	6480	5000	1480	45.9	-728.8	696.5	461	100	361	11.2	223.0
Jan	2834	3000	-166	-5.1	1526.8	1492.0	6451	5000	1451	45.0	-747.3	1488.8	428	100	328	10.2	233.1
Feb	2589	3000	-411	-11.5	783.7	1480.5	5759	5000	759	21.3	-46.3	1556.3	428	100	328	9.2	242.3
Mar	3218	3000	218	6.8	505.1	1487.3	7849	5000	2849	88.3	6.8	1637.9	555	100	455	14.1	256.4
Apr1	4666	3000	1666	25.0	258.7	1512.2	12047	5000	7047	105.7	25.0	1718.6	825	100	725	10.9	267.3
Apr2	7218	3000	4218	63.3	173.5	1575.5	20470	5000	15470	232.1	63.3	1887.4	1137	100	1037	15.6	282.8
May	28063	3000	25063	777.0	469.0	2352.5	69071	5000	64071	1986.2	777.0	3096.6	5170	293	4877	151.2	434.0
June	60134	22350	37784	1133.5	2114.7	3486.0	114433	60550	53883	1616.5	1133.5	3579.6	8030	3997	4033	121.0	555.0
July	56494	55100	1394	43.2	3101.2	3529.2	88803	89140	-337	-10.4	43.2	3579.6	7320	2456	4864	150.8	705.8

### Exhibit 1M – Assured Refill Curves (SI) 1/

Month	MICA						ARROW						DUNCAN					
	1931	PDR	Water Available			ARC	1931	PDR	Water Available		MICA	ARC	1931	PDR	Water Available		ARC	
	Inflow		for Refill		CRC1		Inflow		for Refill				Refill		Inflow	for Refill		ARC
	m <sup>3</sup> /s	m <sup>3</sup> /s 4/	m <sup>3</sup> /s 4/	hm <sup>3</sup>	hm <sup>3</sup>	hm <sup>3</sup>	m <sup>3</sup> /s	m <sup>3</sup> /s 4/	m <sup>3</sup> /s 4/	hm <sup>3</sup>	hm <sup>3</sup> 2/	hm <sup>3</sup>	m <sup>3</sup> /s 3/	m <sup>3</sup> /s 4/	m <sup>3</sup> /s	hm <sup>3</sup>	hm <sup>3</sup>	
Aug1	1478.39	84.95	1393.44	1805.9	8634.5	125.9	2314.16	141.58	2172.58	2815.7	8634.5	0.0	148.04	2.83	145.21	188.2	90.2	
Aug2	1116.70	84.95	1031.75	1426.3	8634.5	1552.2	1748.31	141.58	1606.72	2221.2	0.0	0.0	109.73	2.83	106.90	147.8	238.0	
Sep	653.55	84.95	568.60	1473.8	8618.4	3026.0	1098.89	141.58	957.31	2481.4	-16.1	0.0	65.41	2.83	62.58	162.2	400.2	
Oct	248.08	84.95	163.13	436.9	8340.5	3462.9	408.53	141.58	266.94	715.0	-277.9	0.0	30.84	2.83	28.01	75.0	475.2	
Nov	146.57	84.95	61.62	159.7	7346.9	3622.7	265.30	141.58	123.72	320.7	-993.6	0.0	19.37	2.83	16.54	42.9	518.1	
Dec	99.99	84.95	15.04	40.3	5563.8	3662.9	183.49	141.58	41.91	112.3	-1783.1	1704.0	13.05	2.83	10.22	27.4	545.5	
Jan	80.25	84.95	-4.70	-12.6	3735.5	3650.3	182.67	141.58	41.09	110.1	-1828.3	3642.4	12.12	2.83	9.29	24.9	570.4	
Feb	73.31	84.95	-11.64	-28.2	1917.4	3622.2	163.08	141.58	21.49	52.0	-113.3	3807.7	12.12	2.83	9.29	22.5	592.8	
Mar	91.12	84.95	6.17	16.5	1235.8	3638.7	222.26	141.58	80.67	216.1	16.5	4007.3	15.72	2.83	12.88	34.5	627.3	
Apr1	132.13	84.95	47.18	61.1	632.9	3699.9	341.13	141.58	199.55	258.6	61.1	4204.7	23.36	2.83	20.53	26.6	653.9	
Apr2	204.39	84.95	119.44	154.8	424.5	3854.7	579.65	141.58	438.06	567.7	154.8	4617.7	32.20	2.83	29.36	38.1	692.0	
May	794.65	84.95	709.70	1900.9	1147.5	5755.5	1955.87	141.58	1814.29	4859.4	1900.9	7576.2	146.40	8.30	138.10	369.9	1061.9	
June	1702.80	632.88	1069.92	2773.3	5173.8	8528.8	3240.38	1714.58	1525.80	3954.9	2773.3	8757.8	227.38	113.18	114.20	296.0	1357.9	
July	1599.73	1560.26	39.47	105.7	7587.4	8634.5	2514.62	2524.16	-9.54	-25.56	105.7	8757.8	207.28	69.55	137.73	368.9	1726.8	

Notes on Exhibit 1 and Exhibit 1M:

- 1/ The Assured Refill Curve (ARC) indicates the end-of-month storage content required to assure refill of Canadian storage by 31 July based on 1931 historical monthly inflow. The monthly inflow at each reservoir is reduced by deducting the Power Discharge Requirements (PDR) and water required for refill, if any, at upstream reservoirs. The Entities may agree to revise the data upon the completion of the Refill Study by the Operating Committee.
- 2/ Upstream refill requirement: these values are computed by subtracting current month from previous month's higher of Mica's ARC or first critical rule curve (CRC1) except July value is Mica full minus previous month's higher of Mica's ARC or CRC1. CRC1 is shown in Exhibit 2.
- 3/ Inflows are from the 2000 Level Modified streamflow (HydSim file).
- 4/ PDRs are from the AOP13.



**Exhibit 2 - First Critical Rule Curves (English & SI)**

End-of-Period Usable Storage Content

	(English) (ksfd)				(SI) (hm <sup>3</sup> )			
Month	Mica	Arrow	Duncan	Total	Mica	Arrow	Duncan	Total
August 15	3529.2	3579.6	705.8	7814.6	8634.5	8757.8	1726.8	19119.2
August 31	3529.2	3579.4	705.8	7814.4	8634.5	8757.4	1726.8	19118.7
September	3522.6	3322.8	698.8	7544.2	8618.4	8129.6	1709.7	18457.6
October	3409.0	3032.9	685.2	7127.1	8340.5	7420.3	1676.4	17437.2
November	3002.9	2770.8	621.0	6394.7	7346.9	6779.0	1519.3	15645.3
December	2274.1	2489.7	440.2	5204.0	5563.8	6091.3	1077.0	12732.1
January	1526.8	1532.6	357.0	3416.4	3735.5	3749.7	873.4	8358.6
February	783.7	932.1	259.5	1975.3	1917.4	2280.5	634.9	4832.8
March	505.1	599.2	164.8	1269.1	1235.8	1466.0	403.2	3105.0
April 15	258.7	685.7	140.0	1084.4	632.9	1677.6	342.5	2653.1
April 30	173.5	739.2	151.3	1064.0	424.5	1808.5	370.2	2603.2
May	469.0	1666.4	268.8	2404.2	1147.5	4077.0	657.6	5882.1
June	2114.7	3203.6	543.6	5861.9	5173.8	7837.9	1330.0	14341.7
July	3101.2	3552.9	675.7	7329.8	7587.4	8692.5	1653.2	17933.1

Source: First-year critical rule curves from the AOP13.

**Exhibit 3 - Second Critical Rule Curves (English & SI)**

End-of-Period Usable Storage Content

	(English) (ksfd)				(SI) (hm <sup>3</sup> )			
Month	Mica	Arrow	Duncan	Total	Mica	Arrow	Duncan	Total
August 15	3396.4	3539.1	675.4	7610.9	8309.6	8658.8	1652.4	18620.8
August 31	3504.2	3535.9	652.1	7692.2	8573.4	8650.9	1595.4	18819.7
September	3328.0	3001.3	593.4	6922.7	8142.3	7343.0	1451.8	16937.1
October	2470.9	2950.1	590.6	6011.6	6045.3	7217.7	1445.0	14708.0
November	1956.8	2015.1	543.1	4515.0	4787.5	4930.1	1328.7	11046.4
December	1431.0	1460.9	402.4	3294.3	3501.1	3574.2	984.5	8059.8
January	512.8	471.2	219.4	1203.4	1254.6	1152.8	536.8	2944.2
February	160.5	171.8	45.1	377.4	392.7	420.3	110.3	923.3
March	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
April 15	0.0	70.0	1.1	71.1	0.0	171.3	2.7	174.0
April 30	220.2	447.6	34.2	702.0	538.7	1095.1	83.7	1717.5
May	623.7	1453.4	109.0	2186.1	1525.9	3555.9	266.7	5348.5
June	1169.2	2562.9	315.2	4047.3	2860.6	6270.4	771.2	9902.1
July	2474.4	3268.6	429.6	6172.6	6053.9	7997.0	1051.1	15101.9

Source: Second-year critical rule curves from the AOP13.

**Exhibit 4 - Third Critical Rule Curves (English & SI)**

End-of-Period Usable Storage Content

	<b>(English)</b> (ksfd)				<b>(SI)</b> (hm <sup>3</sup> )			
<b>Month</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>	<b>Total</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>	<b>Total</b>
August 15	2862.9	3369.1	468.3	6700.3	7004.4	8242.8	1145.7	16393.0
August 31	3176.4	3298.5	523.1	6998.0	7771.4	8070.1	1279.8	17121.3
September	3182.0	2800.1	581.1	6563.2	7785.1	6850.7	1421.7	16057.5
October	2452.1	2730.4	539.2	5721.7	5999.3	6680.2	1319.2	13998.7
November	2087.7	1851.9	550.1	4489.7	5107.8	4530.9	1345.9	10984.5
December	1236.3	1247.5	333.6	2817.4	3024.7	3052.1	816.2	6893.1
January	746.5	279.3	143.3	1169.1	1826.4	683.3	350.6	2860.3
February	67.4	144.9	0.0	212.3	164.9	354.5	0.0	519.4
March	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
April 15	0.0	0.0	0.2	0.2	0.0	0.0	0.5	0.5
April 30	0.0	1.4	0.0	1.4	0.0	3.4	0.0	3.4
May	267.4	774.7	157.2	1199.3	654.2	1895.4	384.6	2934.2
June	945.5	1820.5	150.8	2916.8	2313.3	4454.0	368.9	7136.2
July	2093.9	1729.9	139.2	3963.0	5122.9	4232.4	340.6	9695.9

Source: Third-year critical rule curves from the AOP13.

**Exhibit 5 - Fourth Critical Rule Curves (English & SI)**

End-of-Period Usable Storage Content

	<b>(English)</b> (ksfd)				<b>(SI)</b> (hm <sup>3</sup> )			
<b>Month</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>	<b>Total</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>	<b>Total</b>
August 15	2004.5	1778.5	171.4	3954.4	4904.2	4351.3	419.3	9674.8
August 31	1834.3	1889.7	96.6	3820.6	4487.8	4623.3	236.3	9347.5
September	1157.3	1681.5	84.6	2923.4	2831.5	4114.0	207.0	7152.4
October	1064.2	1129.7	113.7	2307.6	2603.7	2763.9	278.2	5645.8
November	612.5	749.7	69.2	1431.4	1498.5	1834.2	169.3	3502.1
December	0.0	226.1	0.0	226.1	0.0	553.2	0.0	553.2
January	0.0	2.1	0.0	2.1	0.0	5.1	0.0	5.1
February	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Fourth-year critical rule curves from the AOP13.

## Exhibit 6 - Operating Rule Curve Lower Limits (English & SI)

End-of-Period Usable Storage Content

	<b>(English)</b> (ksfd)			<b>(SI)</b> (hm <sup>3</sup> )		
<b>Month</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>	<b>Mica</b>	<b>Arrow</b>	<b>Duncan</b>
January	279.8	157.9	78.2	684.6	386.3	191.3
February	28.5	27.6	19.0	69.7	67.5	46.5
March	0.0	0.0	0.0	0.0	0.0	0.0
April 15	0.0	0.0	0.0	0.0	0.0	0.0

Source: Operating Rule Curve Lower Limits from the AOP13.

## Exhibit 7 - Variable Refill Curve Procedures (English)

The Variable Refill Curves (VRCs) indicate the end-of-month storage content required to refill Canadian storage based on forecasts of unregulated inflow volume. The probable forecast volume at each reservoir is reduced by deducting the 95 percent confidence forecast error, Power Discharge Requirements (PDRs), and water required for refill at upstream reservoirs based on the ORC.

### POWER DISCHARGE REQUIREMENTS, IN CFS FOR JANUARY - JULY VOLUME RUNOFF OF THE COLUMBIA RIVER AT THE DALLES, OREGON

Project	Jan	Feb	Mar	Ap1	Ap2	May	Jun	Jul
<b>Mica</b>								
ARC PDRs	3000	3000	3000	3000	3000	3000	22350	55100
80 Maf PDRs	3000	3000	3000	3000	3000	3000	32000	38000
95 Maf PDRs	3000	3000	3000	3000	3000	3000	18000	32300
110 Maf PDRs	3000	3000	3000	3000	3000	3000	18000	32300
<b>Arrow</b>								
ARC PDRs	5000	5000	5000	5000	5000	5000	60550	89140
80 Maf PDRs	5000	5000	5000	5000	5000	5000	66200	69200
95 Maf PDRs	5000	5000	5000	5000	5000	5000	43000	57000
110 Maf PDRs	5000	5000	5000	5000	5000	5000	5000	46300
<b>Duncan</b>								
ARC PDRs	100	100	100	100	100	293	3997	2456
80 Maf PDRs	100	100	100	100	100	1400	1800	1800
95 Maf PDRs	100	100	100	100	100	100	600	1100
110 Maf PDRs	100	100	100	100	100	100	600	1000

Notes:

- (1) If the forecasted natural January through July volume runoff at The Dalles is less than 80 Maf, the Power Discharge Requirement in the 80 Maf schedule will be used. For intermediate forecasted volumes, the Power Discharge Requirement will be interpolated linearly between the values shown above.
- (2) PDRs are from the AOP13. Data may be revised upon completion of any Refill Studies agreed to by the Operating Committee.
- (3) Distribution factors and forecast errors are shown in Appendix 8 of the 2003 POP, as revised by the Operating Committee.

## Exhibit 7M - Variable Refill Curve Procedures (SI)

The Variable Refill Curves (VRCs) indicate the end-of-month storage content required to refill Canadian storage based on forecasts of unregulated inflow volume. The probable forecast volume at each reservoir is reduced by deducting the 95 percent confidence forecast error, Power Discharge Requirements (PDRs), and water required for refill at upstream reservoirs based on the ORC.

### POWER DISCHARGE REQUIREMENTS, IN m<sup>3</sup>/s

#### FOR

### JANUARY - JULY VOLUME RUNOFF OF THE COLUMBIA RIVER AT THE DALLES, OREGON

Project	Jan	Feb	Mar	Ap1	Ap2	May	Jun	Jul
<b>Mica</b>								
ARC PDRs	84.95	84.95	84.95	84.95	84.95	84.95	632.88	1560.26
98.68 km <sup>3</sup> PDRs	84.95	84.95	84.95	84.95	84.95	84.95	906.14	1076.04
117.18 km <sup>3</sup> PDRs	84.95	84.95	84.95	84.95	84.95	84.95	509.70	914.63
135.69 km <sup>3</sup> PDRs	84.95	84.95	84.95	84.95	84.95	84.95	509.70	914.63
<b>Arrow</b>								
ARC PDRs	141.58	141.58	141.58	141.58	141.58	141.58	1714.58	2524.16
98.68 km <sup>3</sup> PDRs	141.58	141.58	141.58	141.58	141.58	141.58	1874.57	1959.52
117.18 km <sup>3</sup> PDRs	141.58	141.58	141.58	141.58	141.58	141.58	1217.62	1614.06
135.69 km <sup>3</sup> PDRs	141.58	141.58	141.58	141.58	141.58	141.58	141.58	1311.07
<b>Duncan</b>								
ARC PDRs	2.83	2.83	2.83	2.83	2.83	8.30	113.18	69.55
98.68 km <sup>3</sup> PDRs	2.83	2.83	2.83	2.83	2.83	39.64	50.97	50.97
117.18 km <sup>3</sup> PDRs	2.83	2.83	2.83	2.83	2.83	2.83	16.99	31.15
135.69 km <sup>3</sup> PDRs	2.83	2.83	2.83	2.83	2.83	2.83	16.99	28.32

Notes:

- (1) If the forecasted natural January through July volume runoff at The Dalles is less than 98.7 km<sup>3</sup>, the Power Discharge Requirement in the 98.7 km<sup>3</sup> schedule will be used. For intermediate forecasted volumes, the Power Discharge Requirement will be interpolated linearly between the values shown above.
- (2) PDRs are from the AOP13. Data may be revised upon completion of any Refill Studies agreed to by the Operating Committee.
- (3) Distribution factors and forecast errors are shown in Appendix 8 of the 2003 POP, as revised by the Operating Committee.

## Exhibit 8 - Coordinated System Loads and Resources Used in the TSR

(Energy in aMW)

<b>Month</b>	<b>PNW Area Firm Loads <u>1/</u></b>	<b>Export, Imports and Resources <u>2/</u></b>	<b>Coordinated Hydro Load <u>3/</u></b>
August 15	22052	11087	<b>10965</b>
August 31	22027	10927	<b>11100</b>
September	20720	9643	<b>11077</b>
October	20879	10963	<b>9916</b>
November	23107	11654	<b>11453</b>
December	25171	11860	<b>13311</b>
January	25676	12803	<b>12873</b>
February	24658	12941	<b>11717</b>
March	22813	12316	<b>10497</b>
April 15	21567	11784	<b>9783</b>
April 30	21549	10052	<b>11497</b>
May	20888	7605	<b>13283</b>
June	21436	7575	<b>13861</b>
July	22513	9986	<b>12527</b>

Notes: Data for columns 1, 2, and 3 are from DDPB Table 1A of the AOP13. References to line numbers in the notes below are references to lines in DDPB Table 1A of the AOP13.

- 1/ The Pacific Northwest Area Firm Load including pumping, but excluding Utah Power and Light loads in Idaho (line 1d).
- 2/ Includes total power flows out (line 2i), total load served by flows-in (line 3f), load served by other resources (lines 4f – 4b), total thermal installations (line 7), and hydro maintenance (line 8a). Other resources include hydro independents (1929 for example) that will be updated as described in subsection II(D)3.
- 3/ AOP13 Coordinated Hydro Model Load, DDPB Table 1A, line 10.

## Exhibit 9 – TSR Critical Rule Curves and ARCs for Other Major Projects (English)

End-of-Period Usable Storage Content in ksf  
Unadjusted for Crossovers

DATA	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>LIBBY</b>														
ARC	1750.8	1799.3	1833.1	1829.1	1801.1	1750.5	1700.1	1648.4	1596.1	1580.7	1578.4	2032.1	2478.4	2510.5
CRC1	2510.5	2510.5	2357.4	2419.7	2106.7	1502.2	1439.9	1313.2	1268.1	1130.0	1063.0	1541.7	2510.5	2441.2
CRC2	2507.7	2457.7	2376.2	2361.2	2109.8	1502.2	1305.8	1207.0	852.3	892.6	1045.9	1441.8	2334.0	2510.5
CRC3	2510.5	2433.2	2374.1	2367.0	2115.0	1502.2	1196.8	869.3	629.2	613.8	611.4	1065.2	1611.9	1820.8
CRC4	1852.2	1865.1	1875.4	1608.9	1100.0	411.8	103.1	0.0						
<b>CORRA LINN</b>														
ARC	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6	57.6
CRC1	285.4	285.4	396.9	396.9	396.9	396.9	322.8	234.8	69.8	69.8	69.8	69.8	285.4	285.4
CRC2	285.4	285.4	396.9	396.9	396.9	396.9	322.8	234.8	69.8	69.8	69.8	69.8	285.4	285.4
CRC3	285.4	285.4	396.9	396.9	396.9	396.9	322.8	234.8	69.8	69.8	69.8	69.8	285.4	285.4
CRC4	285.4	285.4	396.9	396.9	396.9	396.9	322.8	57.6						
<b>HUNGRY HORSE *</b>														
ARC	1077.1	1079.7	1082.3	1098.5	1116.6	1127.7	1136.8	1146.7	1171.5	1203.8	1149.8	1503.4	1503.3	1503.4
CRC1	1503.4	1470.8	1300.1	1312.6	1227.2	969.5	830.0	816.4	822.8	826.1	870.6	1196.6	1503.4	1492.1
CRC2	1427.8	1329.6	1098.4	968.1	786.1	656.6	581.9	582.1	584.3	675.1	826.9	1099.3	1279.0	1151.9
CRC3	1082.4	984.6	757.7	693.2	513.8	271.5	65.4	0.0	0.0	11.5	66.3	420.0	561.7	377.2
CRC4	313.2	222.3	127.8	112.2	86.6	0.0	0.0	0.0						
<b>KERR</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	506.6	614.7
CRC1	614.7	614.7	614.7	614.7	614.7	592.3	405.1	129.8	0.0	0.0	19.7	426.3	614.7	614.7
CRC2	614.7	614.7	614.7	614.7	598.6	416.9	135.0	105.3	0.0	0.0	249.5	426.3	614.7	614.7
CRC3	614.7	614.7	614.7	614.7	614.7	535.0	418.7	239.2	0.0	0.0	28.6	426.3	614.7	614.7
CRC4	614.7	614.7	614.7	501.3	426.4	239.2	0.5	0.0						
<b>ALBENI FALLS</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	421.7	582.4
CRC1	582.4	582.4	465.7	190.4	57.6	57.6	57.6	57.6	57.6	57.6	190.4	279.0	582.4	582.4
CRC2	582.4	582.4	465.7	190.4	57.6	57.6	57.6	57.6	57.6	57.6	190.4	279.0	582.4	582.4
CRC3	582.4	582.4	465.7	190.4	57.6	57.6	57.6	57.6	57.6	57.6	190.4	279.0	582.4	582.4
CRC4	582.4	582.4	465.7	190.4	57.6	57.6	57.6	0.0						
<b>GRAND COULEE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	1470.0	1874.3	2313.1	2332.6	2324.5	2576.0	2614.3	2614.3
CRC1	2614.3	2614.3	2531.9	2531.9	2531.9	2490.7	2490.7	2490.7	2343.6	2280.0	1726.0	1818.1	2614.3	2614.3
CRC2	2614.3	2531.9	2531.9	2531.9	2531.9	2490.7	2490.7	2490.7	2307.2	2237.0	2282.1	2282.1	2614.3	2614.3
CRC3	2614.3	2531.9	2531.9	2531.9	2531.9	2490.7	2490.7	2490.7	2341.7	2342.0	1903.3	2553.0	2614.3	2614.3
CRC4	2614.3	2531.9	2531.9	2531.9	2531.9	2316.5	920.3	0.0						
<b>CHELAN</b>														
ARC	34.1	49.5	67.7	80.0	91.6	101.6	114.0	124.4	142.6	157.2	182.2	281.6	341.5	341.5
CRC1	341.5	341.5	315.4	341.5	335.9	285.5	233.9	186.4	137.0	112.8	98.2	211.0	341.5	341.5
CRC2	341.5	341.5	309.9	260.9	208.4	156.7	97.0	54.7	16.2	49.3	100.1	192.9	270.0	341.5
CRC3	341.5	341.5	308.7	259.0	210.5	158.6	109.2	63.9	20.5	5.4	0.7	162.1	236.3	233.4
CRC4	247.8	230.0	193.5	145.2	100.3	50.4	1.2	0.0						
<b>BROWNLEE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.1	143.4	242.7	376.7	491.7	491.7
CRC1	477.8	477.8	450.1	457.1	450.1	422.4	343.4	320.4	267.2	288.5	309.7	403.5	484.8	477.8
CRC2	477.8	477.8	450.1	457.1	450.1	422.4	343.4	320.4	267.2	288.5	309.7	403.5	484.8	477.8
CRC3	477.8	477.8	450.1	457.1	450.1	422.4	343.4	320.4	267.2	288.5	309.7	403.5	484.8	453.6
CRC4	419.7	379.2	355.8	457.1	450.1	422.4	343.4	0.0						

## Exhibit 9 – TSR Critical Rule Curves and ARCs for Other Major Projects (English) Continued

End-of-Period Usable Storage Content in ksfd  
Unadjusted for Crossovers

DATA	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>NOXON</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	116.3
CRC1	116.3	116.3	116.3	116.3	112.3	112.3	112.3	100.8	78.7	78.7	116.3	116.3	116.3	116.3
<b>PRIEST LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	35.5
CRC1	35.5	35.5	35.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.5	35.5	35.5
<b>CDA LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	91.0	112.5
CRC1	112.5	112.5	101.8	74.8	54.2	27.0	0.0	0.0	0.0	0.0	90.6	112.5	112.5	112.5
<b>LONG LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	52.5
CRC1	52.5	52.5	52.5	52.5	52.5	52.5	19.8	19.8	19.8	50.2	52.5	52.5	52.5	52.5

Note: The CRC data is the same as in the AOP13 studies, and is provided here to verify the critical rule curves used in the TSR studies.

\* Adjusted for 0% bank storage.



**Exhibit 9M – TSR Critical Rule Curves and  
ARCs for Other Major Projects (SI)**  
End-of-Period Usable Storage Content in hm<sup>3</sup>  
Unadjusted for Crossovers

DATA	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>LIBBY</b>														
ARC	4283.5	4402.2	4484.9	4475.1	4406.6	4282.8	4159.5	4033.0	3905.0	3867.3	3861.7	4971.7	6063.7	6142.2
CRC1	6142.2	6142.2	5767.6	5920.0	5154.3	3675.3	3522.9	3212.9	3102.5	2764.7	2600.7	3771.9	6142.2	5972.6
CRC2	6135.3	6013.0	5813.6	5776.9	5161.8	3675.3	3194.8	2953.0	2085.2	2183.8	2558.9	3527.5	5710.4	6142.2
CRC3	6142.2	5953.1	5808.5	5791.1	5174.6	3675.3	2928.1	2126.8	1539.4	1501.7	1495.9	2606.1	3943.7	4454.8
CRC4	4531.6	4563.2	4588.4	3936.3	2691.3	1007.5	252.2	0.0						
<b>CORRA LINN</b>														
ARC	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9	140.9
CRC1	698.3	698.3	971.1	971.1	971.1	971.1	789.8	574.5	170.8	170.8	170.8	170.8	698.3	698.3
CRC2	698.3	698.3	971.1	971.1	971.1	971.1	789.8	574.5	170.8	170.8	170.8	170.8	698.3	698.3
CRC3	698.3	698.3	971.1	971.1	971.1	971.1	789.8	574.5	170.8	170.8	170.8	170.8	698.3	698.3
CRC4	698.3	698.3	971.1	971.1	971.1	971.1	789.8	140.9						
<b>HUNGRY HORSE*</b>														
ARC	2635.2	2641.6	2648.0	2687.6	2731.9	2759.0	2781.3	2805.5	2866.2	2945.2	2813.1	3678.2	3678.0	3678.2
CRC1	3678.2	3598.5	3180.8	3211.4	3002.5	2372.0	2030.7	1997.4	2013.1	2021.1	2130.0	2927.6	3678.2	3650.6
CRC2	3493.3	3253.0	2687.3	2368.6	1923.3	1606.4	1423.7	1424.2	1429.5	1651.7	2023.1	2689.5	3129.2	2818.2
CRC3	2648.2	2408.9	1853.8	1696.0	1257.1	664.3	160.0	0.0	0.0	28.1	162.2	1027.6	1374.3	922.9
CRC4	766.3	543.9	312.7	274.5	211.9	0.0	0.0	0.0						
<b>KERR</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1239.4	1503.9
CRC1	1503.9	1503.9	1503.9	1503.9	1503.9	1449.1	991.1	317.6	0.0	0.0	48.2	1043.0	1503.9	1503.9
CRC2	1503.9	1503.9	1503.9	1503.9	1464.5	1020.0	330.3	257.6	0.0	0.0	610.4	1043.0	1503.9	1503.9
CRC3	1503.9	1503.9	1503.9	1503.9	1503.9	1308.9	1024.4	585.2	0.0	0.0	70.0	1043.0	1503.9	1503.9
CRC4	1503.9	1503.9	1503.9	1226.5	1043.2	585.2	1.2	0.0						
<b>ALBENI FALLS</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1031.7	1424.9
CRC1	1424.9	1424.9	1139.4	465.8	140.9	140.9	140.9	140.9	140.9	140.9	465.8	682.6	1424.9	1424.9
CRC2	1424.9	1424.9	1139.4	465.8	140.9	140.9	140.9	140.9	140.9	140.9	465.8	682.6	1424.9	1424.9
CRC3	1424.9	1424.9	1139.4	465.8	140.9	140.9	140.9	140.9	140.9	140.9	465.8	682.6	1424.9	1424.9
CRC4	1424.9	1424.9	1139.4	465.8	140.9	140.9	140.9	0.0						
<b>GRAND COULEE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	3596.5	4585.7	5659.2	5706.9	5687.1	6302.4	6396.1	6396.1
CRC1	6396.1	6396.1	6194.5	6194.5	6194.5	6093.7	6093.7	6093.7	5733.9	5578.2	4222.8	4448.2	6396.1	6396.1
CRC2	6396.1	6194.5	6194.5	6194.5	6194.5	6093.7	6093.7	6093.7	5644.8	5473.0	5583.4	5583.4	6396.1	6396.1
CRC3	6396.1	6194.5	6194.5	6194.5	6194.5	6093.7	6093.7	6093.7	5729.2	5729.9	4656.6	6246.2	6396.1	6396.1
CRC4	6396.1	6194.5	6194.5	6194.5	6194.5	5667.5	2251.6	0.0						
<b>CHELAN</b>														
ARC	83.4	121.1	165.6	195.7	224.1	248.6	278.9	304.4	348.9	384.6	445.8	689.0	835.5	835.5
CRC1	835.5	835.5	771.7	835.5	821.8	698.5	572.3	456.0	335.2	276.0	240.3	516.2	835.5	835.5
CRC2	835.5	835.5	758.2	638.3	509.9	383.4	237.3	133.8	39.6	120.6	244.9	471.9	660.6	835.5
CRC3	835.5	835.5	755.3	633.7	515.0	388.0	267.2	156.3	50.2	13.2	1.7	396.6	578.1	571.0
CRC4	606.3	562.7	473.4	355.2	245.4	123.3	2.9	0.0						
<b>BROWNLEE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.9	350.8	593.8	921.6	1203.0	1203.0
CRC1	1169.0	1169.0	1101.2	1118.3	1101.2	1033.4	840.2	783.9	653.7	705.8	757.7	987.2	1186.1	1169.0
CRC2	1169.0	1169.0	1101.2	1118.3	1101.2	1033.4	840.2	783.9	653.7	705.8	757.7	987.2	1186.1	1169.0
CRC3	1169.0	1169.0	1101.2	1118.3	1101.2	1033.4	840.2	783.9	653.7	705.8	757.7	987.2	1186.1	1109.8
CRC4	1026.8	927.8	870.5	1118.3	1101.2	1033.4	840.2	0.0						

## Exhibit 9M – TSR Critical Rule Curves and ARCs for Other Major Projects (SI) Continued

End-of-Period Usable Storage Content in hm<sup>3</sup>  
Unadjusted for Crossovers

DATA	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>NOXON</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	284.5
CRC1	284.5	284.5	284.5	284.5	274.8	274.8	274.8	246.6	192.5	192.5	284.5	284.5	284.5	284.5
<b>PRIEST LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.2	86.8
CRC1	86.8	86.8	86.8	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	86.8	86.8	86.8
<b>CDA LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	60.2	222.6	275.2
CRC1	275.2	275.2	249.1	183.0	132.6	66.1	0.0	0.0	0.0	0.0	221.7	275.2	275.2	275.2
<b>LONG LAKE</b>														
ARC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	128.4
CRC1	128.4	128.4	128.4	128.4	128.4	128.4	48.4	48.4	48.4	122.8	128.4	128.4	128.4	128.4

Note: The CRC data is the same as in the AOP13 studies, and is provided here to verify the critical rule curves used in the TSR studies.

\* Adjusted for 0% bank storage.

**Exhibit 10 – PDRs in cfs and VRC Lower Limits in ksf/d**

<b>Project</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr15</b>	<b>Apr30</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>
<b>Libby</b>								
ARC PDRs	4000	4000	4000	4000	4000	4001	7349	9700
80 Maf PDRs	4000	4000	4000	4000	4000	4000	15000	15000
95 Maf PDRs	4000	4000	4000	4000	4000	4000	15000	15000
110 Maf PDRs	4000	4000	4000	4000	4000	4000	8000	11000
<b>Hungry Horse</b>								
ARC PDRs	400	400	400	400	7657	405	5684	1384
80 Maf PDRs	400	400	400	400	400	400	2070	2070
95 Maf PDRs	400	400	400	400	400	400	1600	1600
110 Maf PDRs	400	400	400	400	400	400	800	1200
<b>Grand Coulee *</b>								
ARC PDRs	30000	30000	30000	46288	35580	79295	114657	127458
80 Maf PDRs	30000	30000	30000	30000	30000	30000	30000	30000
95 Maf PDRs	30000	30000	30000	30000	30000	30000	30000	30000
110 Maf PDRs	30000	30000	30000	30000	30000	30000	30000	30000
80 Maf VRCLLs	1778.9	1054.5	418.7	418.7	418.7	843.7	2411.3	2614.3
95 Maf VRCLLs	1778.9	1054.5	418.7	418.7	418.7	843.7	2411.3	2614.3
110 Maf VRCLLs	1778.9	1054.5	418.7	418.7	418.7	843.7	2411.3	2614.3
<b>Chelan</b>								
ARC PDRs	50	50	50	50	50	2051	2056	1958
80 Maf PDRs	50	50	50	50	50	250	1128	1128
95 Maf PDRs	50	50	50	50	50	50	50	50
110 Maf PDRs	50	50	50	50	50	50	50	50

## Notes

1/ PDRs and VRCLLs from the AOP13.

2/ Distribution factors and forecast errors are shown in Appendix 8 of the 2003 POP.

\* VRCLLs for Grand Coulee only.

**Exhibit 10M – PDRs in m<sup>3</sup>/s and VRC Lower Limits in hm<sup>3</sup>**

<b>Project</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr15</b>	<b>Apr30</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>
<b>Libby</b>								
ARC PDRs	113.27	113.27	113.27	113.27	113.27	113.30	208.10	274.67
98.68 km <sup>3</sup> PDRs	113.27	113.27	113.27	113.27	113.27	113.27	424.75	424.75
117.18 km <sup>3</sup> PDRs	113.27	113.27	113.27	113.27	113.27	113.27	424.75	424.75
135.69 km <sup>3</sup> PDRs	113.27	113.27	113.27	113.27	113.27	113.27	226.53	311.49
<b>Hungry Horse</b>								
ARC PDRs	11.33	11.33	11.33	11.33	216.82	11.47	160.95	39.19
98.68 km <sup>3</sup> PDRs	11.33	11.33	11.33	11.33	11.33	11.33	58.62	58.62
117.18 km <sup>3</sup> PDRs	11.33	11.33	11.33	11.33	11.33	11.33	45.31	45.31
135.69 km <sup>3</sup> PDRs	11.33	11.33	11.33	11.33	11.33	11.33	22.65	33.98
<b>Grand Coulee *</b>								
ARC PDRs	849.50	849.50	849.50	1310.73	1007.51	2245.38	3246.72	3609.21
98.68 km <sup>3</sup> PDRs	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
117.18 km <sup>3</sup> PDRs	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
135.69 km <sup>3</sup> PDRs	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
98.68 km <sup>3</sup> VRCLLs	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
117.18 km <sup>3</sup> VRCLLs	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
135.69 km <sup>3</sup> VRCLLs	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
<b>Chelan</b>								
ARC PDRs	1.42	1.42	1.42	1.42	1.42	58.08	58.22	55.44
98.68 km <sup>3</sup> PDRs	1.42	1.42	1.42	1.42	1.42	7.08	31.94	31.94
117.18 km <sup>3</sup> PDRs	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
135.69 km <sup>3</sup> PDRs	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

## Notes

1/ PDRs and VRCLLs from the AOP13.

2/ Distribution factors and forecast errors are shown in Appendix 8 of the 2003 POP.

\* VRCLLs for Grand Coulee only.

**Exhibit 11 – U.S. Operating Rule Curve Lower Limits**  
(End-of-Period Usable Storage Contents)

**English Units in ksfd**

<b>Month</b>	<b>Libby</b>	<b>Hungry Horse *</b>	<b>Grand Coulee</b>	<b>Chelan</b>
January	696.5	122.8	1778.9	82.2
February	383.4	0.9	1054.5	33.2
March	51.1	0.0	174.9	1.2
April 15	0	0.0	0.0	0.0

**Metric Units in hm<sup>3</sup>**

<b>Month</b>	<b>Libby</b>	<b>Hungry Horse *</b>	<b>Grand Coulee</b>	<b>Chelan</b>
January	1704.1	300.4	4352.3	201.1
February	938.0	2.2	2579.9	81.2
March	125.0	0.0	427.9	2.9
April 15	0.0	0.0	0.0	0.0

Source: Operating Rule Curve Lower Limits from the AOP13.

\* Adjusted for 0% bank storage.

## Exhibit 12 - Composite Canadian Storage Contents in ksfd

### From the DOP13 70-Year Continuous TSR Study

<u>Water Year</u>	<u>AU1</u>	<u>AU2</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>AP1</u>	<u>AP2</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>
1928-1929	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3416.4	2122.1	1702.5	1600.0	1096.4	2436.6	5288.4	6778.8
1929-1930	7095.3	7249.8	6628.9	5734.8	4384.8	3019.3	1359.2	1029.2	690.2	798.9	1430.1	2612.2	3712.2	5644.8
1930-1931	6044.3	6279.7	5763.6	5003.1	3857.0	2272.4	946.5	198.9	0.0	10.9	13.8	1784.2	2509.0	3338.0
1931-1932	3303.1	3148.4	2789.6	2120.3	1321.2	405.5	99.2	0.0	0.0	101.9	509.7	2277.7	5946.4	7752.6
1932-1933	7814.6	7814.4	7014.0	6406.9	6241.7	5204.0	3096.2	1450.9	632.3	567.5	701.3	1966.5	5563.1	7674.6
1933-1934	7814.6	7814.4	7544.2	7127.1	6394.7	5228.8	3240.4	1651.0	466.9	312.1	887.0	2585.6	4580.2	6142.9
1934-1935	6511.1	6750.1	6096.1	5460.7	5588.3	4714.7	2618.3	1917.6	1046.3	876.3	972.7	2570.8	5756.6	7752.6
1935-1936	7814.6	7805.1	7476.5	6758.2	5594.6	4203.1	2325.3	1649.4	1229.0	1143.3	1438.9	4403.8	6961.9	7814.6
1936-1937	7814.6	7766.4	7184.1	6348.1	4899.5	3484.3	1402.9	535.5	80.5	50.1	98.1	1434.3	3491.8	5385.0
1937-1938	5638.8	5712.7	5055.2	4510.4	4161.0	3631.3	1562.9	1040.7	638.5	537.7	671.5	2572.1	5770.0	7631.6
1938-1939	7584.6	7659.4	7217.9	6651.6	5711.3	4750.7	3257.4	2779.9	1703.5	1726.4	1885.8	4184.0	5247.5	7309.6
1939-1940	7586.6	7686.3	6984.8	6404.2	5446.6	4718.7	3218.6	2811.2	2004.9	2088.2	2428.6	4780.3	5683.0	6807.6
1940-1941	6987.8	7054.8	6667.0	6478.5	5431.4	4286.7	2834.8	2460.4	2205.6	2416.8	1728.8	3416.4	3613.0	4747.3
1941-1942	4786.9	4798.1	4492.5	4957.3	4650.9	4816.7	3265.1	2138.9	976.0	861.5	967.0	2707.3	5003.3	7428.0
1942-1943	7649.6	7741.5	7157.6	6481.5	5873.3	5204.0	2981.3	2379.8	1458.6	1305.6	1546.7	2705.0	5102.1	7592.1
1943-1944	7814.6	7814.4	7484.4	7097.3	6245.2	5204.0	3416.4	2283.6	1472.1	1336.9	1359.0	2765.5	3598.5	4309.1
1944-1945	4549.1	4505.6	3725.8	3310.4	2527.5	1228.9	773.0	219.7	13.9	0.2	0.8	1673.7	4638.7	6015.4
1945-1946	5951.8	5842.2	5189.6	4699.3	4161.1	3395.9	1208.0	469.0	71.6	36.3	349.3	1809.4	5899.1	7752.6
1946-1947	7814.6	7814.4	7544.2	7097.8	6394.7	5204.0	3013.5	1370.7	554.1	557.9	673.8	2788.0	6293.4	7752.6
1947-1948	7814.6	7799.0	7544.2	7127.1	6394.7	5204.0	3046.5	1313.8	467.1	360.5	524.2	2041.8	6062.7	7802.1
1948-1949	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3206.9	2802.9	1650.5	1425.6	1536.1	4087.3	6181.0	7140.9
1949-1950	7479.9	7559.4	6961.9	6378.9	6033.6	5204.0	3011.8	1342.0	760.1	696.7	801.6	2086.3	4994.6	7814.6
1950-1951	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3161.9	1544.4	896.6	896.5	1009.6	2624.2	5625.0	7690.6
1951-1952	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3012.9	1296.6	866.2	800.9	1192.5	3058.0	6196.8	7752.6
1952-1953	7814.6	7790.6	7341.3	6626.8	5455.2	4243.0	2144.6	1621.2	1204.9	951.6	998.5	2455.7	5718.8	7554.4
1953-1954	7649.6	7814.4	7544.2	7127.1	6394.7	5204.0	3072.2	1520.0	390.2	309.4	371.9	1483.3	4935.3	7674.0
1954-1955	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3120.1	1646.2	1221.7	1185.4	853.9	1910.0	5167.1	7679.7
1955-1956	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3137.3	1407.7	668.4	635.3	741.1	2223.3	6122.9	7752.6
1956-1957	7807.9	7814.4	7544.2	7127.1	6394.7	5204.0	3033.1	1384.4	844.7	810.1	930.1	2215.7	5771.0	7116.9
1957-1958	7319.8	7414.4	6835.0	6415.0	5489.4	4712.8	2572.7	978.2	658.2	699.9	804.5	2260.6	6315.4	7581.8
1958-1959	7642.9	7733.8	7303.2	7064.3	6394.7	5204.0	3164.8	1525.8	711.5	701.2	798.2	1737.0	5426.2	7690.6
1959-1960	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3102.1	1462.3	1161.7	1243.2	1340.3	2817.8	5683.5	7752.6
1960-1961	7814.6	7790.3	7544.2	7114.2	6394.7	5204.0	3094.1	1582.8	401.3	402.0	524.5	1911.9	5901.3	7655.8
1961-1962	7786.4	7814.0	7372.5	7083.7	6348.0	5204.0	3028.3	1785.4	1379.6	1364.2	1547.3	3297.5	6238.8	7752.6
1962-1963	7814.6	7814.4	7489.8	7127.1	6394.7	5204.0	3093.2	2000.7	1595.6	1396.1	1551.6	3342.5	6434.6	7752.6
1963-1964	7814.6	7814.4	7544.2	7043.3	6394.7	5204.0	3070.6	1363.2	933.8	900.6	980.9	2086.1	5372.0	7690.6
1964-1965	7799.9	7814.4	7544.2	7127.1	6394.7	5204.0	3097.7	1481.8	1084.0	1072.6	1309.1	3010.5	6066.9	7752.6
1965-1966	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3087.8	1464.2	1086.0	1216.6	1357.2	3678.7	6324.9	7752.6
1966-1967	7814.6	7793.6	7462.7	6904.7	6261.4	5204.0	3129.6	1579.6	366.5	102.2	0.0	935.6	4841.4	7814.6
1967-1968	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3110.3	1492.8	791.3	771.4	300.5	2373.1	5713.6	7689.3
1968-1969	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3079.4	1443.2	665.0	661.5	820.6	2432.5	6241.0	7690.5
1969-1970	7757.9	7763.8	7450.0	7127.1	6394.7	5204.0	3265.1	2789.3	1651.3	1423.0	1180.8	2506.5	5949.9	7690.3
1970-1971	7797.2	7763.5	7343.0	6807.9	6228.7	5204.0	3040.9	1507.0	1047.3	923.9	1046.5	2653.1	6248.3	7744.3
1971-1972	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3052.2	1368.4	319.1	80.3	65.5	1270.8	4988.2	7807.5
1972-1973	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3288.5	2928.0	2586.2	2524.2	2064.3	3849.7	4916.7	6549.6
1973-1974	6889.7	6866.6	6229.6	5708.4	5949.2	5204.0	3165.5	1587.1	875.1	881.0	990.5	2015.3	5464.1	7661.2
1974-1975	7814.6	7814.4	7544.2	7127.1	6382.0	5204.0	3061.8	1706.1	1276.7	1163.2	1289.5	2775.7	4737.9	7460.0
1975-1976	7649.6	7814.4	7544.2	7127.1	6394.7	5204.0	3177.3	1532.2	749.2	743.7	904.6	2147.3	5141.6	7422.4
1976-1977	7671.4	7768.5	7544.2	7127.1	6277.0	5078.5	3357.9	2295.4	1496.0	1261.1	1275.2	2125.8	2832.3	3327.2
1977-1978	3421.3	3423.5	2608.0	2118.7	1422.1	1429.4	1358.9	926.1	378.1	295.1	441.5	1926.8	4947.8	6885.0
1978-1979	7325.7	7497.3	7544.2	7127.1	6394.7	5204.0	3321.0	2923.0	1941.2	1882.5	2024.4	3677.5	5661.8	7151.7
1979-1980	7240.4	7380.1	6797.8	5984.5	4673.1	3889.2	2562.1	1981.7	947.9	790.6	1113.5	4052.6	6399.0	7752.6
1980-1981	7714.6	7732.4	7454.8	6999.0	6394.7	5204.0	3215.1	1623.9	1279.0	1256.4	1416.0	3109.8	6060.9	7752.6
1981-1982	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3087.9	1510.6	896.7	846.5	971.0	2155.1	5616.0	7686.8
1982-1983	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3087.4	1542.3	1337.3	1144.4	1286.2	3002.5	5899.4	7637.7
1983-1984	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3118.2	1619.6	1344.4	1313.2	1397.6	2338.3	4663.4	6941.0
1984-1985	7502.3	7790.2	7544.2	7127.1	6394.7	5204.0	3265.1	2777.3	1484.3	1278.3	1372.7	3761.8	6294.3	7243.7
1985-1986	7342.2	7362.1	7043.5	6888.2	6366.5	5204.0	3044.4	1412.7	878.6	931.8	1053.7	2739.4	6120.3	7690.6
1986-1987	7807.6	7760.8	7415.7	7106.1	6394.7	5204.0	3265.1	2803.7	2578.5	2674.7	3017.7	5242.4	5521.8	6432.7
1987-1988	6635.2	6648.6	5922.4	4880.9	3675.5	2441.9	1062.5	301.6	44.3	91.6	735.3	2867.5	4022.2	5114.6
1988-1989	5177.5	5087.5	4113.8	3742.0	3287.1	2185.8	1239.8	404.3	82.6	83.2	478.1	2352.9	5430.4	6910.9
1989-1990	7116.7	7451.5	6915.5	6287.9	6394.7	5204.0	3174.8	1566.3	799.3	829.3	1101.1	2886.5	6208.9	7752.6
1990-1991	7814.6	7814.4	7395.7	6871.9	6394.7	5204.0	3220.0	1756.0	568.2	564.9	702.5	2214.0	5728.1	7651.9
1991-1992	7803.7	7814.4	7498.5	6658.7	5832.5	4901.8	3259.9	2900.9	2712.7	2800.5	2629.7	4868.1	4785.8	5796.4
1992-1993	5961.8	5808.2	4903.0	4312.3	3398.2	2007.1	923.5	222.2	20.9	38.2	254.1	2877.5	4193.0	5745.8
1993-1994	6069.2	6350.8	6178.7	5520.4	4395.5	3075.1	2174.7	1295.4	1009.9	1143.9	1783.2	4249.0	4466.9	5896.1
1994-1995	6107.0	6028.5	4999.1	4161.2	3127.6	2093.1	1428.7	1114.6	696.1	615.5	707.0	2366.2	5603.7	7271.1
1995-1996	7649.6	7715.6	7059.8	7127.1	6394.7	5267.9	3272.5	1686.7	699.5	752.3	913.0	2231.6	5613.2	7690.6
1996-1997	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3144.6	1576.3	686.3	669.0	829.8	1662.3	5649.9	7665.0
1997-1998	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3114.0	1594.3	1336.9	1341.8	1507.1	3876.6	6433.8	7739.1
<b>Max.</b>	7814.6	7814.4	7544.2	7127.1	6394.7	5267.9	3416.4	2928.0	2712.7	2800.5				

## Exhibit 12M - Composite Canadian Storage Contents in hm<sup>3</sup>

### From the DOP13 70-Year Continuous TSR Study

<u>Water Year</u>	<u>AU1</u>	<u>AU2</u>	<u>SEP</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>AP1</u>	<u>AP2</u>	<u>MAY</u>	<u>JUN</u>	<u>JUL</u>
1928-1929	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	8358.6	5191.9	4165.3	3914.6	2682.5	5961.4	12938.6	16585.0
1929-1930	17359.4	17737.4	16218.3	14030.8	10727.9	7387.0	3325.4	2518.0	1688.6	1954.6	3498.9	6391.0	9082.3	13810.6
1930-1931	14788.0	15363.9	14101.2	12240.6	9436.5	5559.7	2315.7	486.6	0.0	26.7	33.8	4365.2	6138.5	8166.8
1931-1932	8081.4	7702.9	6825.0	5187.5	3232.4	992.1	242.7	0.0	0.0	249.3	1247.0	5572.6	14548.5	18967.5
1932-1933	19119.2	19118.7	17160.5	15675.1	15270.9	12732.1	7575.2	3549.8	1547.0	1388.4	1715.8	4811.2	13610.7	18776.7
1933-1934	19119.2	19118.7	18457.6	17437.2	15645.3	12792.8	7928.0	4039.3	1142.3	763.6	2170.1	6325.9	11205.9	15029.2
1934-1935	15930.1	16514.8	14914.7	13360.1	13672.3	11535.0	6405.9	4691.6	2559.9	2144.0	2379.8	6289.7	14084.1	18967.5
1935-1936	19119.2	19096.0	18292.0	16534.6	13687.7	10283.3	5689.1	4035.4	3006.9	2797.2	3520.4	10774.3	17033.0	19119.2
1936-1937	19119.2	19001.3	17576.6	15531.3	11987.1	8524.7	3432.3	1310.2	197.0	122.6	240.0	3509.2	8543.0	13174.9
1937-1938	13795.9	13976.7	12368.1	11035.1	10180.3	8884.3	3823.8	2546.2	1562.2	1315.5	1642.9	6292.9	14116.9	18671.5
1938-1939	18556.5	18739.5	17659.3	16273.8	13973.3	11623.1	7969.6	6801.3	4167.8	4223.8	4613.8	10236.6	12838.5	17883.7
1939-1940	18561.4	18805.3	17089.0	15668.5	13325.7	11544.8	7874.6	6877.9	4905.2	5109.0	5941.8	11695.5	13904.0	16655.5
1940-1941	17096.4	17260.3	16311.5	15850.3	13288.5	10487.8	6935.6	6019.6	5396.2	5912.9	4229.7	8358.6	8839.6	11614.7
1941-1942	11711.6	11739.0	10991.4	12128.5	11378.9	11784.5	7988.4	5233.0	2387.9	2107.7	2365.9	6623.7	12241.1	18173.3
1942-1943	18715.5	18940.4	17511.8	15857.6	14369.6	12732.1	7294.0	5822.4	3568.6	3194.3	3784.2	6618.1	12482.8	18574.8
1943-1944	19119.2	19118.7	18311.3	17364.3	15279.5	12732.1	8358.6	5587.1	3601.6	3270.9	3324.9	6766.1	8804.1	10542.6
1944-1945	11129.8	11023.4	9115.5	8099.2	6183.8	3006.6	1891.2	537.5	34.0	0.5	2.0	4094.9	11349.0	14717.3
1945-1946	14561.7	14293.5	12696.9	11497.3	10180.5	8308.4	2955.5	1147.5	175.2	88.8	854.6	4426.9	14432.7	18967.5
1946-1947	19119.2	19118.7	18457.6	17365.5	15645.3	12732.1	7372.8	3353.6	1355.7	1365.0	1648.5	6821.1	15397.4	18967.5
1947-1948	19119.2	19081.0	18457.6	17437.2	15645.3	12732.1	7453.6	3214.3	1142.8	882.0	1282.5	4995.5	14833.0	19088.6
1948-1949	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7846.0	6857.6	4038.1	3487.9	3758.2	10000.0	15122.4	17470.9
1949-1950	18300.3	18494.8	17033.0	15606.6	14761.8	12732.1	7368.7	3283.3	1859.7	1704.5	1961.2	5104.3	12219.8	19119.2
1950-1951	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7735.9	3778.5	2193.6	2193.4	2470.1	6420.4	13762.1	18815.8
1951-1952	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7371.4	3172.3	2119.2	1959.5	2917.6	7481.7	15161.1	18967.5
1952-1953	19119.2	19060.5	17961.2	16213.1	13346.7	10380.9	5247.0	3966.4	2947.9	2328.2	2442.9	6008.1	13991.6	18482.6
1953-1954	18715.5	19118.7	18457.6	17437.2	15645.3	12732.1	7516.4	3718.8	954.7	757.0	909.9	3629.0	12074.7	18775.2
1954-1955	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7633.6	4027.6	2989.0	2900.2	2089.2	4673.0	12641.8	18789.2
1955-1956	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7675.7	3444.1	1635.3	1554.3	1813.2	5439.5	14980.3	18967.5
1956-1957	19102.8	19118.7	18457.6	17437.2	15645.3	12732.1	7420.8	3387.1	2066.6	1982.0	2275.6	5420.9	14119.3	17412.2
1957-1958	17908.6	18140.1	16722.5	15694.9	13430.4	11530.3	6294.4	2393.3	1610.4	1712.4	1968.3	5530.8	15451.3	18549.6
1958-1959	18699.1	18921.5	17868.0	17283.5	15645.3	12732.1	7743.0	3733.0	1740.8	1715.6	1952.9	4249.7	13275.7	18815.8
1959-1960	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7589.6	3577.7	2842.2	3041.6	3279.2	6894.0	13905.3	18967.5
1960-1961	19119.2	19059.7	18457.6	17405.6	15645.3	12732.1	7570.0	3872.5	981.8	983.5	1283.2	4677.7	14438.1	18730.7
1961-1962	19050.2	19117.7	18037.6	17331.0	15531.0	12732.1	7409.0	4368.2	3375.3	3337.7	3785.6	8067.7	15263.8	18967.5
1962-1963	19119.2	19118.7	18324.5	17437.2	15645.3	12732.1	7567.8	4894.9	3903.8	3415.7	3796.1	8177.8	15742.9	18967.5
1963-1964	19119.2	19118.7	18457.6	17232.1	15645.3	12732.1	7512.5	3335.2	2284.6	2203.4	2399.9	5103.9	13143.1	18815.8
1964-1965	19083.2	19118.7	18457.6	17437.2	15645.3	12732.1	7578.8	3625.4	2652.1	2624.2	3202.8	7365.5	14843.3	18967.5
1965-1966	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7554.6	3582.3	2657.0	2976.5	3320.5	9000.3	15474.5	18967.5
1966-1967	19119.2	19067.8	18258.2	16893.0	15319.1	12732.1	7656.9	3864.6	896.7	250.0	0.0	2289.0	11845.0	19119.2
1967-1968	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7609.7	3652.3	1936.0	1887.3	735.2	5806.0	13978.9	18812.6
1968-1969	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7534.1	3530.9	1627.0	1618.4	2007.7	5951.4	15269.2	18815.6
1969-1970	18980.5	18994.8	18227.2	17437.2	15645.3	12732.1	7988.4	6824.3	4040.1	3481.5	2888.9	6132.4	14557.0	18815.1
1970-1971	19076.6	18994.2	17965.4	16656.2	15239.1	12732.1	7439.9	3687.0	2562.3	2260.4	2560.4	6491.1	15287.1	18947.2
1971-1972	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7467.5	3347.9	780.7	196.5	160.3	3109.1	12204.1	19101.8
1972-1973	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	8045.6	7163.6	6327.4	6175.7	5050.5	9418.7	12029.2	16024.3
1973-1974	16856.3	16799.8	15241.3	13966.2	14555.3	12732.1	7744.7	3883.0	2141.0	2155.5	2423.4	4930.6	13368.5	18743.9
1974-1975	19119.2	19118.7	18457.6	17437.2	15614.2	12732.1	7491.0	4174.1	3123.6	2845.9	3154.9	6791.0	11591.7	18251.6
1975-1976	18715.5	19118.7	18457.6	17437.2	15645.3	12732.1	7773.6	3748.7	1833.0	1819.5	2213.2	5253.6	12579.4	18159.6
1976-1977	18768.8	19006.4	18457.6	17437.2	15357.3	12425.1	8215.4	5615.9	3660.1	3085.4	3119.9	5201.0	6929.5	8140.3
1977-1978	8370.6	8375.9	6380.7	5183.6	3479.3	3497.2	3324.7	2265.8	925.1	722.0	1080.2	4714.1	12105.3	16844.8
1978-1979	17923.1	18342.9	18457.6	17437.2	15645.3	12732.1	8125.2	7151.4	4749.3	4605.7	4952.9	8997.4	13852.2	17497.3
1979-1980	17714.4	18056.2	16631.5	14641.7	11433.2	9515.3	6268.4	4848.4	2319.1	1934.3	2724.3	9915.1	15655.8	18967.5
1980-1981	18874.5	18918.1	18238.9	17123.8	15645.3	12732.1	7866.1	3973.0	3129.2	3073.9	3464.4	7608.4	14828.6	18967.5
1981-1982	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7554.9	3695.8	2193.9	2071.0	2375.6	5272.7	13740.1	18806.5
1982-1983	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7553.6	3773.4	3271.8	2799.9	3146.8	7345.9	14433.5	18686.4
1983-1984	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7629.0	3962.5	3289.2	3212.9	3419.4	5720.9	11409.5	16981.9
1984-1985	18355.1	19059.5	18457.6	17437.2	15645.3	12732.1	7988.4	6794.9	3631.5	3127.5	3358.4	9203.6	15399.6	17722.4
1985-1986	17963.4	18012.1	17232.6	16852.7	15576.3	12732.1	7448.4	3456.3	2149.6	2279.7	2578.0	6702.2	14973.9	18815.8
1986-1987	19102.1	18987.6	18143.3	17385.8	15645.3	12732.1	7988.4	6859.5	6308.6	6543.9	7383.1	12826.1	13509.6	15738.2
1987-1988	16233.7	16266.5	14489.7	11941.6	8992.5	5974.4	2599.5	737.9	108.4	224.1	1799.0	7015.6	9840.7	12513.4
1988-1989	12667.3	12447.1	10064.8	9155.2	8042.2	5347.8	3033.3	989.2	202.1	203.6	1169.7	5756.6	13286.0	16908.2
1989-1990	17411.7	18230.8	16919.5	15384.0	15645.3	12732.1	7767.5	3832.1	1955.6	2029.0	2694.0	7062.1	15190.7	18967.5
1990-1991	19119.2	19118.7	18094.3	16812.8	15645.3	12732.1	7878.1	4296.2	1390.2	1382.1	1718.7	5416.8	14014.4	18721.1
1991-1992	19092.5	19118.7	18345.8	16291.2	14269.8	11992.7	7975.7	7097.3	6636.9	6851.7	6433.8	11910.3	11708.9	14181.5
1992-1993	14586.1	14210.3	11995.7	10550.5	8314.0	4910.6	2259.4	543.6	51.1	93.5	621.7	7040.1	10258.6	14057.7
1993-1994	14848.9	15537.9	15116.8	13506.2	10754.0	7523.5	5320.6	3169.3	2470.8	2798.7	4362.8	10395.6	10928.7	14425.4
1994-1995	14941.4	14749.3	12230.8	10180.8	7652.0	5121.0	3495.5	2727.0	1703.1	1505.9	1729.7	5789.1	13710.0	17789.5
1995-1996	18715.5													

## Exhibit 13 – Duncan Reservoir Capacity Table, dated 21 Feb. 1973

### English Units - ksf

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1902.9	804.2										
1902	796.1	796.9	797.7	798.5	799.3	800.1	800.9	801.8	802.6	803.4	0.81
1901	787.0	787.9	788.8	789.7	790.6	791.5	792.4	793.3	794.3	795.2	0.91
1900	777.9	778.8	779.7	780.6	781.5	782.4	783.3	784.2	785.1	786.1	0.91
1899	768.8	769.7	770.6	771.5	772.4	773.3	774.2	775.1	776.0	777.0	0.91
1898	759.7	760.6	761.5	762.4	763.4	764.3	765.2	766.1	767.0	767.9	0.91
1897	750.7	751.6	752.5	753.4	754.3	755.2	756.1	757.0	757.9	758.8	0.90
1896	741.7	742.6	743.5	744.4	745.3	746.2	747.1	748.0	748.9	749.8	0.90
1895	732.7	733.6	734.5	735.4	736.3	737.2	738.1	739.0	739.9	740.8	0.90
1894	723.7	724.6	725.5	726.4	727.3	728.2	729.1	730.0	730.9	731.8	0.90
1893	714.8	715.7	716.6	717.5	718.4	719.3	720.1	721.0	721.9	722.8	0.89
1892	705.8	706.7	707.6	708.5	709.4	710.3	711.2	712.1	713.0	713.9	0.90
1891	696.9	697.8	698.7	699.6	700.5	701.3	702.2	703.1	704.0	704.9	0.89
1890	688.0	688.9	689.8	690.7	691.6	692.4	693.3	694.2	695.1	696.0	0.89
1889	679.2	680.1	681.0	681.8	682.7	683.6	684.5	685.4	686.2	687.1	0.88
1888	670.4	671.3	672.2	673.0	673.9	674.8	675.7	676.6	677.4	678.3	0.88
1887	661.5	662.4	663.3	664.2	665.1	665.9	666.8	667.7	668.6	669.5	0.89
1886	652.8	653.7	654.5	655.4	656.3	657.1	658.0	658.9	659.8	660.6	0.87
1885	644.0	644.9	645.8	646.6	647.5	648.4	649.3	650.2	651.0	651.9	0.88
1884	635.3	636.2	637.0	637.9	638.8	639.6	640.5	641.4	642.3	643.1	0.87
1883	626.6	627.5	628.3	629.2	630.1	630.9	631.8	632.7	633.6	634.4	0.87
1882	617.9	618.8	619.6	620.5	621.4	622.2	623.1	624.0	624.9	625.7	0.87
1881	609.2	610.1	610.9	611.8	612.7	613.5	614.4	615.3	616.2	617.0	0.87
1880	600.6	601.5	602.3	603.2	604.0	604.9	605.8	606.6	607.5	608.3	0.86
1879	592.0	592.9	593.7	594.6	595.4	596.3	597.2	598.0	598.9	599.7	0.86
1878	583.4	584.3	585.1	586.0	586.8	587.7	588.6	589.4	590.3	591.1	0.86
1877	574.8	575.7	576.5	577.4	578.2	579.1	580.0	580.8	581.7	582.5	0.86
1876	566.3	567.1	568.0	568.8	569.7	570.5	571.4	572.2	573.1	573.9	0.85
1875	557.8	558.6	559.5	560.3	561.2	562.0	562.9	563.7	564.6	565.4	0.85
1874	549.3	550.1	551.0	551.8	552.7	553.5	554.4	555.2	556.1	556.9	0.85
1873	540.9	541.7	542.6	543.4	544.3	545.1	545.9	546.8	547.6	548.5	0.84
1872	532.4	533.2	534.1	534.9	535.8	536.6	537.5	538.3	539.2	540.0	0.85
1871	524.0	524.8	525.7	526.5	527.4	528.2	529.0	529.9	530.7	531.6	0.84
1870	515.7	516.5	517.4	518.2	519.0	519.8	520.7	521.5	522.3	523.2	0.83
1869	507.3	508.1	509.0	509.8	510.7	511.5	512.3	513.2	514.0	514.9	0.84
1868	499.0	499.8	500.7	501.5	502.3	503.1	504.0	504.8	505.6	506.5	0.83
1867	490.7	491.5	492.4	493.2	494.0	494.8	495.7	496.5	497.3	498.2	0.83
1866	482.4	483.2	484.1	484.9	485.7	486.5	487.4	488.2	489.0	489.9	0.83
1865	474.2	475.0	475.8	476.7	477.5	478.3	479.1	479.9	480.8	481.6	0.82
1864	466.0	466.8	467.6	468.5	469.3	470.1	470.9	471.7	472.6	473.4	0.82
1863	457.8	458.6	459.4	460.3	461.1	461.9	462.7	463.5	464.4	465.2	0.82
1862	449.7	450.5	451.3	452.1	452.9	453.7	454.6	455.4	456.2	457.0	0.81
1861	441.6	442.4	443.2	444.0	444.8	445.6	446.5	447.3	448.1	448.9	0.81
1860	433.5	434.3	435.1	435.9	436.7	437.5	438.4	439.2	440.0	440.8	0.81
1859	425.4	426.2	427.0	427.8	428.6	429.4	430.3	431.1	431.9	432.7	0.81
1858	417.4	418.2	419.0	419.8	420.6	421.4	422.2	423.0	423.8	424.6	0.80
1857	409.4	410.2	411.0	411.8	412.6	413.4	414.2	415.0	415.8	416.6	0.80
1856	401.4	402.2	403.0	403.8	404.6	405.4	406.2	407.0	407.8	408.6	0.80
1855	393.5	394.3	395.1	395.9	396.7	397.4	398.2	399.0	399.8	400.6	0.79



**Exhibit 13 – Duncan Reservoir Capacity Table, dated 21 Feb. 1973****English Units – ksf**

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1854	385.6	386.4	387.2	388.0	388.8	389.5	390.3	391.1	391.9	392.7	0.79
1853	377.7	378.5	379.3	380.1	380.9	381.6	382.4	383.2	384.0	384.8	0.79
1852	369.9	370.7	371.5	372.2	373.0	373.8	374.6	375.4	376.1	376.9	0.78
1851	362.1	362.9	363.7	364.4	365.2	366.0	366.8	367.6	368.3	369.1	0.78
1850	354.3	355.1	355.9	356.6	357.4	358.2	359.0	359.8	360.5	361.3	0.78
1849	346.6	347.4	348.1	348.9	349.7	350.4	351.2	352.0	352.8	353.5	0.77
1848	338.9	339.7	340.4	341.2	342.0	342.7	343.5	344.3	345.1	345.8	0.77
1847	331.2	332.0	332.7	333.5	334.3	335.0	335.8	336.6	337.4	338.1	0.77
1846	323.6	324.4	325.1	325.9	326.6	327.4	328.2	328.9	329.7	330.4	0.76
1845	316.0	316.8	317.5	318.3	319.0	319.8	320.6	321.3	322.1	322.8	0.76
1844	308.5	309.2	310.0	310.7	311.5	312.2	313.0	313.7	314.5	315.2	0.75
1843	300.9	301.7	302.4	303.2	303.9	304.7	305.5	306.2	307.0	307.7	0.76
1842	293.5	294.2	295.0	295.7	296.5	297.2	297.9	298.7	299.4	300.2	0.74
1841	286.0	286.7	287.5	288.2	289.0	289.7	290.5	291.2	292.0	292.7	0.75
1840	278.6	279.3	280.1	280.8	281.6	282.3	283.0	283.8	284.5	285.3	0.74
1839	271.2	271.9	272.7	273.4	274.2	274.9	275.6	276.4	277.1	277.9	0.74
1838	263.9	264.6	265.4	266.1	266.8	267.5	268.3	269.0	269.7	270.5	0.73
1837	256.6	257.3	258.1	258.8	259.5	260.2	261.0	261.7	262.4	263.2	0.73
1836	249.4	250.1	250.8	251.6	252.3	253.0	253.7	254.4	255.2	255.9	0.72
1835	242.2	242.9	243.6	244.4	245.1	245.8	246.5	247.2	248.0	248.7	0.72
1834	235.0	235.7	236.4	237.2	237.9	238.6	239.3	240.0	240.8	241.5	0.72
1833	227.9	228.6	229.3	230.0	230.7	231.4	232.2	232.9	233.6	234.3	0.71
1832	220.8	221.5	222.2	222.9	223.6	224.3	225.1	225.8	226.5	227.2	0.71
1831	213.8	214.5	215.2	215.9	216.6	217.3	218.0	218.7	219.4	220.1	0.70
1830	206.8	207.5	208.2	208.9	209.6	210.3	211.0	211.7	212.4	213.1	0.70
1829	199.9	200.6	201.3	202.0	202.7	203.3	204.0	204.7	205.4	206.1	0.69
1828	193.0	193.7	194.4	195.1	195.8	196.4	197.1	197.8	198.5	199.2	0.69
1827	186.1	186.8	187.5	188.2	188.9	189.5	190.2	190.9	191.6	192.3	0.69
1826	179.3	180.0	180.7	181.3	182.0	182.7	183.4	184.1	184.7	185.4	0.68
1825	172.6	173.3	173.9	174.6	175.3	175.9	176.6	177.3	178.0	178.6	0.67
1824	165.9	166.6	167.2	167.9	168.6	169.2	169.9	170.6	171.3	171.9	0.67
1823	159.2	159.9	160.5	161.2	161.9	162.5	163.2	163.9	164.6	165.2	0.67
1822	152.6	153.3	153.9	154.6	155.2	155.9	156.6	157.2	157.9	158.5	0.66
1821	146.1	146.7	147.4	148.0	148.7	149.3	150.0	150.6	151.3	151.9	0.65
1820	139.6	140.2	140.9	141.5	142.2	142.8	143.5	144.1	144.8	145.4	0.65
1819	133.2	133.8	134.5	135.1	135.8	136.4	137.0	137.7	138.3	139.0	0.64
1818	126.8	127.4	128.1	128.7	129.4	130.0	130.6	131.3	131.9	132.6	0.64
1817	120.5	121.1	121.8	122.4	123.0	123.6	124.3	124.9	125.5	126.2	0.63
1816	114.3	114.9	115.5	116.2	116.8	117.4	118.0	118.6	119.3	119.9	0.62
1815	108.1	108.7	109.3	110.0	110.6	111.2	111.8	112.4	113.1	113.7	0.62

**Exhibit 13 – Duncan Reservoir Capacity Table, dated 21 Feb. 1973****English Units – ksfd**

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1814	102.0	102.6	103.2	103.8	104.4	105.0	105.7	106.3	106.9	107.5	0.61
1813	96.0	96.6	97.2	97.8	98.4	99.0	99.6	100.2	100.8	101.4	0.60
1812	90.0	90.6	91.2	91.8	92.4	93.0	93.6	94.2	94.8	95.4	0.60
1811	84.1	84.7	85.3	85.9	86.5	87.0	87.6	88.2	88.8	89.4	0.59
1810	78.3	78.9	79.5	80.0	80.6	81.2	81.8	82.4	82.9	83.5	0.58
1809	72.5	73.1	73.7	74.2	74.8	75.4	76.0	76.6	77.1	77.7	0.58
1808	66.9	67.5	68.0	68.6	69.1	69.7	70.3	70.8	71.4	71.9	0.56
1807	61.3	61.9	62.4	63.0	63.5	64.1	64.7	65.2	65.8	66.3	0.56
1806	55.8	56.3	56.9	57.4	58.0	58.5	59.1	59.6	60.2	60.7	0.55
1805	50.4	50.9	51.5	52.0	52.6	53.1	53.6	54.2	54.7	55.3	0.54
1804	45.1	45.6	46.2	46.7	47.2	47.7	48.3	48.8	49.3	49.9	0.53
1803	39.9	40.4	40.9	41.5	42.0	42.5	43.0	43.5	44.1	44.6	0.52
1802	34.8	35.3	35.8	36.3	36.8	37.3	37.9	38.4	38.9	39.4	0.51
1801	29.8	30.3	30.8	31.3	31.8	32.3	32.8	33.3	33.8	34.3	0.50
1800	25.0	25.5	26.0	26.4	26.9	27.4	27.9	28.4	28.8	29.3	0.48
1799	20.3	20.8	21.2	21.7	22.2	22.6	23.1	23.6	24.1	24.5	0.47
1798	15.7	16.2	16.6	17.1	17.5	18.0	18.5	18.9	19.4	19.8	0.46
1797	11.3	11.7	12.2	12.6	13.1	13.5	13.9	14.4	14.8	15.3	0.44
1796	7.1	7.5	7.9	8.4	8.8	9.2	9.6	10.0	10.5	10.9	0.42
1795	3.0	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3	6.7	0.41
1794			0.0	0.4	0.8	1.1	1.5	1.9	2.3	2.6	0.37

## Exhibit 13M – Duncan Reservoir Capacity Table, dated 21 Feb. 1973

### SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
580.00	1967.5										
579.73	1947.7	1949.7	1951.7	1953.7	1955.6	1957.6	1959.6	1961.6	1963.6	1965.6	1.98
579.42	1925.4	1927.6	1929.8	1932.1	1934.3	1936.5	1938.8	1941.0	1943.2	1945.5	2.23
579.12	1903.1	1905.3	1907.6	1909.8	1912.0	1914.3	1916.5	1918.7	1920.9	1923.2	2.23
578.81	1880.9	1883.1	1885.4	1887.6	1889.8	1892.0	1894.2	1896.5	1898.7	1900.9	2.22
578.51	1858.8	1861.0	1863.2	1865.4	1867.6	1869.8	1872.0	1874.3	1876.5	1878.7	2.22
578.21	1836.7	1838.9	1841.1	1843.3	1845.5	1847.7	1849.9	1852.1	1854.3	1856.5	2.21
577.90	1814.6	1816.8	1819.0	1821.2	1823.4	1825.6	1827.8	1830.0	1832.2	1834.4	2.20
577.60	1792.6	1794.8	1797.0	1799.2	1801.4	1803.6	1805.8	1808.0	1810.2	1812.4	2.20
577.29	1770.7	1772.9	1775.1	1777.2	1779.4	1781.6	1783.8	1786.0	1788.2	1790.4	2.19
576.99	1748.8	1751.0	1753.2	1755.3	1757.5	1759.7	1761.9	1764.1	1766.3	1768.5	2.19
576.68	1726.8	1729.0	1731.2	1733.4	1735.6	1737.8	1740.0	1742.2	1744.4	1746.6	2.20
576.38	1705.0	1707.2	1709.4	1711.6	1713.8	1715.8	1718.0	1720.2	1722.4	1724.6	2.18
576.07	1683.3	1685.5	1687.7	1689.9	1692.1	1694.0	1696.2	1698.4	1700.6	1702.8	2.18
575.77	1661.7	1663.9	1666.1	1668.1	1670.3	1672.5	1674.7	1676.9	1678.9	1681.1	2.15
575.46	1640.2	1642.4	1644.6	1646.6	1648.8	1651.0	1653.2	1655.4	1657.3	1659.5	2.15
575.16	1618.4	1620.6	1622.8	1625.0	1627.2	1629.2	1631.4	1633.6	1635.8	1638.0	2.18
574.85	1597.1	1599.3	1601.3	1603.5	1605.7	1607.7	1609.9	1612.1	1614.3	1616.2	2.13
574.55	1575.6	1577.8	1580.0	1582.0	1584.2	1586.4	1588.6	1590.8	1592.7	1594.9	2.15
574.24	1554.3	1556.5	1558.5	1560.7	1562.9	1564.8	1567.0	1569.2	1571.5	1573.4	2.13
573.94	1533.0	1535.2	1537.2	1539.4	1541.6	1543.6	1545.8	1548.0	1550.2	1552.1	2.13
573.63	1511.8	1514.0	1515.9	1518.1	1520.3	1522.3	1524.5	1526.7	1528.9	1530.8	2.13
573.33	1490.5	1492.7	1494.6	1496.8	1499.0	1501.0	1503.2	1505.4	1507.6	1509.6	2.13
573.02	1469.4	1471.6	1473.6	1475.8	1477.7	1479.9	1482.2	1484.1	1486.3	1488.3	2.10
572.72	1448.4	1450.6	1452.5	1454.7	1456.7	1458.9	1461.1	1463.1	1465.3	1467.2	2.10
572.41	1427.3	1429.5	1431.5	1433.7	1435.7	1437.9	1440.1	1442.0	1444.2	1446.2	2.10
572.11	1406.3	1408.5	1410.5	1412.7	1414.6	1416.8	1419.0	1421.0	1423.2	1425.1	2.10
571.80	1385.5	1387.5	1389.7	1391.6	1393.8	1395.8	1398.0	1399.9	1402.1	1404.1	2.08
571.50	1364.7	1366.7	1368.9	1370.8	1373.0	1375.0	1377.2	1379.1	1381.4	1383.3	2.08
571.19	1343.9	1345.9	1348.1	1350.0	1352.2	1354.2	1356.4	1358.4	1360.6	1362.5	2.08
570.89	1323.4	1325.3	1327.5	1329.5	1331.7	1333.6	1335.6	1337.8	1339.8	1342.0	2.06
570.59	1302.6	1304.5	1306.7	1308.7	1310.9	1312.8	1315.0	1317.0	1319.2	1321.2	2.08
570.28	1282.0	1284.0	1286.2	1288.1	1290.3	1292.3	1294.3	1296.5	1298.4	1300.6	2.06
569.98	1261.7	1263.7	1265.9	1267.8	1269.8	1271.7	1273.9	1275.9	1277.9	1280.1	2.03
569.67	1241.2	1243.1	1245.3	1247.3	1249.5	1251.4	1253.4	1255.6	1257.6	1259.8	2.06
569.37	1220.9	1222.8	1225.0	1227.0	1228.9	1230.9	1233.1	1235.0	1237.0	1239.2	2.03
569.06	1200.5	1202.5	1204.7	1206.7	1208.6	1210.6	1212.8	1214.7	1216.7	1218.9	2.03
568.76	1180.2	1182.2	1184.4	1186.4	1188.3	1190.3	1192.5	1194.4	1196.4	1198.6	2.03
568.45	1160.2	1162.1	1164.1	1166.3	1168.3	1170.2	1172.2	1174.1	1176.3	1178.3	2.01
568.15	1140.1	1142.1	1144.0	1146.2	1148.2	1150.1	1152.1	1154.1	1156.3	1158.2	2.01
567.84	1120.1	1122.0	1124.0	1126.2	1128.1	1130.1	1132.0	1134.0	1136.2	1138.2	2.01
567.54	1100.2	1102.2	1104.2	1106.1	1108.1	1110.0	1112.2	1114.2	1116.1	1118.1	1.98
567.23	1080.4	1082.4	1084.3	1086.3	1088.2	1090.2	1092.4	1094.4	1096.3	1098.3	1.98
566.93	1060.6	1062.6	1064.5	1066.5	1068.4	1070.4	1072.6	1074.5	1076.5	1078.5	1.98
566.62	1040.8	1042.7	1044.7	1046.7	1048.6	1050.6	1052.8	1054.7	1056.7	1058.6	1.98
566.32	1021.2	1023.2	1025.1	1027.1	1029.0	1031.0	1033.0	1034.9	1036.9	1038.8	1.96
566.01	1001.6	1003.6	1005.6	1007.5	1009.5	1011.4	1013.4	1015.3	1017.3	1019.3	1.96
565.71	982.1	984.0	986.0	987.9	989.9	991.9	993.8	995.8	997.7	999.7	1.96
565.40	962.7	964.7	966.7	968.6	970.6	972.3	974.2	976.2	978.2	980.1	1.93

## Exhibit 13M – Duncan Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
565.10	943.4	945.4	947.3	949.3	951.2	953.0	954.9	956.9	958.8	960.8	1.93
564.79	924.1	926.0	928.0	930.0	931.9	933.6	935.6	937.5	939.5	941.5	1.93
564.49	905.0	907.0	908.9	910.6	912.6	914.5	916.5	918.5	920.2	922.1	1.91
564.18	885.9	887.9	889.8	891.5	893.5	895.5	897.4	899.4	901.1	903.0	1.91
563.88	866.8	868.8	870.7	872.5	874.4	876.4	878.3	880.3	882.0	884.0	1.91
563.57	848.0	849.9	851.7	853.6	855.6	857.3	859.2	861.2	863.2	864.9	1.88
563.27	829.2	831.1	832.8	834.8	836.7	838.4	840.4	842.4	844.3	846.0	1.88
562.97	810.3	812.3	814.0	815.9	817.9	819.6	821.6	823.5	825.5	827.2	1.88
562.66	791.7	793.7	795.4	797.3	799.1	801.0	803.0	804.7	806.6	808.4	1.86
562.36	773.1	775.1	776.8	778.8	780.5	782.4	784.4	786.1	788.0	789.8	1.86
562.05	754.8	756.5	758.4	760.2	762.1	763.8	765.8	767.5	769.5	771.2	1.83
561.75	736.2	738.1	739.9	741.8	743.5	745.5	747.4	749.1	751.1	752.8	1.86
561.44	718.1	719.8	721.7	723.5	725.4	727.1	728.8	730.8	732.5	734.5	1.81
561.14	699.7	701.4	703.4	705.1	707.1	708.8	710.7	712.4	714.4	716.1	1.83
560.83	681.6	683.3	685.3	687.0	689.0	690.7	692.4	694.3	696.1	698.0	1.81
560.53	663.5	665.2	667.2	668.9	670.9	672.6	674.3	676.2	678.0	679.9	1.81
560.22	645.7	647.4	649.3	651.0	652.8	654.5	656.4	658.1	659.8	661.8	1.79
559.92	627.8	629.5	631.5	633.2	634.9	636.6	638.6	640.3	642.0	643.9	1.79
559.61	610.2	611.9	613.6	615.6	617.3	619.0	620.7	622.4	624.4	626.1	1.76
559.31	592.6	594.3	596.0	597.9	599.7	601.4	603.1	604.8	606.8	608.5	1.76
559.00	575.0	576.7	578.4	580.3	582.0	583.8	585.5	587.2	589.1	590.9	1.76
558.70	557.6	559.3	561.0	562.7	564.4	566.1	568.1	569.8	571.5	573.2	1.74
558.39	540.2	541.9	543.6	545.3	547.1	548.8	550.7	552.4	554.2	555.9	1.74
558.09	523.1	524.8	526.5	528.2	529.9	531.6	533.4	535.1	536.8	538.5	1.71
557.78	506.0	507.7	509.4	511.1	512.8	514.5	516.2	517.9	519.7	521.4	1.71
557.48	489.1	490.8	492.5	494.2	495.9	497.4	499.1	500.8	502.5	504.2	1.69
557.17	472.2	473.9	475.6	477.3	479.0	480.5	482.2	483.9	485.7	487.4	1.69
556.87	455.3	457.0	458.7	460.5	462.2	463.6	465.3	467.1	468.8	470.5	1.69
556.56	438.7	440.4	442.1	443.6	445.3	447.0	448.7	450.4	451.9	453.6	1.66
556.26	422.3	424.0	425.5	427.2	428.9	430.4	432.1	433.8	435.5	437.0	1.64
555.95	405.9	407.6	409.1	410.8	412.5	414.0	415.7	417.4	419.1	420.6	1.64
555.65	389.5	391.2	392.7	394.4	396.1	397.6	399.3	401.0	402.7	404.2	1.64
555.35	373.4	375.1	376.5	378.2	379.7	381.4	383.1	384.6	386.3	387.8	1.61
555.04	357.4	358.9	360.6	362.1	363.8	365.3	367.0	368.5	370.2	371.6	1.59
554.74	341.5	343.0	344.7	346.2	347.9	349.4	351.1	352.6	354.3	355.7	1.59
554.43	325.9	327.4	329.1	330.5	332.2	333.7	335.2	336.9	338.4	340.1	1.57
554.13	310.2	311.7	313.4	314.9	316.6	318.1	319.5	321.2	322.7	324.4	1.57
553.82	294.8	296.3	298.0	299.5	300.9	302.4	304.1	305.6	307.0	308.8	1.54
553.52	279.6	281.1	282.6	284.3	285.8	287.2	288.7	290.2	291.9	293.3	1.52
553.21	264.5	265.9	267.4	269.1	270.6	272.1	273.5	275.0	276.7	278.2	1.52

## Exhibit 13M – Duncan Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
552.91	249.6	251.0	252.5	254.0	255.4	256.9	258.6	260.1	261.5	263.0	1.49
552.60	234.9	236.3	237.8	239.3	240.7	242.2	243.7	245.1	246.6	248.1	1.47
552.30	220.2	221.7	223.1	224.6	226.1	227.5	229.0	230.5	231.9	233.4	1.47
551.99	205.8	207.2	208.7	210.2	211.6	212.9	214.3	215.8	217.3	218.7	1.44
551.69	191.6	193.0	194.5	195.7	197.2	198.7	200.1	201.6	202.8	204.3	1.42
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
551.38	177.4	178.8	180.3	181.5	183.0	184.5	185.9	187.4	188.6	190.1	1.42
551.08	163.7	165.1	166.4	167.8	169.1	170.5	172.0	173.2	174.7	175.9	1.37
550.77	150.0	151.4	152.7	154.1	155.4	156.8	158.3	159.5	161.0	162.2	1.37
550.47	136.5	137.7	139.2	140.4	141.9	143.1	144.6	145.8	147.3	148.5	1.35
550.16	123.3	124.5	126.0	127.2	128.7	129.9	131.1	132.6	133.8	135.3	1.32
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
549.86	110.3	111.6	113.0	114.3	115.5	116.7	118.2	119.4	120.6	122.1	1.30
549.55	97.6	98.8	100.1	101.5	102.8	104.0	105.2	106.4	107.9	109.1	1.27
549.25	85.1	86.4	87.6	88.8	90.0	91.3	92.7	93.9	95.2	96.4	1.25
548.94	72.9	74.1	75.4	76.6	77.8	79.0	80.2	81.5	82.7	83.9	1.22
548.64	61.2	62.4	63.6	64.6	65.8	67.0	68.3	69.5	70.5	71.7	1.17
548.33	49.7	50.9	51.9	53.1	54.3	55.3	56.5	57.7	59.0	59.9	1.15
548.03	38.4	39.6	40.6	41.8	42.8	44.0	45.3	46.2	47.5	48.4	1.13
547.73	27.6	28.6	29.8	30.8	32.1	33.0	34.0	35.2	36.2	37.4	1.08
547.42	17.4	18.3	19.3	20.6	21.5	22.5	23.5	24.5	25.7	26.7	1.03
547.12	7.3	8.3	9.3	10.3	11.3	12.2	13.5	14.4	15.4	16.4	1.00
546.81			0.0	1.0	2.0	2.7	3.7	4.6	5.6	6.4	0.91

## Exhibit 14 – Arrow Reservoir Capacity Table, dated 28 Feb. 1974

### English Units – ksf

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1446.9	3768.2										
1446	3711.6	3717.3	3722.9	3728.6	3734.3	3739.9	3745.6	3751.2	3756.9	3762.5	5.65
1445	3645.4	3652.1	3658.7	3665.3	3671.9	3678.5	3685.2	3691.8	3698.4	3705.0	6.62
1444	3579.6	3586.2	3592.8	3599.4	3605.9	3612.5	3619.1	3625.7	3632.3	3638.9	6.58
1443	3514.1	3520.6	3527.2	3533.7	3540.3	3546.8	3553.4	3559.9	3566.5	3573.0	6.55
1442	3448.9	3455.4	3461.9	3468.5	3475.0	3481.5	3488.0	3494.5	3501.1	3507.6	6.52
1441	3384.0	3390.5	3397.0	3403.5	3410.0	3416.4	3422.9	3429.4	3435.9	3442.4	6.49
1440	3319.5	3325.9	3332.4	3338.8	3345.3	3351.7	3358.2	3364.6	3371.1	3377.5	6.45
1439	3255.2	3261.6	3268.1	3274.5	3280.9	3287.3	3293.8	3300.2	3306.6	3313.1	6.43
1438	3191.4	3197.8	3204.2	3210.5	3216.9	3223.3	3229.7	3236.1	3242.4	3248.8	6.38
1437	3127.8	3134.2	3140.5	3146.9	3153.2	3159.6	3166.0	3172.3	3178.7	3185.0	6.36
1436	3064.6	3070.9	3077.2	3083.6	3089.9	3096.2	3102.5	3108.8	3115.2	3121.5	6.32
1435	3001.7	3008.0	3014.3	3020.6	3026.9	3033.1	3039.4	3045.7	3052.0	3058.3	6.29
1434	2939.2	2945.4	2951.7	2957.9	2964.2	2970.4	2976.7	2982.9	2989.2	2995.4	6.25
1433	2877.0	2883.2	2889.4	2895.7	2901.9	2908.1	2914.3	2920.5	2926.8	2933.0	6.22
1432	2815.1	2821.3	2827.5	2833.7	2839.9	2846.0	2852.2	2858.4	2864.6	2870.8	6.19
1431	2753.5	2759.7	2765.8	2772.0	2778.1	2784.3	2790.5	2796.6	2802.8	2808.9	6.16
1430	2692.3	2698.4	2704.5	2710.7	2716.8	2722.9	2729.0	2735.1	2741.3	2747.4	6.12
1429	2631.5	2637.6	2643.7	2649.7	2655.8	2661.9	2668.0	2674.1	2680.1	2686.2	6.08
1428	2570.9	2577.0	2583.0	2589.1	2595.1	2601.2	2607.3	2613.3	2619.4	2625.4	6.06
1427	2510.7	2516.7	2522.7	2528.8	2534.8	2540.8	2546.8	2552.8	2558.9	2564.9	6.02
1426	2450.8	2456.8	2462.8	2468.8	2474.8	2480.7	2486.7	2492.7	2498.7	2504.7	5.99
1425	2391.2	2397.2	2403.1	2409.1	2415.0	2421.0	2427.0	2432.9	2438.9	2444.8	5.96
1424	2331.9	2337.8	2343.8	2349.7	2355.6	2361.5	2367.5	2373.4	2379.3	2385.3	5.93
1423	2272.8	2278.7	2284.6	2290.5	2296.4	2302.3	2308.3	2314.2	2320.1	2326.0	5.91
1422	2214.1	2220.0	2225.8	2231.7	2237.6	2243.4	2249.3	2255.2	2261.1	2266.9	5.87
1421	2155.7	2161.5	2167.4	2173.2	2179.1	2184.9	2190.7	2196.6	2202.4	2208.3	5.84
1420	2097.7	2103.5	2109.3	2115.1	2120.9	2126.7	2132.5	2138.3	2144.1	2149.9	5.8
1419	2040.1	2045.9	2051.6	2057.4	2063.1	2068.9	2074.7	2080.4	2086.2	2091.9	5.76
1418	1982.9	1988.6	1994.3	2000.1	2005.8	2011.5	2017.2	2022.9	2028.7	2034.4	5.72
1417	1926.1	1931.8	1937.5	1943.1	1948.8	1954.5	1960.2	1965.9	1971.5	1977.2	5.68
1416	1869.6	1875.2	1880.9	1886.5	1892.2	1897.8	1903.5	1909.1	1914.8	1920.4	5.65
1415	1813.5	1819.1	1824.7	1830.3	1835.9	1841.5	1847.2	1852.8	1858.4	1864.0	5.61
1414	1757.8	1763.4	1768.9	1774.5	1780.1	1785.6	1791.2	1796.8	1802.4	1807.9	5.57
1413	1702.4	1707.9	1713.5	1719.0	1724.6	1730.1	1735.6	1741.2	1746.7	1752.3	5.54
1412	1647.4	1652.9	1658.4	1663.9	1669.4	1674.9	1680.4	1685.9	1691.4	1696.9	5.5
1411	1592.7	1598.2	1603.6	1609.1	1614.6	1620.0	1625.5	1631.0	1636.5	1641.9	5.47
1410	1538.4	1543.8	1549.3	1554.7	1560.1	1565.5	1571.0	1576.4	1581.8	1587.3	5.43
1409	1484.5	1489.9	1495.3	1500.7	1506.1	1511.4	1516.8	1522.2	1527.6	1533.0	5.39
1408	1430.9	1436.3	1441.6	1447.0	1452.3	1457.7	1463.1	1468.4	1473.8	1479.1	5.36
1407	1377.7	1383.0	1388.3	1393.7	1399.0	1404.3	1409.6	1414.9	1420.3	1425.6	5.32
1406	1324.7	1330.0	1335.3	1340.6	1345.9	1351.2	1356.5	1361.8	1367.1	1372.4	5.3
1405	1272.1	1277.4	1282.6	1287.9	1293.1	1298.4	1303.7	1308.9	1314.2	1319.4	5.26

## Exhibit 14 – Arrow Reservoir Capacity Table (English) Continued

English Units – ksfd

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
1404	1219.5	1224.8	1230.0	1235.3	1240.5	1245.8	1251.1	1256.3	1261.6	1266.8	5.26
1403	1167.3	1172.5	1177.7	1183.0	1188.2	1193.4	1198.6	1203.8	1209.1	1214.3	5.22
1402	1115.4	1120.6	1125.8	1131.0	1136.2	1141.3	1146.5	1151.7	1156.9	1162.1	5.19
1401	1063.9	1069.0	1074.2	1079.3	1084.5	1089.6	1094.8	1099.9	1105.1	1110.2	5.15
1400	1012.8	1017.9	1023.0	1028.1	1033.2	1038.3	1043.5	1048.6	1053.7	1058.8	5.11
1399	962.5	967.5	972.6	977.6	982.6	987.6	992.7	997.7	1002.7	1007.8	5.03
1398	912.7	917.7	922.7	927.6	932.6	937.6	942.6	947.6	952.5	957.5	4.98
1397	863.2	868.1	873.1	878.0	883.0	887.9	892.9	897.8	902.8	907.7	4.95
1396	814.1	819.0	823.9	828.8	833.7	838.6	843.6	848.5	853.4	858.3	4.91
1395	765.2	770.1	775.0	779.9	784.8	789.6	794.5	799.4	804.3	809.2	4.89
1394	716.2	721.1	726.0	730.9	735.8	740.7	745.6	750.5	755.4	760.3	4.9
1393	667.5	672.4	677.2	682.1	687.0	691.8	696.7	701.6	706.5	711.3	4.87
1392	619.3	624.1	628.9	633.8	638.6	643.4	648.2	653.0	657.9	662.7	4.82
1391	571.5	576.3	581.1	585.8	590.6	595.4	600.2	605.0	609.7	614.5	4.78
1390	524.2	528.9	533.7	538.4	543.1	547.8	552.6	557.3	562.0	566.8	4.73
1389	477.9	482.5	487.2	491.8	496.4	501.0	505.7	510.3	514.9	519.6	4.63
1388	432.3	436.9	441.4	446.0	450.5	455.1	459.7	464.2	468.8	473.3	4.56
1387	387.2	391.7	396.2	400.7	405.2	409.7	414.3	418.8	423.3	427.8	4.51
1386	342.6	347.1	351.5	356.0	360.4	364.9	369.4	373.8	378.3	382.7	4.46
1385	298.5	302.9	307.3	311.7	316.1	320.5	325.0	329.4	333.8	338.2	4.41
1384	254.6	259.0	263.4	267.8	272.2	276.5	280.9	285.3	289.7	294.1	4.39
1383	211.2	215.5	219.9	224.2	228.6	232.9	237.2	241.6	245.9	250.3	4.34
1382	168.4	172.7	177.0	181.2	185.5	189.8	194.1	198.4	202.6	206.9	4.28
1381	126.1	130.3	134.6	138.8	143.0	147.2	151.5	155.7	159.9	164.2	4.23
1380	84.3	88.5	92.7	96.8	101.0	105.2	109.4	113.6	117.7	121.9	4.18
1379	43.2	47.3	51.4	55.5	59.6	63.7	67.9	72.0	76.1	80.2	4.11
1378	2.7	6.7	10.8	14.8	18.9	22.9	27.0	31.0	35.1	39.1	4.05
1377										0.0	2.7

# Exhibit 14M – Arrow Reservoir Capacity Table, dated 28 Feb. 1974

SI Units -  $\text{hm}^3$

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
441.00	9219.2										
440.74	9080.9	9094.7	9108.6	9122.4	9136.2	9150.1	9163.9	9177.7	9191.6	9205.4	13.83
440.44	8918.9	8935.1	8951.3	8967.5	8983.7	8999.9	9016.1	9032.3	9048.5	9064.7	16.20
440.13	8757.8	8774.0	8790.1	8806.2	8822.3	8838.4	8854.5	8870.6	8886.7	8902.8	16.11
439.83	8597.6	8613.5	8629.6	8645.6	8661.7	8677.6	8693.7	8709.7	8725.8	8741.7	16.03
439.52	8438.1	8454.0	8469.9	8486.0	8501.9	8517.8	8533.7	8549.6	8565.8	8581.7	15.95
439.22	8279.3	8295.2	8311.1	8327.0	8342.9	8358.6	8374.5	8390.4	8406.3	8422.2	15.88
438.91	8121.5	8137.1	8153.0	8168.7	8184.6	8200.3	8216.2	8231.8	8247.7	8263.4	15.78
438.61	7964.2	7979.8	7995.7	8011.4	8027.0	8042.7	8058.6	8074.3	8089.9	8105.8	15.73
438.30	7808.1	7823.7	7839.4	7854.8	7870.5	7886.1	7901.8	7917.4	7932.9	7948.5	15.61
438.00	7652.5	7668.1	7683.5	7699.2	7714.6	7730.3	7745.9	7761.3	7777.0	7792.4	15.56
437.69	7497.9	7513.3	7528.7	7544.3	7559.7	7575.2	7590.6	7606.0	7621.6	7637.1	15.46
437.39	7344.0	7359.4	7374.8	7390.2	7405.6	7420.8	7436.2	7451.6	7467.0	7482.4	15.39
437.08	7191.0	7206.2	7221.6	7236.8	7252.2	7267.4	7282.8	7298.0	7313.4	7328.5	15.29
436.78	7038.9	7054.0	7069.2	7084.6	7099.8	7115.0	7130.1	7145.3	7160.7	7175.9	15.22
436.47	6887.4	6902.6	6917.8	6932.9	6948.1	6963.0	6978.2	6993.4	7008.5	7023.7	15.14
436.17	6736.7	6751.9	6766.8	6782.0	6796.9	6812.1	6827.2	6842.2	6857.3	6872.3	15.07
435.86	6587.0	6601.9	6616.8	6632.0	6646.9	6661.8	6676.8	6691.7	6706.9	6721.8	14.97
435.56	6438.2	6453.2	6468.1	6482.8	6497.7	6512.6	6527.5	6542.5	6557.1	6572.1	14.88
435.25	6290.0	6304.9	6319.6	6334.5	6349.2	6364.1	6379.0	6393.7	6408.6	6423.3	14.83
434.95	6142.7	6157.4	6172.0	6187.0	6201.6	6216.3	6231.0	6245.7	6260.6	6275.3	14.73
434.64	5996.1	6010.8	6025.5	6040.2	6054.8	6069.3	6084.0	6098.6	6113.3	6128.0	14.66
434.34	5850.3	5865.0	5879.4	5894.1	5908.5	5923.2	5937.9	5952.3	5967.0	5981.4	14.58
434.04	5705.2	5719.7	5734.3	5748.8	5763.2	5777.6	5792.3	5806.8	5821.2	5835.9	14.51
433.73	5560.6	5575.1	5589.5	5603.9	5618.4	5632.8	5647.5	5661.9	5676.4	5690.8	14.46
433.43	5417.0	5431.5	5445.6	5460.1	5474.5	5488.7	5503.1	5517.6	5532.0	5546.2	14.36
433.12	5274.1	5288.3	5302.8	5317.0	5331.4	5345.6	5359.8	5374.2	5388.4	5402.8	14.29
432.82	5132.2	5146.4	5160.6	5174.8	5189.0	5203.2	5217.4	5231.6	5245.8	5259.9	14.19
432.51	4991.3	5005.5	5019.4	5033.6	5047.6	5061.8	5076.0	5089.9	5104.1	5118.0	14.09
432.21	4851.4	4865.3	4879.3	4893.4	4907.4	4921.3	4935.3	4949.2	4963.4	4977.4	13.99
431.90	4712.4	4726.3	4740.3	4754.0	4767.9	4781.9	4795.8	4809.8	4823.5	4837.4	13.90
431.60	4574.2	4587.9	4601.8	4615.5	4629.5	4643.2	4657.1	4670.8	4684.7	4698.5	13.82
431.29	4436.9	4450.6	4464.3	4478.0	4491.7	4505.4	4519.4	4533.1	4546.8	4560.5	13.73
430.99	4300.6	4314.3	4327.8	4341.5	4355.2	4368.6	4382.3	4396.1	4409.8	4423.2	13.63
430.68	4165.1	4178.5	4192.2	4205.7	4219.4	4232.9	4246.3	4260.0	4273.5	4287.2	13.55
430.38	4030.5	4044.0	4057.4	4070.9	4084.4	4097.8	4111.3	4124.7	4138.2	4151.6	13.46
430.07	3896.7	3910.2	3923.4	3936.8	3950.3	3963.5	3976.9	3990.4	4003.9	4017.1	13.38
429.77	3763.8	3777.1	3790.5	3803.7	3816.9	3830.2	3843.6	3856.8	3870.0	3883.5	13.29
429.46	3632.0	3645.2	3658.4	3671.6	3684.8	3697.8	3711.0	3724.2	3737.4	3750.6	13.19
429.16	3500.8	3514.1	3527.0	3540.2	3553.2	3566.4	3579.6	3592.6	3605.8	3618.8	13.11
428.85	3370.7	3383.6	3396.6	3409.8	3422.8	3435.8	3448.7	3461.7	3474.9	3487.9	13.02
428.55	3241.0	3254.0	3266.9	3279.9	3292.9	3305.8	3318.8	3331.8	3344.7	3357.7	12.97
428.24	3112.3	3125.3	3138.0	3151.0	3163.7	3176.7	3189.6	3202.4	3215.3	3228.0	12.87



## Exhibit 14M – Arrow Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER											AVERAGE DIFFERENCE PER 3/100 M
	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	
427.94	2983.6	2996.6	3009.3	3022.3	3035.0	3048.0	3060.9	3073.7	3086.6	3099.4	12.87
427.63	2855.9	2868.6	2881.4	2894.3	2907.1	2919.8	2932.5	2945.2	2958.2	2970.9	12.77
427.33	2728.9	2741.7	2754.4	2767.1	2779.8	2792.3	2805.0	2817.7	2830.5	2843.2	12.70
427.02	2602.9	2615.4	2628.1	2640.6	2653.3	2665.8	2678.5	2691.0	2703.7	2716.2	12.60
426.72	2477.9	2490.4	2502.9	2515.3	2527.8	2540.3	2553.0	2565.5	2578.0	2590.5	12.50
426.42	2354.9	2367.1	2379.6	2391.8	2404.0	2416.3	2428.7	2441.0	2453.2	2465.7	12.31
426.11	2233.0	2245.2	2257.5	2269.5	2281.7	2293.9	2306.2	2318.4	2330.4	2342.6	12.18
425.81	2111.9	2123.9	2136.1	2148.1	2160.3	2172.3	2184.6	2196.6	2208.8	2220.8	12.11
425.50	1991.8	2003.8	2015.8	2027.7	2039.7	2051.7	2064.0	2075.9	2087.9	2099.9	12.01
425.20	1872.1	1884.1	1896.1	1908.1	1920.1	1931.8	1943.8	1955.8	1967.8	1979.8	11.96
424.89	1752.3	1764.2	1776.2	1788.2	1800.2	1812.2	1824.2	1836.2	1848.2	1860.1	11.99
424.59	1633.1	1645.1	1656.8	1668.8	1680.8	1692.6	1704.5	1716.5	1728.5	1740.3	11.91
424.28	1515.2	1526.9	1538.7	1550.7	1562.4	1574.1	1585.9	1597.6	1609.6	1621.4	11.79
423.98	1398.2	1410.0	1421.7	1433.2	1445.0	1456.7	1468.4	1480.2	1491.7	1503.4	11.69
423.67	1282.5	1294.0	1305.8	1317.2	1328.7	1340.2	1352.0	1363.5	1375.0	1386.7	11.57
423.37	1169.2	1180.5	1192.0	1203.2	1214.5	1225.7	1237.2	1248.5	1259.8	1271.3	11.33
423.06	1057.7	1068.9	1079.9	1091.2	1102.2	1113.4	1124.7	1135.7	1147.0	1158.0	11.16
422.76	947.3	958.3	969.3	980.4	991.4	1002.4	1013.6	1024.6	1035.6	1046.7	11.03
422.45	838.2	849.2	860.0	871.0	881.8	892.8	903.8	914.5	925.5	936.3	10.91
422.15	730.3	741.1	751.8	762.6	773.4	784.1	795.1	805.9	816.7	827.4	10.79
421.84	622.9	633.7	644.4	655.2	666.0	676.5	687.2	698.0	708.8	719.5	10.74
421.54	516.7	527.2	538.0	548.5	559.3	569.8	580.3	591.1	601.6	612.4	10.62
421.23	412.0	422.5	433.0	443.3	453.8	464.4	474.9	485.4	495.7	506.2	10.47
420.93	308.5	318.8	329.3	339.6	349.9	360.1	370.7	380.9	391.2	401.7	10.35
420.62	206.2	216.5	226.8	236.8	247.1	257.4	267.7	277.9	288.0	298.2	10.23
420.32	105.7	115.7	125.8	135.8	145.8	155.8	166.1	176.2	186.2	196.2	10.06
420.01	6.6	16.4	26.4	36.2	46.2	56.0	66.1	75.8	85.9	95.7	9.91
419.71										0.0	6.61

## Exhibit 15 – Mica Reservoir Capacity Table, dated 25 Mar. 1974

### English Units – ksf

ELEVATION IN FEET										AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
2490	10945.2	9850.7								
2486.9	10770.5	10787.9	10805.4	10822.9	10840.4	10857.8	10875.3	10892.8	10910.2	10927.7
2486	10721.7	10726.6	10731.5	10736.4	10741.2	10746.1	10751.0	10755.9	10760.7	10765.6
2485	10666.3	10671.9	10677.4	10682.9	10688.5	10694.0	10699.6	10705.1	10710.7	10716.2
										5.54
2484	10611.0	10616.6	10622.1	10627.6	10633.1	10638.7	10644.2	10649.7	10655.3	10660.8
2483	10555.9	10561.4	10567.0	10572.5	10578.0	10583.5	10589.0	10594.5	10600.0	10605.5
2482	10501.0	10506.5	10512.0	10517.5	10523.0	10528.5	10534.0	10539.5	10544.9	10550.4
2481	10446.2	10451.7	10457.2	10462.7	10468.1	10473.6	10479.1	10484.6	10490.0	10495.5
2480	10391.6	10397.1	10402.5	10408.0	10413.5	10418.9	10424.4	10429.8	10435.3	10440.8
										5.46
2479	10337.2	10342.6	10348.1	10353.5	10359.0	10364.4	10369.9	10375.3	10380.7	10386.2
2478	10282.9	10288.4	10293.8	10299.2	10304.6	10310.1	10315.5	10320.9	10326.3	10331.8
2477	10228.8	10234.2	10239.7	10245.1	10250.5	10255.9	10261.3	10266.7	10272.1	10277.5
2476	10174.9	10180.3	10185.7	10191.1	10196.5	10201.9	10207.3	10212.7	10218.0	10223.4
2475	10121.1	10126.5	10131.9	10137.2	10142.6	10148.0	10153.4	10158.8	10164.1	10169.5
										5.38
2474	10067.5	10072.9	10078.2	10083.6	10088.9	10094.3	10099.7	10105.0	10110.4	10115.7
2473	10014.1	10019.4	10024.8	10030.1	10035.5	10040.8	10046.1	10051.5	10056.8	10062.2
2472	9960.8	9966.1	9971.5	9976.8	9982.1	9987.4	9992.8	9998.1	10003.4	10008.8
2471	9907.8	9913.1	9918.4	9923.7	9929.0	9934.3	9939.6	9944.9	9950.2	9955.5
2470	9854.8	9860.1	9865.4	9870.7	9876.0	9881.3	9886.6	9891.9	9897.2	9902.5
										5.30
2469	9802.1	9807.4	9812.6	9817.9	9823.2	9828.5	9833.7	9839.0	9844.3	9849.5
2468	9749.5	9754.8	9760.0	9765.3	9770.5	9775.8	9781.1	9786.3	9791.6	9796.8
2467	9697.1	9702.3	9707.6	9712.8	9718.1	9723.3	9728.5	9733.8	9739.0	9744.3
2466	9644.8	9650.0	9655.3	9660.5	9665.7	9671.0	9676.2	9681.4	9686.6	9691.9
2465	9592.7	9597.9	9603.1	9608.3	9613.5	9618.8	9624.0	9629.2	9634.4	9639.6
										5.21
2464	9540.8	9546.0	9551.2	9556.4	9561.6	9566.8	9571.9	9577.1	9582.3	9587.5
2463	9489.0	9494.2	9499.4	9504.5	9509.7	9514.9	9520.1	9525.3	9530.4	9535.6
2462	9437.4	9442.6	9447.7	9452.9	9458.0	9463.2	9468.4	9473.5	9478.7	9483.8
2461	9386.0	9391.1	9396.3	9401.4	9406.6	9411.7	9416.8	9422.0	9427.1	9432.3
2460	9334.8	9339.9	9345.0	9350.2	9355.3	9360.4	9365.5	9370.6	9375.8	9380.9
										5.12
2459	9283.7	9288.8	9293.9	9299.0	9304.1	9309.3	9314.4	9319.5	9324.6	9329.7
2458	9232.8	9237.9	9243.0	9248.1	9253.2	9258.3	9263.3	9268.4	9273.5	9278.6
2457	9182.0	9187.1	9192.2	9197.2	9202.3	9207.4	9212.5	9217.6	9222.6	9227.7
2456	9131.4	9136.5	9141.5	9146.6	9151.6	9156.7	9161.8	9166.8	9171.9	9176.9
2455	9081.0	9086.0	9091.1	9096.1	9101.2	9106.2	9111.2	9116.3	9121.3	9126.4
										5.04
2454	9030.8	9035.8	9040.8	9045.9	9050.9	9055.9	9060.9	9065.9	9071.0	9076.0
2453	8980.7	8985.7	8990.7	8995.7	9000.7	9005.8	9010.8	9015.8	9020.8	9025.8
2452	8930.8	8935.8	8940.8	8945.8	8950.8	8955.8	8960.7	8965.7	8970.7	8975.7
2451	8881.0	8886.0	8891.0	8895.9	8900.9	8905.9	8910.9	8915.9	8920.8	8925.8
2450	8831.4	8836.4	8841.3	8846.3	8851.2	8856.2	8861.2	8866.1	8871.1	8876.0
										4.96
2449	8782.0	8786.9	8791.9	8796.8	8801.8	8806.7	8811.6	8816.6	8821.5	8826.5
2448	8732.8	8737.7	8742.6	8747.6	8752.5	8757.4	8762.3	8767.2	8772.2	8777.1
2447	8683.7	8688.6	8693.5	8698.4	8703.3	8708.3	8713.2	8718.1	8723.0	8727.9
2446	8634.8	8639.7	8644.6	8649.5	8654.4	8659.3	8664.1	8669.0	8673.9	8678.8
2445	8586.0	8590.9	8595.8	8600.6	8605.5	8610.4	8615.3	8620.2	8625.0	8629.9
										4.88
2444	8537.5	8542.4	8547.2	8552.1	8556.9	8561.8	8566.6	8571.5	8576.3	8581.2
2443	8489.1	8493.9	8498.8	8503.6	8508.5	8513.3	8518.1	8523.0	8527.8	8532.7
2442	8440.8	8445.6	8450.5	8455.3	8460.1	8465.0	8469.8	8474.6	8479.4	8484.3
2441	8392.7	8397.5	8402.3	8407.1	8411.9	8416.8	8421.6	8426.4	8431.2	8436.0
2440	8344.8	8349.6	8354.4	8359.2	8364.0	8368.8	8373.5	8378.3	8383.1	8387.9
										4.79

## Exhibit 15 – Mica Reservoir Capacity Table (English) Continued

English Units – ksf

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
2439	8297.1	8301.9	8306.6	8311.4	8316.2	8321.0	8325.7	8330.5	8335.3	8340.0	4.77
2438	8249.5	8254.3	8259.0	8263.8	8268.5	8273.3	8278.1	8282.8	8287.6	8292.3	4.76
2437	8202.1	8206.8	8211.6	8216.3	8221.1	8225.8	8230.5	8235.3	8240.0	8244.8	4.74
2436	8154.8	8159.5	8164.3	8169.0	8173.7	8178.5	8183.2	8187.9	8192.6	8197.4	4.73
2435	8107.8	8112.5	8117.2	8121.9	8126.6	8131.3	8136.0	8140.7	8145.4	8150.1	4.70
2434	8060.9	8065.6	8070.3	8075.0	8079.7	8084.4	8089.0	8093.7	8098.4	8103.1	4.69
2433	8014.1	8018.8	8023.5	8028.1	8032.8	8037.5	8042.2	8046.9	8051.5	8056.2	4.68
2432	7967.5	7972.2	7976.8	7981.5	7986.1	7990.8	7995.5	8000.1	8004.8	8009.4	4.66
2431	7921.1	7925.7	7930.4	7935.0	7939.7	7944.3	7948.9	7953.6	7958.2	7962.9	4.64
2430	7874.9	7879.5	7884.1	7888.8	7893.4	7898.0	7902.6	7907.2	7911.9	7916.5	4.62
2429	7828.8	7833.4	7838.0	7842.6	7847.2	7851.9	7856.5	7861.1	7865.7	7870.3	4.61
2428	7782.9	7787.5	7792.1	7796.7	7801.3	7805.9	7810.4	7815.0	7819.6	7824.2	4.59
2427	7737.2	7741.8	7746.3	7750.9	7755.5	7760.1	7764.6	7769.2	7773.8	7778.3	4.57
2426	7691.6	7696.2	7700.7	7705.3	7709.8	7714.4	7719.0	7723.5	7728.1	7732.6	4.56
2425	7646.2	7650.7	7655.3	7659.8	7664.4	7668.9	7673.4	7678.0	7682.5	7687.1	4.54
2424	7600.9	7605.4	7610.0	7614.5	7619.0	7623.6	7628.1	7632.6	7637.1	7641.7	4.53
2423	7555.9	7560.4	7564.9	7569.4	7573.9	7578.4	7582.9	7587.4	7591.9	7596.4	4.50
2422	7511.0	7515.5	7520.0	7524.5	7529.0	7533.5	7537.9	7542.4	7546.9	7551.4	4.49
2421	7466.2	7470.7	7475.2	7479.6	7484.1	7488.6	7493.1	7497.6	7502.0	7506.5	4.48
2420	7421.6	7426.1	7430.5	7435.0	7439.4	7443.9	7448.4	7452.8	7457.3	7461.7	4.46
2419	7377.2	7381.6	7386.1	7390.5	7395.0	7399.4	7403.8	7408.3	7412.7	7417.2	4.44
2418	7333.0	7337.4	7341.8	7346.3	7350.7	7355.1	7359.5	7363.9	7368.4	7372.8	4.42
2417	7288.9	7293.3	7297.7	7302.1	7306.5	7311.0	7315.4	7319.8	7324.2	7328.6	4.41
2416	7245.0	7249.4	7253.8	7258.2	7262.6	7267.0	7271.3	7275.7	7280.1	7284.5	4.39
2415	7201.3	7205.7	7210.0	7214.4	7218.8	7223.2	7227.5	7231.9	7236.3	7240.6	4.37
2414	7157.7	7162.1	7166.4	7170.8	7175.1	7179.5	7183.9	7188.2	7192.6	7196.9	4.36
2413	7114.3	7118.6	7123.0	7127.3	7131.7	7136.0	7140.3	7144.7	7149.0	7153.4	4.34
2412	7071.0	7075.3	7079.7	7084.0	7088.3	7092.7	7097.0	7101.3	7105.6	7110.0	4.33
2411	7028.0	7032.3	7036.6	7040.9	7045.2	7049.5	7053.8	7058.1	7062.4	7066.7	4.30
2410	6985.1	6989.4	6993.7	6998.0	7002.3	7006.6	7010.8	7015.1	7019.4	7023.7	4.29
2409	6942.3	6946.6	6950.9	6955.1	6959.4	6963.7	6968.0	6972.3	6976.5	6980.8	4.28
2408	6899.7	6904.0	6908.2	6912.5	6916.7	6921.0	6925.3	6929.5	6933.8	6938.0	4.26
2407	6857.3	6861.5	6865.8	6870.0	6874.3	6878.5	6882.7	6887.0	6891.2	6895.5	4.24
2406	6815.1	6819.3	6823.5	6827.8	6832.0	6836.2	6840.4	6844.6	6848.9	6853.1	4.22
2405	6773.0	6777.2	6781.4	6785.6	6789.8	6794.1	6798.3	6802.5	6806.7	6810.9	4.21
2404	6731.2	6735.3	6739.5	6743.7	6747.9	6752.1	6756.3	6760.5	6764.7	6768.9	4.20
2403	6689.5	6693.7	6697.9	6702.0	6706.2	6710.4	6714.5	6718.7	6722.9	6727.1	4.17
2402	6648.0	6652.2	6656.3	6660.5	6664.7	6668.8	6673.0	6677.1	6681.3	6685.5	4.16
2401	6606.7	6610.9	6615.0	6619.2	6623.3	6627.4	6631.6	6635.7	6639.9	6644.0	4.14
2400	6565.5	6569.7	6573.8	6577.9	6582.1	6586.2	6590.3	6594.5	6598.6	6602.7	4.13

## Exhibit 15 – Mica Reservoir Capacity Table (English) Continued

### English Units – ksf

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
2399	6524.6	6528.7	6532.8	6536.9	6541.0	6545.1	6549.2	6553.3	6557.4	6561.5	4.11
2398	6483.9	6487.9	6492.0	6496.1	6500.1	6504.2	6508.3	6512.4	6516.4	6520.5	4.07
2397	6443.5	6447.6	6451.6	6455.6	6459.6	6463.7	6467.7	6471.8	6475.8	6479.8	4.03
2396	6403.5	6407.5	6411.5	6415.5	6419.5	6423.5	6427.5	6431.5	6435.5	6439.5	4.00
2395	6363.9	6367.8	6371.8	6375.7	6379.7	6383.7	6387.6	6391.6	6395.6	6399.5	3.96
2394	6324.5	6328.5	6332.4	6336.3	6340.2	6344.2	6348.1	6352.0	6356.0	6359.9	3.93
2393	6285.6	6289.5	6293.4	6297.2	6301.1	6305.0	6308.9	6312.8	6316.7	6320.6	3.90
2392	6246.9	6250.8	6254.6	6258.5	6262.4	6266.2	6270.1	6274.0	6277.8	6281.7	3.87
2391	6208.6	6212.4	6216.2	6220.0	6223.9	6227.7	6231.5	6235.4	6239.2	6243.1	3.83
2390	6170.6	6174.4	6178.2	6181.9	6185.7	6189.5	6193.3	6197.2	6201.0	6204.8	3.80
2389	6132.9	6136.7	6140.4	6144.2	6147.9	6151.7	6155.5	6159.2	6163.0	6166.8	3.77
2388	6095.5	6099.2	6103.0	6106.7	6110.4	6114.2	6117.9	6121.7	6125.4	6129.2	3.74
2387	6058.4	6062.1	6065.8	6069.5	6073.2	6076.9	6080.6	6084.3	6088.1	6091.8	3.71
2386	6021.7	6025.3	6029.0	6032.7	6036.3	6040.0	6043.7	6047.4	6051.0	6054.7	3.68
2385	5985.2	5988.8	5992.5	5996.1	5999.7	6003.4	6007.0	6010.7	6014.3	6018.0	3.65
2384	5949.0	5952.6	5956.2	5959.8	5963.4	5967.0	5970.7	5974.3	5977.9	5981.6	3.62
2383	5913.0	5916.6	5920.2	5923.8	5927.4	5931.0	5934.6	5938.2	5941.8	5945.4	3.59
2382	5877.4	5881.0	5884.5	5888.1	5891.7	5895.2	5898.8	5902.3	5905.9	5909.5	3.56
2381	5842.1	5845.6	5849.2	5852.7	5856.2	5859.7	5863.3	5866.8	5870.3	5873.9	3.53
2380	5807.0	5810.5	5814.0	5817.5	5821.0	5824.5	5828.0	5831.6	5835.1	5838.6	3.51
2379	5772.2	5775.7	5779.1	5782.6	5786.1	5789.6	5793.0	5796.5	5800.0	5803.5	3.48
2378	5737.6	5741.1	5744.5	5748.0	5751.4	5754.9	5758.3	5761.8	5765.3	5768.7	3.45
2377	5703.4	5706.8	5710.2	5713.6	5717.1	5720.5	5723.9	5727.3	5730.8	5734.2	3.43
2376	5669.3	5672.7	5676.1	5679.5	5682.9	5686.3	5689.7	5693.1	5696.5	5700.0	3.41
2375	5635.5	5638.9	5642.3	5645.6	5649.0	5652.4	5655.8	5659.2	5662.5	5665.9	3.38
2374	5602.0	5605.3	5608.7	5612.0	5615.4	5618.7	5622.1	5625.5	5628.8	5632.2	3.35
2373	5568.7	5572.0	5575.4	5578.7	5582.0	5585.3	5588.7	5592.0	5595.3	5598.7	3.33
2372	5535.6	5538.9	5542.2	5545.5	5548.8	5552.1	5555.4	5558.7	5562.1	5565.4	3.31
2371	5502.8	5506.1	5509.3	5512.6	5515.9	5519.2	5522.5	5525.7	5529.0	5532.3	3.28
2370	5470.2	5473.4	5476.7	5479.9	5483.2	5486.5	5489.7	5493.0	5496.3	5499.5	3.26
2369	5437.8	5441.0	5444.3	5447.5	5450.7	5453.9	5457.2	5460.4	5463.7	5466.9	3.24
2368	5405.6	5408.9	5412.1	5415.3	5418.5	5421.7	5424.9	5428.1	5431.4	5434.6	3.22
2367	5373.7	5376.9	5380.1	5383.3	5386.5	5389.7	5392.9	5396.1	5399.3	5402.4	3.19
2366	5342.0	5345.2	5348.3	5351.5	5354.7	5357.8	5361.0	5364.2	5367.4	5370.5	3.17
2365	5310.5	5313.6	5316.8	5319.9	5323.0	5326.2	5329.3	5332.5	5335.7	5338.8	3.15
2364	5279.1	5282.3	5285.4	5288.5	5291.6	5294.8	5297.9	5301.0	5304.2	5307.3	3.13
2363	5248.0	5251.1	5254.2	5257.4	5260.5	5263.6	5266.7	5269.8	5272.9	5276.0	3.11
2362	5217.1	5220.2	5223.3	5226.4	5229.5	5232.6	5235.7	5238.7	5241.8	5244.9	3.09
2361	5186.4	5189.4	5192.5	5195.6	5198.7	5201.7	5204.8	5207.9	5211.0	5214.0	3.07
2360	5155.9	5158.9	5162.0	5165.0	5168.0	5171.1	5174.2	5177.2	5180.3	5183.3	3.05

## Exhibit 15 – Mica Reservoir Capacity Table (English) Continued

### English Units – ksf

ELEVATION IN FEET											AVERAGE DIFFERENCE PER TENTH FT
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	
2359	5125.5	5128.5	5131.6	5134.6	5137.6	5140.7	5143.7	5146.7	5149.8	5152.8	3.03
2358	5095.4	5098.4	5101.4	5104.4	5107.4	5110.4	5113.4	5116.5	5119.5	5122.5	3.02
2357	5065.4	5068.4	5071.4	5074.4	5077.4	5080.4	5083.4	5086.4	5089.4	5092.4	3.00
2356	5035.6	5038.5	5041.5	5044.5	5047.5	5050.4	5053.4	5056.4	5059.4	5062.4	2.98
2355	5005.9	5008.9	5011.9	5014.8	5017.8	5020.7	5023.7	5026.7	5029.6	5032.6	2.96
2354	4976.5	4979.4	4982.4	4985.3	4988.3	4991.2	4994.1	4997.1	5000.0	5003.0	2.94
2353	4947.2	4950.1	4953.0	4956.0	4958.9	4961.8	4964.8	4967.7	4970.6	4973.6	2.93
2352	4918.0	4920.9	4923.9	4926.8	4929.7	4932.6	4935.5	4938.4	4941.3	4944.3	2.91
2351	4889.1	4892.0	4894.9	4897.8	4900.6	4903.5	4906.4	4909.3	4912.2	4915.1	2.90
2350	4860.3	4863.1	4866.0	4868.9	4871.8	4874.6	4877.5	4880.4	4883.3	4886.2	2.88
2349	4831.6	4834.4	4837.3	4840.2	4843.1	4845.9	4848.8	4851.7	4854.5	4857.4	2.87
2348	4803.1	4805.9	4808.8	4811.6	4814.5	4817.3	4820.2	4823.0	4825.9	4828.7	2.85
2347	4774.7	4777.5	4780.4	4783.2	4786.0	4788.9	4791.7	4794.6	4797.4	4800.2	2.84
2346	4746.5	4749.3	4752.1	4755.0	4757.8	4760.6	4763.4	4766.2	4769.1	4771.9	2.82
2345	4718.4	4721.2	4724.0	4726.8	4729.6	4732.4	4735.3	4738.1	4740.9	4743.7	2.81
2344	4690.5	4693.3	4696.1	4698.8	4701.6	4704.4	4707.2	4710.0	4712.8	4715.6	2.79
2343	4662.7	4665.4	4668.2	4671.0	4673.8	4676.5	4679.3	4682.1	4684.9	4687.7	2.78
2342	4635.0	4637.8	4640.5	4643.3	4646.1	4648.8	4651.6	4654.4	4657.1	4659.9	2.77
2341	4607.4	4610.2	4613.0	4615.7	4618.5	4621.2	4624.0	4626.7	4629.5	4632.2	2.76
2340	4580.0	4582.8	4585.5	4588.2	4591.0	4593.7	4596.5	4599.2	4602.0	4604.7	2.74
2339	4552.7	4555.4	4558.2	4560.9	4563.6	4566.4	4569.1	4571.8	4574.6	4577.3	2.73
2338	4525.5	4528.2	4530.9	4533.6	4536.4	4539.1	4541.8	4544.5	4547.3	4550.0	2.72
2337	4498.3	4501.0	4503.7	4506.5	4509.2	4511.9	4514.6	4517.3	4520.0	4522.8	2.72
2336	4471.2	4473.9	4476.6	4479.3	4482.0	4484.7	4487.5	4490.2	4492.9	4495.6	2.71
2335	4444.2	4446.9	4449.6	4452.3	4455.0	4457.7	4460.4	4463.1	4465.8	4468.5	2.70
2334	4417.3	4420.0	4422.6	4425.3	4428.0	4430.7	4433.4	4436.1	4438.8	4441.5	2.69
2333	4390.4	4393.1	4395.8	4398.4	4401.1	4403.8	4406.5	4409.2	4411.9	4414.6	2.69
2332	4363.6	4366.3	4368.9	4371.6	4374.3	4377.0	4379.7	4382.3	4385.0	4387.7	2.68
2331	4336.9	4339.6	4342.2	4344.9	4347.6	4350.2	4352.9	4355.6	4358.2	4360.9	2.67
2330	4310.2	4312.9	4315.6	4318.2	4320.9	4323.6	4326.2	4328.9	4331.6	4334.2	2.66
2329	4283.7	4286.3	4289.0	4291.6	4294.3	4296.9	4299.6	4302.3	4304.9	4307.6	2.66
2328	4257.2	4259.8	4262.5	4265.1	4267.8	4270.4	4273.1	4275.7	4278.4	4281.0	2.65
2327	4230.8	4233.4	4236.1	4238.7	4241.3	4244.0	4246.6	4249.3	4251.9	4254.5	2.64
2326	4204.5	4207.1	4209.7	4212.3	4215.0	4217.6	4220.2	4222.9	4225.5	4228.1	2.63
2325	4178.2	4180.8	4183.4	4186.1	4188.7	4191.3	4193.9	4196.6	4199.2	4201.8	2.63
2324	4152.0	4154.6	4157.2	4159.9	4162.5	4165.1	4167.7	4170.3	4173.0	4175.6	2.62
2323	4125.9	4128.5	4131.2	4133.8	4136.4	4139.0	4141.6	4144.2	4146.8	4149.4	2.61
2322	4099.9	4102.5	4105.1	4107.7	4110.3	4112.9	4115.5	4118.1	4120.7	4123.3	2.61
2321	4074.0	4076.6	4079.1	4081.7	4084.3	4086.9	4089.5	4092.1	4094.7	4097.3	2.59
2320	4048.1	4050.7	4053.3	4055.9	4058.4	4061.0	4063.6	4066.2	4068.8	4071.4	2.59
2319	4022.3	4024.9	4027.5	4030.0	4032.6	4035.2	4037.8	4040.4	4042.9	4045.5	2.58

# Exhibit 15M – Mica Reservoir Capacity Table, dated 25 Mar. 1974

SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
758.95	26778.4										
758.00	26351.1	26393.8	26436.5	26479.3	26522.0	26564.8	26607.5	26650.2	26693.0	26735.7	42.74
757.73	26231.8	26243.7	26255.7	26267.6	26279.5	26291.4	26303.4	26315.3	26327.2	26339.1	11.92
757.43	26096.2	26109.8	26123.3	26136.9	26150.4	26164.0	26177.6	26191.1	26204.7	26218.3	13.56
757.12	25961.0	25974.5	25988.0	26001.5	26015.1	26028.6	26042.1	26055.6	26069.1	26082.7	13.52
756.82	25826.1	25839.6	25853.1	25866.6	25880.1	25893.6	25907.0	25920.5	25934.0	25947.5	13.48
756.51	25691.7	25705.2	25718.6	25732.1	25745.5	25758.9	25772.4	25785.8	25799.3	25812.7	13.44
756.21	25557.7	25571.1	25584.5	25597.9	25611.3	25624.7	25638.1	25651.5	25664.9	25678.3	13.40
755.90	25424.2	25437.5	25450.9	25464.2	25477.6	25490.9	25504.3	25517.7	25531.0	25544.4	13.36
755.60	25291.0	25304.3	25317.6	25330.9	25344.2	25357.6	25370.9	25384.2	25397.5	25410.8	13.32
755.29	25158.2	25171.5	25184.8	25198.0	25211.3	25224.6	25237.9	25251.1	25264.4	25277.7	13.28
754.99	25025.9	25039.1	25052.3	25065.6	25078.8	25092.0	25105.3	25118.5	25131.7	25145.0	13.24
754.68	24893.9	24907.1	24920.3	24933.5	24946.7	24959.9	24973.1	24986.3	24999.5	25012.7	13.19
754.38	24762.3	24775.4	24788.6	24801.8	24814.9	24828.1	24841.3	24854.4	24867.6	24880.7	13.16
754.07	24631.1	24644.4	24657.3	24670.5	24683.5	24696.7	24709.9	24722.9	24736.1	24749.1	13.11
753.77	24500.5	24513.5	24526.7	24539.6	24552.9	24565.8	24578.8	24592.0	24605.0	24618.2	13.06
753.47	24370.1	24383.1	24396.3	24409.2	24422.2	24435.2	24448.4	24461.4	24474.3	24487.5	13.04
753.16	24240.4	24253.4	24266.4	24279.3	24292.3	24305.3	24318.2	24331.2	24344.2	24357.1	12.97
752.86	24110.8	24123.7	24136.7	24149.7	24162.6	24175.6	24188.6	24201.5	24214.5	24227.5	12.97
752.55	23981.8	23994.8	24007.5	24020.5	24033.4	24046.4	24059.1	24072.1	24085.1	24097.8	12.89
752.25	23853.1	23866.1	23878.8	23891.8	23904.5	23917.5	23930.4	23943.2	23956.1	23968.9	12.87
751.94	23724.9	23737.6	23750.6	23763.3	23776.3	23789.0	23801.7	23814.7	23827.4	23840.4	12.82
751.64	23597.0	23609.7	23622.7	23635.4	23648.1	23661.1	23673.8	23686.5	23699.2	23712.2	12.80
751.33	23469.5	23482.2	23494.9	23507.7	23520.4	23533.4	23546.1	23558.8	23571.5	23584.2	12.75
751.03	23342.5	23355.2	23368.0	23380.7	23393.4	23406.1	23418.6	23431.3	23444.1	23456.8	12.70
750.72	23215.8	23228.5	23241.2	23253.7	23266.4	23279.2	23291.9	23304.6	23317.1	23329.8	12.67
750.42	23089.5	23102.3	23114.7	23127.5	23139.9	23152.7	23165.4	23177.9	23190.6	23203.1	12.62
750.11	22963.8	22976.3	22989.0	23001.5	23014.2	23026.7	23039.1	23051.9	23064.3	23077.1	12.58
749.81	22838.5	22851.0	22863.5	22876.2	22888.7	22901.2	22913.6	22926.1	22938.8	22951.3	12.53
749.50	22713.5	22726.0	22738.5	22750.9	22763.4	22776.1	22788.6	22801.1	22813.6	22826.0	12.50
749.20	22589.0	22601.4	22613.9	22626.4	22638.9	22651.4	22663.6	22676.1	22688.5	22701.0	12.45
748.89	22464.7	22477.2	22489.6	22501.9	22514.3	22526.8	22539.3	22551.8	22564.0	22576.5	12.43
748.59	22340.9	22353.4	22365.6	22378.1	22390.3	22402.8	22415.3	22427.5	22440.0	22452.2	12.38
748.28	22217.6	22229.8	22242.3	22254.5	22267.0	22279.2	22291.5	22303.9	22316.2	22328.7	12.33
747.98	22094.8	22107.0	22119.2	22131.7	22143.9	22156.2	22168.4	22180.6	22193.1	22205.3	12.28
747.67	21972.2	21984.4	21996.6	22008.9	22021.1	22033.6	22045.8	22058.1	22070.3	22082.5	12.26
747.37	21850.1	21862.3	21874.6	21886.8	21899.0	21911.3	21923.2	21935.5	21947.7	21959.9	12.21
747.06	21728.3	21740.5	21752.7	21764.7	21776.9	21789.2	21801.4	21813.6	21825.6	21837.9	12.18
746.76	21606.9	21619.1	21631.1	21643.4	21655.3	21667.6	21679.8	21691.8	21704.0	21716.0	12.14
746.45	21486.0	21498.0	21510.3	21522.3	21534.5	21546.5	21558.5	21570.7	21582.7	21594.9	12.09
746.15	21365.7	21377.7	21389.6	21401.9	21413.9	21425.9	21437.8	21449.8	21462.1	21474.1	12.04
745.85	21245.5	21257.5	21269.5	21281.5	21293.5	21305.7	21317.7	21329.7	21341.7	21353.7	12.01
745.54	21125.9	21137.9	21149.9	21161.9	21173.9	21185.8	21197.6	21209.6	21221.6	21233.6	11.96
745.24	21006.5	21018.5	21030.5	21042.2	21054.2	21066.2	21078.2	21090.2	21101.9	21113.9	11.94
744.93	20887.8	20899.8	20911.6	20923.6	20935.3	20947.3	20959.0	20971.0	20982.8	20994.8	11.87
744.63	20769.4	20781.2	20793.2	20804.9	20816.9	20828.6	20840.4	20852.4	20864.1	20876.1	11.84
744.32	20651.3	20663.0	20675.0	20686.7	20698.5	20710.5	20722.2	20734.0	20745.7	20757.7	11.82
744.02	20533.6	20545.3	20557.1	20568.8	20580.6	20592.5	20604.3	20616.0	20627.8	20639.5	11.77
743.71	20416.4	20428.1	20439.9	20451.6	20463.4	20475.1	20486.6	20498.3	20510.1	20521.8	11.72

## Exhibit 15M – Mica Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER											AVERAGE DIFFERENCE PER 3/100 M
	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	
743.41	20299.7	20311.4	20322.9	20334.7	20346.4	20358.2	20369.7	20381.4	20393.1	20404.6	11.67
743.10	20183.2	20195.0	20206.5	20218.2	20229.7	20241.5	20253.2	20264.7	20276.4	20287.9	11.65
742.80	20067.3	20078.8	20090.5	20102.0	20113.7	20125.2	20136.7	20148.5	20160.0	20171.7	11.60
742.49	19951.5	19963.0	19974.8	19986.3	19997.8	20009.5	20021.0	20032.5	20044.0	20055.8	11.57
742.19	19836.5	19848.0	19859.5	19871.0	19882.5	19894.0	19905.5	19917.0	19928.5	19940.0	11.50
741.88	19721.8	19733.3	19744.8	19756.3	19767.8	19779.3	19790.5	19802.0	19813.5	19825.0	11.47
741.58	19607.3	19618.8	19630.3	19641.5	19653.0	19664.5	19676.0	19687.5	19698.8	19710.3	11.45
741.27	19493.3	19504.8	19516.0	19527.5	19538.8	19550.3	19561.8	19573.0	19584.5	19595.8	11.40
740.97	19379.8	19391.0	19402.5	19413.8	19425.3	19436.5	19447.8	19459.3	19470.5	19482.0	11.35
740.66	19266.7	19278.0	19289.2	19300.7	19312.0	19323.2	19334.5	19345.8	19357.3	19368.5	11.30
740.36	19153.9	19165.2	19176.5	19187.7	19199.0	19210.5	19221.7	19233.0	19244.2	19255.5	11.28
740.05	19041.6	19052.9	19064.2	19075.4	19086.7	19097.9	19108.9	19120.2	19131.4	19142.7	11.23
739.75	18929.8	18941.1	18952.1	18963.4	18974.6	18985.9	18996.9	19008.1	19019.4	19030.4	11.18
739.44	18818.3	18829.5	18840.5	18851.8	18862.8	18874.1	18885.3	18896.3	18907.6	18918.6	11.16
739.14	18707.2	18718.2	18729.5	18740.5	18751.7	18762.7	18773.7	18785.0	18796.0	18807.3	11.11
738.83	18596.4	18607.4	18618.6	18629.6	18640.6	18651.9	18662.9	18673.9	18684.9	18696.2	11.08
738.53	18486.3	18497.3	18508.3	18519.3	18530.3	18541.3	18552.3	18563.3	18574.3	18585.4	11.01
738.23	18376.4	18387.4	18398.4	18409.4	18420.5	18431.5	18442.2	18453.2	18464.2	18475.3	10.99
737.92	18266.8	18277.8	18288.8	18299.6	18310.6	18321.6	18332.6	18343.6	18354.4	18365.4	10.96
737.62	18157.7	18168.7	18179.5	18190.5	18201.2	18212.2	18223.3	18234.0	18245.0	18255.8	10.91
737.31	18049.1	18059.8	18070.8	18081.6	18092.6	18103.4	18114.1	18125.1	18135.9	18146.9	10.86
737.01	17940.9	17951.7	17962.4	17973.5	17984.2	17995.0	18005.8	18016.5	18027.5	18038.3	10.81
736.70	17833.0	17843.8	17854.6	17865.3	17876.1	17887.1	17897.9	17908.6	17919.4	17930.2	10.79
736.40	17725.6	17736.4	17747.1	17757.9	17768.7	17779.4	17790.0	17800.7	17811.5	17822.3	10.74
736.09	17618.7	17629.5	17640.0	17650.8	17661.5	17672.3	17682.8	17693.6	17704.3	17714.9	10.69
735.79	17512.0	17522.8	17533.3	17544.1	17554.6	17565.4	17576.1	17586.7	17597.4	17607.9	10.67
735.48	17405.8	17416.4	17427.1	17437.7	17448.4	17458.9	17469.5	17480.2	17490.7	17501.5	10.62
735.18	17299.9	17310.4	17321.2	17331.7	17342.2	17353.0	17363.5	17374.0	17384.6	17395.3	10.59
734.87	17194.7	17205.2	17215.7	17226.3	17236.8	17247.3	17257.8	17268.3	17278.9	17289.4	10.52
734.57	17089.7	17100.3	17110.8	17121.3	17131.8	17142.3	17152.6	17163.1	17173.7	17184.2	10.50
734.26	16985.0	16995.6	17006.1	17016.3	17026.9	17037.4	17047.9	17058.4	17068.7	17079.2	10.47
733.96	16880.8	16891.3	16901.6	16912.1	16922.4	16932.9	16943.4	16953.7	16964.2	16974.5	10.42
733.65	16777.1	16787.3	16797.9	16808.1	16818.7	16828.9	16839.2	16849.7	16860.0	16870.5	10.37
733.35	16673.8	16684.1	16694.4	16704.9	16715.2	16725.4	16735.7	16746.0	16756.5	16766.8	10.32
733.04	16570.8	16581.1	16591.4	16601.6	16611.9	16622.4	16632.7	16643.0	16653.3	16663.5	10.30
732.74	16468.6	16478.6	16488.9	16499.1	16509.4	16519.7	16530.0	16540.2	16550.5	16560.8	10.28
732.43	16366.5	16376.8	16387.1	16397.1	16407.4	16417.7	16427.7	16438.0	16448.2	16458.5	10.20
732.13	16265.0	16275.3	16285.3	16295.6	16305.9	16315.9	16326.2	16336.2	16346.5	16356.7	10.18
731.82	16164.0	16174.2	16184.3	16194.5	16204.6	16214.6	16224.9	16234.9	16245.2	16255.2	10.13
731.52	16063.2	16073.4	16083.5	16093.5	16103.8	16113.8	16123.8	16134.1	16144.1	16154.2	10.10

## Exhibit 15M – Mica Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
731.21	15963.1	15973.1	15983.1	15993.2	16003.2	16013.2	16023.3	16033.3	16043.3	16053.4	10.06
730.91	15863.5	15873.3	15883.3	15893.4	15903.1	15913.2	15923.2	15933.2	15943.0	15953.1	9.96
730.61	15764.7	15774.7	15784.5	15794.3	15804.1	15814.1	15823.9	15833.9	15843.7	15853.5	9.86
730.30	15666.8	15676.6	15686.4	15696.2	15705.9	15715.7	15725.5	15735.3	15745.1	15754.9	9.79
730.00	15569.9	15579.5	15589.2	15598.8	15608.6	15618.4	15627.9	15637.7	15647.5	15657.0	9.69
729.69	15473.5	15483.3	15492.8	15502.4	15511.9	15521.7	15531.3	15540.8	15550.6	15560.1	9.62
729.39	15378.3	15387.9	15397.4	15406.7	15416.3	15425.8	15435.4	15444.9	15454.4	15464.0	9.54
729.08	15283.7	15293.2	15302.5	15312.0	15321.6	15330.9	15340.4	15350.0	15359.3	15368.8	9.47
728.78	15190.0	15199.3	15208.6	15217.9	15227.4	15236.7	15246.0	15255.5	15264.8	15274.4	9.37
728.47	15097.0	15106.3	15115.6	15124.6	15133.9	15143.2	15152.5	15162.1	15171.4	15180.7	9.30
728.17	15004.8	15014.1	15023.1	15032.4	15041.5	15050.7	15060.0	15069.1	15078.4	15087.7	9.22
727.86	14913.3	14922.3	14931.6	14940.7	14949.7	14959.0	14968.1	14977.4	14986.4	14995.7	9.15
727.56	14822.5	14831.5	14840.6	14849.6	14858.7	14867.7	14876.8	14885.8	14895.1	14904.2	9.08
727.25	14732.7	14741.5	14750.6	14759.6	14768.4	14777.5	14786.5	14795.6	14804.4	14813.4	9.00
726.95	14643.4	14652.2	14661.3	14670.1	14678.9	14687.9	14696.7	14705.8	14714.6	14723.6	8.93
726.64	14554.8	14563.6	14572.4	14581.2	14590.1	14598.9	14607.9	14616.7	14625.5	14634.6	8.86
726.34	14466.7	14475.6	14484.4	14493.2	14502.0	14510.8	14519.6	14528.4	14537.2	14546.0	8.78
726.03	14379.6	14388.5	14397.0	14405.8	14414.6	14423.2	14432.0	14440.6	14449.4	14458.2	8.71
725.73	14293.3	14301.8	14310.7	14319.2	14327.8	14336.3	14345.1	14353.7	14362.3	14371.1	8.64
725.42	14207.4	14216.0	14224.5	14233.1	14241.7	14250.2	14258.8	14267.6	14276.2	14284.7	8.59
725.12	14122.3	14130.8	14139.1	14147.7	14156.3	14164.8	14173.2	14181.7	14190.3	14198.8	8.51
724.81	14037.6	14046.2	14054.5	14063.1	14071.4	14079.9	14088.3	14096.8	14105.4	14113.7	8.44
724.51	13953.9	13962.3	13970.6	13978.9	13987.5	13995.8	14004.1	14012.4	14021.0	14029.3	8.39
724.20	13870.5	13878.8	13887.1	13895.5	13903.8	13912.1	13920.4	13928.7	13937.1	13945.6	8.34
723.90	13787.8	13796.1	13804.5	13812.5	13820.8	13829.2	13837.5	13845.8	13853.9	13862.2	8.27
723.59	13705.9	13713.9	13722.2	13730.3	13738.6	13746.7	13755.0	13763.3	13771.4	13779.7	8.20
723.29	13624.4	13632.5	13640.8	13648.8	13656.9	13665.0	13673.3	13681.4	13689.5	13697.8	8.15
722.99	13543.4	13551.5	13559.5	13567.6	13575.7	13583.8	13591.8	13599.9	13608.2	13616.3	8.10
722.68	13463.2	13471.2	13479.1	13487.1	13495.2	13503.3	13511.3	13519.2	13527.3	13535.3	8.02
722.38	13383.4	13391.2	13399.3	13407.1	13415.2	13423.3	13431.1	13439.2	13447.2	13455.1	7.98
722.07	13304.1	13312.0	13320.0	13327.9	13335.7	13343.5	13351.6	13359.4	13367.5	13375.3	7.93
721.77	13225.3	13233.4	13241.2	13249.1	13256.9	13264.7	13272.6	13280.4	13288.5	13296.3	7.88
721.46	13147.3	13155.1	13163.0	13170.8	13178.6	13186.4	13194.3	13202.1	13209.9	13217.5	7.80
721.16	13069.7	13077.6	13085.2	13093.0	13100.8	13108.4	13116.2	13124.1	13131.9	13139.5	7.76
720.85	12992.7	13000.3	13008.1	13015.7	13023.3	13031.1	13038.7	13046.5	13054.3	13061.9	7.71
720.55	12915.8	12923.7	12931.3	12938.8	12946.4	12954.3	12961.8	12969.4	12977.3	12984.8	7.66
720.24	12839.8	12847.3	12854.9	12862.8	12870.3	12877.9	12885.5	12893.1	12900.7	12908.3	7.61
719.94	12764.2	12771.7	12779.3	12786.9	12794.5	12802.1	12809.7	12817.0	12824.6	12832.2	7.56
719.63	12689.0	12696.4	12704.0	12711.6	12719.1	12726.5	12734.1	12741.6	12749.2	12756.6	7.51
719.33	12614.4	12621.8	12629.3	12636.7	12644.0	12651.6	12659.2	12666.5	12674.1	12681.5	7.46



## Exhibit 15M – Mica Reservoir Capacity Table (SI) Continued

SI Units - hm<sup>3</sup>

ELEVATION IN METER	0.00	0.03	0.06	0.09	0.12	0.15	0.18	0.21	0.24	0.27	AVERAGE DIFFERENCE PER 3/100 M
719.02	12540.0	12547.4	12555.0	12562.3	12569.7	12577.2	12584.6	12591.9	12599.5	12606.8	7.41
718.72	12466.4	12473.7	12481.1	12488.4	12495.8	12503.1	12510.4	12518.0	12525.4	12532.7	7.39
718.41	12393.0	12400.3	12407.7	12415.0	12422.4	12429.7	12437.0	12444.4	12451.7	12459.1	7.34
718.11	12320.1	12327.2	12334.5	12341.9	12349.2	12356.3	12363.6	12371.0	12378.3	12385.7	7.29
717.80	12247.4	12254.8	12262.1	12269.2	12276.5	12283.6	12291.0	12298.3	12305.4	12312.8	7.24
717.50	12175.5	12182.6	12189.9	12197.0	12204.4	12211.5	12218.6	12225.9	12233.0	12240.3	7.19
717.19	12103.8	12110.9	12118.0	12125.3	12132.4	12139.5	12146.9	12154.0	12161.1	12168.4	7.17
716.89	12032.4	12039.5	12046.8	12053.9	12061.0	12068.1	12075.2	12082.3	12089.4	12096.7	7.12
716.58	11961.7	11968.8	11975.9	11983.0	11989.8	11996.9	12004.0	12011.1	12018.2	12025.3	7.10
716.28	11891.2	11898.1	11905.2	11912.3	11919.3	11926.2	11933.3	11940.4	11947.5	11954.6	7.05
715.97	11821.0	11827.8	11834.9	11842.0	11849.1	11856.0	11863.1	11870.2	11877.0	11884.1	7.02
715.67	11751.3	11758.1	11765.2	11772.1	11779.2	11786.0	11793.1	11800.0	11807.0	11813.9	6.97
715.37	11681.8	11688.6	11695.7	11702.6	11709.4	11716.5	11723.4	11730.5	11737.3	11744.2	6.95
715.06	11612.8	11619.6	11626.5	11633.6	11640.4	11647.3	11654.1	11661.0	11668.1	11674.9	6.90
714.76	11544.0	11550.9	11557.7	11564.6	11571.4	11578.3	11585.4	11592.2	11599.1	11605.9	6.87
714.45	11475.8	11482.6	11489.5	11496.1	11502.9	11509.8	11516.6	11523.5	11530.3	11537.2	6.83
714.15	11407.8	11414.4	11421.2	11428.1	11434.9	11441.5	11448.4	11455.2	11462.1	11468.9	6.80
713.84	11340.0	11346.8	11353.4	11360.3	11367.1	11373.8	11380.6	11387.5	11394.1	11400.9	6.78
713.54	11272.5	11279.3	11286.2	11292.8	11299.6	11306.2	11313.1	11319.7	11326.5	11333.1	6.75
713.23	11205.4	11212.3	11218.9	11225.5	11232.3	11238.9	11245.8	11252.4	11259.3	11265.9	6.70
712.93	11138.6	11145.2	11152.1	11158.7	11165.3	11172.2	11178.8	11185.4	11192.2	11198.8	6.68
712.62	11072.1	11078.7	11085.3	11091.9	11098.8	11105.4	11112.0	11118.6	11125.4	11132.0	6.65
712.32	11005.5	11012.1	11018.8	11025.6	11032.2	11038.8	11045.4	11052.0	11058.6	11065.5	6.65
712.01	10939.2	10945.8	10952.4	10959.1	10965.7	10972.3	10979.1	10985.7	10992.3	10998.9	6.63
711.71	10873.2	10879.8	10886.4	10893.0	10899.6	10906.2	10912.8	10919.4	10926.0	10932.6	6.61
711.40	10807.4	10814.0	10820.3	10826.9	10833.5	10840.2	10846.8	10853.4	10860.0	10866.6	6.58
711.10	10741.6	10748.2	10754.8	10761.1	10767.7	10774.3	10780.9	10787.5	10794.2	10800.8	6.58
710.79	10676.0	10682.6	10689.0	10695.6	10702.2	10708.8	10715.4	10721.7	10728.3	10734.9	6.56
710.49	10610.7	10617.3	10623.6	10630.2	10636.8	10643.2	10649.8	10656.4	10662.8	10669.4	6.53
710.18	10545.3	10551.9	10558.5	10564.9	10571.5	10578.1	10584.5	10591.1	10597.7	10604.1	6.51
709.88	10480.5	10486.9	10493.5	10499.8	10506.4	10512.8	10519.4	10526.0	10532.4	10539.0	6.51
709.57	10415.7	10422.0	10428.6	10435.0	10441.6	10448.0	10454.6	10460.9	10467.5	10473.9	6.48
709.27	10351.1	10357.4	10364.0	10370.4	10376.8	10383.4	10389.7	10396.3	10402.7	10409.1	6.46
708.96	10286.7	10293.1	10299.5	10305.8	10312.4	10318.8	10325.1	10331.7	10338.1	10344.5	6.43
708.66	10222.4	10228.7	10235.1	10241.7	10248.1	10254.4	10260.8	10267.4	10273.8	10280.1	6.43
708.35	10158.3	10164.6	10171.0	10177.6	10184.0	10190.3	10196.7	10203.1	10209.7	10216.0	6.41
708.05	10094.4	10100.8	10107.4	10113.8	10120.1	10126.5	10132.8	10139.2	10145.6	10151.9	6.39
707.75	10030.8	10037.2	10043.5	10049.9	10056.3	10062.6	10069.0	10075.3	10081.7	10088.1	6.39
707.44	9967.4	9973.8	9979.9	9986.3	9992.6	9999.0	10005.4	10011.7	10018.1	10024.5	6.34
707.14	9904.1	9910.4	9916.8	9923.2	9929.3	9935.6	9942.0	9948.4	9954.7	9961.1	6.34
706.83	9841.0	9847.3	9853.7	9859.8	9866.2	9872.5	9878.9	9885.2	9891.4	9897.7	6.31