

# COLUMBIA RIVER TREATY DETAILED OPERATING PLAN FOR CANADIAN STORAGE

1 August 2013  
Through  
31 July 2014



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**COLUMBIA RIVER TREATY ENTITY AGREEMENT ON THE  
DETAILED OPERATING PLAN  
FOR CANADIAN STORAGE**

**1 AUGUST 2013 THROUGH 31 JULY 2014**

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 2013 through 31 July 2014" (the 2013-14 Detailed Operating Plan), dated June 2013.

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 2013-14 Detailed Operating Plan.

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


Executed for the Canadian Entity this 28<sup>th</sup> day of MAY, 2013.

By


  
Chris O'Riley  
Chair

Executed for the United States Entity this 31<sup>st</sup> day of May, 2013.

By

  
William K. Drummond  
Chairman

By

  
Brigadier General Anthony C. Funkhouser  
Member

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# **COLUMBIA RIVER TREATY DETAILED OPERATING PLAN FOR CANADIAN STORAGE 1 AUGUST 2013 THROUGH 31 JULY 2014**

## **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 2013-14 (AOP14) executed February 2009.”
- 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 2013 through 31 July 2014.

- 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 subsection 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 AOP14 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 AOP14 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.

This DOP document includes updated surcharge storage/elevation tables for the Canadian Storage projects in Exhibits 13, 14, and 15. The new project data contained in these exhibits were not used in HYDSIM studies and are provided for the reader’s convenience.

## **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 and updated February 1, 2013.

### Arrow Reservoir

8.758 km<sup>3</sup> (7.1 Maf or 3579.6 ksfd) 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 and updated February 1, 2013.

### Mica Reservoir

8.634 km<sup>3</sup> (7 Maf or 3529.2 ksfd) 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 and updated February 1, 2013. The total available storage between these elevations is 14.802 km<sup>3</sup> (12 Maf, 6050.0 ksfd), but only 8.634 km<sup>3</sup> (7 Maf, 3529.2 ksfd) of this storage is utilized for power purposes, except as described in paragraph VII(C)6.

## **C. Flood Risk Management**

This DOP introduces new terminology because the Corps of Engineers has transitioned from “flood control” to “flood risk management (FRM)”. Historic documents that use flood control will not be changed. The requirements for FRM operations are defined in the Treaty and the FCOP. In accordance with Section 6-6 of the FCOP, the Canadian Entity selected for the AOP14 a reallocation of Mica/Arrow system FRM 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 FRM 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 FRM purposes under special circumstances, as described in Section 3-2 of the FCOP.

During the 2013-14 Operating Year, the Canadian Entity may request a different allocation of Mica/Arrow system flood space. To the extent that the requested allocation differs from that included in the AOP14, 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 AOP14 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 FRM elevations for Arrow with the intent to minimize the occurrence of flows above 180 kcfs at Trail (as measured at Birchbank) or as updated with best available information based on BC Hydro operating policies for flood impacts. This local FRM objective which is below 225 kcfs will be included in the FRM rule curve and input as the



Upper Rule Curve in the TSR studies only to the extent that it does not jeopardize system FRM needs.

In order to accommodate local minimum flow requirements downstream of Duncan Dam beginning with the 2009-10 Operating Year, the Canadian Entity has requested a permanent variance to the February Duncan FRM 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 TSR14 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 AOP14 Step I hydro regulation study, except for the following changes agreed to by the Entities:

1. FRM 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 FRM rule curve to no lower than 1812.5 feet (usable content 93.2 ksfd). This change does not affect the critical rule curves.
3. Use of the hydro-independent (HI) generation included in the Actual Energy Regulation (AER) plus the 80-year median values from the AOP18 for all other HIs not updated in the AER and for which updates are not available from the project owner. 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 actual operations is limited to 2,265 m<sup>3</sup>/s (80,000 cfs). However, for the TSR, the AOP14 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 are based on the historic 80-year 2010 Modified Streamflow record, and as updated in Appendix 8 of the 2003 POP. Forecast errors were updated and approved at the March 2012 CRTOC meeting and distribution factors were updated and approved at the May 2012 CRTOC meeting. The Operating Committee may revise forecast errors and distribution factors in accordance with subsection II(E).
6. The February 1, 2013 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, Arrow, Duncan, Revelstoke, and Brilliant projects are based upon PNCA data submittals, including most recently the February 1, 2012 submittal.
8. Updated Grand Coulee and Hungry Horse storage/elevation tables from the February 1, 2008 PNCA data submittal, which includes a reduction in total usable storage at Hungry Horse of 45.1 ksfd due to no longer including the assumption of 3% bank storage. The AOP14 rule curves for Hungry Horse (CRC, ARC, & ORCLL) will be adjusted to subtract 45.1 ksfd from all values, limited to empty, to avoid impacting the 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 80-year medians from the 2010 Modified Flows without Grand Coulee pumping will be used.
10. The hydro regulation model used will be PCHYDSIM version 29, or a later version if agreed upon by the Operating Committee.
11. During the FRM evacuation period, the FRM curves at Grand Coulee may be adjusted to recognize drafts below the FRM 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 February 1, 2013 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. Dworshak will be operated to meet minimum flow or FRM objectives in all periods except June through September. The operation will use target contents for June through September as defined in the PNCA data submittal. Target contents for July and mid-August correspond to the median elevations developed by the COE in their HYSSR 80-yr study to achieve smooth outflows during this time frame.
13. 80-year median Energy Content Curves for Ross are based on the February 1, 2013, PNCA data submittal.
14. The operation of Mossyrock, Mayfield, Swift #1, Swift #2, Merwin, Alder, and Yale will be based on past actual inflows and elevations, and 80-year median inflows and median Variable Energy Content Curves for future months.
15. Use of updated plant data including h/k values, generation vs discharge, spill vs discharge, physical project limits, storage elevation tables, tailwater rating curves, maximum generation table and full gate h/k values for 14 federal projects based on the PNCA February 1, 2012 data submittal.

16. Use of updated project operating constraints including initial storage contents, fish spill, minimum spill, spill caps, minimum and maximum outflows, minimum target, and maximum storage contents based on the PNCA February 1, 2012 data submittal.
17. Brownlee's storage operation is based on critical rule curves and power discharge requirements included in the AOP14, as well as by a project minimum flow in support of a year-round minimum navigation flow of 6,500 cfs at Hells Canyon. In prior DOPs, this navigation flow requirement was referenced to a 13,000 cfs flow minimum at Lime Point. However, an agreement between the U.S. Army Corps of Engineers and Idaho Power Company established this new reference flow point and amount.
18. Noxon Special Logic in HYDSIM was removed (as in AOP18) because the updated h/k data provided by Avista Utilities made the logic obsolete. Originally the logic was used to reduce the calculated generation at higher flows.
19. Corra Linn '5-Step Logic' in HYDSIM was removed (as in AOP18) to reflect current operating practices, as approved at the May 2012 CRTOC meeting. Prior to AOP18, Libby and Duncan discharges were reduced through a step-wise modeling procedure whenever the level of Kootenay Lake exceeded its IJC Rule Curve level.

Although not changed from the AOP14, some notable assumptions for this TSR include:

20. U.S. FRM curves will include VarQ at Hungry Horse but not at Libby, and will not include Variable End-of-December FRM rule curves at Libby or shifted FRM spaces from Brownlee and/or Dworshak to Grand Coulee.

The Canadian FRM curves will not include impacts due to VarQ and Variable End-of-December FRM rule curves at Libby or any impacts related to shifting of FRM spaces from Brownlee and/or Dworshak to Grand Coulee unless otherwise agreed by the Operating Committee.

21. 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 which 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).
22. The Variable Refill Curve Lower Limits (VRCLLs) are used at Grand Coulee only and are fixed for all three forecast levels, 98.7, 117.2 and 135.7 km<sup>3</sup> (80, 95, and 110 Maf, respectively). The January and February Grand Coulee VRCLL values are the same as its ORCLL, while the March to June VRCLL 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 TSR14 will be based on the AOP14 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 AOP14 is:

Capacity Entitlement = 1,335.5 MW  
Energy Entitlement = 505.5 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 2013 through 31 July 2014 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 FRM 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 (excluding subsection VII(B)7) of this DOP, the objectives for SOAs include the following.

###### **1. Power Objectives:**

Power objectives include minimizing spill and optimizing energy production, and power value. 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 objectives. 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 FRM 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 FRM 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 on by the Operating Committee). Actual unregulated streamflows and forecasted unregulated streamflows will be updated for each TSR study. Variable refill curves, FRM storage evacuation requirements, and variable FRM 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. Additional information regarding TSR study input may be found in POP Section 4.4A and POP Section 4.4 B.

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

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 FRM storage evacuation period and the FRM refill period, project FRM curves will be determined by the Columbia Basin Water Management Division, Northwestern Division, U.S. Army Corps of Engineers, in accordance with the FCOP and the latest update to the "Standard Operating Procedures for Computation of Flood Control Criteria for Treaty Storage Regulation and Actual Energy Regulation Models". 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**

- 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 \_\_\_\_\_ ksfd.

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 \_\_\_\_\_ ksfd.

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 to 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 FRM

- 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 FRM 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 FRM 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 is 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 FRM, a reservoir ends up above its FRM rule curve, then an appropriate outflow schedule for that reservoir will be determined to ensure that the reservoir will be drafted to its FRM 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 2013 through 31 July 2014 is determined in accordance with the reference documents of Section I, and is defined as follows:

1. During the period 1 August 2013 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 2014 through 31 July 2014, 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 2014 through 15 April 2014, 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 FRM (Exhibit 6).
4. During any month in the Operating Year, the ORC will not be higher than the FRM Rule Curve, defined as the maximum elevation of each reservoir established by FRM 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 (Table 3) tabulated with specified qualifications in subsection 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 (as described in subsection VII(B)). 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 and 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 subsection 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 Curves for Duncan, Arrow, and Mica.   | Exhibit 1 |
| 2. First Critical Rule Curves for Duncan, Arrow, Mica, and the whole of Canadian storage.   | Exhibit 2 |
| 3. Second Critical Rule Curves for Duncan, Arrow, Mica, and the whole of Canadian storage.  | Exhibit 3 |
| 4. Third Critical Rule Curves for Duncan, Arrow, Mica, and the whole of Canadian storage.   | Exhibit 4 |
| 5. Fourth Critical Rule Curves for Duncan, Arrow, Mica, and the whole of Canadian storage.  | Exhibit 5 |
| 6. Operating Rule Curve Lower Limits for Duncan, Arrow, Mica, based on 1936-37 Hydro Conditions.  | Exhibit 6 |
| 7. Variable Refill Curve Procedures, including Power Discharge Requirements for January – July Volume Runoff of the Columbia River at The Dalles, Oregon for Duncan, Arrow, and Mica. | Exhibit 7 |
| 8. Coordinated System Loads and Resources Used in the AOP14.  | 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 DOP14 80-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 and updated February 1, 2013). | Exhibit 13 |
| 2. | Arrow Reservoir Capacity Table (based on B.C. Hydro Table dated 28 February 1974 and updated February 1, 2013).  | Exhibit 14 |
| 3. | Mica Reservoir Capacity Table (based on B.C. Hydro Table dated 25 March 1974 and updated February 1, 2013).      | Exhibit 15 |

## **VII. OPERATING LIMITS**

### **A. Duncan Project**

1. Maximum outflow is 566.34 m<sup>3</sup>/s (20,000 cfs) through outlets but limited to 283.17 m<sup>3</sup>/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. In actual operation, Arrow 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 FRM 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 FRM 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, and 283 m<sup>3</sup>/s (10,000 cfs) for April 16-30 and May, and no change for June at 142 m<sup>3</sup>/s (5,000 cfs). These minimum monthly outflows 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 FRM 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 through 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	URC to	1800 4403.8				
							1800 4403.8				
March	1 Mar - 31 Jul					URC	URC			20	566
		>80.2	>65	to	<75	URC to	900 2201.9				
							900 2201.9				
April 15	1 Apr - 31 Jul					URC	URC			15	425
		>75.2	>61	to	<70	URC to	900 2201.9				
							900 2201.9				
April 30	1 Apr - 31 Jul					URC	URC			10	283
		>75.2	>61	to	<70	URC to	1000 2446.6				
							1000 2446.6				
May	1 May - 31 Jul					URC	URC			10	283
		>83.9	>68	to	<70	URC to	2100 5137.8				
							2100 5137.8				
June	1 Jun - 31 Jul					URC	URC			5	142
		>40.7	>33	to	<35	URC to	3400 8318.4				
							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 hm<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 <u>1/</u>					
		Jan-Jul	Feb-Jul	Mar-Jul	Apr-Jul	May-Jul	Jun-Jul
1-Jan	1 Jan - 31 Jul	1.0000	0.9440	0.8860	0.8080	0.6800	0.4270
1-Feb	1 Feb - 31 Jul		1.0000	0.9390	0.8560	0.7200	0.4520
1-Mar	1 Mar - 31 Jul			1.0000	0.9120	0.7670	0.4810
1-Apr	1 Apr - 31 Jul				1.0000	0.8410	0.5280
1-May	1 May - 31 Jul					1.0000	0.6280
1-Jun	1 Jun - 31 Jul						1.0000

**Notes:**

1. Unless otherwise agreed, the DOP14 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 2010 Modified streamflows mean 80 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 0.6280, the estimated June-July volume runoff is 50.4 km<sup>3</sup> (40.8 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 is used for the prior month. Then the End of Previous Month Arrow Storage Content will be established using the most recent TSR with the Arrow Total Inflow Method 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 FRM 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 FRM 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 FRM 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 FRM.

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 FRM.

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	for Refill							
	CFS 1/		CFS 3/	CFS			KSFD		KSFD	CFS 1/			CFS 3/		CFS	KSFD	
Aug1	52256	3000	49256	738.8	3529.2	<b>46.9</b>	81791	5000	76791	1151.9	3529.2	<b>0.0</b>	5228	100	5128	76.9	<b>36.9</b>
Aug2	39483	3000	36483	583.7	3529.2	<b>630.6</b>	61808	5000	56808	908.9	0.0	<b>0.0</b>	3875	100	3775	60.4	<b>97.3</b>
Sep	23088	3000	20088	602.6	3522.6	<b>1233.3</b>	38819	5000	33819	1014.6	-6.6	<b>0.0</b>	2310	100	2210	66.3	<b>163.6</b>
Oct	8755	3000	5755	178.4	3409.0	<b>1411.7</b>	14417	5000	9417	291.9	-113.6	<b>0.0</b>	1089	100	989	30.7	<b>194.3</b>
Nov	5167	3000	2167	65.0	3002.9	<b>1476.7</b>	9356	5000	4356	130.7	-406.1	<b>0.0</b>	684	100	584	17.5	<b>211.8</b>
Dec	3525	3000	525	16.3	2274.1	<b>1493.0</b>	6470	5000	1470	45.6	-728.8	<b>691.5</b>	461	100	361	11.2	<b>223.0</b>
Jan	2828	3000	-172	-5.3	1526.8	<b>1487.6</b>	6442	5000	1442	44.7	-747.3	<b>1483.5</b>	428	100	328	10.2	<b>233.2</b>
Feb	2584	3000	-416	-11.6	783.7	<b>1476.0</b>	5751	5000	751	21.0	-50.8	<b>1555.3</b>	428	100	328	9.2	<b>242.3</b>
Mar	3214	3000	214	6.6	505.1	<b>1482.6</b>	7842	5000	2842	88.1	6.6	<b>1636.8</b>	554	100	454	14.1	<b>256.4</b>
Apr1	4669	3000	1669	25.0	258.7	<b>1507.7</b>	12052	5000	7052	105.8	25.0	<b>1717.5</b>	825	100	725	10.9	<b>267.3</b>
Apr2	7221	3000	4221	63.3	173.5	<b>1571.0</b>	20475	5000	15475	232.1	63.3	<b>1886.3</b>	1137	100	1037	15.6	<b>282.8</b>
May	28098	3000	25098	778.0	469.0	<b>2349.0</b>	69119	5000	64119	1987.7	778.0	<b>3096.0</b>	5170	293	4877	151.2	<b>434.0</b>
June	60185	22350	37835	1135.1	2114.7	<b>3484.1</b>	114506	60550	53956	1618.7	1135.1	<b>3579.6</b>	8030	3997	4033	121.0	<b>555.0</b>
July	56556	55100	1456	45.1	3101.2	<b>3529.2</b>	88892	89140	-248	-7.7	45.1	<b>3579.6</b>	7320	2456	4864	150.8	<b>705.8</b>

**Exhibit 1M – Assured Refill Curves (SI) 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				hm <sup>3</sup>		hm <sup>3</sup>	Inflow	for Refill		Refill		Inflow	for Refill	
	m <sup>3</sup> /s 1/		m <sup>3</sup> /s 3/	m <sup>3</sup> /s	hm <sup>3</sup>	hm <sup>3</sup>	hm <sup>3</sup>		m <sup>3</sup> /s 1/	m <sup>3</sup> /s 3/	m <sup>3</sup> /s	hm <sup>3</sup>	hm <sup>3</sup> 2/		hm <sup>3</sup>	m <sup>3</sup> /s 1/	m <sup>3</sup> /s 3/
Aug1	1479.72	84.95	1394.77	1807.6	8634.5	114.8	2316.06	141.58	2174.48	2818.2	8634.5	0.0	148.04	2.83	145.21	188.2	90.3
Aug2	1118.03	84.95	1033.08	1428.1	8634.5	1542.9	1750.21	141.58	1608.62	2223.8	0.0	0.0	109.73	2.83	106.90	147.8	238.1
Sep	653.78	84.95	568.83	1474.4	8618.4	3017.3	1099.23	141.58	957.65	2482.2	-16.1	0.0	65.41	2.83	62.58	162.2	400.3
Oct	247.91	84.95	162.96	436.5	8340.5	3453.8	408.24	141.58	266.66	714.2	-277.9	0.0	30.84	2.83	28.01	75.0	475.3
Nov	146.31	84.95	61.36	159.1	7346.9	3612.9	264.93	141.58	123.35	319.7	-993.6	0.0	19.37	2.83	16.54	42.9	518.2
Dec	99.82	84.95	14.87	39.8	5563.8	3652.7	183.21	141.58	41.63	111.5	-1783.1	1691.7	13.05	2.83	10.22	27.4	545.6
Jan	80.08	84.95	-4.87	-13.0	3735.5	3639.7	182.42	141.58	40.83	109.4	-1828.3	3629.4	12.12	2.83	9.29	24.9	570.4
Feb	73.17	84.95	-11.78	-28.5	1917.4	3611.2	162.85	141.58	21.27	51.4	-124.3	3805.2	12.12	2.83	9.29	22.5	592.9
Mar	91.01	84.95	6.06	16.2	1235.8	3627.4	222.06	141.58	80.48	215.6	16.2	4004.5	15.69	2.83	12.86	34.4	627.3
Apr1	132.21	84.95	47.26	61.3	632.9	3688.6	341.27	141.58	199.69	258.8	61.3	4202.1	23.36	2.83	20.53	26.6	653.9
Apr2	204.48	84.95	119.53	154.9	424.5	3843.5	579.79	141.58	438.20	567.9	154.9	4615.1	32.20	2.83	29.36	38.1	692.0
May	795.65	84.95	710.70	1903.5	1147.5	5747.1	1957.23	141.58	1815.65	4863.1	1903.5	7574.6	146.40	8.30	138.10	369.9	1061.9
June	1704.25	632.88	1071.37	2777.0	5173.8	8524.1	3242.45	1714.58	1527.86	3960.3	2777.0	8757.8	227.38	113.18	114.20	296.0	1357.9
July	1601.49	1560.26	41.23	110.4	7587.4	8634.5	2517.14	2524.16	-7.02	-18.81	110.4	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, based on the 2010 Level Modified streamflow record, 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 at Arrow: These values are computed by subtracting current month from previous month's higher of Mica's ARC or first year critical rule curve (CRC1), except July value is Mica full minus previous month's higher of Mica's ARC or CRC1. CRC1 is also shown in Exhibit 2.
- 3/ PDRs are from the AOP14.

## 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 are from the AOP14.

## 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 are from the AOP14.

**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 are from the AOP14.

**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 are from the AOP14.

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

End-of-Period Usable Storage Content

	English (ksfd)			SI (hm3)		
<u>Month</u>	<u>Mica</u>	<u>Arrow</u>	<u>Duncan</u>	<u>Mica</u>	<u>Arrow</u>	<u>Duncan</u>
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 are from the AOP14.

## 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 AOP14. 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>	84.95	84.95	84.95	84.95	84.95	84.95	906.14	1076.04
117.18 km <sup>3</sup>	84.95	84.95	84.95	84.95	84.95	84.95	509.70	914.63
135.69 km <sup>3</sup>	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>	141.58	141.58	141.58	141.58	141.58	141.58	1874.57	1959.52
117.18 km <sup>3</sup>	141.58	141.58	141.58	141.58	141.58	141.58	1217.62	1614.06
135.69 km <sup>3</sup>	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>	2.83	2.83	2.83	2.83	2.83	39.64	50.97	50.97
117.18 km <sup>3</sup>	2.83	2.83	2.83	2.83	2.83	2.83	16.99	31.15
135.69 km <sup>3</sup>	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 AOP14. 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 AOP14**  
(Energy in aMW)

Month	PNW Area Firm Loads 1/	Export, Imports and Resources 2/	Coordinated Hydro Load 3/
August 15	22,202	11,239	10,963
August 31	22,199	11,100	11,099
September	20,865	9,790	11,076
October	21,029	11,114	9,915
November	23,328	11,876	11,452
December	25,374	12,065	13,309
January	25,899	13,028	12,871
February	24,854	13,138	11,716
March	23,021	12,525	10,496
April 15	21,733	11,952	9,781
April 30	21,757	10,261	11,496
May	21,060	7,779	13,281
June	21,629	7,769	13,860
July	22,708	10,183	12,525

Notes: Data for columns 1, 2, and 3 are from DDPB Table 1A of the AOP14. References to line numbers in the notes below are references to lines in DDPB Table 1A of the AOP14.

- 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 2j), total load served by flows-in (line 3i), load served by other resources (lines 4f – 4b), total thermal installations (line 6c), hydro maintenance (line 8a), and transmission system losses (line 8b). Other resources include hydro independents (1929 for example) that will be updated as described in subsection II(D)3.
- 3/ AOP14 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 ksfd  
Unadjusted for Crossovers

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>LIBBY</b>														
<b>ARC</b>	1738.9	1789.5	1824.2	1820.1	1791.2	1739.8	1688.8	1636.4	1583.7	1568.5	1566.3	2022.5	2472.7	2510.5
1928-29	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
1929-30	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
1930-31	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
1031-32	1852.2	1865.1	1875.4	1608.9	1100.0	411.8	103.1	0.0						
<b>CORRA LINN</b>														
<b>ARC</b>	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
1928-29	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
1929-30	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
1930-31	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
1031-32	285.4	285.4	396.9	396.9	396.9	396.9	322.8	57.6						
<b>HUNGRY HORSE *</b>														
<b>ARC</b>	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
1928-29	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
1929-30	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
1930-31	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
1031-32	313.2	222.3	127.8	112.2	86.6	0.0	0.0	0.0						
<b>KERR</b>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	516.4	614.7
1928-29	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
1929-30	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
1930-31	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
1031-32	614.7	614.7	614.7	501.3	426.4	239.2	0.5	0.0						
<b>ALBENI FALLS</b>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	404.8	582.4
1928-29	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
1929-30	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
1930-31	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
1031-32	582.4	582.4	465.7	190.4	57.6	57.6	57.6	0.0						
<b>GRAND COULEE</b>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	0.0	1427.7	1836.3	2274.9	2289.8	2282.8	2549.7	2614.3	2614.3
1928-29	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
1929-30	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
1930-31	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
1031-32	2614.3	2531.9	2531.9	2531.9	2531.9	2316.5	920.3	0.0						
<b>CHELAN</b>														
<b>ARC</b>	35.4	49.4	67.6	80.0	91.7	101.5	114.0	124.4	142.5	153.9	182.1	281.5	341.5	341.5
1928-29	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
1929-30	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
1930-31	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
1031-32	247.8	230.0	193.5	145.2	100.3	50.4	1.2	0.0						
<b>BROWNLEE</b>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	6.8	124.9	210.3	384.3	422.0	459.8	491.7	491.7	491.7
1928-29	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
1929-30	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
1930-31	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
1031-32	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 ksf  
Unadjusted for Crossovers

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>NOXON</b>														
<b>ARC</b>	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
<b>CRC1</b>	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>														
<b>ARC</b>	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
<b>CRC1</b>	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>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.6	89.5	112.5
<b>CRC1</b>	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>														
<b>ARC</b>	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	52.5
<b>CRC1</b>	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 AOP14 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

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>LIBBY</b>														
ARC	4254.4	4378.2	4463.1	4453.1	4382.3	4256.6	4131.8	4003.6	3874.7	3837.5	3832.1	4948.2	6049.7	6142.2
1928-29	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
1929-30	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
1930-31	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
1031-32	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
1928-29	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
1929-30	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
1930-31	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
1031-32	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
1928-29	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
1929-30	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
1930-31	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
1031-32	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	3.7	1263.4	1503.9
1928-29	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
1929-30	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
1930-31	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
1031-32	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	990.4	1424.9
1928-29	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
1929-30	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
1930-31	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
1031-32	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	3493.0	4492.7	5565.8	5602.2	5585.1	6238.1	6396.1	6396.1
1928-29	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
1929-30	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
1930-31	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
1031-32	6396.1	6194.5	6194.5	6194.5	6194.5	5667.5	2251.6	0.0						
<b>CHELAN</b>														
ARC	86.6	120.9	165.4	195.7	224.4	248.3	278.9	304.4	348.6	376.5	445.5	688.7	835.5	835.5
1928-29	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
1929-30	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
1930-31	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
1031-32	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	16.6	305.6	514.5	940.2	1032.5	1124.9	1203.0	1203.0	1203.0
1928-29	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
1929-30	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
1930-31	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
1031-32	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

YEAR	AUG15	AUG31	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR15	APR30	MAY	JUN	JUL
<b>NOXON</b>														
<b>ARC</b>	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
<b>CRC1</b>	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>														
<b>ARC</b>	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
<b>CRC1</b>	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>														
<b>ARC</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.8	219.0	275.2
<b>CRC1</b>	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>														
<b>ARC</b>	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	128.4
<b>CRC1</b>	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 AOP14 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

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

Notes

1/ PDRs and VRCLLs from the AOP14.

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 PDR	113.27	113.27	113.27	113.27	113.27	113.30	208.10	274.67
98.68 km3 PDR	113.27	113.27	113.27	113.27	113.27	113.27	424.75	424.75
117.18 km3 PDR	113.27	113.27	113.27	113.27	113.27	113.27	424.75	424.75
135.69 km3 PDR	113.27	113.27	113.27	113.27	113.27	113.27	226.53	311.49
<b>Hungry Horse</b>								
ARC PDR	11.33	11.33	11.33	11.33	216.82	11.47	160.95	39.19
98.68 km3 PDR	11.33	11.33	11.33	11.33	11.33	11.33	58.62	58.62
117.18 km3 PDR	11.33	11.33	11.33	11.33	11.33	11.33	45.31	45.31
135.69 km3 PDR	11.33	11.33	11.33	11.33	11.33	11.33	22.65	33.98
<b>Grand Coulee</b>								
ARC PDR	849.50	849.50	849.50	1310.73	1007.51	2245.38	3246.72	3609.21
98.68 km3 PDR	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
117.18 km3 PDR	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
135.69 km3 PDR	849.50	849.50	849.50	849.50	849.50	849.50	849.50	849.50
98.68 km3 VRCLL	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
117.18 km3 VRCLL	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
135.69 km3 VRCLL	4352.3	2579.9	1024.4	1024.4	1024.4	2064.2	5899.5	6396.1
<b>Chelan</b>								
ARC PDR	1.42	1.42	1.42	1.42	1.42	58.08	58.22	55.44
98.68 km3 PDR	1.42	1.42	1.42	1.42	1.42	7.08	31.94	31.94
117.18 km3 PDR	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
135.69 km3 PDR	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42

## Notes

1/ PDRs and VRCLLs from the AOP14.

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 (ksfd)				
Month	Libby	Hungry Horse *	Grand Coulee	Chelan
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
Apr-15	0.0	0.0	0.0	0.0

SI (hm <sup>3</sup> )				
Month	Libby	Hungry Horse *	Grand Coulee	Chelan
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
Apr-15	0.0	0.0	0.0	0.0

Source: Operating Rule Curve Lower Limits from the AOP14.

\* Adjusted for 0% bank storage.



## Exhibit 12 - Composite Canadian Storage Contents in ksfd

### From the DOP14 80-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	7810.5	7464.5	6967.6	6133.0	4876.7	3151.7	1803.9	1396.3	1293.9	763.3	2105.0	4909.7	6406.4
1929-1930	6745.4	6919.3	6226.9	5246.3	3953.0	2569.0	1165.8	835.6	496.5	590.1	1221.4	2444.7	3544.0	5241.6
1930-1931	5584.0	5749.8	5063.6	4270.2	3166.8	1680.8	664.8	125.4	0.0	0.0	0.0	345.9	1988.2	2625.2
1931-1932	2665.8	2680.6	2439.7	1736.8	975.1	204.1	0.0	0.0	0.0	102.0	341.5	2229.7	5781.3	7628.8
1932-1933	7786.1	7814.4	6915.7	6214.4	5988.9	5204.0	3096.0	1450.4	632.9	568.2	701.8	2012.5	5578.3	7690.6
1933-1934	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3172.1	1591.6	400.3	245.6	886.6	2587.2	4633.8	6179.8
1934-1935	6530.5	6744.6	5999.8	5311.0	5200.3	4235.1	2344.3	1929.3	1108.7	860.1	995.8	2623.3	5782.9	7752.6
1935-1936	7814.6	7798.2	7428.2	6643.8	5431.1	3990.5	2343.2	1654.9	1236.0	1096.3	1440.1	4409.2	6973.9	7814.6
1936-1937	7814.6	7753.4	7088.8	6201.0	4757.2	3335.9	1336.8	513.9	55.8	26.6	55.9	1393.5	3298.5	5021.1
1937-1938	5222.3	5234.4	4452.2	3861.1	3501.5	2817.8	1495.3	1036.4	583.5	482.6	617.1	2432.5	5718.0	7581.1
1938-1939	7480.7	7362.3	6863.7	6213.2	5182.7	4091.7	2978.5	2493.9	1568.5	1600.7	1794.3	4151.1	5203.8	7206.0
1939-1940	7472.0	7559.6	6830.0	6132.5	5191.5	4484.1	3221.5	2820.7	2064.8	2148.2	2488.6	4816.1	5664.5	6763.8
1940-1941	6891.2	6884.6	6600.2	6344.5	5266.4	4077.6	2599.8	2224.8	1969.8	2181.1	1420.1	3113.1	3436.5	4441.3
1941-1942	4488.4	4487.7	4044.4	4475.7	4139.3	4313.8	3221.0	2066.6	903.6	787.9	894.2	2565.5	4914.2	7359.8
1942-1943	7649.6	7728.4	7006.5	6268.0	5579.9	4924.8	2835.9	2358.7	1318.6	1164.3	1406.2	2614.1	5017.2	7455.5
1943-1944	7687.7	7814.6	7397.9	6875.3	5954.0	4845.5	3169.4	1890.6	1026.2	838.2	737.9	2145.9	3177.2	3824.6
1944-1945	3901.0	3810.4	3175.1	2666.5	1907.9	443.9	376.2	0.0	0.0	0.0	0.0	1674.4	4641.5	6111.6
1945-1946	6016.6	5796.3	4956.7	4198.2	3562.1	2712.7	905.1	437.0	39.4	4.2	317.3	1816.0	5907.9	7752.6
1946-1947	7814.6	7788.2	7460.6	6947.1	6394.7	5204.0	3013.2	1370.2	554.9	553.7	674.4	2815.4	6302.6	7752.6
1947-1948	7814.6	7792.9	7538.2	7127.1	6394.7	5204.0	3039.7	1307.7	468.0	361.4	524.9	2047.9	6067.3	7802.6
1948-1949	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3255.8	2852.6	1650.4	1424.4	1535.6	4088.9	6183.6	7149.2
1949-1950	7470.7	7533.7	6889.2	6204.4	5765.2	5204.0	3011.5	1341.5	760.6	697.3	802.9	2074.7	5377.5	7690.6
1950-1951	7794.7	7814.4	7544.2	7127.1	6394.7	5204.0	3093.7	1485.0	831.7	826.9	944.4	2629.7	5632.6	7690.6
1951-1952	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3012.6	1296.5	865.9	800.4	1191.9	3062.6	6198.7	7752.6
1952-1953	7814.6	7782.7	7249.9	6483.5	5210.0	3893.8	2163.7	1642.1	1203.9	950.6	997.4	2699.3	5720.9	7557.8
1953-1954	7649.6	7814.4	7544.2	7101.1	6394.7	5204.0	3071.9	1484.4	391.2	310.5	373.0	1490.4	5162.7	7690.6
1954-1955	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3119.8	1680.0	1255.3	1219.1	816.1	1866.6	5742.8	7752.6
1955-1956	7814.6	7814.4	7537.7	7127.1	6394.7	5204.0	3065.4	1343.3	669.1	636.1	741.7	2229.2	6127.5	7752.6
1956-1957	7808.6	7814.4	7544.2	7127.1	6394.7	5204.0	3032.9	1383.9	845.2	810.7	930.4	2221.5	5778.9	7134.4
1957-1958	7320.2	7401.2	6792.6	6214.0	5206.1	4343.1	2203.6	791.8	476.0	523.6	740.4	2364.4	6341.9	7582.5
1958-1959	7627.7	7720.6	7197.2	6941.2	6394.7	5204.0	3106.3	1478.4	712.1	697.0	798.7	1743.7	5325.3	7690.6
1959-1960	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3101.9	1461.8	1161.1	1242.1	1339.2	2818.2	5858.8	7752.6
1960-1961	7814.6	7785.7	7518.2	7037.1	6394.7	5204.0	3093.8	1523.4	334.7	332.4	459.9	1919.3	5906.8	7623.4
1961-1962	7755.8	7797.3	7285.6	6906.8	6131.4	5204.0	3028.1	1769.1	1149.0	933.9	1117.7	2889.5	5811.6	7602.1
1962-1963	7792.6	7814.4	7464.7	7127.1	6394.7	5204.0	3093.0	2048.0	1594.6	1394.8	1551.3	3361.3	6436.5	7752.6
1963-1964	7814.6	7810.7	7544.2	6979.4	6377.8	5204.0	3070.3	1362.7	933.1	900.0	980.3	2130.7	5387.8	7690.6
1964-1965	7800.6	7814.4	7544.2	7127.1	6394.7	5204.0	3097.4	1481.3	1083.3	1071.7	1308.6	2685.2	5518.0	7690.6
1965-1966	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3087.6	1463.7	1085.3	1215.9	1356.2	3681.0	6340.9	7752.6
1966-1967	7814.6	7788.5	7395.3	6783.6	6078.3	5204.0	3112.2	1520.3	318.4	54.1	0.0	928.9	4849.2	7814.6
1967-1968	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3109.8	1492.2	791.9	772.0	338.1	2397.6	5711.3	7690.6
1968-1969	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3076.1	1440.6	665.8	657.5	821.8	2506.6	6283.6	7690.6
1969-1970	7758.7	7759.4	7404.5	7118.5	6394.7	5204.0	3265.1	2792.8	1651.3	1421.8	1148.2	2494.9	5957.6	7693.5
1970-1971	7801.1	7760.0	7249.9	6662.7	5987.7	5194.7	3028.7	1442.8	1001.4	929.3	1046.0	2629.2	6250.0	7752.6
1971-1972	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3054.5	1372.4	255.7	13.6	0.0	1272.8	5007.9	7814.6
1972-1973	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3288.8	2929.8	2589.6	2533.0	2103.8	3942.4	5162.1	6748.6
1973-1974	7071.4	6938.7	6258.0	5739.4	6000.5	5204.0	3094.3	1527.7	810.2	811.4	925.3	1919.1	5444.8	7690.6
1974-1975	7814.6	7814.4	7544.2	6919.9	6143.1	5204.0	3071.0	1611.5	1170.2	1056.2	1196.4	2658.1	5625.7	7640.1
1975-1976	7677.7	7814.4	7544.2	7127.1	6394.7	5204.0	3134.8	1472.1	749.9	739.6	904.9	2182.3	5208.5	7690.6
1976-1977	7814.6	7814.4	7544.2	7127.1	6278.7	5055.7	3358.1	2278.8	1442.7	1231.4	1184.0	2128.4	2790.2	3220.3
1977-1978	3281.4	3260.2	2520.3	2029.6	1312.1	1072.1	995.9	581.7	301.1	324.3	471.4	2022.3	4980.2	6918.9
1978-1979	7360.5	7504.5	7544.2	7127.1	6394.7	5204.0	3320.4	2939.1	1943.7	1894.2	1933.9	3616.8	5757.1	7202.7
1979-1980	7259.6	7442.5	6844.8	6010.2	4696.9	3855.4	2481.4	1923.7	947.0	785.0	1112.5	4129.3	6401.8	7752.6
1980-1981	7718.3	7731.8	7390.5	6891.6	6394.7	5204.0	3185.4	1629.6	1220.6	1211.4	1397.2	3242.3	6124.4	7752.6
1981-1982	7814.6	7814.4	7544.2	7113.0	6394.7	5204.0	3083.5	1477.8	897.3	853.0	983.9	2158.4	5635.0	7690.6
1982-1983	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3131.1	1585.5	1336.2	1143.0	1285.7	3107.5	5909.1	7653.1
1983-1984	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3122.6	1602.8	1335.3	1311.9	1396.3	2341.5	5538.1	7322.5
1984-1985	7649.6	7805.1	7544.2	7127.1	6394.7	5204.0	3265.1	2780.6	1485.3	1278.1	1372.5	3796.4	6301.8	7230.7
1985-1986	7255.9	7191.9	7003.1	6881.2	6366.2	5204.0	3046.2	1415.8	815.1	862.2	1013.7	2704.7	6111.0	7690.6
1986-1987	7808.4	7758.6	7313.5	6815.7	6394.7	5204.0	3265.1	2805.6	2449.1	2551.7	2906.2	5063.5	5453.1	6388.0
1987-1988	6530.4	6469.5	5714.7	4733.4	3571.0	2376.6	1062.2	308.4	46.2	99.2	758.3	2923.9	4114.7	5172.1
1988-1989	5202.3	5092.8	4104.4	3671.6	3166.0	2049.9	1084.1	302.5	40.3	49.6	456.9	2359.9	5527.2	7021.5
1989-1990	7166.3	7456.8	6909.1	6233.6	6394.7	5204.0	3108.8	1510.7	734.8	760.0	944.6	2834.7	6171.3	7752.6
1990-1991	7814.6	7814.4	7392.6	6801.8	6394.7	5204.0	3154.5	1701.3	501.6	495.6	637.9	2167.3	5709.7	7729.4
1991-1992	7814.6	7814.4	7533.7	6673.4	5791.0	4852.6	3259.1	2902.9	2716.0	2809.3	2670.3	4948.1	4930.5	5869.2
1992-1993	5962.8	5686.0	4797.2	4405.3	3463.3	2034.9	949.5	215.1	19.0	41.2	265.6	2924.7	4350.3	6035.9
1993-1994	6365.5	6653.4	6332.5	5612.7	4462.2	3061.3	2033.0	1151.8	877.5	1021.5	1682.2	4174.8	4548.3	6034.8
1994-1995	6237.7	6115.0	5084.7	4226.3	3173.8	2170.1	1616.9	1304.9	696.2	615.4	706.9	2360.1	5606.5	7286.0
1995-1996	7649.6	7745.9	7097.9	7127.1	6394.7	5204.0	3203.1	1626.6	635.2	683.1	848.3	2173.7	5650.1	7690.6
1996-1997	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3078.2	1520.3	622.0	609.3	765.2	1656.7	5622.3	7690.6
1997-1998	7814.6	7814.4	7544.2	7127.1	6394.7	5204.0	3115.7	1597.4	1334.6	1340.8	1506.9	3911.2	6485.9	7752.6
1998-1999	7814.6	7756.3	7337.3	6685.5	6071.4	5204.0	3105.1	1514.8	1104.4	1093.2	1243.8	23		

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

## From the DOP14 80-Year Continuous TSR Study

Water Year	AU1	AU2	SEP	OCT	NOV	DEC	JAN	FEB	MAR	AP1	AP2	MAY	JUN	JUL
1928-1929	19119.2	19109.2	18262.6	17046.9	15005.0	11931.3	7710.9	4413.4	3416.2	3165.7	1867.5	5150.1	12012.1	15673.9
1929-1930	16503.3	16928.8	15234.7	12835.6	9671.4	6285.3	2852.2	2044.4	1214.7	1443.7	2988.3	5981.2	8670.8	12824.1
1930-1931	13661.8	14067.5	12388.6	10447.5	7747.9	4112.2	1626.5	306.8	0.0	0.0	0.0	846.3	4864.3	6422.8
1931-1932	6522.1	6558.4	5969.0	4249.3	2385.7	499.4	0.0	0.0	0.0	249.6	835.5	5455.2	14144.5	18664.6
1932-1933	19049.5	19118.7	16920.0	15204.2	14652.4	12732.1	7574.7	3548.5	1548.5	1390.2	1717.0	4923.8	13647.9	18815.8
1933-1934	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7760.9	3894.0	979.4	600.9	2169.2	6329.8	11337.1	15119.5
1934-1935	15977.5	16501.3	14679.1	12993.9	12723.1	10361.6	5735.6	4720.2	2712.5	2104.3	2436.3	6418.2	14148.4	18967.5
1935-1936	19119.2	19079.1	18173.8	16254.7	13287.7	9763.2	5732.9	4048.9	3024.0	2682.2	3523.3	10787.5	17062.3	19119.2
1936-1937	19119.2	18969.5	17343.5	15171.4	11639.0	8161.6	3270.6	1257.3	136.5	65.1	136.8	3409.3	8070.1	12284.6
1937-1938	12776.9	12806.5	10892.8	9446.6	8566.8	6894.0	3658.4	2535.7	1427.6	1180.7	1509.8	5951.4	13989.7	18547.9
1938-1939	18302.3	18012.6	16792.7	15201.2	12680.0	10010.8	7287.2	6101.6	3837.5	4389.9	5015.6	12731.6	17630.2	19673.0
1939-1940	18281.0	18495.3	16710.3	15003.8	12701.5	10970.8	7881.7	6901.1	5051.7	5255.8	6088.6	11783.1	13858.8	16548.3
1940-1941	16860.0	16843.9	16148.0	15522.5	12884.8	9976.3	6360.7	5443.2	4819.3	5336.3	3474.4	7616.5	8407.7	10866.1
1941-1942	10981.3	10979.6	9895.0	10950.2	10127.2	10554.1	7880.5	5056.1	2210.7	1927.7	2187.7	6276.8	12023.1	18006.5
1942-1943	18715.5	18908.3	17142.1	15335.3	13651.8	12049.0	6938.3	5770.8	3226.1	2848.6	3440.4	6395.7	12275.1	18240.6
1943-1944	18808.7	19101.1	18099.7	16821.1	14567.1	11855.0	7754.3	4625.5	2510.7	2050.7	1805.3	5250.2	7773.3	9357.3
1944-1945	9544.2	9322.5	7768.2	6523.9	4667.9	1086.0	920.4	0.0	0.0	0.0	0.0	4096.6	11355.9	14952.6
1945-1946	14720.2	14181.2	12127.1	10271.3	8715.0	6636.9	2214.4	1069.2	96.4	10.3	776.3	4443.0	14454.3	18967.5
1946-1947	19119.2	19054.6	18253.1	16996.8	15645.3	12732.1	7372.1	3352.3	1357.6	1354.7	1650.0	6888.2	15419.9	18967.5
1947-1948	19119.2	19066.1	18443.0	17437.2	15645.3	12732.1	7436.9	3199.4	1145.0	884.2	1284.2	5010.4	14844.3	19089.8
1948-1949	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7965.6	6979.2	4037.9	3484.9	3757.0	10003.9	15128.8	17491.2
1949-1950	18277.8	18432.0	16855.1	15179.7	14105.1	12732.1	7367.9	3282.1	1860.9	1706.0	1964.4	5076.0	13156.6	18815.8
1950-1951	19070.5	19118.7	18457.6	17437.2	15645.3	12732.1	7569.0	3633.2	2034.8	2023.1	2310.6	6433.8	13780.7	18815.8
1951-1952	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7370.6	3172.0	2118.5	1958.3	2916.1	7493.0	15165.7	18967.5
1952-1953	19119.2	19041.2	17737.6	15862.5	12746.8	9526.6	5293.7	4017.6	2945.5	2325.7	2440.2	6604.1	13996.8	18490.9
1953-1954	18715.5	19118.7	18457.6	17373.6	15645.3	12732.1	7515.7	3631.7	957.1	759.7	912.6	3646.4	12631.1	18815.8
1954-1955	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7632.9	4110.3	3071.2	2982.7	1996.7	4566.8	14050.3	18967.5
1955-1956	19119.2	19118.7	18441.7	17437.2	15645.3	12732.1	7499.8	3286.5	1637.0	1556.3	1814.6	5454.0	14991.5	18967.5
1956-1957	19104.5	19118.7	18457.6	17437.2	15645.3	12732.1	7420.3	3385.8	2067.9	1983.5	2276.3	5435.1	14138.7	17455.0
1957-1958	17909.6	18107.8	16618.8	15203.2	12737.2	10625.8	5391.3	1937.2	1164.6	1281.0	1811.5	5784.7	15516.1	18551.3
1958-1959	18661.9	18889.2	17608.7	16982.3	15645.3	12732.1	7599.9	3617.1	1742.2	1705.3	1954.1	4266.1	13028.9	18815.8
1959-1960	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7589.1	3576.4	2840.7	3038.9	3276.5	6895.0	13910.9	18967.5
1960-1961	19119.2	19048.5	18394.0	17217.0	15645.3	12732.1	7569.3	3727.2	818.9	813.2	1125.2	4695.8	14451.6	18651.4
1961-1962	18975.3	19076.9	17824.9	16898.2	15001.1	12732.1	7408.3	4328.3	2811.1	2284.9	2734.6	7069.5	14218.7	18599.3
1962-1963	19065.4	19118.7	18263.1	17437.2	15645.3	12732.1	7567.3	5010.6	3901.3	3412.5	3795.4	8223.8	15747.5	18967.5
1963-1964	19119.2	19100.6	18457.6	17075.8	15603.9	12732.1	7511.8	3334.0	2282.9	2201.9	2398.4	5213.0	13181.8	18815.8
1964-1965	19084.9	19118.7	18457.6	17437.2	15645.3	12732.1	7578.1	3624.1	2650.4	2622.0	3201.6	6569.6	13500.3	18815.8
1965-1966	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7554.1	3581.1	2655.3	2974.8	3318.1	9005.9	15513.6	18967.5
1966-1967	19119.2	19055.3	18093.3	16596.8	14871.2	12732.1	7614.3	3719.6	779.0	132.4	0.0	2272.6	11864.1	19119.2
1967-1968	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7608.4	3650.8	1937.5	1888.8	827.2	5866.0	13973.3	18815.8
1968-1969	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7526.0	3524.6	1628.9	1608.6	2010.6	6132.6	15373.5	18815.8
1969-1970	18982.4	18984.1	18115.8	17416.1	15645.3	12732.1	7988.4	6832.9	4040.1	3478.6	2809.2	6104.0	14575.9	18822.9
1970-1971	19086.2	18985.6	17737.6	16301.0	14649.5	12709.4	7410.0	3530.0	2450.0	2273.6	2559.1	6432.6	15291.3	18967.5
1971-1972	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7473.1	3357.7	625.6	33.3	0.0	3114.0	12252.3	19119.2
1972-1973	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	8046.4	7168.0	6335.7	6197.2	5147.2	9645.5	12629.6	16511.1
1973-1974	17300.9	16976.2	15310.8	14042.0	14680.8	12732.1	7570.5	3737.7	1982.2	1985.2	2263.8	4695.3	13321.2	18815.8
1974-1975	19119.2	19118.7	18457.6	16930.2	15029.7	12732.1	7513.5	3942.7	2863.0	2584.1	2927.1	6503.3	13763.8	18692.3
1975-1976	18784.3	19118.7	18457.6	17437.2	15645.3	12732.1	7669.6	3601.6	1834.7	1809.5	2213.9	5339.2	12743.1	18815.8
1976-1977	19119.2	19118.7	18457.6	17437.2	15361.5	12369.3	8215.9	5575.3	3529.7	3012.7	2896.8	5207.3	6826.5	7878.8
1977-1978	8028.3	7976.4	6166.2	4965.6	3210.2	2623.0	2436.6	1423.2	736.7	793.4	1153.3	4947.8	12184.6	16927.8
1978-1979	18008.2	18360.5	18457.6	17437.2	15645.3	12732.1	8123.7	7190.8	4755.5	4634.3	4731.5	8848.9	14085.3	17622.1
1979-1980	17761.3	18208.8	16746.5	14704.6	11491.4	9432.6	6071.0	4706.5	2316.9	1920.6	2721.8	10102.7	15662.6	18967.5
1980-1981	18883.6	18916.6	18081.6	16861.0	15645.3	12732.1	7793.4	3987.0	2986.3	2963.8	3418.4	7932.6	14984.0	18967.5
1981-1982	19119.2	19118.7	18457.6	17402.7	15645.3	12732.1	7544.1	3615.6	2195.3	2086.9	2407.2	5280.7	13786.6	18815.8
1982-1983	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7660.5	3879.1	3269.1	2796.5	3145.6	7602.8	14457.2	18724.1
1983-1984	19119.2	19118.7	18457.6	17437.2	15645.3	12732.1	7639.8	3921.4	3266.9	3209.7	3416.2	5728.7	13549.5	17915.2
1984-1985	18715.5	19096.0	18457.6	17437.2	15645.3	12732.1	7988.4	6803.0	3633.9	3127.0	3358.0	9288.3	15418.0	17690.6
1985-1986	17752.3	17595.7	17133.8	16835.5	15575.5	12732.1	7452.8	3463.9	1994.2	2109.5	2480.1	6617.3	14951.2	18815.8
1986-1987	19104.0	18982.2	17893.2	16675.3	15645.3	12732.1	7988.4	6864.2	5992.0	6243.0	7110.3	12388.4	13341.6	15628.9
1987-1988	15977.3	15828.3	13981.6	11580.7	8736.8	5814.6	2598.8	754.5	113.0	242.7	1855.3	7153.6	10067.0	12654.1
1988-1989	12727.9	12460.0	10041.8	8982.9	7745.9	5015.3	2652.4	740.1	98.6	121.4	1117.9	5773.7	13522.8	17178.8
1989-1990	17533.1	18243.8	16903.8	15251.1	15645.3	12732.1	7606.0	3696.1	1797.8	1859.4	2311.1	6935.4	15098.7	18967.5
1990-1991	19119.2	19118.7	18086.7	16641.3	15645.3	12732.1	7717.8	4162.4	1227.2	1212.5	1560.7	5302.5	13969.4	18910.8
1991-1992	19119.2	19118.7	18432.0	16327.1	14168.3	11872.4	7973.7	7102.2	6645.0	6873.2	6533.2	12106.0	12063.0	14359.6
1992-1993	14588.6	13911.4	11736.8	10778.0	8473.3	4978.6	2323.0	526.3	46.5	100.8	649.8	7155.6	10643.4	14767.4
1993-1994	15573.8	16278.2	15493.1	13732.0	10917.2	7489.8	4973.9	2818.0	2146.9	2499.2	4115.7	10214.1	11127.9	14764.7
1994-1995	15261.2	14961.0	12440.2	10340.1	7765.0	5309.4	3955.9	3192.6	1703.3	1505.6	1729.5	5774.2	13716.9	17825.9
1995-1996	18715.5	18951.1	17365.7	17437.2	15645.3	12732.1	7836.7	3979.6	1554.1	1671.3	2075.5	5318.2	13823.5	

## Exhibit 13 – Duncan Reservoir Capacity Table, dated 21 February 1973, Updated February 1, 2013 (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	796.1	797.0	797.9	798.8	799.7	800.6	801.5	802.4	803.3	804.2	0.90
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 February 1973,**  
**Updated February 1, 2013 - 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	
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 February 1973,  
Updated February 1, 2013 - 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	
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	-0.7	-0.3	0.0	0.4	0.8	1.2	1.5	1.9	2.3	2.6	0.37
1793	-4.2	-3.9	-3.5	-3.2	-2.8	-2.5	-2.1	-1.8	-1.4	-1.1	0.35
1792	-7.3	-7.0	-6.7	-6.4	-6.1	-5.8	-5.5	-5.2	-4.9	-4.5	0.31
1791				-9.1	-8.8	-8.6	-8.3	-8.0	-7.8	-7.5	0.26

## Exhibit 13M – Duncan Reservoir Capacity Table, dated 21 February 1973, Updated February 1, 2013 (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
579.73	1947.7	1949.9	1952.1	1954.3	1956.5	1958.7	1960.9	1963.1	1965.3	1967.5	2.20
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, dated 21 February 1973, Updated February 1, 2013 - 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, dated 21 February 1973, Updated February 1, 2013 - 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	-1.7	-0.8	0.1	1.0	1.9	2.8	3.7	4.6	5.5	6.4	0.90
546.51	-10.4	-9.5	-8.6	-7.8	-6.9	-6.0	-5.2	-4.3	-3.4	-2.6	0.86
546.20	-18.0	-17.2	-16.4	-15.7	-14.9	-14.2	-13.4	-12.6	-11.9	-11.1	0.76
545.90				-22.3	-21.6	-21.0	-20.3	-19.7	-19.0	-18.4	0.65



## Exhibit 14 – Arrow Reservoir Capacity Table, dated 28 February 1974, Updated February 1, 2013 (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	3710.6	3716.8	3723.0	3729.2	3735.4	3741.5	3747.7	3753.9	3760.1	3766.3	6.19
1445	3645.1	3651.7	3658.2	3664.8	3671.3	3677.9	3684.4	3691.0	3697.5	3704.1	6.55
1444	3579.6	3586.2	3592.7	3599.3	3605.8	3612.4	3618.9	3625.5	3632.0	3638.6	6.55
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, dated 28 February 1974,  
Updated February 1, 2013 - 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	
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	-42.4	-37.7	-33.0	-28.3	-23.6	-18.8	-14.1	-9.4	-4.7	0.0	4.71
1376	-89.5	-84.8	-80.1	-75.4	-70.7	-65.9	-61.2	-56.5	-51.8	-47.1	4.71
1375	-134.7	-130.2	-125.7	-121.2	-116.6	-112.1	-107.6	-103.1	-98.5	-94.0	4.53
1374	-179.7	-175.2	-170.7	-166.2	-161.7	-157.2	-152.7	-148.2	-143.7	-139.2	4.50
1373	-224.5	-220.0	-215.5	-211.1	-206.6	-202.1	-197.6	-193.2	-188.7	-184.2	4.47
1372	-268.9	-264.5	-260.0	-255.6	-251.2	-246.7	-242.3	-237.8	-233.4	-228.9	4.45
1371	-313.2	-308.7	-304.3	-299.9	-295.5	-291.0	-286.6	-282.2	-277.8	-273.4	4.42
1370					-339.3	-334.9	-330.6	-326.2	-321.9	-317.5	4.35

## Exhibit 14M – Arrow Reservoir Capacity Table, dated 28 February 1974, Updated February 1, 2013 (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
440.74	9078.4	9093.5	9108.6	9123.8	9138.9	9154.1	9169.2	9184.3	9199.5	9214.6	15.14
440.44	8918.1	8934.1	8950.2	8966.2	8982.2	8998.2	9014.3	9030.3	9046.3	9062.3	16.03
440.13	8757.8	8773.9	8789.9	8805.9	8822.0	8838.0	8854.0	8870.0	8886.1	8902.1	16.03
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, dated 28 February 1974, Updated February 1, 2013 - 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
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	-103.7	-92.2	-80.7	-69.2	-57.6	-46.1	-34.6	-23.1	-11.5	0.0	11.53
419.40	-218.9	-207.4	-195.9	-184.4	-172.9	-161.3	-149.8	-138.3	-126.8	-115.3	11.52
419.10	-329.7	-318.6	-307.5	-296.5	-285.4	-274.3	-263.2	-252.2	-241.1	-230.0	11.07
418.80	-439.8	-428.7	-417.7	-406.7	-395.7	-384.7	-373.7	-362.7	-351.7	-340.7	11.01
418.49	-549.2	-538.2	-527.3	-516.4	-505.4	-494.5	-483.5	-472.6	-461.6	-450.7	10.94
418.19	-658.0	-647.1	-636.2	-625.3	-614.5	-603.6	-592.7	-581.8	-570.9	-560.1	10.88
417.88	-766.2	-755.3	-744.5	-733.7	-722.9	-712.1	-701.3	-690.4	-679.6	-668.8	10.82
417.58					-830.1	-819.4	-808.8	-798.1	-787.5	-776.8	10.65

## Exhibit 15 – Mica Reservoir Capacity Table, dated 25 March 1974, Updated February 1, 2013 (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										
2486	10721.7	10727.3	10732.9	10738.4	10744.0	10749.5	10755.1	10760.7	10766.2	10770.5	5.56
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	5.53
2483	10555.9	10561.4	10567.0	10572.5	10578.0	10583.5	10589.0	10594.5	10600.0	10605.5	5.51
2482	10501.0	10506.5	10512.0	10517.5	10523.0	10528.5	10534.0	10539.5	10544.9	10550.4	5.49
2481	10446.2	10451.7	10457.2	10462.7	10468.1	10473.6	10479.1	10484.6	10490.0	10495.5	5.48
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	5.44
2478	10282.9	10288.4	10293.8	10299.2	10304.6	10310.1	10315.5	10320.9	10326.3	10331.8	5.43
2477	10228.8	10234.2	10239.7	10245.1	10250.5	10255.9	10261.3	10266.7	10272.1	10277.5	5.41
2476	10174.9	10180.3	10185.7	10191.1	10196.5	10201.9	10207.3	10212.7	10218.0	10223.4	5.39
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	5.36
2473	10014.1	10019.4	10024.8	10030.1	10035.5	10040.8	10046.1	10051.5	10056.8	10062.2	5.34
2472	9960.8	9966.1	9971.5	9976.8	9982.1	9987.4	9992.8	9998.1	10003.4	10008.8	5.33
2471	9907.8	9913.1	9918.4	9923.7	9929.0	9934.3	9939.6	9944.9	9950.2	9955.5	5.30
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	5.27
2468	9749.5	9754.8	9760.0	9765.3	9770.5	9775.8	9781.1	9786.3	9791.6	9796.8	5.26
2467	9697.1	9702.3	9707.6	9712.8	9718.1	9723.3	9728.5	9733.8	9739.0	9744.3	5.24
2466	9644.8	9650.0	9655.3	9660.5	9665.7	9671.0	9676.2	9681.4	9686.6	9691.9	5.23
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	5.19
2463	9489.0	9494.2	9499.4	9504.5	9509.7	9514.9	9520.1	9525.3	9530.4	9535.6	5.18
2462	9437.4	9442.6	9447.7	9452.9	9458.0	9463.2	9468.4	9473.5	9478.7	9483.8	5.16
2461	9386.0	9391.1	9396.3	9401.4	9406.6	9411.7	9416.8	9422.0	9427.1	9432.3	5.14
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	5.11
2458	9232.8	9237.9	9243.0	9248.1	9253.2	9258.3	9263.3	9268.4	9273.5	9278.6	5.09
2457	9182.0	9187.1	9192.2	9197.2	9202.3	9207.4	9212.5	9217.6	9222.6	9227.7	5.08
2456	9131.4	9136.5	9141.5	9146.6	9151.6	9156.7	9161.8	9166.8	9171.9	9176.9	5.06
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	5.02
2453	8980.7	8985.7	8990.7	8995.7	9000.7	9005.8	9010.8	9015.8	9020.8	9025.8	5.01
2452	8930.8	8935.8	8940.8	8945.8	8950.8	8955.8	8960.7	8965.7	8970.7	8975.7	4.99
2451	8881.0	8886.0	8891.0	8895.9	8900.9	8905.9	8910.9	8915.9	8920.8	8925.8	4.98
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	4.94
2448	8732.8	8737.7	8742.6	8747.6	8752.5	8757.4	8762.3	8767.2	8772.2	8777.1	4.92
2447	8683.7	8688.6	8693.5	8698.4	8703.3	8708.3	8713.2	8718.1	8723.0	8727.9	4.91
2446	8634.8	8639.7	8644.6	8649.5	8654.4	8659.3	8664.1	8669.0	8673.9	8678.8	4.89
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	4.85
2443	8489.1	8493.9	8498.8	8503.6	8508.5	8513.3	8518.1	8523.0	8527.8	8532.7	4.84
2442	8440.8	8445.6	8450.5	8455.3	8460.1	8465.0	8469.8	8474.6	8479.4	8484.3	4.83
2441	8392.7	8397.5	8402.3	8407.1	8411.9	8416.8	8421.6	8426.4	8431.2	8436.0	4.81
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, dated 25 March 1974,  
Updated February 1, 2013 - 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	
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, dated 25 March 1974, Updated February 1, 2013 - 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	
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, dated 25 March 1974, Updated February 1, 2013 - Continued (English Units – ksf/d)

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
2318	3996.6	3999.2	4001.8	4004.3	4006.9	4009.5	4012.0	4014.6	4017.2	4019.7	2.57
2317	3971.0	3973.6	3976.1	3978.7	3981.3	3983.8	3986.4	3989.0	3991.5	3994.1	2.56
2316	3944.8	3947.3	3949.9	3952.4	3955.0	3957.6	3960.1	3962.7	3965.2	3967.8	2.55
2310	3794.0	3796.5	3799.1	3801.6	3804.1	3806.6	3809.2	3811.7	3814.2	3816.7	2.53
2280	3083.5	3085.9	3088.2	3090.6	3093.0	3095.3	3097.7	3100.1	3102.4	3104.8	2.37
2240	2279.6	2281.6	2283.6	2285.6	2287.6	2289.6	2291.7	2293.7	2295.7	2297.7	2.01



## Exhibit 15M – Mica Reservoir Capacity Table, dated 25 March 1974, Updated February 1, 2013 (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	
758.95	26778.4										
757.73	26231.8	26245.4	26259.0	26272.6	26286.2	26299.8	26313.4	26327.0	26340.6	26351.1	13.60
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, dated 25 March 1974, Updated February 1, 2013 - 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
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, dated 25 March 1974, Updated February 1, 2013 – 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, dated 25 March 1974, Updated February 1, 2013 – 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	
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
706.53	9778.2	9784.5	9790.7	9797.0	9803.3	9809.6	9815.8	9822.1	9828.4	9834.7	6.28
706.22	9715.5	9721.8	9728.0	9734.3	9740.6	9746.8	9753.1	9759.4	9765.6	9771.9	6.27
705.92	9651.3	9657.6	9663.8	9670.1	9676.3	9682.6	9688.8	9695.1	9701.3	9707.6	6.25
704.09	9282.4	9288.6	9294.8	9300.9	9307.1	9313.3	9319.5	9325.7	9331.8	9338.0	6.18
694.94	7544.1	7549.9	7555.7	7561.5	7567.3	7573.1	7578.9	7584.7	7590.4	7596.2	5.79
682.75	5577.3	5582.2	5587.1	5592.0	5596.9	5601.9	5606.8	5611.7	5616.6	5621.5	4.92