Contract No. 12PG-10002

COLUMBIA RIVER NON-TREATY STORAGE AGREEMENT

executed by the

BONNEVILLE POWER ADMINISTRATION

and

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY

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This COLUMBIA RIVER NON-TREATY STORAGE AGREEMENT (Agreement) is executed by the BONNEVILLE POWER ADMINISTRATION (BPA) a departmental element of the United States, Department of Energy, and BRITISH COLUMBIA HYDRO AND POWER AUTHORITY (BCH) a Crown corporation of the Province of British Columbia, continued under the *Hydro and Power Authority Act*, R.S.B.C. 1996, c. 212, as amended. BPA and BCH are sometimes referred to individually as "Party" and collectively as "Parties."

RECITALS

Whereas BCH is engaged in the sale and delivery of electric power and energy to customers in British Columbia and is the owner of an electric generation, transmission and distribution system which is used by it to supply electric power and energy to such customers; and

Whereas BPA is authorized, pursuant to United States (U.S.) law to dispose of electric power generated at various federal hydroelectric projects in the Pacific Northwest, or acquired from other resources, to construct and operate transmission facilities, to provide transmission and other services, and to enter into agreements to carry out such authority; and

Whereas the Governments of the United States of America and Canada, on September 16, 1964, ratified the Treaty between Canada and the United States of America Relating to Cooperative Development of the Water Resources of the Columbia River Basin signed at Washington on January 17, 1961, and by an Exchange of Notes dated January 22, 1964, the two Governments agreed upon the terms of a Protocol with effect from the date of the exchange of instruments of ratification of the aforesaid Treaty (which Treaty and Protocol are hereinafter referred to as the "Treaty"); and

Whereas BCH constructed Mica and Arrow dams (hereinafter referred to as "Mica" and "Arrow" respectively) pursuant to the Treaty providing approximately 7.0 million acre-feet of Treaty storage at Mica, and approximately 7.1 million acre-feet of Treaty storage at Arrow, and BCH is authorized to operate such storage; and

Whereas BCH constructed additional non-Treaty storage at Mica, which has provided additional flexibility and other benefits to both Parties; and

Whereas successive agreements executed between the Parties and relating to the initial filling of non-Treaty reservoirs and the use of Columbia River non-Treaty storage (BPA Contract No. DE-MS79-84BP90946 and DE-MS79-90BP92754) have expired and short-term, seasonal non-Treaty storage agreements have been reached between the Parties from 2006 through 2012; and

Whereas nothing in this Agreement is intended to supersede or amend the terms and requirements of the Treaty nor diminish BCH's entitlement to determine the operation of its facilities, including its reservoirs; and

Whereas the U.S. and Canadian Entities established under the Treaty have reviewed this Agreement and have, through a separate written agreement, concurred that operations under this Agreement will not adversely affect stream flow control in the Columbia River within Canada so as to reduce flood control and hydroelectric power benefits under the Treaty, pursuant to Article IV(5) of the Treaty; and

Whereas BPA and BCH enter into this Agreement with the shared purpose of obtaining additional operational flexibility and power and non-power benefits through the coordination of flow operations;

Now therefore the Parties agree as follows:

1. TERM

This Agreement shall take effect upon the latest date of execution by both Parties. Subject to Sections 23 and 24, this Agreement shall expire at 2400 hours on September 15, 2024.

2. DEFINITIONS

In this Agreement, the following words and terms shall have the meanings stated below, unless the context otherwise requires. Capitalized terms that are not listed below are defined within the section in which the term is used. Words in the singular include the plural and vice versa, as context requires. Where a value is quoted in both cubic kilometers (km^3) and million acre-feet (MAF), or both cubic meters per second (m^3/s) and thousand cubic feet per second (kcfs), the units of MAF and kcfs shall be used and shall be determinative for the purpose of making calculations under this Agreement.

(a) "Active Account" shall have the meaning as described in Section 3(a).

(b) "Available Energy Balance" means the value of energy deliveries a Party may request in accordance with Section 6(c) and determined as described in Exhibit F, Determination of Available Energy Balance.

(c) "BCH Critical Planning Period" means the period in the historical stream flow record during which the water available from reservoir releases plus the natural stream flow is capable of producing the least amount of hydroelectric power in meeting system load requirements.

(d) "BCH Dry Period Conditions" means the water conditions occurring when system unregulated inflow volume for the previous February through September are as low as, or lower than the highest February through September inflow volume occurring within the BCH Critical Planning Period, as determined through BC Hydro long term planning models. As of the Effective Date, this threshold system inflow volume is estimated at 90% of normal using the 1981 to 2010 period of record, which may be updated

periodically by BC Hydro, for the February through September period. Average system unregulated inflows are documented in the official Water Supply Summary, published by BCH in October of each year and shared with Provincial government agencies.

(e) "BCH Dry Period Operation" shall have the meaning as described in Section 8(a).

(f) "BPA Dry Period Conditions" means water conditions in a year that are in the lowest 20th percentile based on the Northwest River Forecast Center's (NWRFC) volume runoff averages for their statistical period of record as defined in the 2010 Federal Columbia River Power System (FCRPS) Biological Opinion, or its successor or replacement document that captures such information, as determined in accordance with Section 9(a).

(g) "BPA Dry Period Operation" shall have the meaning as described in Section 9(b).

(h) "Bridge Agreement" means the Non Treaty Storage Short-Term Bridge Agreement, Contract No. 11PB-21385.

(i) "Delivery Point" means the Canada-U.S. border at British Columbia or such other delivery point as is mutually agreed to by the Parties.

(j) "Detailed Operating Plan" means the detailed hydroelectric operating plan prepared annually for the August through July period, in accordance with Article XIV of the Treaty.

(k) "Downstream Federal Hydro Projects" means the six federal hydroelectric generating facilities on the Columbia River in the United States: Grand Coulee, Chief Joseph, McNary, John Day, The Dalles and Bonneville.

(l) "Downstream Mid-C Hydro Projects" means the five non-federal Mid-Columbia (Mid-C) hydroelectric generating facilities on the Columbia River in the United States: Wells, Rock Island, Rocky Reach, Wanapum, and Priest Rapids.

(m) "Downstream U.S. Hydro Projects" means the Downstream Federal Hydro Projects plus the Downstream Mid-C Hydro Projects.

(n) "Effective Date" means the date on which this Agreement takes effect as described in Section 1.

(o) "Energy Price" means the price per megawatt-hour (MWh) of energy in U.S. dollars as determined consistent with Exhibit B, Energy Pricing.

(p) "Expiration Date" means the date on which this Agreement expires as described in Section 1.

(q) "Federal h/k" means the daily average rate in megawatts (MW) per kcfs at which water can be or could have been converted into energy, including adjustments for spill, at the Downstream Federal Hydro Projects, as calculated in accordance with Exhibit A, Daily Conversion Factors (h/k) Calculation.

(r) "Head Loss Energy" means the energy associated with BPA's share of head losses on the BCH system, as calculated in accordance with Section 7.

(s) "Heavy Load Hours" or "HLH" shall have the meaning as defined in Exhibit B, Energy Pricing.

(t) "Initial Water Balance" shall have the meaning as described in Section 3(a)(2) and Section 3(b)(2) for the Active Accounts and Recallable Accounts, respectively.

(u) "Light Load Hours" or "LLH" shall have the meaning as defined in Exhibit B, Energy Pricing.

(v) "Mid-C Participant" means an owner and/or operator of any of the Downstream Mid-C Hydro Projects: Public Utility District No. 1 of Chelan County, Washington (Rock Island and Rocky Reach Projects); Public Utility District No. 1 of Douglas County, Washington (Wells Project); and Public Utility District No. 2 of Grant County, Washington (Wanapum and Priest Rapids) and other parties that receive a share of the output from one or more of the Downstream Mid-C Hydro Projects.

(w) "Recallable Account" shall have the meaning as described in Section 3(b).

(x) "Transaction Benefit Account" shall have the meaning as described in Section 6(b).

(y) "Transaction Request Protocol" means the procedures for making and responding to Transaction requests, as set out in Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines.

(z) "Treaty Storage Regulation Study" means the coordinated system hydro regulation study prepared in accordance with the Detailed Operating Plan.

(aa) "Treaty Week" means the one-week period covered by the Weekly Treaty Storage Operation Agreement as defined in the Detailed Operating Plan, currently Saturday through Friday.

(bb) "U.S. h/k" means the daily average rate in MW per kcfs at which Non-Treaty Water Transactions can be or could have been converted into energy, including adjustments for spill, at the Downstream U.S. Hydro Projects, as calculated in accordance with Exhibit A, Daily Conversion Factors (h/k) Calculation.

(cc) "Water Transaction" means the change in outflow at Arrow resulting from requests made under this Agreement with respect to the volume of water in the Parties' respective Active Accounts or Recallable Accounts.

3. ESTABLISHMENT AND AVAILABILITY OF COLUMBIA RIVER NON-TREATY ACCOUNTS

On the Effective Date, BCH shall establish and make available the following non-Treaty accounts totaling 6.17 km^3 (5.0 MAF), in accordance with the following:

(a) **Active Accounts**

In accordance with and subject to the terms of this Agreement:

(1) BCH shall establish an Active Account for each Party with an account limit of 1.85 km^3 (1.5 MAF), which shall remain available for use by the Party during the term of the Agreement.

(2) The Initial Water Balance in each Party's Active Account shall be set equal to 1.85 km^3 (1.5 MAF).

(b) **Recallable Accounts**

In accordance with and subject to the terms of this Agreement:

(1) BCH shall establish a Recallable Account for each Party with an account limit of 1.233 km^3 (1.0 MAF), which BC Hydro may make available for use by the Parties over the term of the Agreement.

(2) The Initial Water Balance in each Party's Recallable Account shall be set equal to 0.93 km^3 (0.75 MAF).

(c) **Activation of Recallable Accounts**

At any time during the term of this Agreement, either Party may request access to its Recallable Account, and BCH may, in its sole discretion and with as much advance written notice as is reasonably practicable, declare some or all of the Recallable Accounts available for use by the Parties. Subject to Section 8, BCH Dry Period Provisions and Section 13, Forced Evacuation of Non-Treaty Accounts, if the Recallable Accounts are declared available by BCH, then:

(1) the Recallable Accounts shall be made available for use by the Parties in equal amounts, unless otherwise agreed;

(2) the terms and conditions of use of the Recallable Accounts shall be as agreed by the Parties; and

(3) either Party may request a Water Transaction from its Recallable Account in accordance with and subject to Section 4, Water Transactions.

4. WATER TRANSACTIONS

Subject to Section 5, Displacement of Active Account Balances; Section 8, BCH Dry Period Provisions; Section 9, BPA Dry Period Provisions; and Section 13, Forced Evacuation of Non-Treaty Accounts, the terms and conditions of Water Transaction requests outlined in this Section 4 shall apply to all Water Transactions under this Agreement.

(a) Water Transaction Requests

In accordance with Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines, either Party may request a Water Transaction for the upcoming Treaty Week. In such request, the requesting Party shall: (1) designate a Water Transaction in respect of either its Active Account or, if declared available by BCH, the Party's Recallable Account and (2) specify if it is exercising its rights under Sections 5, 8 or 9. Subject to Section 13, a request shall not be required for forced evacuation. The priority of Water Transaction requests shall be in accordance with Section 12.

(b) Account Limits

A Party shall not request a Water Transaction that would: (1) reduce the balance of its Active Account or Recallable Account to less than zero, or (2) increase the balance of its Recallable Account to more than 1.233 km^3 (1.0 MAF).

A Party may request a Water Transaction that would increase the balance of its Active Account to more than 1.85 km^3 (1.5 MAF); provided, however, that the total balance of the Active Accounts shall not exceed 3.70 km^3 (3.0 MAF). If the Parties agree to such a Water Transaction, then the terms and conditions of Section 5, Displacement of Active Account Balances, shall apply.

(c) Declining a Water Transaction Request

Subject to Section 5, Displacement of Active Account Balances, Section 8, BCH Dry Period Provisions and Section 9, BPA Dry Period Provisions, either Party has the right to decline a Water Transaction request made by the other Party. However, each Party shall make reasonable efforts to accommodate Water Transactions requested under this Section 4 by the other Party.

The Parties recognize there are numerous constraints, including power and non-power requirements, upon system operations that may limit the ability of a Party to accommodate a Water Transaction request by the other Party. To promote a better understanding of each Party's non-power requirements and the resulting impacts on coordinating operations under this Agreement, a non-exhaustive listing of typical non-power requirements that the Parties recognize may limit operational flexibility is set out in Exhibit E, Potential Operational Limitations on NTSA Transactions.

(d) Changes to Arrow Outflows

Water Transactions under this Agreement for each Treaty Week shall be implemented by BCH by adjusting the outflow at Arrow to achieve a uniform flow rate for these Water Transactions over the applicable Treaty Week that

corresponds to the sum of the Parties' Water Transactions, unless the Parties agree to a mid-week change under Section 4(e).

(e) **Mid-week Changes**
Either Party may request a mid-week Water Transaction, if no request has been made for that week, or a mid-week modification to an existing Water Transaction (each, a Mid-Week Change) in situations including, but not limited to the following:

(1) by Monday of the Treaty Week, if the weekly average Federal h/k estimate has changed from the estimate made at the time of the Water Transaction request by fifteen percent (15 %) or more, higher or lower; or

(2) the Treaty Storage Regulation Study changes such that it will result in a significant change to Treaty outflows at Arrow from what was expected and planned for by a Party at the time of making its Water Transaction request.

A Party's request for a Mid-Week Change as a result of (1) or (2) above shall not be unreasonably denied by the other Party. All other Mid-Week Changes shall be made by mutual agreement of the Parties.

(f) **Water Transaction Accounting**
Accounting of Water Transactions made pursuant to this Section 4 shall be completed in accordance with Section 6, Water Transaction Accounting, Energy Accounting, and Energy Deliveries, except that accounting for Water Transactions made pursuant to Section 8, BCH Dry Period Provisions, shall be completed in accordance with Section 8.

5. DISPLACEMENT OF ACTIVE ACCOUNT BALANCES

If the Parties agree to a Water Transaction that would increase a Party's Active Account balance to more than 1.85 km^3 (1.5 MAF), then any volume of water in the Active Account of that Party (Overfilled Party) exceeding 1.85 km^3 (1.5 MAF) shall be subject to displacement by the other Party (Displacing Party) in accordance with the following:

(a) A Water Transaction storage request to displace an Active Account balance pursuant to this Section 5 shall be made in accordance with Section 4(a). Such storage request shall be limited by the lesser of:

(1) the Overfilled Party's Active Account balance in excess of 1.85 km^3 (1.5 MAF) expressed as a uniform flow rate over the applicable Treaty Week (in kcfs); or

(2) the volume of water required to achieve a uniform flow rate of 5.0 kcfs over the applicable Treaty Week.

The Overfilled Party shall not deny the Displacing Party's Water Transaction request.

(b) The Overfilled Party shall be deemed to have requested a corresponding Water Transaction release equal to the Water Transaction by the Displacing Party under Section 5(a). The net change in Arrow outflows resulting from such corresponding Water Transactions shall be zero.

(c) Accounting of displacement Water Transactions made pursuant to this Section 5, and any associated energy accounting, shall be completed in accordance with Section 6.

6. WATER TRANSACTION ACCOUNTING, ENERGY ACCOUNTING, AND ENERGY DELIVERIES

(a) General Accounting and Verification

(1) BPA and BCH shall each be responsible for maintaining a daily accounting to include, but not be limited to, the following: Water Transactions; account balances for BPA and BCH Active and Recallable Accounts; Federal h/k or U.S. h/k as applicable; Energy Prices; energy values associated with BCH Water Transactions; BPA Head Loss Payments; account balances for the Transaction Benefit Account; energy deliveries; and any financial payments made pursuant to this Agreement by either Party to the other.

(2) As of the Effective Date, all account balances under the Bridge Agreement shall be transferred to account balances under this Agreement, in accordance with Exhibit H, Bridge Agreement Reconciliation.

(3) BPA and BCH shall verify and reconcile Water Transactions and energy accounting on a monthly basis.

(4) BCH may request information from BPA to verify the after-the-fact accuracy of the Federal h/k or, if applicable, U.S. h/k applied to a BCH Water Transaction, and BPA shall provide such information as soon as practicable following such request.

(b) Transaction Benefit Account

A Transaction Benefit Account shall be established and maintained under the Agreement by the Parties to track and account for the energy values associated with the transactions described below. A positive balance in the Transaction Benefit Account shall be deemed a value allocated to BCH, and a negative balance in the Transaction Benefit Account shall be deemed a value allocated to BPA.

(1) Energy values associated with BCH Water Transactions shall be tracked and accounted for in the Transaction Benefit Account, except

for BCH Water Transactions under Section 8, BCH Dry Period Provisions.

(2) There shall be no energy values associated with any BPA Water Transactions under this Agreement, except for energy values associated with head losses on the BCH system as described in Section 7, BPA Head Loss Payments, which shall be tracked and accounted for in the Transaction Benefit Account.

(3) The energy values associated with BCH Water Transactions in Section 6(b)(1) above shall be calculated as follows, on a daily basis:

(i) The energy associated with a BCH Water Transaction shall be calculated by multiplying the after-the-fact Federal h/k by the daily Water Transaction volume. BCH Water Transactions that reduce Arrow outflows shall be recorded as a negative volume and those that increase Arrow outflows shall be recorded as a positive volume.

(ii) The value of the energy in (i) above shall be calculated by multiplying the energy in MWh times the daily flat Energy Price for the day that the water is deemed to pass through the Downstream Federal Hydro Projects.

The Parties shall assume a 1-day lag between BCH Water Transactions and the resulting change in generation on the Downstream Federal Hydro Projects. Therefore, the Parties shall use Federal h/k and Energy Prices that are lagged by one day from the day of the BCH Water Transaction to calculate energy and energy value in (i) and (ii) above.

(c) **Energy Deliveries Based on the Transaction Benefit Account Balance**

(1) The Party with an Available Energy Balance in its favor, as determined in accordance with Exhibit F, may request energy deliveries from the other Party (Delivering Party) up to the value of the Available Energy Balance. Such requests shall be at a uniform hourly rate, up to 300 MW in Light Load Hours (LLH).

(2) The Delivering Party may not unreasonably deny an energy delivery request. It shall not be deemed unreasonable to deny the request if it is expected that the Energy Price for the applicable upcoming week will be less than or equal to zero, or if energy or capacity limitations would compromise the Delivering Party's ability to serve its load obligations. The Parties may mutually agree to alternate delivery schedules.

(3) Energy deliveries shall be scheduled pursuant to Section 11, Scheduling and Delivery of Energy and Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines.

(4) The value of the energy actually delivered shall be tracked and accounted for in the Transaction Benefit Account. Energy values will be calculated based on the Energy Price for the applicable time blocks, as described in Exhibit B, Energy Pricing, and delivered energy amounts. Energy deliveries from BPA to BCH shall be recorded in the Transaction Benefit Account as a negative energy value, and energy deliveries from BCH to BPA shall be recorded in the Transaction Benefit Account as a positive energy value.

(d) **Settling the Transaction Benefit Account Balance, Billing and Payment**

As soon as practicable after each August 31, the Parties shall verify the Transaction Benefit Account balance for the year prior (September 1 through August 31).

Unless otherwise agreed, a bill shall be issued on or about September 25 each year in the amount of the Transaction Account Balance, in U.S. dollars. If there is a negative account balance, BPA shall bill and BCH shall pay to BPA the amount of any negative Transaction Benefit Account balance, unless otherwise agreed by the Parties. If there is a positive account balance, BCH shall bill and BPA shall pay to BCH the amount of any positive Transaction Benefit Account balance, unless otherwise agreed by the Parties.

All bills shall be issued by electronic submittal unless electronic submittal is not practical, in which case each Party shall transmit a summary to the other Party electronically and send the entire bill by mail.

Payment of all bills shall be made by electronic funds transfer in accordance with instructions on the bill. Payment of all bills shall be made in full on or before the 20th day after the bill is issued. If the 20th day is a Saturday, Sunday, or holiday for the U.S. Federal Government or British Columbia, as applicable, the due date shall be the next business day.

After the due date, either Party may assess a late payment charge equal to the higher of:

(1) the U.S. Prime Rate as listed in the Wall Street Journal, or equivalent successor or replacement publication, in the first issue published during the month in which payment was due plus four percent, divided by 365; or

(2) the U.S. Prime Rate times 1.5, divided by 365;

applied each day to any unpaid balance. Each Party shall adjust the Transaction Benefit Account accordingly upon receipt of payment from the other Party.

7. BPA HEAD LOSS PAYMENTS

Subject to Section 13, Forced Evacuation of Non-Treaty Accounts, if, at any time, the sum of BPA's Active and Recallable Account balances are less than 2.77 km^3 (2.25 MAF), then BPA shall compensate BCH for Head Loss Energy, calculated on a daily basis.

The energy values associated with head losses shall be calculated as follows: first, the Head Loss Energy shall be calculated as the daily average energy of the head losses in accordance with Exhibit C, Mica Head Loss Calculation; then, the daily average value of that Head Loss Energy shall be calculated as the product of the Head Loss Energy in MWh times the daily flat prices on the same day, based on the price index in accordance with Exhibit B, Energy Pricing.

The energy value attributed to Head Loss Energy is a value allocated to BCH and shall be credited to the Transaction Benefit Account under Section 6(b)(2) unless Section 8, BCH Dry Period Provisions apply, in which case Head Loss Energy shall be delivered to BCH under Sections 8(e) and 8(f) and the value shall not be credited to the Transaction Benefit Account.

8. BCH DRY PERIOD PROVISIONS

(a) BCH Dry Period Operation Request

If BCH Dry Period Conditions occur, then BCH may request a BCH Dry Period Operation by written notice to BPA and shall supply BPA with data to support the determination of BCH Dry Period Conditions.

(b) BCH Dry Period Operation Release Rights

If BCH has requested a BCH Dry Period Operation, then BCH may request Water Transactions in the period of October through April to increase Arrow outflows, first from its Active Account up to the volume of water remaining in such account and then from its Recallable Account up to the volume of water remaining in such account. The amount of any such request shall not exceed the volume of water required to achieve a uniform flow rate of 56.6 m^3/s (2 kcfs) over the applicable Treaty Week.

If at the beginning of October and end of April a Treaty Week straddles two calendar months, then the Treaty Week shall be deemed to belong to the calendar month in which most of the days of the Treaty Week occur.

BCH Dry Period Operation Water Transaction requests shall be made in accordance with Section 4(a). BPA shall make all reasonable efforts to accommodate such requests, which shall be implemented in accordance with Section 4(d).

(c) **BPA Option during a BCH Dry Period Operation**
When BCH requests a Water Transaction under Section 8(b) above, BPA may request a concurrent Water Transaction to increase Arrow outflows, first from its Active Account up to the volume of water remaining in such account and then from its Recallable Account up to the volume of water remaining in such account. The amount of any such request shall not exceed the amount of BCH's Dry Period Operation Water Transaction request.

Any such BPA Water Transaction request shall be made in accordance with Section 4(a). BCH shall make all reasonable efforts to accommodate such requests, which shall be implemented in accordance with Section 4(d).

(d) **Scheduling of Equivalent Water Return**
If BCH Dry Period Operation Water Transactions under Section 8(b) occur, then as soon as conditions reasonably permit, BCH shall request Water Transactions to return an equivalent amount of water, first to its Recallable Account, if applicable, and then to its Active Account.

If BPA Water Transactions under Section 8(c) occur from BPA's Recallable Account, then as soon as conditions reasonably permit, BPA shall request Water Transactions to return an equivalent amount of water to its Recallable Account.

All Water Transaction requests under this Section 8(d) shall be made in accordance with Section 4(a). The Parties shall make reasonable efforts to accommodate such requests, which shall be implemented in accordance with Section 4(d). The Parties may agree to Water Transactions under Section 4 in addition to those under this Section 8(d).

(e) **Accounting and Energy Considerations**
BCH Water Transactions made under Sections 8(b) and 8(d) and the associated energy and energy values shall be tracked and accounted for under this Section 8 and not in the Transaction Benefit Account.

At any time when BCH Dry Period Operation Water Transactions under Section 8(b) occur, regardless of whether any BPA Water Transactions under Section 8(c) occur, BPA shall deliver all Head Loss Energy to BCH under Section 8(f), and the energy value attributed to such Head Loss Energy shall not be credited to the Transaction Benefit Account.

(f) **Energy Deliveries to BCH under a BCH Dry Period Operation**
When a BCH Dry Period Operation Water Transaction under Section 8(b) occurs, BPA shall deliver to BCH an amount of energy equivalent to the sum of the energy that will result from such BCH Dry Period Operation Water Transaction and any Head Loss Energy. Energy amounts associated with BCH Dry Period Operation Water Transactions under Section 8(b) shall be calculated by multiplying the estimated U.S. h/k by the Water Transaction volume on a daily basis and shall be adjusted for after-the-fact U.S. h/k in

accordance with Section 8(h). Head Loss Energy shall be calculated in accordance with Section 7.

In accordance with Section 11, Scheduling and Delivery of Energy and Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines, the energy to be delivered shall be estimated and prescheduled on a uniform hourly schedule for the upcoming week to the Delivery Point. The weekly period to be used for such energy deliveries shall be lagged one day from the Treaty Week in which the applicable BCH Dry Period Operation Water Transaction occurs. The Parties may mutually agree to alternate delivery schedules.

(g) **Energy Deliveries to BPA in Return**

When a BCH Water Transaction under Section 8(d) occurs, BCH shall deliver to BPA the amount of energy related to the water return and such energy shall be calculated by multiplying the estimated U.S. h/k by the Water Transaction volume on a daily basis, as adjusted for after-the-fact U.S. h/k in accordance with Section 8(h).

In accordance with Section 11, Scheduling and Delivery of Energy and Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines, the energy to be delivered shall be estimated and prescheduled on a uniform hourly schedule for the upcoming week to the Delivery Point. The weekly period to be used for such energy deliveries shall be lagged one day from the Treaty Week in which the applicable BCH Water Transaction occurs. The Parties may mutually agree to alternate delivery schedules.

(h) **After-the-Fact Energy Adjustments**

The Parties shall establish and maintain an energy adjustment account to record differences in estimated versus actual U.S. h/k and resulting energy amounts under Sections 8(f) and 8(g), as well as any adjustments in the Head Loss Energy calculation under Section 8(f). Energy amounts as a result of such adjustments shall be delivered in a timely manner by BCH or BPA, as the case may be, in accordance with Section 11, Scheduling and Delivery of Energy and Exhibit G, Transaction Request Protocol and Energy Scheduling Guidelines.

(i) **Capacity Limitations**

The Party obligated to deliver energy under Sections 8(f) or 8(g) may suspend delivery if, on the preschedule day, the Party delivering the energy determines that capacity limitations may compromise its ability to serve its load obligations. The Party suspending delivery shall provide the other Party with as much advance notice as is reasonably practicable. If an energy delivery is suspended, then unless the Parties otherwise agree, the energy not delivered shall be rescheduled to either Light Load Hours in the same day or to 168 hours forward from the original hour of delivery, at the receiving Party's option.

(j) **Differences in Value of Energy Delivered to BCH**

(1) Subject to 8(j)(2) below, the value of the energy delivered by one Party to the other under Section 8(f) and 8(g), as adjusted under Section 8(h), shall be calculated as the product of the energy delivered in MWh times the daily flat Energy Price on the day of delivery.

(2) If energy deliveries under Section 8(f) and 8(g), as adjusted under Section 8(h), are not flat in a day, then energy values will be calculated based on the Energy Price for the applicable HLH or LLH time blocks and delivered energy amounts.

(3) Upon completion the BCH Water Transactions made under Sections 8(b) and 8(d): if the value of energy delivered by BPA to BCH related to BCH Dry Period Operation Water Transactions (not including Head Loss Energy) exceeds the value of energy delivered by BCH to BPA, then such difference shall be subtracted from the Transaction Benefit Account balance; and if the value of energy delivered by BPA to BCH is less than the value of energy delivered by BCH to BPA, then no adjustment to the Transaction Benefit Account shall be made.

(k) **Transmission Costs**

Each Party shall be responsible for transmission on its system to and from the Delivery Point for energy deliveries under Sections 8(f) and 8(g). In consideration of such, BCH shall compensate BPA for all energy deliveries under 8(f) and 8(g) at the posted BPA hourly non-firm point-to-point transmission and ancillary services rates, or their successor rates. Losses shall be paid at the posted BPA Power Services transmission losses product rate, or its successor rate. If transmission is not available or transmission schedules are curtailed, then the energy deliveries shall be rescheduled as agreed by the Parties.

9. BPA DRY PERIOD PROVISIONS

(a) **Determination of BPA Dry Period Conditions**

The determination of BPA Dry Period Conditions shall be made using the NWRFC's early May water supply forecast for the April through August period as measured at The Dalles Dam. If the forecasting period changes from the current April through August period in a successor or replacement FCRPS Biological Opinion, then the period used for the NWRFC water supply forecast shall be adjusted to match. If requested by BPA prior to January 15, the NWRFC's water supply forecast for early April may be used for the year, rather than the early May forecast. All water supply forecasts used to determine BPA Dry Period Conditions water conditions will be consistent with those used in the Treaty Storage Regulation Study.

(b) **BPA Dry Period Operation Request**
Within seven days of the issuance of the NWRFC's water supply forecast in Section 9(a), if BPA Dry Period Conditions occur and if BPA did not request a BPA Dry Period Operation in the previous calendar year, then BPA may request a BPA Dry Period Operation by written notice to BCH and shall supply BCH with data to support the determination of BPA Dry Period Conditions.

If BPA Dry Period Conditions occur and BPA requested a BPA Dry Period Operation in the previous calendar year, then BPA may request Water Transactions to increase Arrow outflows under Section 9(c), and BCH, in its sole discretion, shall determine whether it can accommodate such request. If BCH elects to accommodate such request, then a BPA Dry Period Operation will be deemed to have been requested by BPA for that calendar year.

(c) **BPA Dry Period Operation Release Rights**
If BPA has requested a BPA Dry Period Operation, then BPA may request Water Transactions in the period from the BPA Dry Period Operation request through to the end of June of that calendar year, or such other period agreed to by the Parties, to increase Arrow outflows. The amount of such requests shall not exceed the lesser of: (1) 0.62 km^3 (0.5 MAF) and (2) the volume of water remaining in BPA's Active Account.

By agreement of the Parties, the rate of release shall be determined and adjusted, as necessary, to provide a smooth delivery of the volume of water requested by BPA. If at the end of June a Treaty Week straddles June and July, then the Treaty Week shall be deemed to belong in June if most of the days of the Treaty Week occur in June.

BPA Dry Period Operation Water Transaction requests shall be made in accordance with Section 4(a). BCH shall make all reasonable efforts to accommodate such requests, which shall be implemented in accordance with Section 4(d).

(d) **BCH Option during a BPA Dry Period Operation**
When BPA requests a Water Transaction under Section 9(c) above, BCH may release a portion of the requested volume of water from BCH's Active Account up to the lesser of: (1) 50% of the water requested by BPA and (2) the volume of water remaining in BCH's Active Account. The remaining balance of water requested by BPA shall be released from BPA's Active Account.

(e) **Accounting and Energy Considerations**
Energy accounting for Dry Period Operation Water Transactions under this Section 9 shall be in accordance with Section 6(b).

10. ENERGY PRICING

Energy Prices shall be determined consistent with Exhibit B. For purposes of determining energy values, Energy Prices will be limited to a minimum of $0.00 for both Heavy Load Hour blocks and Light Load Hour blocks, unless otherwise agreed.

Such limitation shall be in effect so long as BPA does not purchase or sell negative priced energy, except as may inadvertently occur when BPA makes price taker bids to purchase energy out of the California ISO (or other jurisdictions that may offer price taker bids) and the Locational Marginal Price (LMP) is negative at the point of purchase.

In the event that BPA's negative pricing policy and/or practices are amended or replaced, BPA shall promptly notify BCH in writing, and the Parties shall amend this limitation accordingly. Such amendment will be based on the principle that the price should reflect the benefit BPA, in accordance with its policy, would receive for additional/decremental energy produced at the Downstream Federal Hydro Projects on a preschedule basis as a result of Water Transactions under this Agreement. In the event the Parties are unable to agree on amendments to this Agreement, the matter shall be resolved pursuant to Section 18, Dispute Resolution.

11. SCHEDULING AND DELIVERY OF ENERGY

In accordance with Exhibit G, all energy deliveries under this Agreement shall be submitted on a preschedule basis, may be scheduled on non-firm transmission, and are subject to transmission availability. Schedules for delivery of energy under this Agreement shall be made at the Delivery Point.

If transmission is not available or transmission schedules are curtailed, then the energy deliveries shall be rescheduled as agreed between the Parties. Where BPA is the Delivering Party under Section 6(c), BPA may limit the agreed-upon south to north energy delivery within any Light Load Hour to the difference between the prescheduled Canadian Entitlement delivery and the maximum Canadian Entitlement that can be scheduled on any hour. The Parties may mutually agree to alternate delivery schedules.

Subject to Section 8(k), unless otherwise agreed each Party shall be responsible for acquiring and scheduling transmission and all transmission costs, including losses, on its system to or from the Delivery Point for energy deliveries under this Agreement.

12. PRIORITY USE OF FACILITIES

(a) **Priority of the Columbia River Treaty**
The use of Treaty storage space and the use of all other facilities at Mica Arrow, Duncan and Downstream U.S. Hydro Projects to fulfill the requirements of the Treaty shall receive priority over all uses provided for in this Agreement.

(b) **Priority of Requests under this Agreement**
When concurrent Water Transaction requests by BPA and BCH under this Agreement cannot be accommodated, BCH and BPA Dry Period Operation release rights under Sections 8 and 9 shall receive priority, after which the priority shall be as follows: if BPA and BCH Water Transaction requests are either both positive or both negative, and the combined request exceeds the available limited flexibility as specified by the Parties, then the total amount

of the Water Transaction requests shall be reduced as necessary to conform to such limits, first by reducing the larger request by up to the amount it exceeds the smaller request and then by reducing each request by equal amounts.

13. FORCED EVACUATION OF NON-TREATY ACCOUNTS

If water recorded in any non-Treaty account must be evacuated because:

(a) the storage space is no longer available;

(b) BCH has determined that a release is necessary for flood control, safety, protection of structures, or any other cause that BCH reasonably determines constitutes an emergency in British Columbia; or

(c) the U.S. Entity under the Treaty makes an on-call flood control operation request pursuant to the Treaty;

then BCH shall give notice to BPA by any means practicable and confirm such notice in writing as soon as reasonably practicable, and shall have the right to initiate the release of water without the consent of BPA. In such event, each Recallable Account shall be reduced first to its Initial Water Balance, followed by reducing the Active Account balances, and finally reducing the remaining balance in the Recallable Accounts. For each category of account, as per the reduction priority above, the release will be first from the Party's account with the largest balance until the Parties' respective account balances are equal, and then such accounts shall be released concurrently on an equal basis.

Releases of water and return of water under this Section 13 shall be considered BCH or BPA Water Transactions, as the case may be, under Section 6 for purposes of energy and energy value accounting, including the associated crediting and debiting of the Transaction Benefit Account.

The obligation to return any of the water evacuated under this Section 13 shall be pursuant to procedures to be agreed upon by the Parties at such time. If the Parties cannot agree, then the matter shall be resolved pursuant to Section 18, Dispute Resolution.

In the event of a forced evacuation under paragraphs (a) or (b) above, the calculation of BPA compensation for head losses on the BCH system under Section 7 shall be adjusted to use the maximum balance allowable for Active and Recallable Accounts in place of Initial Water Balances, until such time as the forced evacuation has been lifted and BPA has had reasonable opportunity to return the equivalent amount of water evacuated from its accounts.

In the event of a forced evacuation under paragraph (c) above, the calculation of BPA compensation for head losses on the BCH system under Section 7 shall not be adjusted, unless BCH has been otherwise compensated under the Treaty or other agreements for the resulting head losses, in which case the calculation of BPA

compensation for head losses on the BCH system under Section 7 shall be adjusted as described in the preceding paragraph.

14. FORCE MAJEURE

(a) A Party shall not be in breach of an obligation under this Agreement to the extent its failure to fulfill the obligation is due to a Force Majeure. "Force Majeure" means an event beyond the reasonable control, and without the fault or negligence, of the Party claiming the Force Majeure, that prevents that Party from performing its obligations under this Agreement and which that Party could not have avoided by the exercise of reasonable care, diligence and foresight. A Force Majeure may include, but is not limited to the following events:

(1) strikes, work stoppage, riot, civil or labor disturbance; and

(2) floods, earthquakes, other natural disasters, or terrorist acts; and

(3) final orders or injunctions issued by a court or regulatory body having subject matter jurisdiction which the Party claiming the Force Majeure, after diligent efforts, was unable to have stayed, suspended, or set aside pending review by a court having subject matter jurisdiction.

(b) Neither the unavailability of funds or financing, nor conditions of national or local economies or markets shall be considered a Force Majeure. The economic hardship of either Party shall not constitute a Force Majeure. Nothing contained in this provision shall be construed to require either Party to settle any strike or labor dispute in which it may be involved.

(c) If a Force Majeure prevents a Party from performing any of its obligations under this Agreement, such Party shall:

(1) immediately notify the other Party of such Force Majeure by any means practicable and confirm such notice in writing as soon as reasonably practicable;

(2) use commercially reasonable efforts to mitigate the effects of such Force Majeure, remedy its inability to perform, and resume full performance of its obligation hereunder as soon as reasonably practicable;

(3) keep the other Party apprised of such efforts on an ongoing basis; and

(4) provide written notice of the resumption of performance.

(d) A Force Majeure shall not relieve a Party from its obligations to restore its Active Account and Recallable Account to the Initial Water Balance for each account upon expiry or early termination of the Agreement and a Party shall

be in breach of this Agreement if it fails to do so, notwithstanding a Force Majeure event.

15. COORDINATION RESPONSIBILITIES

As necessary, BPA shall be responsible for coordinating any flow changes resulting from this Agreement with the U.S. Army Corps of Engineers, the Bureau of Reclamation, and affected Mid-C Participants.

16. NON-TREATY OPERATING COMMITTEE

(a) **Members and Meetings**

Within 30 days of the Effective Date, the Parties shall establish a Non-Treaty Operating Committee (the "NTOC") that shall include two members from each Party whom shall confer regularly and meet at least once a year to review and document various operating issues.

(b) **Purpose and Authority**

The NTOC shall provide a forum for discussing issues and problems that may arise during the implementation of this Agreement. The NTOC shall review and document various operating issues including, but not limited to: power scheduling procedures; methods of calculating the amounts or value of energy otherwise stored or released; operating plans; and planned maintenance of transmission and generating facilities used to implement this Agreement.

The NTOC shall have the authority to amend any Exhibit to this Agreement by unanimous agreement, but shall have no authority, expressly or by course of conduct, to otherwise agree to amend the body of this Agreement. Decisions of the NTOC shall be by unanimous agreement.

17. MANAGEMENT OF CREDIT RISK

(a) For the purpose of managing credit risk, as of the Effective Date each Party shall have established a Transaction Benefit Account balance monitoring limit of $40 million (positive or negative). If at any time the Transaction Benefit Account balance owed to a Party (First Party) exceeds the monitoring limit established by that Party, then the First Party may, by written notice to the other Party (Second Party), require the Second Party to make an early payment to bring the Transaction Benefit Account balance to at least 20% below the monitoring limit, or to such other balance as may be agreed to by the Parties. The Second Party shall pay the amount of such early payment to the First Party. Issuance and payment of bills for early payment shall be made in accordance with Section 6(d).

(b) The Parties may agree to energy deliveries in lieu of early payment required by this Section 17. Any such energy deliveries shall be made in accordance with Section 6(c).

(c) At any time during the term of the Agreement, a Party may change its monitoring limit by written notice to the other Party, if:

(1) BPA is no longer a federal agency or instrumentality of the United States, if the other Party is BPA; or

(2) BCH is no longer a Crown Corporation of the Province of British Columbia, if the other Party is BCH.

(d) At any time during the term of the Agreement, either Party may change its monitoring limit with the consent of the other Party, such consent not to be unreasonably withheld.

18. DISPUTE RESOLUTION

If a dispute arises out of or relates to this Agreement, or a breach thereof, and if the dispute cannot be settled by the NTOC or through other negotiation, then the Parties agree to first try in good faith to settle the dispute by mediation in accordance with the International Mediation Rules of the International Centre for Dispute Resolution (a division of the American Arbitration Association) before resorting to litigation or some other dispute resolution procedure.

19. INDEMNIFICATION

Subject to Section 20, and with the exception of Sections 13(a) and 13(b), BPA agrees to indemnify BCH for payments of judgments or settlements made by BCH to any Mid-C Participant for actions BCH has taken pursuant to and consistent with the terms of this Agreement. Any such BCH settlements shall be subject to the prior approval of BPA.

20. MID-C PARTICIPANTS

If BPA enters into a companion agreement with one or more Mid-C Participants, which do not stem from the Pacific Northwest Coordination Agreement, that would result in participation with respect to BCH Water Transactions as contemplated under this Agreement, then BPA shall notify BCH in writing as soon as practicable and the Parties shall amend this Agreement to account for: (1) the sharing of benefits among BPA and the applicable Mid-C Participants and (2) any other relevant provisions as determined by the Parties. If any such companion agreement is executed and if the Mid-C Participant has entered into an indemnification agreement with BCH in a form satisfactory to BCH, then the Parties shall deem that Section 19, Indemnification, does not apply with respect to that Mid-C Participant for so long as such indemnification agreement is in force and effect.

21. INFORMATION EXCHANGE AND CONFIDENTIALITY

Upon request, each Party shall provide the other Party with any information that is necessary to administer this Agreement.

Before one Party provides information to the other Party that is confidential, or is otherwise subject to a privilege or nondisclosure, each shall clearly designate such information as confidential. Each Party shall notify the other in writing as soon as practicable of any request received under applicable domestic law (e.g., the U.S. Freedom of Information Act (FOIA), British Columbia's Freedom of Information and Protection of Privacy Act (FOIPPA), or under any other federal, state, or provincial

law or court or administrative order) for any confidential information. The Parties shall only release such confidential information to comply with applicable law or if required by any other federal law or court or administrative order. Each Party shall limit the use and dissemination of confidential information within their respective organizations to employees who need it for purposes of administering this Agreement.

22. GENERAL PROVISIONS

(a) **Entire Agreement and Order of Precedence**
This Agreement, including documents expressly incorporated by reference, constitutes the entire agreement between the Parties with respect to the subject matter of this Agreement. It supersedes all previous communications, representations, or contracts, either written or oral, which purport to describe or embody the subject matter of this Agreement. The body of this Agreement shall prevail over the exhibits to this Agreement in the event of a conflict.

(b) **Assignment**
Except as provided for in this Section or with the consent of the other Party, neither Party may assign its rights or obligations under the Agreement to a third party. Such consent shall not be unreasonably withheld. BCH may assign its obligations to receive and deliver any energy required to be delivered by BCH to BPA, or by BPA to BCH, under this Agreement to BCH's subsidiary, Powerex Corp., on written notice to BPA.

(c) **No Third-Party Beneficiaries**
This Agreement is made and entered into for the sole benefit of the Parties. The Parties intend that no other person or entity shall be a direct or indirect beneficiary of this Agreement, and nothing in this Agreement is intended to provide a basis for any action, either legal or equitable, by any person or class of persons against the United States, the Province of British Columbia, or their respective departments, agencies, crown corporations, instrumentalities, entities, officers, or employees.

(d) **Waivers**
No waiver of any provision or breach of this Agreement shall be effective unless such waiver is in writing and signed by the waiving Party, and any such waiver shall not be deemed a waiver of any other provision of this Agreement or of any other breach of this Agreement.

(e) **Applicable Law**
This Agreement shall not be construed to amend or modify the Treaty or the obligations of Canada or the United States under such. The Parties intend that this Agreement shall be an operational agreement governed by applicable domestic law and not international law.

(f) **Agency Policies**
Any reference in this Agreement to a BPA or BCH policy, including any revisions, does not constitute agreement of the other Party to such policy by execution of this Agreement, nor shall it be construed to be a waiver of the right of the other Party to seek judicial review of any such policy.

(g) **Amendments**
Except as expressly stated otherwise in this Agreement, no amendment of this Agreement shall be of any force or effect unless set forth in writing and signed by authorized representatives of each Party.

(h) **Survival**
All rights, obligations, liabilities and remedies of the Parties which accrued prior to the expiration or early termination of this Agreement, or which are by their nature continuing, including Sections 6(d), 19 and 24, and all other provisions necessary for the interpretation or enforcement of such provisions shall survive expiration or early termination of this Agreement.

(i) **Notices**
Any written notice required under this Agreement shall be provided to the other Party in one of the following ways:

(1) delivered in person;

(2) by a nationally recognized delivery service with proof of receipt;

(3) by United States or Canadian certified mail with return receipt requested;

(4) electronically by facsimile or e-mail; or

(5) by another method agreed to by the Parties.

Notices are effective when received.

23. MAINTENANCE OF REQUIRED APPROVALS
This Agreement is subject to BCH and BPA maintaining throughout the term of this Agreement specified in Section 1, all necessary and applicable regulatory and governmental licenses, permits or other approvals necessary to satisfy each Party's respective obligations under this Agreement. If any such license, permit or other approval expires or ceases to be effective for any reason, then this Agreement shall expire as of the same date and time as the expiration of that license, permit or other approval. The Party with the expiring license, permit or other approval shall act in good faith to notify in writing the other Party of the pending expiration as soon as possible. Upon such notice, or upon a mutually agreed later date, the provisions in Sections 24(b) and 24(c) concerning Water Transactions and final Transaction Benefit Account balance and payment shall apply.

24. EXPIRATION AND EARLY TERMINATION

At least 24 months prior to the Expiration Date, or as otherwise mutually agreed by the Parties, the NTOC shall complete a plan to manage the balancing of accounts to achieve Initial Water Balances in a timely manner as required in Sections 24(a) and 24(b) below.

(a) **Expiration**

If this Agreement is not terminated early under Section 24(b), then each Party shall restore its Active Account and Recallable Account to the Initial Water Balances by 2400 hours on the Expiration Date.

(b) **Early Termination**

During the term of this Agreement, either Party may request early termination of the Agreement if:

(1) operating requirements or other restrictions imposed after the Effective Date materially diminishes the benefits received by a Party under the Agreement; or

(2) non-power requirements or objectives on a Party's system, such as water use planning and biological opinion requirements or objectives, that are materially negatively impacted by Water Transactions made under this Agreement.

Any early termination request shall be given by written notice, not later than September 1 of any year with the intent to terminate at 2400 hours on December 31 two calendar years, or at least 28 months, after such notice was given.

As soon as practicable after an early termination request is given, the Parties shall make a good faith attempt to agree upon a mutually acceptable alternative to termination. If, by January 15 of the following calendar year after a termination request has been given, termination has been deemed unavoidable by Parties, the Party that gave notice of intent to terminate shall provide the other Party with a final written notice of termination, and the Expiration Date for this Agreement shall then be 2400 hours on the December 31 that is two calendar years after the calendar year in which the early termination request was given (i.e., the intended termination date identified in the early termination request).

Unless otherwise agreed by the Parties, once the Party requesting termination has provided the other Party a final written notice of termination, all Water Transactions made under this Agreement shall be for the purpose of restoring the Active Accounts and Recallable Accounts to their Initial Water Balances, and each Party shall restore its Active Account and Recallable Account to the Initial Water Balances by the Expiration Date as described in this Section 24(b).

(c) **Issuance and Payment of Final Bill**
Within thirty (30) calendar days following the Expiration Date in Sections 24(a) or 24(b) above, the Parties shall verify the final Transaction Benefit Account balance. Within sixty (60) calendar days following such Expiration Date, a bill will be issued in the amount of the final Transaction Benefit Account balance and payment shall be made in accordance with Section 6(d).

25. SIGNATURES
The Parties have caused this Agreement to be executed as of the date both Parties have signed this Agreement.

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY		BONNEVILLE POWER ADMINISTRATION	
By		By	
Name	CHARLES REID *(Print/Type)*	Name	Stephen J. Wright *(Print/Type)*
Title	PRESIDENT + CEO	Title	Administrator/CEO
Date	APRIL 10 2012	Date	March 23, 2012

Exhibit A
DAILY CONVERSION FACTORS (H/K) CALCULATION

This exhibit describes the intent and basic procedures used to determine federal and U.S. daily conversion factors (Federal h/k and U.S. h/k) used in calculating the deemed change in generation on the Downstream Federal Hydro Projects or Downstream U.S. Hydro Projects resulting from Water Transactions under this Agreement. The calculated h/k's assume the water flows through each Downstream U.S. Hydro Project the day after each Water Transaction and include adjustments for limitations on project generating capability such as required spill, reserve requirements, and turbine generation limits.

1. CALCULATION

(a) General

(1) The Federal h/k is the sum of the individual Downstream Federal Hydro Project h/k values.

(2) The U.S. h/k is the sum of individual Downstream U.S. Project h/k values.

(3) The daily h/k for each project is the daily average project generation divided by the daily average turbine flow, adjusted for operating limits including such factors as required spill, reserve requirements, and turbine generation limits.

(4) With the exception of Water Transactions under Section 5 of this Agreement, if both positive and negative Water Transactions occur concurrently, then the negative Water Transaction will be examined first based on the actual flow value, and the positive Water Transaction will be examined second based on the actual flow increased by the negative Water Transaction.

(5) If the federal system is spilling due to lack of load, then the Federal h/k is 0. In such instance, a change in flow from a Water Transaction would not result in a change in generation at the Downstream Federal Hydro Projects.

(b) Determining Project h/k Values

The ability of a project to increase or decrease generation as a result of Water Transactions includes consideration of project operating limits. If a project is operating near its turbine or generating limits, or there is project spill, then the calculated h/k will include the effects of those limitations.

(1) It is assumed all Water Transactions pass through Downstream U.S. Hydro Projects the day following the Water Transaction.

(2) Positive Water Transactions (outside fish passage season):

(i) If there is no spill, then all of the additional flow is assumed converted to generation and the project h/k is the daily average generation divided by the daily average turbine flow.

(ii) If a project spills due to lack of turbine capability, then all or a portion of the Water Transaction is spilled. The h/k is calculated as the average generation divided by the turbine flow multiplied by the percentage of the Water Transaction that could be generated.

(3) Negative Water Transactions (outside fish passage season):

(i) If there is any spill at a project due to lack of turbine capability, then the h/k for that project is 0 MW/kcfs. A negative Water Transaction reduces downstream flow. If flows had been higher the project would have spilled, thus there is no change in generation resulting from the Water Transaction.

(ii) If a project is operating at maximum turbine capability, then the h/k for that project is 0 MW/kcfs because there is no change in generation resulting from the Water Transaction.

(iii) If a project is operating near turbine capability then all or a portion of the Water Transaction may result in a generation change. The portion that affects generation is limited to the difference between the maximum turbine flow and the actual turbine flow. In this case, the project h/k is calculated as the average generation divided by the average turbine flow multiplied by the percentage of the Water Transaction that could have been generated.

(4) Fish Passage Season brings in additional project constraints including turbine generating limits and spill requirements that vary daily and hourly within the day. Determination of project h/k's during fish passage season will be based upon the proportion of any Water Transaction that was or could have been generated within the constraints.

(c) **Calculated Generation Change**
The generation change resulting from a Water Transaction is calculated as the Water Transaction multiplied by the sum of the project h/k's, including project operating limits.

2. PRIORITY
To calculate h/k's when there are multiple Water Transactions under this and other agreements, the following priority of calculations will apply:

(1) Transactions under the Columbia River Treaty;

(2) Water Transaction releases under Sections 8 and 9 of the Agreement;

(3) Other Water Transactions under this Agreement.

3. **EXAMPLES**

The following examples are provided for illustration purposes. The calculations shown are for the Federal h/k, however the same principles would apply to the U.S. h/k.

(a) **Example 1. Spill Due to Lack of Load (See 1(a)5 in this Exhibit)**
During a winter rain event, BPA and BCH each requested a -10 kcfs Water Transaction. Although federal projects had generating capacity, there was insufficient load and Grand Coulee spilled 30 kcfs all hours of one day. The federal h/k on that day was 0 MW/kcfs.

(b) **Example 2. Positive Water Transaction That is Partially Spilled (See 1(b)(2)(ii) in this Exhibit)**
BPA requested a 5 kcfs Water Transaction and BCH requested a 10 kcfs Water Transaction. McNary was operating at maximum turbine capability and spilling 12 kcfs on a day-average basis. In this case a portion of the Water Transaction was spilled: 12 kcfs was spilled and 3 kcfs was generated. The h/k calculation is as follows:

Daily average generation/daily average turbine flow = 5.4 MW/kcfs (typical value)

Water Transaction generated: 3 kcfs

Total Water Transaction: 15 kcfs

h/k = 5.4 MW/kcfs * 3/15 = 1.08 MW/kcfs

(c) **Example 3. Negative Water Transaction Limited by Turbine Capability (See 1(b)(3)(iii) in this Exhibit)**
BPA and BCH each requested a -5 kcfs Water Transaction. McNary's daily average turbine flow was 7 kcfs less than its maximum turbine capability. In this case the maximum amount of additional water that could have been generated is 7 kcfs.

Daily average generation/daily average turbine flow = 5.4 MW/kcfs (typical value)

Water Transaction that could have been generated: 7 kcfs

Total Water Transaction: 10 kcfs

h/k = 5.4 MW/kcfs * 7/10 = 3.78 MW/kcfs

(d) **Example 4. Water Transactions with Percentage of Flow Spilled for Fish**

During fish passage season BPA and BCH each request a -7.5 kcfs Water Transaction. Due to fisheries requirements, McNary is required to spill 40% of its outflow and no other restrictions are limiting operations. Of the -15 kcfs of Water Transactions, 40% or 6 kcfs would have been spilled and 9 kcfs would have been generated.

Daily average generation/daily average turbine flow = 5.4 MW/kcfs (typical value)

Water Transaction that could have been generated: 9 kcfs

Total Water Transaction: 15 kcfs

h/k = 5.4 MW/kcfs * 9/15 = 3.24 MW/kcfs

Exhibit B
ENERGY PRICING

1. DETERMINATION OF ENERGY PRICES

Subject to Section 10 of the Agreement and Sections 3 and 4 of this Exhibit B, prices for determining energy values under this Agreement shall be based on the daily pre-schedule index for valuing energy in the Mid-Columbia region as described in Section 2 below.

2. DAILY PRE-SCHEDULE INDEX

The Parties agree to use the Intercontinental Exchange (ICE) indices as described in this Section 2.

(a) **Definition of Hourly Blocks**

"Heavy Load Hours" or "HLH" means hours ending (HE) 0700 through HE 2200 (16 hours per day) Pacific prevailing time, Monday through Saturday (6 days per week), excluding North American Electric Reliability Corporation (NERC) holidays.

"Light Load Hours" or "LLH" means HE 0100 through HE 0600 and HE 2300 through HE 2400 Pacific prevailing time and all hours on Sundays and NERC holidays.

(b) **Use of Index**

For any given day over the term of this Agreement, the following ICE indices shall apply:

(1) for Heavy Load Hours, the Mid-C On-Peak Index, being the volume-weighted "average" price for Mid-C day ahead transactions in Heavy Load Hours in that day (or days where the index covers more than one day), as published in the ICE Day Ahead Power Price Report; and

(2) for Light Load Hours, the Mid-C Off-Peak Index, being the volume-weighted "average" price for Mid-C day ahead transactions in Light Load Hours in that day (or days where the index covers more than one day), as published in the ICE Day Ahead Power Price Report.

(c) **Diurnal Energy Pricing**

Energy Prices under this Agreement shall be determined by:

(1) for Light Load Hour blocks in any day, the ICE Index for Light Load Hours in that day,

(2) for Heavy Load Hour blocks in any day, the ICE Index for Heavy Load Hours in that day, and

(3) for daily flat energy blocks in any day, the weighted average of the ICE Index for Light Load Hours and for Heavy Load Hours in that day, based on the number of Light Load Hours and Heavy Load Hours in the day; provided that if any Heavy Load Hour or Light Load Hour block prices that make up the flat index are negative, such prices shall be adjusted in accordance with and subject to Section 10 of the Agreement.

3. UPDATE/REPLACEMENT INDEX

By August 31 of any year, either Party may propose use of a different price index by providing notice in writing to the other Party of its view that the proposed index is the most generally accepted and used by market participants for daily pre-scheduled transactions in the Mid-Columbia region of the United States of America and that it is appropriate for the kind of product represented by deemed energy or delivered energy under this Agreement. In such case, the applicable index shall be an index that most closely applies to energy and energy deliveries under this Agreement (considering applicable factors and the intent of the Parties, including such factors as delivery point, firmness of electricity, time of day and general acceptance and use of such index by market participants), or such other index as the Parties may agree.

If the Parties agree within 30 days after the foregoing notice is given, the index will be updated, including any changes to definitions of hourly energy blocks, and will be implemented beginning on October 1 of that year. If the Parties do not agree on a change to the index, then the prior agreed index shall remain in effect.

4. CHANGE IN HOURS USED FOR PRICING

If the hours used for energy pricing by the ICE Index or any replacement thereof change from the hours used in the definitions of "Light Load Hours" and "Heavy Load Hours", the Parties will revise, to the extent reasonable, the definitions in this Agreement to take into account the hours used by the ICE Index or replacement, and will amend, to the extent reasonable, any other provision of this Agreement that uses the amended definitions, in order to reflect the original intent of this Agreement. If the Parties are unable to so agree within 30 days after the change in the hours used for pricing of energy, either Party may refer the matter to dispute resolution pursuant to Section 18 of the Agreement.

Exhibit C
MICA HEAD LOSS CALCULATION

Two shadow contents, S_1 and S_2, shall be determined daily as follows:

Storage contents S_1 and S_2 are expressed in ksfd and are defined by the following formulas:

$$S_1 = M_{Base} + M_{TRT} + 2*ABi + 2*RBi$$
$$= 4060.511 + M_{TRT} + 2268.750$$

$$S_2 = M_{Base} + M_{TRT} + \min(RB_i + AB_i, RB_{BPA} + AB_{BPA}) + \min(RB_i + AB_i, RB_{BCH} + AB_{BCH})$$
$$= 4060.511 + M_{TRT} + \min(1134.375, RB_{BPA} + AB_{BPA}) + \min(1134.375, RB_{BCH} + AB_{BCH})$$

WHERE:

All balances are as of 2400 hours on the day for which the calculation is made and are in units of ksfd.

M_{Base} is the Mica dead storage space and other storage space not impacted by this Agreement set equal to 4060.511 ksfd.

RB_i is the Recallable Account Initial Water Balance set to 378.125 ksfd each for BPA and BCH;

RB_{BCH} and RB_{BPA} are equal to the balances in the BCH and BPA Recallable Accounts, respectively;

M_{TRT} is equal to the Mica Treaty content pursuant to the Detailed Operating Plans including any Supplemental Operating Agreements in effect;

AB_i is the Active Account Initial Water Balance set to 756.250 ksfd, each for BPA and BCH;

AB_{BPA} is the balance in the BPA Active Account, subject to the adjustment below; and

AB_{BCH} is the balance in the BCH Active Account, subject to the adjustment below.

If AB_{BCH} exceeds AB_i, for the purpose of head loss calculations, an adjustment shall be made by deducting the difference ($AB_{BCH} - AB_i$), and adding such difference to AB_{BPA}. The purpose of this adjustment is to give BPA credit in the head loss calculation for the water, if any, which BCH has in their Active Account balance in excess of 1.5 MAF.

Provided, however, that if either content S_1 or S_2 exceeds the maximum content at which Mica could be operated on such day, such content shall be set equal to the maximum content. Such maximum shall be the lowest of the following contents:

(i) Mica's normal full content, which is 10121.100 ksfd;

(ii) Mica's maximum content at 2400 hours on such day as prescribed in the Columbia River Treaty Flood Control Operating Plan; or

(iii) Any other limits on maximum contents at Mica as determined by BCH.

The amount of total head loss energy shall be determined daily according to the following formula:

$$HLE_T = (HK_1 - HK_2) \times Q_{DOP} \times 24 \text{ hours}$$

WHERE:

HLE_T is the total head loss in MWh;

HK_1 is the water to energy conversion factor for Mica in MW/kcfs at content S_1 in ksfd as determined by linear interpolation from Column (3) of Exhibit D;

HK_2 is the water to energy conversion factor for Mica in MW/kcfs at content S_2 as determined by linear interpolation from Column (3) of Exhibit D; and

Q_{DOP} is the turbine discharge in kcfs at Mica on such day pursuant to the Detailed Operating Plan currently in effect including any supplemental Treaty operating agreements.

If the amount of total head loss is not zero, the portion of such total allocated to BPA on such day shall be determined according to the following formula:

$$HLE_{BPA} = \frac{HLE_T \times \max(AB_i + RB_i - AB_{BPA} - RB_{BPA}, 0)}{\max(AB_i + RB_i - AB_{BPA} - RB_{BPA}, 0) + \max(AB_i + RB_i - AB_{BCH} - RB_{BCH}, 0)}$$

WHERE:

HLE_{BPA} is the amount of head loss energy allocated to BPA on such day; and

all other terms are as defined above.

Provided, however, if the resultant HLE_{BPA} is negative, such amount shall be set to zero.

Exhibit D
MICA PLANT CHARACTERISTICS

(1) Reservoir Elevation (feet)	(2) Storage Content (kcfs-days)	(3) Water-to-Energy Conversion Factor (kW/cfs)[1]
2475.0	10121.1	45.09
2470.0	9854.8	44.77
2465.0	9592.7	44.42
2460.0	9334.8	44.06
2455.0	9081.0	43.69
2450.0	8831.4	43.31
2445.0	8586.0	42.92
2440.0	8344.8	42.53
2435.0	8107.8	42.13
2430.0	7874.9	41.74
2425.0	7646.2	41.33
2420.0	7421.6	40.93
2415.0	7201.3	40.53
2410.0	6985.1	40.13
2405.0	6773.0	39.75
2400.0	6565.1	39.36
2395.0	6363.4	38.95
2390.0	6170.1	38.55
2385.0	5984.8	38.14
2380.0	5806.7	37.73
2375.0	5635.2	37.32
2370.0	5469.9	36.91
2365.0	5310.2	36.50
2360.0	5155.7	36.09
2355.0	5005.8	35.67
2350.0	4860.1	35.26
2345.0	4718.3	34.83
2340.0	4580.0	34.41
2335.0	4444.1	33.98
2330.0	4310.2	33.54
2325.0	4178.2	33.11
2320.0	4048.1	32.67

[1] Tailwater elevation assumed to be 1880.7 feet based on 30,000 cfs Mica discharge with Revelstoke in-service.

Exhibit E
POTENTIAL OPERATIONAL LIMITATIONS ON NTSA TRANSACTIONS

Month	Project	Issue	Limitations on Positive Water Transactions	Limitations on Negative Water Transactions
January	Arrow	Whitefish flows downstream of Arrow	Transactions possible if Treaty flows are low. Desire to maintain Arrow outflows for whitefish spawning such that eggs broadcast in January can be protected through March.	Transactions possible in many water conditions, provided the reduced flows do not adversely impact survival of spawned whitefish eggs.
	Priest Rapids	Vernita Bar flows	Unlikely to be limiting	Minimum flows needed to protect salmon redds at Vernita Bar (55-70 kcfs). Chum requirement typically more limiting.
	Bonneville	Chum salmon protection	Unlikely to be limiting	Minimum flows needed to protect salmon redds (110-135 kcfs)
February	Arrow	Whitefish flows downstream of Arrow	Unlikely to be limiting	Transactions possible if flows are high enough survival that spawned whitefish eggs are not adversely impacted
	Priest Rapids	Vernita Bar flows	Unlikely to be limiting	Minimum flows needed to protect salmon redds at Vernita Bar (55-70 kcfs). Chum requirement typically more limiting.
	Bonneville	Chum salmon protection	Unlikely to be limiting	Minimum flows needed to protect salmon redds (110-135 kcfs)
March	Arrow	Whitefish flows downstream of Arrow	Unlikely to be limiting	Transactions possible if flows are high enough survival that spawned whitefish eggs are not adversely impacted
	Grand Coulee	Meet minimum elevation for refill to flood control elevation mid Apr.	Unlikely to be limiting	Limited by flow needed to meet downstream minimum flow and elevation target.
	Priest Rapids	Vernita Bar flows	Unlikely to be limiting	Minimum flows needed to protect salmon redds at Vernita Bar. May become more limiting than chum requirement.

Month	Project	Issue	Limitations on Positive Water Transactions	Limitations on Negative Water Transactions
	Bonneville	Chum salmon protection	Unlikely to be limiting	Minimum flows needed to protect salmon redds (110-135 kcfs)
April	Arrow	Trout Spawning	Limited - low flow desired (15-35 kcfs) so that flows are steady or increasing through June.	Limited - low flow desired (15-35 kcfs) so that flows are steady or increasing through June.
	Grand Coulee	Meet mid-April flood control elevation	Unlikely to be limiting	Limited by flow needed to meet downstream minimum flow and reach flood control elevation mid-April.
	Priest Rapids	Steelhead flows	Unlikely to be limiting	Minimum flows needed for salmon (around 135 kcfs)
May	Arrow	Trout spawning	Limited - need to maintain flows through June	Limited - need to maintain flows through June
	McNary	Salmon flows	Desirable in dry years.	Limited – if flows exceed what is needed for salmon, may be able to shape water into future periods. More limiting than Priest Rapids requirement.
June	Arrow	Trout spawning	Possible, depending on flow levels	Limited - need to maintain flows through June
	Grand Coulee	Salmon flows and refill	Possible if flows downstream are low	Possible – need to maintain flow levels downstream and refill
	McNary	Salmon flows	Possible if flows downstream are low	Possible if flows are high
July	McNary	Salmon flows	Possible	Limited, but possible if flows are high
August	McNary	Salmon flows	Unlikely to be limiting	Very limited. Required release of any spring net storage.
September	Grand Coulee	Minimum elevation of 1283 ft.	Unlikely to be limiting	Limited unless there is good water
	Bonneville	Minimum flow for navigation	Unlikely to be limiting	May be limiting

Month	Project	Issue	Limitations on Positive Water Transactions	Limitations on Negative Water Transactions
October	Priest Rapids	Vernita Bar salmon	May be limited in high flow conditions. Daytime flows limited to (50-70 kcfs) mid-Oct – late Nov. for fall Chinook spawning	Largely unrestricted
	Bonneville	Minimum flow for navigation	Unlikely to be limiting	May be limiting
November	Priest Rapids	Vernita Bar salmon	May be limited in high flow conditions. Daytime flows limited to (50-70 kcfs) mid-Oct – late Nov. for fall Chinook spawning	Largely unrestricted
	Bonneville	Chum salmon protection	Limited in high flow conditions	Limiting Minimum flows needed to protect salmon redds (110-135 kcfs)
December	Priest Rapids	Vernita Bar salmon	May be limited in high flow conditions. Daytime flows limited to (50-70 kcfs) mid-Oct – late Nov. for fall Chinook spawning	Largely unrestricted
	Bonneville	Chum salmon protection	Limited in high flow conditions	Limiting Minimum flows needed to protect salmon redds (110-135 kcfs)

Exhibit F
DETERMINATION OF AVAILABLE ENERGY BALANCE

1. The right of a Party to request energy deliveries pursuant to Section 6(c) of the Agreement is based on the Party having an Available Energy Balance in its favor, as calculated in accordance with this Exhibit, and is intended to be a mechanism to manage balances in the Transaction Benefit Account and reduce the amount of the financial settlement as of August 31 of each year. The Available Energy Balance is in BCH's favor if positive, and in BPA's favor if negative.

2. Beginning with the first full Treaty Week in September and continuing through to and including the first full Treaty Week in August of the following year, the Available Energy Balance shall be calculated as follows:

   Available Energy Balance = TBA + A - B; where

   "TBA" = Transaction Benefit Account balance (which may be a positive or negative value),

   "A" = The energy value attributed to Head Loss Energy for the prior year ending August 31 (this will be a positive value), subject to Section 3 below, and

   "B" = The energy value attributed to BCH Water Transactions that reduce Arrow outflows where the Parties have made an agreement for BCH to release that water by the upcoming August 31 (this will be a negative value).

3. From the Effective Date through August 31, 2012, the energy value in "A" above shall be equal to $3.4 million.

4. In the time period not covered by that specified in Section 2 above, the Available Energy Balance shall be equal to the Transaction Benefit Account balance.

5. For the purpose of scheduling energy deliveries under Section 6(c) of the Agreement, the Available Energy Balance shall be the balance calculated as of the end of the Treaty Week prior to the week in which the request is made.

Exhibit G
TRANSACTION REQUEST PROTOCOL AND ENERGY SCHEDULING GUIDELINES

1. WATER TRANSACTION COORDINATION AND REQUEST PROTOCOL

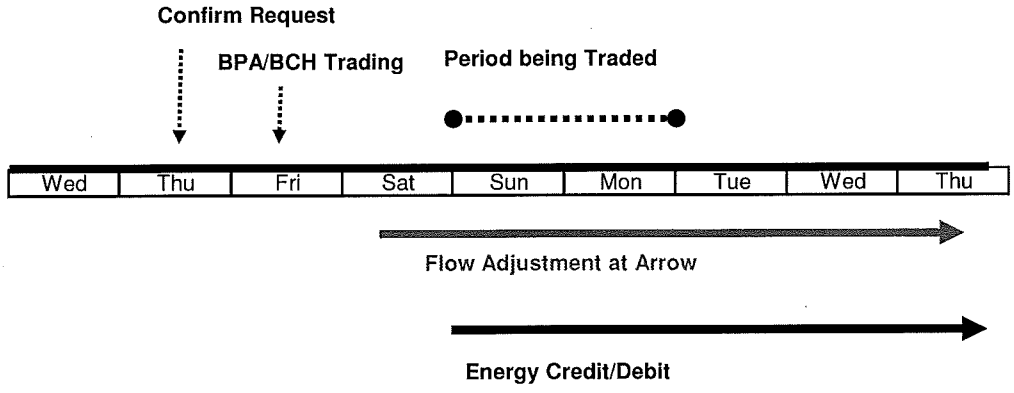
Water Transaction requests pursuant to Section 4(a) of the Agreement shall be coordinated in conjunction with the Weekly Treaty Storage Operation Agreement for the upcoming Treaty Week. On each Thursday, or earlier if needed due to U.S. Federal Government or British Columbia holidays or other scheduling considerations, the Parties shall have a weekly conference call to discuss Water Transaction volumes and accounting for the upcoming Treaty Week. BPA shall, upon request, provide BCH with an estimate of the weekly average Federal h/k or, as appropriate, the weekly average U.S. h/k for the upcoming Treaty Week.

Water Transaction requests shall be made on a flat, weekly basis for the upcoming Treaty week. Water Transactions shall be deemed to begin at 0000 hours on the day for which the Water Transaction is scheduled. The requesting Party shall specify the Water Transaction requested in kcfs.

If all Water Transaction requests for a given week cannot be accommodated, such requests shall be limited in accordance with Section 12 of this Agreement.

All requests must be confirmed by 1200 hours Pacific prevailing time on the day-prior to the day on which BPA would carry out pre-schedule Trading (defined as Confirm Request and BPA Trading as per Example 1 below), as specified by the Western Electric Coordinating Council (WECC) scheduling calendar, or earlier if needed due to U.S. Federal Government or British Columbia holidays or other scheduling considerations, to accommodate Water Transactions that are deemed to have resulted in a change in generation on the Downstream Federal Hydro Projects (See Section 6(b)(3) of the Agreement). Unless otherwise agreed, it is intended that the confirmation of Water Transactions shall be timed such that BPA will have opportunity to carry out energy transactions in pre-scheduled markets to capture and mitigate the changes in economic value of flows through the Downstream Federal Hydro Projects resulting from BCH Water Transactions (see Example 1 below).

Example 1:



2. ENERGY SCHEDULING GUIDELINES

Requests for energy deliveries under this Agreement shall be finalized on the same schedule as Water Transaction requests. All requests must be confirmed by 1200 hours Pacific prevailing time on the day-prior to the day on which BPA and BCH would carry out pre-schedule Trading, as specified by the WECC scheduling calendar, or earlier if needed due to U.S. Federal Government or British Columbia holidays or other scheduling considerations. (See Confirm Request and BPA/BCH Trading as per Example 1.)

The period for which energy schedules shall be requested is the one-week period, lagged by one day, from the Treaty Week. The current Treaty Week is Saturday through Friday, resulting in energy schedules for Sunday through Saturday.

Exhibit H
BRIDGE AGREEMENT RECONCILIATION

1. ACTIVE ACCOUNTS

In accordance with Section 6(a)(2) of the Agreement, each Party's account balance under the Bridge Agreement as of the Effective Date shall be transferred to the Party's Active Account under this Agreement in accordance with the following formula:

Active Account balance = account balance under Bridge Agreement

2. TRANSACTION BENEFIT ACCOUNT

As of the Effective Date: (1) the energy value associated with BCH water transactions and (2) the value of BPA head loss energy, under the Bridge Agreement, will be carried forward to this Agreement, and the Transaction Benefit Account will be initialized to the sum of (1) and (2).