NON-TREATY STORAGE AGREEMENT
Content:

• Background/Review
• Renegotiation Outcomes
• Stakeholder Feedback and Comments
• Next Steps
Background/Review
WHAT IS THE COLUMBIA RIVER TREATY?

An international Treaty between Canada and the US, to coordinate the operations of Canadian storage projects to maximize power and flood control benefits.
WHAT IS THE NON-TREATY STORAGE AGREEMENT?

A commercial agreement between BC Hydro and Bonneville Power Administration (BPA) that provides further coordination of Kinbasket and Arrow reservoir, beyond that which is provided by the Columbia River Treaty.
Treaty vs. Non-Treaty

Treaty:
- International Treaty
- Entities: BC Hydro (BCH), Bonneville Power Administration (BPA) and the US Army Corp of Engineers (COE)
- 15.5 million acre feet (MAF) of storage operated under a set of rules (at Mica, Arrow, and Duncan)

Non-Treaty Storage Agreement:
- Bilateral agreement between BCH and BPA
- An enabling agreement that provides for up to 5 MAF of storage operated by mutual agreement (at Mica, but also affects Arrow)
Other Points Related to NTS

- **Columbia River Treaty:**
  - Treaty Operations result is physical outcome
  - NTS operations used to adjust the physical outcome
  - Actual Treaty Operation is not changed

- **Water Use Plan:**
  - Operational modeling in WUP included 1990 Non-Treaty Storage Operation (4.5 MAF)
  - WLR program ($120M) tailored to reservoir operations with 4.5 MAF Non-Treaty Storage Operations.

- **Regulatory Approvals:**
  - None required for an Agreement.
  - Reservoir/Plants operate within their Water Licences
Storage at Mica and Arrow

**Kinbasket Reservoir**
- Treaty Storage (7.0 MAF)
- Non-Treaty Storage (5.0 MAF)
- Unusable Storage (8.0 MAF)

**Arrow Reservoir**
- Treaty Storage (7.1 MAF)

1 MAF = top 10 feet at Kinbasket
1 MAF = top 8 feet at Arrow
Non-Treaty Storage Utilization Scenarios

Four different strategies for utilizing Non-Treaty Storage:

- Scenario A: High Potential Utilization (4.5 MAF Max)
- Scenario B: Mod Potential Utilization (3.0 MAF Max)
- Scenario C: Low Potential Utilization (2.0 MAF Max)
- Scenario D: No Utilization
Performance Measures (PM’s)

• A tool for evaluating impact of operating Scenarios on non-power interests/values

• Origin of Performance Measures:
  – Most developed during the WUP
  – WUP Sub-committees formed for each interest area

• NTSA Process
  – WUP PM’s updated
  – New PM’s developed based on local knowledge & interests, and new study data
## Performance Measure List

**KINBASKET, REV & MCR**
- Navigation
- Recreation
- Heritage
- Erosion
- Vegetation
- Dust
- Fish (Pelagic)
- Entrainment
- REV Productivity
- MCR Recreation
- MCR Aquatics
- MCR Wetlands

**ARROW**
- Navigation
- Recreation
- Heritage
- Vegetation
- Wildlife
- Dust
- Pelagic Productivity
- Entrainment

**Soft Constraints**
- Recreation
- Fish
- Heritage
- Erosion
- Vegetation
- Wildlife

**LOWER COL RIVER**
- LCR Recreation
- LCR Flooding
- TGP
- Whitefish

**SYSTEM WIDE**
- Power (Cost)
- GHG
### Consequence Table

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First Nations Consultation

• Meetings with First Nations on similar timetable to Public Stakeholder Sessions.
• Key concerns expressed:
  – Heritage/Archeology:
    • Lack of archaeology inventory.
  – Canadian Fisheries:
    • Kokanee and Sturgeon
  – US Fisheries:
    • Strong support for US efforts for recovery of salmon stocks
    • Return of salmon to Canadian Columbia river.
Renegotiation Outcome
Objectives: To secure an agreement with the US that will:

- Optimize additional power and non-power benefits for BC Hydro
- Improve control of Kinbasket/Arrow reservoir levels
- Support the system capability to meet existing Columbia Water Use Planning objectives.
- Extend to maximum of 2024, with short notice termination to protect from negative implications of sudden regulatory or other changes.
Negotiation Process

**NTSA Re-Negotiations 2010/2011**

**Schedule**

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<th>Nov/10</th>
<th>Dec/10</th>
<th>Jan/11</th>
<th>Feb/11</th>
<th>Mar/11</th>
<th>Apr/11</th>
<th>May/11</th>
<th>Jun/11</th>
<th>Jul/11</th>
<th>Aug/11</th>
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**Negotiations:**
- Term Sheet Negotiation
- Term Sheet Approval by BCH Board
- Final Contract Preparation/Negotiation
- Final Contract Approval

**Public Engagement:**
- Meeting 1: Operational Data Reviews
- Meeting 2: Enviro Data Reviews
- Meeting 3: Report Back
### 1990 Agreement Accounts

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<th>BCH</th>
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<td><strong>Availability and Terms of operating at BCH Option</strong></td>
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<td><strong>Recallable Storage Account</strong></td>
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<td>0.25 MAF (Starts Empty)</td>
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<td><strong>Active Storage Account</strong></td>
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<td>2.25 MAF (Starts full)</td>
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*BC hydro - FOR GENERATIONS*
2011 Term Sheet Accounts

**BPA**

- **Recallable Storage Account**
  - 0.25 MAF
  - (Starts Empty)

- **Active Storage Account**
  - 1.5 MAF
  - (Starts Full)

- **Recallable Release Account**
  - 0.75 MAF
  - (Starts Full)

**BCH**

- **Recallable Storage Account**
  - 0.25 MAF
  - (Starts Empty)

- **Active Storage Account**
  - 1.5 MAF
  - (Starts Full)

- **Recallable Release Account**
  - 0.75 MAF
  - (Starts Full)

Operated by Mutual Agreement

Availability and Terms of operation, at BCH Option

Operated by Mutual Agreement

Availability and Terms of operation, at BCH Option

BC hydro
FOR GENERATIONS
BPA Release Option

• 0.5 MAF release in May/June, under low runoff conditions.
  – ~15% to 20% chance of occurring.
• Can only be released out of Active Storage
• Driven by US Biological Opinion
  – Objective: To help migration of salmon smolt to the ocean.
BC Hydro Release Option

- 2 kcfs release in October – April, under dry conditions:
  - ~15% to 20% chance of being triggered
- Can be released out of both Active and Lower Recallable Storage
- Option to release water will qualify as a firm resource to serve domestic load
- Benefits:
  - About 1,080 GWh/year of firm energy.
    - 5 Pingston Creeks, 20 Akolkolex
  - Reduced requirement for procurement of new resources.
<table>
<thead>
<tr>
<th>Description</th>
<th>1990 Agreement</th>
<th>2011 Term Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active Storage</strong></td>
<td>2.25 MAF each</td>
<td>1.5 MAF each</td>
</tr>
<tr>
<td><strong>BPA Release Right</strong></td>
<td>2 kcfs applied to full 2.25 MAF</td>
<td>0.5 MAF limited to 1.5 MAF Active Account (under dry conditions)</td>
</tr>
<tr>
<td><strong>BCH Release Right</strong></td>
<td>2 kcfs applied to full 2.25 MAF</td>
<td>2 kcfs applied to full 2.25 MAF (under dry conditions)</td>
</tr>
<tr>
<td><strong>Early Termination</strong></td>
<td>Trigger:</td>
<td>Trigger:</td>
</tr>
<tr>
<td></td>
<td>• Loss of essentially all benefits:</td>
<td>• Material reduction in benefits</td>
</tr>
<tr>
<td></td>
<td>Refill: Up to 11 yrs</td>
<td>• WUP/Biop changes</td>
</tr>
<tr>
<td><strong>Initial and Final Termination:</strong></td>
<td>Initial Termination, then a 7 year refill period</td>
<td>No Initial Termination.</td>
</tr>
<tr>
<td><strong>BCH Firm Energy</strong></td>
<td>850 GWh</td>
<td>1080 GWh</td>
</tr>
</tbody>
</table>

(potential IPP project deferrals)
Stakeholder Feedback and Comments
### Stakeholder Feedback – Acct Size

**Feedback:**

1. 2.0 MAF Provides majority of power benefits

2. 4.5 MAF provides the greatest flexibility

**Comment:**

The proposed Terms have flexibility to:

- Capture majority of power benefits.
- Balance conflicting objectives as contemplated in the WUP
Feedback:

3. Refill Provisions desirable

4. Concern over 0.5 MAF for BPA in low flow years

Comment:

- BPA limited to 1.5 MAF
- BPA 2 kcfs release right is gone.
- BPA will be forced to operate in the mid-range of their account to preserve flexibility to meet obligation to store or release in freshet
- Term Sheet includes improved contract termination and refill provisions
<table>
<thead>
<tr>
<th>Feedback:</th>
<th>Comment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. US appear to place higher value on meeting environmental and social objectives</td>
<td>• ESA legislation in the US is a major controlling factor</td>
</tr>
<tr>
<td></td>
<td>• SARA in Canada</td>
</tr>
<tr>
<td></td>
<td>• Headwater reservoirs typically draft first</td>
</tr>
</tbody>
</table>
### Stakeholder Feedback – managing impacts

#### Feedback:

6. Specific Interests on Arrow and Kinbasket identified

7. Targets for reservoir Operations desirable

8. Avoid multi-year impacts

#### Comment:

- Flexibility available to balance impacts across competing objectives
  - System Flexibility
  - NTS flexibility
  - WLR physical works programs augment operational adjustments
Stakeholder Feedback – Additional Responses

Feedback:


10. Desire for improved communications

Comment:

– BC Hydro has an improved understanding of stakeholder interests.

– Opportunity to improve communications across a wider range of topics on both reservoirs.
Next Steps
Review of Interests

- Non-Treaty Storage process looked at a variety of interests
- Broad extent of issues are being dealt with through WLR programs.
- Exceptions identified:
  - Heritage issues (particularly on Kinbasket)
  - Valemount dust issue
Kinbasket Heritage Issue
Kinbasket Heritage

- Significant void in archaeology inventory on Kinbasket:
  - Arrow: significant gaps.
  - Kinbasket: near complete lack of inventory.

- Reservoir Archaeology Program (RAP):
  - Arrow scheduled for next year
  - Kinbasket scheduled for 2020+

- Kinbasket Archaeology studies are being moved up to 2012-2014
Valemount Dust Issue
Air Quality Data from Valemount

- Air quality monitor at the Valemount Fire hall.
- 10 years of data
- Sampling on 3 day time-steps
- Sample size:
  - PM10: very fine dust
  - PM2.5: extremely fine, typically resulting from combustion.
Valemount Dust

Valemount PM$_{10}$ (Fine Dust)
Valemount Dust

Valemount PM$_{2.5}$

(Extremely Fine Dust)
Valemount Dust

• Monitoring Results:
  – Winter particulate levels exceed current provincial guidelines for PM10 and PM 2.5
  – Spring/Summer particulate levels do not exceed guidelines

• Monitoring Issue:
  – Discontinuous sampling
  – Photo backup would better define source of events

• BC Hydro examining feasibility of modifying sampling equipment at Valemount, coupled with photographic backup.
System Flexibility
Arrow Reservoir Elevation
(1984 - 2010)

Reservoir Elevation (feet)

Average 2011 Term Sheet
Kinbasket Reservoir Elevation (1984 - 2010)

- 2,320
- 2,340
- 2,360
- 2,380
- 2,400
- 2,420
- 2,440
- 2,460
- 2,480

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Reservoir Elevat (feet)

Average 2011 Term Sheet
Downstream Columbia Flows

Keenleyside Dam Releases
(1984 - 2010)

Discharge (kcfs)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

2007 2008 2009 2010 Average 2011 Term Sheet
Performance Measure Reporting
### Performance Measure Reporting

<table>
<thead>
<tr>
<th>Current Reporting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>– WUP Arrow Soft Constraint reported annually</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Expanded Reporting:</td>
</tr>
<tr>
<td>– Potential to include reporting on additional PM’s developed through NTSA process.</td>
</tr>
<tr>
<td>– What measures are of particular interest to the forum?</td>
</tr>
<tr>
<td>– Best mechanism to report results?</td>
</tr>
</tbody>
</table>
Overall Outcomes

1. Achieved BC Hydro Board Objectives:
   - Optimize power & diverse non-power benefits
   - Improve control of reservoir operations
   - Support of WUP Planning Objectives

2. Confirmed WLR is working on the things that matter.
   - Interests expressed are consistent with those raised during the WUP
   - $120M investment is preserved

3. Identified opportunities for additional information gathering.
   - Kinbasket heritage studies
   - Improved Valemount dust monitoring.

4. Gained further insight into stakeholder interests and priorities for ongoing operations.
   - Opportunity to improve operations reporting across a wider range of performance measures.