Dear Mr Wruck

I submitted attached brief October 5 but it has not got listed. Perhaps it didn’t get sent by my computer so I RE-SEND

I MADE A VERBAL PRESENTATION ON OCT 5 BUT DID NOT GET FINISHED IN 5 MINUTES ALLOWED

I HEREBY RESPECTFULLY REQUEST TIME ON OCT 13 TO FINISH MY PRESENTATION BECAUSE

/I am sure that BCUC, Deloitte and other interveners realize the 900 page brief by BC Hydro claiming that Site C is needed by 2025 hinges on one single number namely BC Heritage Resources Plants can produce only around 48,500 (48491, or 49000) GWhrs,-

WORSE, a widely respected colleague found that in instruction NO 7, deposited March 6 2014, BCUC was (HANDCUFFED) “instructed “to use 49000 gwhr/year for Heritage capacity see Exhibit X 1
Someone on the minister’s staff in Victoria committed a grave self-serving error mandating around 49000 gwhr which would prove Site C is needed by 2025

But FROM DATA obtained directly from BC Hydro I found the average energy capacity of the BC Hydro Heritage system is actually 53,000 GWhrs. plus 1721 for reasonable upgrades

Meantime I got the attached email that my figures are irrefutable from Mauro Chiesa, a well-known power plant expert for the World Bank see exhibit X2
Note if you use around 49000 the table T3-8 becomes self serving to prove you need site C in 2025,
When the corrected 53000 plus 1721 is used, it shows there is no need for Site C

THE $2 billion SITE C MESS IS ONLY THE SYMPTOM

PRIOR MUZZLING AND HANDCUFFING BCUC IS THE DISEASE THAT CAUSED IT

bcuc cannot discover true facts with handcuffs

I RESPECTFULLY REQUEST TIME ON OCT 13 TO FINISH MY PRESENTATION
sincerely
Vern Ruskin
Dear Commission Secretary Mr Wruck and Dear Erica Hamilton

SITE C - EXECUTIVE SUMMARY & CONCLUSIONS

BCUC requested submissions, relevant to the terms of reference which ask
d) what portfolio of generating projects and
demand-side management initiatives could provide similar benefits; and
e) what are expected peak capacity demand and energy demand.

EXECUTIVE SUMMARY

1/ There are 6 easy portfolios of alternative generation available aggregating 4 times the size of Site C at a fraction of its cost. These are explained below in detail.

2/ BC Hydro claim lights will go dark because their present hydro capacity (around 48,500 GWhrs) isn’t enough after 2025. But BC Hydro’s own figures show their Hydro capacity is 53,000 GWhrs. That is 4,728 rounded to 4,500 GWhrs greater. Site C isn’t needed.
There are 6 easy portfolios of alternative generation available aggregating 4 times the size of Site C at a fraction of it's cost.

Adding Generators

Keenleyside dam originally had no generators and BC Hydro later installed a poorly built vibrating powerhouse with insufficient generators only 185 MW. It is now shutdown because it was poorly built and it needs a new powerhouse, 350 MW and 1,445 GWhrs can be added without building any new dam. This is shown on page 109 of my referenced book entitled Clean Energy Starvation in the Midst of Plenty IBSN 9781492222552.

Duncan dam has sat without generators for over 50 years. Installing around 100 MW generators can add around 276 GWhrs

<table>
<thead>
<tr>
<th>BC Hydro Table 3-8 says Heritage Avg Resources</th>
<th>Gwhr</th>
<th>Gwhr</th>
<th>% of Site C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Keenlyside Generators</td>
<td>1,445</td>
<td></td>
<td>28%</td>
</tr>
<tr>
<td>Add Duncan Generators</td>
<td>276</td>
<td></td>
<td>5%</td>
</tr>
<tr>
<td>BC Hydro understated Resources by</td>
<td>4,500</td>
<td></td>
<td>88%</td>
</tr>
<tr>
<td>Lake Williston diversity plus cyclic scheduling</td>
<td>4,600</td>
<td></td>
<td>90%</td>
</tr>
<tr>
<td>(ie 5 year moving avg over 20 year span)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add Columbia River Treaty</td>
<td>4,100</td>
<td></td>
<td>80%</td>
</tr>
<tr>
<td>Sub Total Available Resources</td>
<td></td>
<td>63,412</td>
<td></td>
</tr>
<tr>
<td>Powerex short term potential purchases</td>
<td></td>
<td>5,000</td>
<td>98%</td>
</tr>
<tr>
<td><strong>Total Available Resources with Powerex</strong></td>
<td></td>
<td>68,412</td>
<td></td>
</tr>
</tbody>
</table>
BC Hydro understated their Heritage Resources.

Correct Heritage Average Resources
From BC Hydro Table 3-8, F2017-F2019 Revenue Requirements Application
Energy Load Resource Balance after Planned Resources

<table>
<thead>
<tr>
<th></th>
<th>Gwhr</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC Hydro Table 3-8 says</td>
<td>48,491</td>
</tr>
<tr>
<td>Heritage Avg Resources</td>
<td>rounded to</td>
</tr>
<tr>
<td>Correct Heritage Average</td>
<td>53,219</td>
</tr>
<tr>
<td>Resources</td>
<td>rounded to</td>
</tr>
<tr>
<td>BC Hydro understated</td>
<td>4,728</td>
</tr>
<tr>
<td>Resources by</td>
<td>too low</td>
</tr>
<tr>
<td>Percentage of Site C</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>88%</td>
</tr>
</tbody>
</table>

I am sure that BCUC, Deloitte and some interveners realize
the 900 page BC Hydro claiming that Site C is needed by 2025 hinges on one
single number viz-a-viz ie BC Heritage Resources Plants can produce only around 48,500
(or 48,491) GWhrs, - see the 'Heritage Resources' on the first line of Table T3-8.

But FROM DATA obtained directly from BC Hydro I found the average energy
capacity of the BC Hydro Heritage system is actually 53,000 GWhrs.

It seems that the BC Hydro person submitting the figure made a huge error
by simply picking Hydro GENERATED (which happens to be 48,483 GWhrs -
see page 24 of BC Hydro's Annual Service Report 2016-2017)

To draw a parallel, a kind 'Mother Nature' left you a legacy to fill your community
hall stockroom to capacity with 53,000 light bulbs every year, but in 2016/7 you
actually only used 48,500 light bulbs.

So should you plan for using only 48,500 light bulbs or 53,000 full capacity in the
future.

In real life dispatch, the IPPs (including unpredictable wind and solar) MUST be
given first priority because their output is not controlled.
Everyday loads fluctuate and the Heritage hydro generates only the
unpredictable GAP = difference between IPPs and the Load.
Whereas the full Heritage CAPACITY planned to be available must be far greater, nearly
53,000 GWhrs

That 53,000 GWhrs should be in table 3-8 for PLANNING
I EXPLAIN DETAILS in the following tables and exhibits for the record, so BCUC and Deloitte are welcome to audit the originals and ask questions, and everybody interveners can verify my calculations.

If BC Hydro wants to prove to BCUC that they are correct and hydro capacity is only 48,483 GWhrs (which is a lot less than 53,000), its up to them to supply BCUC or Deloitte with a list of every Heritage Plants showing the minimum and average energy capacity of every plant.

**Bottom Line**

BC Hydro erroneously used the energy they happened to GENERATE during 2015.7 (the actual 'HYDRO GENERATED' (which happens to be 48,483 GWhrs - see page 24 of BC Hydro's Annual Service Report 2017-6) instead they should have used their FULL CAPACITY of their Plants in their "Planning View" Table 3-8

that huge totally misleading error invalidates their entire 900 page submissions and slants it to prove BC Hydro needs Site C by 2025 REGARDLESS OF COST, AND TOTALLY IGNORES CHEAPER ALTERNATIVES.

<table>
<thead>
<tr>
<th>Correct Heritage Average Resources</th>
<th>Gwhrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Domestic (as reported)</td>
<td>62,588</td>
</tr>
<tr>
<td>Less IPP supplied</td>
<td>13,644</td>
</tr>
<tr>
<td>Less other (131+74+118+138)</td>
<td>461</td>
</tr>
<tr>
<td>Herritage Resources Generated</td>
<td>48,483</td>
</tr>
<tr>
<td>Spilled over dam or surplus to Powerex</td>
<td>4,736</td>
</tr>
<tr>
<td>Percentage of Site C</td>
<td>93%</td>
</tr>
</tbody>
</table>

**Table A**

I will be pleased to give BCUC and/or Deloitte all my records that I have and answer questions and the moot point is that I got all my records directly from BC Hydro.
Duncan

BC Hydro has an obsolete report needs a short transmission line, no environmental problems but the report needs to update 5.5% interest wrong assumptions about Columbia River Treaty and 28% contingency.

Four interveners asked me 'exactly how did I calculate the capacity of various alternatives', so I EXPLAIN KEY DETAILS WITH EXHIBITS for the record, so BCUC, Deloitte and other interveners can verify them.

Given the rush and constraints I don’t know how much thought and time BCUC will give to my submission, but facts don’t expire and truth will out:

1. BC Hydro’s 900 pages don’t show Site C is needed.
2. There are many far less expensive alternatives for more power.

### Calculation of Average Heritage Resources

<table>
<thead>
<tr>
<th></th>
<th>Gwhr</th>
<th>Ref #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heritage minimum</td>
<td>43,000</td>
<td>1</td>
</tr>
<tr>
<td>Peace min vs avg</td>
<td>4,495</td>
<td>2</td>
</tr>
<tr>
<td>Columbia min vs avg</td>
<td>2,863</td>
<td>3</td>
</tr>
<tr>
<td>Other Hydro Bridge Kootenay, Seven Mile, Others</td>
<td>2,861</td>
<td>4</td>
</tr>
<tr>
<td>Average Flow Heritage</td>
<td><strong>53,219</strong></td>
<td>5</td>
</tr>
</tbody>
</table>

Table C

Table C shows how the corrected Heritage Hydro average energy capacity was calculated EXPLAIN DETAILS WITH EXHIBITS Also Tables D and E for the record, so BCUC Deloitte and other interveners can verify them and ask questions.
Table D

Table is ref 1.2,3 and prorates the difference between minimum vs average energy capacity of the Heritage Hydro.

Table E

Table E is Ref 4 and prorates the difference between minimum vs average energy capacity of the Heritage Hydro.

References

1. BC Hydro Annual Report minimum Generated Gwhr
   43,000

2. Peace Avg 17,045
   Peace min 12,550
   Difference 4,495

3. Columbia Avg 16,962
   Columbia min 14,099
   Difference 2,863

Total Difference Avg vs Min 7,358

References

4. Other Hydro
   Kootenay 3,330
   Seven Mile 3,326
   Bridge 2,504
   Other 4,118

Total 13,278

Peace and Columbia avg 34,000

Peace and Columbia Difference min vs avg 7,358 21.64%

Other Hydro Prorated Difference (approx) 2,861 21.64% of 13,278

REF 1. from BC Hydro "https://www.bchydro.com/energy-in-bc/our_system/generation/electric_generation.html

(shows Minimum flow hydro= 43,000 gwhrs)
BC Hydro Doug Robinson (Secretary) Canadian Entity Colombia River Treaty (CRT) gave me 70 yr flows Peace and Columbia Rivers from a **joint unbiased computer study** by US-Bonneville Power Administration (BPA) and BC Hydro in 2012. see exhibits X2.1
NOTES = exhibit X2.2 is source of Peace River and Columbia River flows
see email to Doug Robinson, Ralph Sultan and Anita Bell, (Secretary for Chris O Reilly)

Ralph Sultan was adviser to the Columbia River Treaty, and years before, surveyed for the dams when I was Director of Planning for BC Electric see Exhibit X

REF 4 From ref 2,3 (Avg peace 17,000 plus avg Columbia 17,000) = 34,000 GWhrs = see exhibit X2
D 1.4.2 Keenleyside dam originally had no generators and BC Hydro later installed a poorly built vibrating powerhouse with insufficient generators only 185 MW. It is now shutdown because it was poorly built and it needs a new powerhouse, 350 MW and 1,445 GWhrs can be added without building any new dam. This is shown on page 109 of my referenced book entitled Clean Energy Starvation in the Midst of Plenty IBSN 9781492222552.

Duncan dam has sat without generators for over 50 years. Installing around 100 MW generators can add around 276 GWhrs

BC Hydro has an obsolete report needs a short transmission line, no environmental problems but the report needs to update 5.5% interest wrong assumptions about Columbia River Treaty and 28% contingency.
Re: BCUC Site C - Verns spreadsheets used in Oct 5 Word doc

Thu, Oct 5, 2017 at 6:38 AM

To: [redacted]

All, these numbers are irrefutable. To this you can add 5-10 TWh of DSM and another 2 TWh of upgradable potential by redoing all of the "old" sites (assumed at nationalisation) that currently represent 12% of capacity but produce a paltry 8% at a capacity factor of 37%, through mostly neglect.

I wish people would stop discussing LNG: nowhere in the world does LNG live off a grid: it carries its own energy, and often sells the energy to the grid, to enhance finances.

Cheers

Mauro

In a message dated 05/10/2017 12:44:15 A.M. Pacific Daylight Time, [redacted] writes:

Attached is the Spreadsheet workbook with 5 spreadsheets that were used in the Word doc.

The document and spreadsheets relate to Alternative Power Portfolios, Heritage Resources (corrected for understatement or mistake) and the Columbia River Treaty.

Best Regards

... Vern

Phone [redacted]
BC Hydro means the British Columbia Hydro and Power Authority;

"BCH Distribution" means BC Hydro's distribution line-of-business;

"BCH Generation" means BC Hydro's generation line-of-business;

"Commission" means the British Columbia Utilities Commission;

"heritage electricity" means the capacity, energy and ancillary services that BCH Generation is required to supply to BCH Distribution under this Agreement;

"heritage energy" means

(a) subject to paragraph (b), 49,000 GWh per year less the energy generated for delivery under the Skagit Valley Treaty, or

(b) the quantity of energy determined by the Commission under section 8 of this Agreement to be heritage energy;

"heritage payment obligation" means

(a) subject to paragraph (b), the annual payment determined in accordance with the procedure set out in Schedule A to this Agreement, or

(b) the annual payment determined by the Commission under section 8 of this Agreement to be the heritage payment obligation;

"heritage resources" means the Electric Facilities and Thermal Facilities described in Schedule A to the Terms of Reference, together with

(a) the related civil works and plant, and

(b) potential future investments that increase the capacity, energy or ancillary service capability of such facilities, including potential future units 5 and 6 at Mica and potential future units 5 and 6 at Revelstoke;

"Order" means an order of the Commission;

"Terms of Reference" means Schedule A, Terms of Reference, to Order in Council 253/2003;

"Transfer Pricing Agreement" means the Transfer Pricing Agreement for Electricity and Gas dated April 1, 2003 between BC Hydro and Powerex Corp. as amended from time to time;

"Year" means fiscal year.

**Electricity supply**

2 BCH Generation must provide the full capacity of the heritage resources to BCH Distribution on a priority call basis.

**Obligation to supply**

3 BCH Generation must supply to BCH Distribution, in each Year, the heritage energy or such lesser amount of energy as may be required by BCH Distribution.

**Obligation to deliver**

4 BCH Generation will deliver the heritage energy to BCH Distribution at the various points of interconnection of the generation stations included in the heritage
This consolidation is current to October 3, 2017.

Link to Point in Time

Utilities Commission Act

DIRECTION NO. 7 TO THE BRITISH COLUMBIA UTILITIES COMMISSION

[includes amendments up to B.C. Reg. 207/2016, July 28, 2016]

Contents

1 Definitions
2 Application
3 Consideration in designing rates for transmission rate customers
4 Basis for establishing authority revenue requirements
5 Determining the cost of energy
6 Use of trade income in setting rates
7 Regulatory accounts
8 Annual distributable surpluses allowed
9 F2017, F2018 and F2019 rates
10 Deferral account rate rider
11 Commission reviews
12 Expenditures for export
13 Powerex Corp.
14 Retail access
15 Burrard Thermal
16 Rates

Appendix A — Heritage Contract
Appendix B — Burrard Depreciation Rates

Definitions

1 In this direction:
   "Act" means the Utilities Commission Act;
   "asbestos remediation costs" means the costs that are subject to the asbestos remediation regulatory account;
   "asbestos remediation regulatory account" means the regulatory account established under commission order G-7-13;
   "base line rate change" means, for each of F2017, F2018 and F2019, the year-over-year increase in the authority’s average rates that the commission determines it would have ordered but for section 9 (1) of this direction, expressed as a percentage;