

Submission to the B.C. Utilities Commission

on

the plan by B.C.Hydro

to

construct the Site C dam on the Peace River

by

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“This Earth, this planet, is ours to pass on to future generations in good shape. And it is this notion that should guide us in all of our choices and all of our decisions.”

Hon Julie Payette, Governor General of Canada²

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This is a more detailed version of the oral presentation I made on October 4, 2017

² inaugural speech October 2, 2017.

<https://www.gg.ca/document.aspx?id=17012&lan=eng> accessed October 11, 2017

Overview:

There are many reasons why the proposed Site C dam on the Peace River should not be built. They can be summarized by the quote from our new Governor General on the front page. I will only present evidence for three:

- 1) The Peace River is a canoeing river
- 2) The dam is not consistent with our responsibility to First Nations
- 3) There are better alternatives.

1) The Peace River is a canoeing river.

Please read and include here the submission I presented, cosigned by the Dogwood Canoe Club, to the BCUC at the previous Site C hearing in November 1981. For your convenience I include it here as Appendix A;

I have found the best holidays to be those spent on a wilderness canoe trip. All the troubles and stresses of ‘civilized’ living are forgotten. There are not many such trips available and the Peace River is one of them. If you would like to read an account of such a trip I recommend ‘Down the Wild River North’ by Constance Helmericks³ in which Constance and her two daughters ages 12 and 14 canoed the Peace, Slave and Mackenzie Rivers to the Arctic.

Losing this part of the Peace River would be a ‘cost’ which must be considered if the Site C dam is built.

³ Constance Helmericks: Down the Wild River North. Little, Brown and Company (Canada) Limited, 1968.

2) Treaty 8

“Maps and Dreams” by Hugh Brody.⁴ is one of the most memorable books I have read, and that was several decades ago. This a professional sociologist’s account of the life of First Nations peoples in Treaty 8 country. In particular one learns how the natives have been treated by the white people, continually being pushed out of their traditional lands. I hope you have all read it. If you have not, please do so.

It is abundantly clear that the treaty natives had no understanding of what they signed. They had no concept of ownership of land. The treaty states that the Queen takes all of their land except for small parcels known as reserves, and can even take reserve land if she wishes. No judge reading this treaty could regard it as a fair contract. It should be declared void. There is a long history of attempts to determine the natives understanding of the treaty, of which a useful account is provided by Dennis Madill⁵ It is clear that the natives and white people had completely different understandings of what the treaty meant, and for that reason also it should be declared void.

The construction of Site C is a cost, a significant cost to the natives, and which must be considered.

We have heard much about reconciliation recently. The best definition I have heard of the word is that we have their backs and they have ours. Cancelling Site C would show that we actually mean it.

⁴ Hugh Brody: Maps and Dreams. Douglas and McIntyre, Vancouver/Toronto, 1981, 1988.

⁵ Dennis F. K. Madill. Treaty Research Report, Treaty Eight (1899). Treaties and Historical Research Centre, Indian and Northern Affairs Canada, 1986.

3) An alternative

As you all know, almost all the electrical energy we use ends up heating the environment, it is wasted. Avoiding this is sometimes referred to colloquially as energy efficiency or conservation. Please read and include here my submission to the BCUC Site C hearing in November 1981 on this topic; for your convenience I have attached it as Appendix B.

I offer you also my letter to the BCUC of May 29, 1982, Exhibit 288, Hearing No.74. This discusses the potential for large reductions in energy use by TMP refiners in pulp mills. The cover and first page are attached as Appendix C (I do not seem to have the rest, but you do).

I offer here another example of the potential. A neighbour of mine recently told me her electricity bill was over \$1,500. I was shocked because mine for the same period was \$50. Her bill was 30 times more than mine. How can that be? Both houses were built about 60 years ago. My neighbour's house is larger, having had an extra floor added, and it has three residents compared to one. This does not account for the difference. The culprit is electric heating combined with poor insulation. The numbers are dramatic:

for the past 12 months

	Electricity use	Electricity cost
my house	1,800 kwh	\$ 150
neighbour's house	34,000 kwh	\$ 3,940

Documentation of these figures is the BC Hydro bills shown in Appendix D.

Supposing the neighbour's house were to be insulated properly, would it make sense and be relevant to Site C? Let us imagine the electricity use could be reduced substantially, to about double my use, to about 4,000 kwh/year. The demand on BC Hydro would be reduced by 30,000 kwh/year.

The figures for Site C are 4,600 GWh/y⁶ at a cost of about 9 G\$. At this ratio, the cost for 30,000 kwh/y is about \$59,000.

If BC Hydro can insulate my neighbour's house for under \$59,000, which seems very likely, it would be more effective to do this than to construct Site C⁷. Better still, it would be even more cost effective to share the cost with my neighbour by providing her with an incentive.

This is only one example of what is possible in the way of 'efficiency' and which should be explored before construction of Site C.

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https://www.bchydro.com/news/press_centre/news_releases/2010/province_announces_site_c_clean_energy_project.html accessed October 2, 2017

⁷ The numbers are approximate, and do not include maintenance and transmission costs. There is also the risk of cost overruns.

EXHIBIT 64

HEARING No.	ENTERED BY	DATE
13	D.J. Huntley	Jan 5 1982

APPENDIX
A

PEACE RIVER

The B.C.Hydro Site "C" proposal

A submission to the B.C.Utilities Commission

by

D. J. Huntley*

and cosigned by

the Dogwood Canoe Club

November 1981

*980 Thermal, Coquitlam, B.C. V3J 6S1

The rivers of British Columbia are great natural assets. They are savoured and enjoyed by many, in many ways. There are those who travel them, there are those who fish them, and there are those who quietly watch the water moving. A river dammed has almost no such appeal. It is dead.

The Peace River is one of the great rivers of the Province; the latter include in addition the Columbia, Fraser, Liard, Skeena and Stikine. None of these are protected by legislation. Surely a society such as ours can preserve some of its great rivers for future generations to enjoy. We urge the Commission to request the Provincial Government to do so.

Each river has its own character and attractions. The Peace River downstream from Hudson's Hope is a quiet one of moderate speed. It offers high quality canoeing, without requiring extreme skill, and is very accessible. It is well suited to trips of one or two days or longer. The trip from Hudson's Hope to Taylor must be rated as one of the most popular in the Province, and as many as 20-30 canoes per day pass a given point on some weekends (R.Wright and R.Wright, 'Canoe Routes of B.C.', Antonson Pub. Co., Surrey, 1977). Reasons for this are

- i) only moderate canoeing skills are required (I have even taught beginners on the Peace),
- ii) the scenery is attractive (it was featured recently on a Vancouver telephone directory),
- iii) there are several historic trading post sites by the river, including the first non-native settlement in the B.C. mainland,
- iv) wildlife, and
- v) good camping areas.

The Peace River also offers the rare opportunity for family river canoeing holidays of a week or longer. Such holidays must be regarded as being of the highest quality, offering everything that a holiday should. They also happen

to be economical and make a very small drain on our natural resources. Rivers which provide such holidays in an attractive surrounding are rare. In B.C. only the Peace, the upper Fraser, the lower Stikine and the Dease Rivers can provide such holidays.

Hudson's Hope is also the starting point for a canoe trip to Inuvik, one that is of great historic interest and includes large parts of Alexander Mackenzie's two great journeys of exploration. The trip is a long and interesting one. An account of a trip taken by two teenage girls and their mother, 'Down the Wild River North' by Constance Helmericks, is fascinating reading. I would like someday to make this trip and I would like my children and their children to have the opportunity also. Removal of any portion of the river would lessen the experience. The part from Hudson's Hope to Taylor contains some of the most beautiful scenery of this trip.

The Site C dam would have a significant impact on the canoeing in B.C., one that we would not like to occur.

Regulation: One of the present features of canoeing the Peace is that one is in danger of having one's campsite swept away by the river rising unnaturally. One cannot now use any of the most pleasant spots on the bars for camping because of this danger. With two (or more) dams and sufficient generating capacity this unnatural hazard can be eliminated. We request the Commission order B.C.Hydro to regulate its discharge so that the river level at a specified place does not rise more than a specified height in any given 24 hour period or portion thereof, and that the height selected by the Commission to be of a value comparable to that which might occur under usual natural conditions.

APPENDIX

B

17 THE CHAIRMAN: Do we have
18 copies of the second brief?

19 A No. I apologize for not
20 having it printed and circulated beforehand.

21 THE CHAIRMAN: That's fine, if
22 you read it into the record, it will be printed tonight.

1 I think the alternative is.

2 Okay, now I should state that
3 what my instinct when faced with a room full of people is
4 to lecture to them, that's my natural occupation. I'm going
5 to try not to do so. If any semblance of that appears here,
6 please excuse me. There's no intention to do that.

7 I've stated earlier that a
8 river cannot be compared to a lake. You have read the
9 environmental consultant's report. This fact is recognized
10 in that report in passing perhaps, but the consultant
11 simply didn't know what to do with that observation.
12 Nothing they could do adequately with it and so they didn't
13 discuss it very much.

14 For those of you who do not
15 understand the difference between a river and a lake,
16 I'm going to try an analogy which I think is quite
17 reasonable.

18 The differences between a
19 lion seen in the African wild and the same lion stuffed
20 and mounted over a fireplace, I think that will convey
21 to you hopefully my understanding or something of my
22 feelings of the difference between the two.

23 In Africa the people have
24 seen the wisdom of preserving lions. In B.C. we have
25 not yet seen the wisdom of preserving any of our
26 rivers. I think we can do that.

1 I would like to present my
2 views on how this will be accomplished as a professional
3 physicist. Some of what I'm going to say may sound a little
4 bit far out, but I'm hoping you will see it as something
5 which represents the limits of what we can do, not
6 necessarily with our present technology. But limits as
7 our present understanding of physics is concerned.

8 When I look around me, at
9 home and outside, I see energy coming in in the form of
10 electrical energy and other.

11 I also see where that energy
12 ends up. Most of it ends up in the form of heat at the
13 temperature of the environment. In that sense it's
14 being wasted; almost all of the energy that we use, perhaps
15 almost all is a little bit too extreme, but certainly most
16 of the energy that we make use of is wasted in that respect.

17 There are a few exceptions.
18 Perhaps the most notable exception to this is in the
19 refining of aluminum ore where you have to separate
20 aluminum from aluminum oxide that requires a certain amount
21 of energy. Chemists will tell you exactly how much

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1 and there's nothing you can do about that, if you're
2 going to refine aluminum you need that energy.

That consideration

4 does not apply to most of the other uses of energy.

5 If you walk around the house you will see examples of the
6 kind of thing I mean. If you look around industrial
7 processes, you'll see the same kind of thing.

The B.C. Hydro has

9 produced some reports on -- in discussing the possibilities
10 for energy conservation. I've looked through these.
11 I don't think they in any way tell you what the limits
12 of what can be achieved are. They tell you the limits
13 subject to certain boundary conditions. I don't know
14 what those boundary conditions are, because I don't think
15 they were stated very clearly.

16 I'm not going to talk
17 about the kind of energy conservation that you find in
18 those reports. There are lots of examples you will find
19 around you in every day life. Well, maybe I will tell
20 you about a couple of examples. I was sitting out in
21 town before Christmas eating my lunch beside the skating
22 rink, and I looked around me, and I saw a large number
23 of lights on. These were not Christmas lights, they
24 were just ordinary lights, and as far as I could see,
25 they served no useful purpose except decoration.

Now, if we -- I'm not

1 objecting to using lights for decorations as long as
2 the, as I will state later, the pricing is done
3 appropriately.

4 My own institution
5 recently installed a new lighting system, an emergency
6 lighting system in the science laboratories. As far as
7 I know, no one in our laboratories was asked if we wanted
8 it. We certainly weren't consulted on how to put it in.
9 The net result of the way it was put in is that there
10 are several kilowatts of lights which are on continuously.
11 There are no switches to turn them off. The only time
12 those lights go off is when there's a general power
13 failure. They're off for about ten seconds, and then
14 the emergency generator comes on and the lights go back
15 on.

16 Now, that's the kind --
17 that's a straight-forward kind of inefficiency which is
18 unnecessary, and it's the kind of thing that the B.C.
19 Hydro report discusses.

20 That's not the kind of
21 thing I want to talk about. What I want to talk about
22 are things like industrial processes where the B.C.
23 Hydro report discusses the possibility of improved
24 efficiency of electric motors, and they tell you what
25 the possibilities are.

That report discusses

1 very little, if anything, in the way of what those
2 electric motors are used for. Now, if you ask how much
3 energy is required to take a piece of wood and turn it
4 into some pulp, you can do some calculations based on the
5 chemical bond energies of the material involved, and you
6 can calculate a figure. You can ask also what kind of
7 electric power is used actually in the process of doing
8 this, and you will get a different figure.

9 I suspect that in most
10 cases these figures will differ by orders of magnitude, or
11 at least one order of magnitude. I can only give you one
12 example from a former graduate student of mine who looked
13 into this in one particular industrial process, and he
14 found that this particular process was using five
15 megawatts. He didn't think anything like that much was
16 necessary, and he devised a method of doing the same thing
17 for one tenth of the amount of power. He still didn't
18 know whether that was the limit.

19 If you look around the
20 house, you'll see the same kind of thing. The straight-
21 forward thing, if you look at a piece of -- if you look
22 at your toaster and ask how much electrical energy is
23 actually needed to turn a piece of bread into toast,
24 I think you'll find it a very small fraction of the
25 energy you actually use.

26 You can go further than

1 that. If you look at the heating system, the hot water
2 heating system, the B.C. Hydro report discussing that
3 talks about the limits and saturation point. They do not
4 discuss the possibility that you can heat your hot water
5 using a heat pump, and you'll find that that makes an
6 enormous difference. I'm not sure, I haven't calculated
7 the factor, but I think it will be at least a factor
8 of five less energy required than is actually used.

9 I'm sure that some people
10 are going to say I'm talking about pie in the sky, the
11 technology is not with us, they'll be right, but that's
12 the kind of thing that can be done, and the technology
13 will come. Certainly technology will not come unless
14 the incentives are there.

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2:00

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D.J. Huntley
In Chief

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2 When I look at other things in the house, I look at
3 a freezer. No energy is required to keep the food
4 cold in my freezer, yet I use a lot of energy. No
5 energy is required to keep my house warm, yet I use
6 a lot. It's a matter of the technology.

7 Okay, what I'm saying here
8 is that I don't think that the energy conservation
9 reports that B.C. Hydro has, go anywhere near into the
10 possibility, into the limits of the possibilities.
11 I believe the potential much larger.

12 Because of it, I have a
13 vision of how our society might be in the future.
14 I think the Directors of B. C. Hydro have a totally
15 different vision. From their scheduled projects for
16 the future, it appears as though their vision is to
17 dam all of the major rivers in British Columbia and
18 produce a lot of electrical energy. That's something
19 that's easy to do and I suspect that the reason they
20 do it is because it's easy. It's just a matter of
21 engineering. It can be done, they know it can be done
22 and everyone else knows it can be done. No one is
23 going to argue that it can't be done.

24 I have a different kind of
25 vision of the future. It's a vision in which our
26 society operates with a much smaller amount of energy,

In Chief

1 much of which is produced locally on a small scale.
2 Some of it possibly in individual residences, it
3 will depend on the circumstances. I believe that
4 can be done. We don't have the technology for doing
5 it, but I believe we can.

6 One example of this kind
7 of thing is the new town of Tumbler Ridge. As I
8 understand it from one of the intervenors' papers,
9 the plan for that town is to have it serviced by
10 B.C. Hydro with electrical heating in the houses.
11 I don't understand that.

12 Here we have a large supply
13 of coal, right on site. I would have thought that
14 B.C. Hydro would have, if it was serious about the
15 Hat Creek Project, it would have taken this as an
16 opportunity for a demonstration showpiece that it can
17 build a coal fired generating plant which is acceptable
18 to the public. They claim they can do it for Hat
19 Creek, then they should be able to do it at Tumbler
20 Ridge and one of the intervenors has pointed out that
21 in fact it will be a lot cheaper.

22 The kind of society which
23 I envisage, as I said has a lot more local production
24 of electricity and much less consumption, because of
25 the efficiencies that one has, or one can have. The
surroundings will be cleaner, they will be quieter and

In Chief

1 in fact less work will be required to keep everyone
2 fed and housed, with all the amenities we have now.
3 I'm not asking anyone to suffer at all. I think in
4 fact we'll be better off.

5 A society like that will be
6 much less susceptible to disruption. Right now it would
7 be very easy either through some unusual natural cause
8 or through some kind of insurgency to disrupt our
9 present society, simply by severing some of the main
10 transmission lines or putting some of the generators
11 or dams out of commission.

12 A society where there's a
13 lot more local independence would not be nearly so
14 susceptible in that respect, and I think we'd be
15 better off for it.

16 I'd like to look at this
17 subject from a completely point of view as well.
18 There's a scenario called, by Garrett Harding, "The
19 Tragedy of the Commons". Some of you may know it,
20 some of you may not. For the benefit of those who
21 don't, I will outline it very briefly.

22 There's a common land where
23 a number of herdsmen graze their cattle. This system
24 works fine for awhile. Some of these herdsmen will
25 find that they think they're better off if they graze
26 more cattle on the land,

1 and they will find that they are better off by grazing
2 even more cattle on the land, and this will go on and
3 the first one will become better off. Everything will
4 be fine until the land starts becoming overgrazed. What
5 happens then?

6 Well, if you consider one
7 of these herdsmen, with the land being overgrazed, and
8 he asks himself, am I better off if I graze one more cattle
9 on this land, and the answer will, to start off with be
10 yes, he's better off because he's got one more cow. He's
11 not as well off because the land is being a little bit
12 more overgrazed by that extra cow, but on net he's better
13 off.

14 This carries on, with all
15 of the herdsmen thinking of the same thing, and the
16 ultimate result, of course, is ruin for them all when
17 the land is so overgrazed that no cattle can be grazed
18 at all.

19 There are many many
20 examples of this phenomenon in our society, and you all
21 know a number of different ways in which the ruinous
22 conclusion is avoided.

23 There are two examples
24 of this in the Site C application. There are a number
25 of people who would like to use the Peace River Valley
26 for a number of different purposes, but up until now

1 there has been, as far as I know, no conflicts between
2 them. Up until now this common, namely the valley, was
3 not being overgrazed. We now have an application for
4 one herdsman who actually represents in a way of course
5 a very large number of people. That particular herdsman
6 wishes to overgraze it. That is why we have the
7 Utilities Commission.

13 B.C. Hydro sees over-
14 grazing ahead. That is, going on their projections,
15 they envisage in the future not enough electricity being
16 generated to meet the demand. The Utilities Commission
17 can avoid this by introducing appropriate regulations,
18 in just the same way that a Grazing Commission can
19 prevent overgrazing on the common land. That is one
20 possible solution.

21 B.C. Hydro sees a
22 different solution. They see the solution as to enlarge
23 the commons, in this case, to build another dam. Okay
24 now, in the case of the herdsman on a common land, if one
25 herdsman wants to graze more cattle than the others,
26 but that would cause overgrazing, what would be the

1 obvious solution? Well, you either don't allow him, or
2 you give him the option of increasing the size of the
3 common land, but you expect him to pay for it.

4 I think that the same
5 thing should apply in the present case. If myself, and
6 lots of other people like me decide that we want to
7 buy a widget, I don't care what a widget is, let's just
8 call it a widget, and this widget uses, say, one kilowatt
9 of continuous electrical energy, electrical power, sorry,
10 at present it would cost me, I understand, 3.7 cents per
11 kilowatt hour. But what is the real cost? That's not
12 the way the herdsman would see it. The way the herdsman
13 would see it is that I should go out and, you know,
14 be financially responsible for the extra grazing land,
15 but that's not what's happening.

16 The price that I should
17 be paying for this widget should be the price of the
18 new grazing land, namely the price of new electricity.
19 I made some efforts to find out what that is, and I've
20 not been successful. I gather there is no agreement on
21 the price per kilowatt hour for electricity from the
22 proposed Site C Dam. The only figure I've seen quoted
23 is in one of the intervenors' briefs, and I think that
24 was about 19 cents per kilowatt hour.

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2:10
D.J. Huntley
In Chief

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1 I've tried to make some
2 rational estimates of my own and all I can tell you is
3 that I'm reasonably confident it's over 10 cents per
4 kilowatt hour.

5 It's certainly several factors
6 higher than the currently charged rate for electricity
7 if I want to buy myself a new widget. I'm not sure if
8 the factor is three or four or five. If you consider
9 bulk users who pay less than the residential one, the
10 factor is going to be even larger, okay? It may even be
11 as large as a factor of 10.

12 The rate structure is here
13 extremely important and this is what I'm driving at. I
14 would like to see the rate structure set according to the
15 principle that I've just outlined, namely people like
16 myself, if I want to use a lot more electricity, I should
17 at least pay for the cost of it.

18 This in no way, you know, if
19 people are willing to pay for it, then we can also consider
20 the other losses, the environmental losses and so forth,
21 associated with the dam. This has nothing to do with
22 that at all. It is simply a matter of straight economics
23 as I see it, okay? I'm sure there will be people who
24 disagree with me.

25 Supposing we take a figure
26 which I'm sure people will argue with, of somewhere

1 around 10 to 15 cents per kilowatt hour for electricity
2 from the proposed Site C dam, we should ask ourselves the
3 question, are people in fact willing to pay for it? At
4 present we don't know. The Commissioners asked B.C. Hydro
5 for some estimates on the elasticity of the price; the
6 response, I think, indicated a certain amount of uncertainty
7 and I'll have to confess the numbers given were not well
8 enough explained, so that I don't know what they meant.

9 I don't think that's
10 important because I suspect that those numbers did not
11 apply to changes in electrical prices in factors of five
12 or ten, which I think is what is being envisaged here.

13 I would like the Commissioners
14 to ask those intervenors who want 100 or 200 megawatts,
15 whether in fact they are willing to pay 10 or 15 cents
16 per kilowatt hour for that electricity.

17 Okay, I realize here, I think
18 that the answer will be no. I think most people will not
19 be willing to pay that. Now there will be some who will
20 and I think the Commissioners are much more able than I
21 to evaluate how many people will and how many people won't.

22 But I think if you find that
23 people are paying -- if the rate structure is set so that
24 if I used more electricity, I pay 10 or 15 cents per
25 kilowatt hour, and if I used less electricity, I pay that
26 much less, then you will see a very large change in the

kind of incentive to, you would call it energy conservation;
I would call it less energy wastage than we have at present.

3 And I would like to see the
4 rate structure set in that kind of way.

5 You may argue that one should
6 not use the price from Site C as that price that I'm
7 quoting you. It may be that the price from Revelstoke
8 would be a more sensible one to use. The argument remains
9 the same.

I looked to see if B.C. Hydro
had taken this consideration into their application. In other
~~words~~ I looked to see if I could see that B.C. Hydro had
considered this kind of price structure and what effect
it would have on the demand, okay, I could not find this
anywhere, okay. It may be there, but if it's there, I
apologize, but I couldn't find it. And I'll be glad to
be corrected.

Okay, to summarize my statement then, I would like to say three things. The first is, as I stated many times before, the river is a totally different thing from a lake

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1 and I don't believe the consultants, environmental
2 consultants report has stated this adequately.

3 The second thing is that the
4 possibilities for energy use reduction are in fact very
5 much larger than stated in the B. C. Hydro reports.
6 Perhaps I should give the numbers of those reports if
7 this is going to be printed.

8 Okay, the numbers are
9 7833, 7853 and 7854. They were ones that the Commission
10 made available.

11 The third point I wish to
12 make is that as far as I can see, the impact of a proper
13 rate structure has not been considered by B.C. Hydro.

14 My personal estimation is
15 if these three things are put together, you will find
16 that the Site C Dam is not needed, but it will require
17 the Commission to introduce an appropriate rate structure,
18 or it may require the Commission to introduce an
19 appropriate rate structure. Thank you.

20 THE CHAIRMAN: Thank you
21 very much. Now have we people who would like to ask
22 questions of this witness? If not, nobody from the floor?
23 The Applicant?

24 COMM. LITTLE:
25 Q Mr. Huntley, you were
26 implying the rates should increase and that you feel
the general public will probably pay for this.

1 What about a person that has electric heat and
2 all of a sudden he has a big jump. He has no way
3 of counteracting that, does he?

4 A I'm sorry, you misunder-
5 stood and I knew someone would misunderstand what
6 I was saying. I'm not proposing in this that the
7 actual amount is -- the actual amount paid by a
8 typical person would change. All I'm suggesting is
9 that the structure be changed, so that you pay less
10 for less electricity and more for more. Okay, and
11 if my electric bill is still 50, you know, is \$50 for
12 the last two months, it will be still \$50 for the next
13 two months, but if I use more electricity then it will
14 cost me somewhere around 10 or 15 cents a kilowatt
15 hour more, and if I use less, I will save 10 or 15
16 cents a kilowatt hour. Okay, so in other words the
17 rate at which electricity is charged increases for the
18 amount of use.

COMM. LITTLE:

Well, what about in

20 the industrial part?

21 A Yes, the same thing.

22 COMM. LITTLE: The same

23 thing, in other words if they get more production
24 they would be penalized?

25 A I recognize there is a
26 difficult problem there and in asking you to introduce

1 this, you are going to have a difficult problem in
2 determining exactly how to do it. Okay, but I
3 maintain that you can do it, it won't be perfect,
4 but it will be better than the present situation.

5 COMM. LITTLE: Thank you.

THE CHAIRMAN: Mr. Ryan.

A What I'm suggesting is
that people would find it economically more attractive
to pay for, if you like, energy efficient devices than
to pay for the dam, and you can ask yourself the
question in a totally different way. Given the price
of the dam, I've forgotten what it is, about 2.6
billion, could you spend that same money in a way
so that people have the same amenities, same everything
they have now, but you know, using only the electricity
that they have now, instead of the extra that would be
produced by the dam, and I think the answer is that it
could be done. I'm sorry, did I make myself clear
or not?

25 COMM. RYAN: No, not to me
26 you don't.

1 A No, okay. Let's
2 supposing everyone has a widget, okay. It uses one
3 kilowatt of energy continuously. Supposing you
4 could, supposing -- okay, but everyone wouldn't need
5 that widget if you spent \$1 billion, but on the other
6 hand in order for people to keep those widgets, you
7 have to spend \$2.6 billion, which way would you go,
8 okay. You would spend the \$1 billion, so that
9 people didn't need the widgets any more.

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1 Okay now, what I'm
2 suggesting is that the rate structure would have that
3 effect, the rate structure that I'm suggesting.

4 COMM. KILPATRICK: Professor
5 Huntley, are you recommending a rate structure which
6 will charge more for increased usage, or are you
7 recommending a marginal cost pricing approach to life
8 which -- or both?

9 A Okay, I have not used
10 the phrase "marginal cost pricing", because I'm sure it
11 has a precise meaning, and I don't know what that is.
12 It may be that's what I'm referring to.

13 COMM. KILPATRICK: Well then
14 I won't get into that can of worms anyway. Thank you
15 very much.

16 THE CHAIRMAN: Earlier in
17 your second presentation, the one we're talking about
18 now, you referred to a friend of yours who had developed
19 a device that cut the need in an industrial situation,
20 from five kilowatts to about one-tenth of that. I find
21 that fascinating, can you tell me more about it?

22 A I wish I could. I
23 will be glad to give you his name and address and
24 phone number, but I have tried previously, you know,
25 I have asked him if it would be possible to make this
26 public, and he said no, it was information which is

1 privy to the company, and it couldn't be made public.

2 But I shall be glad to try and get that --

3 THE CHAIRMAN: No, I don't
4 care to try and pry it out of your friend.

5 A Okay.

6 THE CHAIRMAN: The -- I would
7 make an observation or two concerning your presentation.
8 You talked about the toaster using perhaps four or five
9 times as much heat as it needs to turn a piece of bread
10 into toast. If you do that in your kitchen you don't
11 lose much energy, do you?

12 A You're saying that that
13 energy is going to heat my kitchen? If I wanted to
14 heat my kitchen I will do it in a totally different
15 way, much more economically.

16 THE CHAIRMAN: Thank you very
17 much. Is there anything further? Then I think that
18 we now can excuse you, and carry on with the next
19 intervenor.

JUN 1 1982



Mr. K. Henry, Chairman,
Site C Hearings,
B.C. Utilities Commission,
1177 West Hastings,
Vancouver.

BRITISH COLUMBIA UTILITIES COMMISSION		
EXHIBIT		288
HEARING No.	ENTERED BY	DATE
74	F.H. Huntley	11/6/82

Dear Mr. Henry:

In my testimony at the Site C hearings I mentioned a 5MW machine performing an operation for which very much less power was actually required. In response to a question from you I indicated an unwillingness to make public more details. I can now do this and at the same time would like to correct what may have been an erroneous statement of mine.

The process is the production of pulp. A copy of a report describing the details, "TMP refiners" by C.W.E.Walker*, is enclosed. The report was given to a colleague of mine for evaluation and is thus now in the public domain.

The essential messages are:

- 1) The energy actually needed for the process is less than 1% of the energy used (page 1).
- 2) A newly designed type of plate in the refiner is expected to result in a power saving of 75% (p.87).
- 3) A test experiment on a laboratory refiner showed a power saving of 33% (p.88).

As I understand it the company (MacMillan Bloedel Ltd) has shown no inclination to pursue this possibility of large power savings.

This matter has demonstrated to me that very large reductions in energy consumption are quite feasible but that financial incentives are necessary to cause them. I believe that a marginal rate structure should be the first financial incentive.

Yours sincerely,

D.J. Huntley (Intervenor)

TMP REFINERS

I INTRODUCTION

A. Experimental Data - Fall, 1977

When this investigation started in the Fall of 1977 there was a considerable body of experimental data on the operation of TMP refiners, obtained both from laboratory and from regular production machines but this data left a somewhat confused picture, with many contradictions.

The salient fact of the TMP operation was an energy consumption of about 100 horse power days per ton of dry pulp produced, coupled with the creation of dirty low pressure steam whose sensible and latent heats accounted for almost all of the energy consumed. Estimates of the work actually needed to break down whole wood into separated and fibrillated fibres could account for less than 1% of the energy consumed. Of the large amount of steam produced between the rotating plates of the refiner, about half appeared to move outward and leave with the outgoing pulp and about half appeared to move inward against the wood and pulp flow and so act to preheat it.

Important measurements had been made of the steam temperatures and pressures at a series of points, spaced radially through the refining zone, and this had been done in several different TMP refiners. These measurements, in addition to providing the steam pressure profile through the refining zone, gave the force due to steam pressure which is acting to hold

Prepared For

Billing Date

Oct 26, 2016

Pay By

Nov 17, 2016

Please Pay

\$406.46

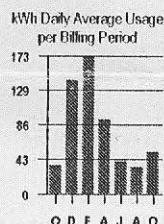
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Invoice Number:
101009325991

Meter Reading Information

Electric:
Meter # 4673510
Aug 24 16405
Oct 24 19708
62 days 3303

Next meter reading on or about Dec 21



Daily Average Comparison
Oct 2015 36 kWh
Oct 2016 53 kWh

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Previous Bill

BC Hydro

Balance payable from your previous bill
Thank you for your payment Sep 13, 2016

241.73
241.73CR

Balance from your previous bill

\$0.00

Electric Charges

Aug 24 to Oct 24 (Residential Conservation Rate 1101)
Basic Charge: 62 days @ \$0.18350 /day 11.38*
Usage Charge!
Step 1: 1376 kWh @ \$0.08290 /kWh 114.07*
Step 2: 1927 kWh @ \$0.12430 /kWh 239.53*
Rate Rider at 5.0% 18.25*
Regional transit levy: 62 days @ \$0.06240 /day 3.87*
* GST 19.36

\$406.46

Your total consumption for the billing period is 3303 kWh and your Conservation Rate breakdown is as follows:

1927 kWh @ 12.43¢

Your Step 1 threshold of 1376 kWh is prorated based on 62 days

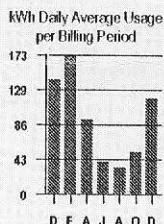
1376 kWh @ 8.29¢

Invoice Number:
109009367136

Meter Reading Information

Electric:
Meter # 4673510
Oct 25 19708
Dec 22 26766
59 days 7058

Next meter reading on or about Feb 22



Daily Average Comparison
Dec 2015 143 kWh
Dec 2016 120 kWh

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Other questions? Call the

Billing Date

Dec 28, 2016

Pay By

Please Pay

Jan 19, 2017

\$923.30

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Previous Bill

Balance payable from your previous bill
Thank you for your payment Nov 28, 2016

406.46
406.46CR

Balance from your previous bill

\$0.00

Electric Charges

Oct 25 to Dec 22 (Residential Conservation Rate 1101)
Basic Charge: 59 days @ \$0.18350 /day 10.83*
Usage Charge!
Step 1: 1309 kWh @ \$0.08290 /kWh 108.52*
Step 2: 5749 kWh @ \$0.12430 /kWh 714.60*
Rate Rider at 5.0% 41.70*
Regional transit levy: 59 days @ \$0.06240 /day 3.68*
* GST 43.97

\$923.30

Your total consumption for the billing period is 7058 kWh and your Conservation Rate breakdown is as follows:

5749 kWh @ 12.43¢

Your Step 1 threshold of 1309 kWh is prorated based on 59 days



Prepared For

Billing Date

Jun 27, 2017

Pay By

Jul 19, 2017

Please Pay

\$293.76

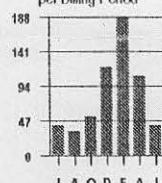
Invoice Number:
109009750514

Meter Reading Information

Electric:
Meter # 4673510
Apr 27 45301
Jun 23 47688
58 days 2387

Next meter reading on or about Aug 23

KWh Daily Average Usage per Billing Period



Daily Average Comparison
Jun 2016 41 kWh
Jun 2017 41 kWh

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Previous Bill

BC Hydro

Balance payable from your previous bill
Thank you for your payment May 05, 2017

883.60
883.60CR

Balance from your previous bill

\$0.00

Electric Charges

Apr 27 to Jun 23 (Residential Conservation Rate 1101)

Basic Charge: 58 days @ \$0.18990 /day

11.01*

Usage Charge¹

Step 1: 1287 kWh @ \$0.08580 /kWh

110.42*

Step 2: 1100 kWh @ \$0.12870 /kWh

141.57*

Rate Rider at 5.0%

13.15*

Regional transit levy: 58 days @ \$0.06240 /day

3.62*

* GST

13.99

\$293.76

39330-001
BMO Bank of Montreal

1100 kWh @ 12.87¢
1287 kWh @ 8.58¢

Your total consumption for the billing period is 2387 kWh and your Conservation Rate breakdown is as follows:

Your Step 1 threshold of 1287 kWh is prorated based on 58 days



Prepared For

Billing Date

Aug 28, 2017

Pay By

Please Pay

Sep 19, 2017

\$360.33

Invoice Number:
102009961120

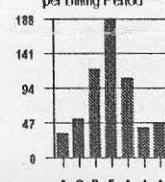
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Meter Reading Information

Electric:
Meter # 4673510
Jun 24 47688
Aug 24 50566
62 days 2878

Next meter reading on or about Oct 24

KWh Daily Average Usage per Billing Period



Daily Average Comparison
Aug 2016 34 kWh
Aug 2017 46 kWh

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Previous Bill

BC Hydro

Balance payable from your previous bill
Thank you for your payment Jul 12, 2017

293.76
293.76CR

Balance from your previous bill

\$0.00

Electric Charges

Jun 24 to Aug 24 (Residential Conservation Rate 1101)

Basic Charge: 62 days @ \$0.18990 /day

11.77*

Usage Charge¹

Step 1: 1376 kWh @ \$0.08580 /kWh

118.06*

Step 2: 1502 kWh @ \$0.12870 /kWh

193.31*

Rate Rider at 5.0%

16.16*

Regional transit levy: 62 days @ \$0.06240 /day

3.87*

* GST

17.16

\$360.33

Your total consumption for the billing period is 2878 kWh and your Conservation Rate breakdown is as follows:

1502 kWh @ 12.87¢

Your Step 1 threshold of 1376 kWh is prorated based on 62 days

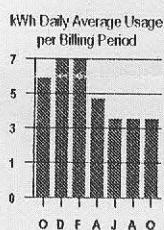
Prepared For
DAVID HUNTLEY

Invoice Number:
111009199267

Meter Reading Information

Electric:	
Meter #:	4673536
Aug 24	9440
Oct 24	9704
62 days	264

Next meter reading on or about Dec 21



Daily Average Comparison
Oct 2015 6 kWh
Oct 2016 4 kWh

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Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766

Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Billing Date

Oct 26, 2016

Account Number

Pre-authorized Payment Date

Nov 16, 2016

Pre-authorized Payment Amount

\$40.74

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Switch to online billing before December 15 and get a \$5 e-gift card.
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Please do not pay this pre-authorized payment bill.

Previous Bill

Balance payable from your previous bill

40.56

Thank you for your payment Sep 15, 2016

40.56CR

BC Hydro

Balance from your previous bill

\$0.00

Electric Charges

Aug 24 to Oct 24 (Residential Conservation Rate 1101)

11.38*

Basic Charge: 62 days @ \$0.18350 /day

Usage Charge¹

21.89*

Step 1: 264 kWh @ \$0.08290 /kWh

0.00

Step 2: 0 kWh @ \$0.12430 /kWh

1.66*

Rate Rider at 5.0%

3.87*

Regional transit levy: 62 days @ \$0.06240 /day

* GST

1.94

\$40.74

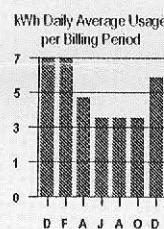
Prepared For
DAVID HUNTLEY

Invoice Number:
116009219696

Meter Reading Information

Electric:	
Meter #:	4673536
Oct 25	9704
Dec 22	10074
59 days	370

Next meter reading on or about Feb 22



Daily Average Comparison
Dec 2015 7 kWh
Dec 2016 6 kWh

Take action to save electricity and money.

Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766

Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Billing Date

Dec 28, 2016

Account Number

Pre-authorized Payment Date

Jan 18, 2017

Pre-authorized Payment Amount

\$49.62

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Please do not pay this pre-authorized payment bill.

Previous Bill

Balance payable from your previous bill

40.74

Thank you for your payment Nov 16, 2016

40.74CR

BC Hydro

Balance from your previous bill

\$0.00

Electric Charges

Oct 25 to Dec 22 (Residential Conservation Rate 1101)

10.83*

Basic Charge: 59 days @ \$0.18350 /day

Usage Charge¹

30.67*

Step 1: 370 kWh @ \$0.08290 /kWh

0.00

Step 2: 0 kWh @ \$0.12430 /kWh

2.08*

Rate Rider at 5.0%

3.68*

Regional transit levy: 59 days @ \$0.06240 /day

* GST

2.36

\$49.62

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DAVID HUNTLEY

Billing Date

Account Number

Apr 28, 2017

Pre-authorized Payment Date

Pre-authorized Payment Amount

May 19, 2017

\$44.81

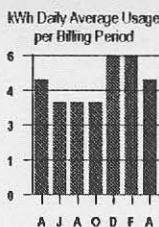
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Invoice Number:
108009634649

Meter Reading Information

Electric:	
Meter #	4673536
Feb 24	10470
Mar 31	10645
36 days	175
Meter #	4673536
Apr 01	10645
Apr 26	10772
26 days	127

Next meter reading on or about Jun 22



Daily Average Comparison
Apr 2016 5 kWh
Apr 2017 5 kWh

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Other questions? Call the

Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766

Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Please do not pay this pre-authorized payment bill.

Previous Bill

Balance payable from your previous bill
Thank you for your payment Mar 20, 2017

53.07
53.07CR

Balance from your previous bill

\$0.00

BC Hydro

Electric Charges

Feb 24 to Mar 31 (Residential Conservation Rate 1101)

Basic Charge: 36 days @ \$0.18350 /day
Usage Charge¹

6.61*

Step 1: 175 kW.h @ \$0.08290 /kW.h

14.51*

Step 2: 0 kW.h @ \$0.12430 /kW.h

0.00

Feb 24 to Apr 26 (Residential Conservation Rate 1101)

Rate Rider at 5.0%
Regional transit levy: 62 days @ \$0.06240 /day

1.85*

3.87*

Apr 01 to Apr 26 (Residential Conservation Rate 1101)

Basic Charge: 26 days @ \$0.18990 /day
Usage Charge¹

4.94*

Step 1: 127 kW.h @ \$0.08580 /kW.h

10.90*

Step 2: 0 kW.h @ \$0.12870 /kW.h

0.00

* GST

2.13

\$44.81

Prepared For
DAVID HUNTLEY

Billing Date

Account Number

Feb 27, 2017

Pre-authorized Payment Date

Pre-authorized Payment Amount

Mar 20, 2017

\$53.07

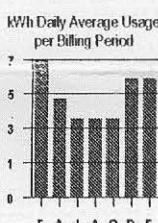
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Invoice Number:
102009571815

Meter Reading Information

Electric:	
Meter #	4673536
Dec 23	10074
Feb 23	10470

Next meter reading on or about Apr 25



Daily Average Comparison
Feb 2016 7 kWh
Feb 2017 6 kWh

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Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766

Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Please do not pay this pre-authorized payment bill.

Previous Bill

Balance payable from your previous bill
Thank you for your payment Jan 18, 2017

49.62
49.62CR

Balance from your previous bill

\$0.00

BC Hydro

Electric Charges

Dec 23 to Feb 23 (Residential Conservation Rate 1101)

Basic Charge: 63 days @ \$0.18350 /day

11.56*

Usage Charge¹

Step 1: 396 kW.h @ \$0.08290 /kW.h

32.83*

Step 2: 0 kW.h @ \$0.12430 /kW.h

0.00

Rate Rider at 5.0%

2.22*

Regional transit levy: 63 days @ \$0.06240 /day

3.93*

* GST

2.53

\$53.07

Prepared For
DAVID HUNTLEY

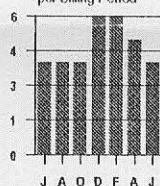
Invoice Number:
108009763440

Meter Reading Information

Electric:
Meter # 4673536
Apr 27 10772
Jun 23 10999
58 days 227

Next meter reading on or about Aug 23

kWh Daily Average Usage per Billing Period



Daily Average Comparison
Jun 2016 4 kWh
Jun 2017 4 kWh

Take action to save

Customer Service

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Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Previous Bill

Balance payable from your previous bill 44.81
Thank you for your payment May 19, 2017 44.81CR

BC Hydro

Balance from your previous bill \$0.00

Electric Charges

Apr 27 to Jun 23 (Residential Conservation Rate 1101)

Basic Charge: 58 days @ \$0.18990 /day 11.01*

Usage Charge¹

Step 1: 227 kWh @ \$0.08580 /kWh 19.48*

Step 2: 0 kWh @ \$0.12870 /kWh 0.00

Rate Rider at 5.0% 1.52*

Regional transit levy: 58 days @ \$0.06240 /day 3.62*

* GST 1.78

\$37.41

Prepared For
DAVID HUNTLEY

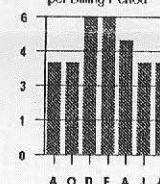
Invoice Number:
114009766949

Meter Reading Information

Electric:
Meter # 4673536
Jun 24 10999
Aug 24 11250
62 days 251

Next meter reading on or about Oct 24

kWh Daily Average Usage per Billing Period



Daily Average Comparison
Aug 2016 4 kWh
Aug 2017 4 kWh

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Customer Service

Phone: (604) 224-9376 **Power Out?** 1-888-769-3766

Mail to: BC Hydro, PO Box 9501 Stn Terminal, Vancouver BC, V6B 4N1

Previous Bill

Balance payable from your previous bill 37.41
Thank you for your payment Jul 18, 2017 37.41CR

BC Hydro

Balance from your previous bill \$0.00

Electric Charges

Jun 24 to Aug 24 (Residential Conservation Rate 1101)

Basic Charge: 62 days @ \$0.18990 /day 11.77*

Usage Charge¹

Step 1: 251 kWh @ \$0.08580 /kWh 21.54*

Step 2: 0 kWh @ \$0.12870 /kWh 0.00

Rate Rider at 5.0% 1.67*

Regional transit levy: 62 days @ \$0.06240 /day 3.87*

* GST 1.94

\$40.79

Your total consumption for the billing period is 251 kWh and your Conservation Rate breakdown is as follows:

0 kWh @ 12.87¢

Your Step 1 threshold of 1376 kWh is prorated based on 62 days

251 kWh @ 8.58¢