



CAC/msos-1014  
EXHIBIT #  
WUSKWATIM GENERATION  
& TRANSMISSION PROJECT  
P.L.C.  
CLEAN ENVIRONMENT COMMISSION

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MANITOBA HYDRO AND NISICHAWAYASIIHK CREE NATION  
WUSKWATIM GENERATION AND TRANSMISSION PROJECTS

HEARING BEFORE THE  
MANITOBA CLEAN ENVIRONMENT COMMISSION

WRITTEN COMMENTARY  
ON  
ENVIRONMENTAL IMPACT STATEMENT

CAC/MSOS

June 8, 2004

## **Overview: Uncertainty**

Ultimately, the questions concerning the environmental impacts of this project may not be fully determined until the hydro-electric dam is built and operations commence.

Despite the accumulation of data and the qualifications of those interpreting it, predicting what will happen to the environment when it is disrupted by developments is inherently uncertain. While the proponents have presented many volumes of material and analysis which they feel demonstrates that the project will have no significant adverse effects on the region, there always remains an element of uncertainty in the process, variables that cannot be deciphered with complete accuracy or consequences that remain unimagined until their detrimental effects are felt.

While uncertainty is infused in the process of prediction, the degree of uncertainty may be bolstered by the methodologies employed in conducting studies or analyzing information. There is some question concerning whether the cumulative effects methodology was ultimately the best analytical framework for this project. Ultimately, the analysts employed to conduct the assessment must use their "best professional judgement", but such judgement relies somewhat on subjective opinion. While there is a certain amount of professional expertise and experience involved which would mitigate uncertainty, it must be acknowledged that experts often disagree on what's best.

These uncertainties may be mitigated somewhat through a thorough and transparent review process before the project is approved. Any failings in "professional judgment" may be corrected or at least brought to light through a process where concerned members of the public can produce evidence or cross-examine the evidence provided by the proponent. Where such a process exists and has been fairly carried out, uncertainty may be tempered.

Should doubts remain concerning the proponent's plans, the ultimate failsafe is the implementation of extensive mitigation measures, monitoring and adaptive management. Such measures may be imperative and of necessity applied with greater rigor if the information provided by the proponents is not thoroughly tested during the hearing process and questions as to its adequacy remain.

## **Lack of Dialogue/ Lack of Debate**

While we have heard from many participants during the course of this hearing, two essential points of view have predominated: the future promise of the Wuskwatim project, and the cataclysmic impacts of "big hydro". While the proponents have focused their presentation of evidence on the examination of the former, many

participants have opted to push the outer boundaries of the hearing's scope and advocate the latter view. These views may seem diametrically opposed at first glance, however they are only peripherally related, and the consequence has been a genuine lack of meaningful dialogue during the course of the hearing.

The Terms of Reference set out that the Commission must consider the EIS as well as public concerns and determine whether a license should be issued for the project, and as well as what, if any, future mitigation, management or monitoring should be conducted to alleviate any detrimental impacts or adverse effects. While the proponents and their supporters have generally concentrated on the impacts and effects of the Wuskwatim project itself upon the project region, opponents to the project have tended to focus their attentions on matters of broader temporal and spatial scope. Both views are relevant and may offer valid perspectives for the Commission's consideration, but the lack of substantial interrelation of these themes has resulted in two very different and oft-times one sided conversations occurring in relative isolation. While this has resulted in a good deal of information being presented to the Commission, the value of much of the information to this process is lost due to the lack of critical engagement and assessment of this information.

While the historical background of hydro development in the region and its ongoing detrimental impacts has served as a valid warning concerning future development and also provides a certain basis for the socioeconomic environment that the project will be superimposed upon, it speaks only tangentially about the specific environmental and socioeconomic impacts that the project under review will have and fails to evaluate the information presented in the EIS itself. In the end, none of the intervenors opposed to this project have presented a valid case for why this dam should not be built. They have adequately set the stage concerning the impacts of past projects on the region and its people, but they have not established that this project will breach a critical environmental or socioeconomic threshold. While public concerns may be perfectly valid, there has been presented no evidentiary case to substantiate the concerns that this project will further exacerbate the effects of the CRD or to challenge MH/NCN's assertions that the project will operate within the parameters of the already existing regulated system and have no impacts upon that system.

### **Missed opportunities**

PCN was funded to provide evidence as to the relationship between the construction of the dam at Wuskwatim and impacts upon the larger system along the Burntwood-Nelson. While the participant made a presentation, redolent with criticisms based on the impacts of past projects, it failed to offer any criticism of the information contained in the EIS itself. While accusing the proponents of making "bald assertions"

that need to be tested, the participant relied on little more than “bald accusations”.<sup>1</sup>

While the lessons of history are demonstrative and understanding historical impacts has been integral to the process, the scope of history needs to be firmly fixed upon the adequacy of the EIS. PCN may speak eloquently concerning historical and ongoing system impacts which continue to affect the community, but they failed to relate these impacts to the content of the EIS. The impacts of the CRD are an important consideration, but the real question of concern is the impact that this project will have on the environment or that the environment will have on this project. MH/NCN has maintained that Wuskwatim will operate within the ambit of the regulated system and will not significantly impact upon that system; little evidence has been produced to contradict the EIS materials on this pivotal issue.

Another missed opportunity to adequately assess the EIS information stems from the type of evidence provided by the main environmental participant in this hearing process. While a panoply of witnesses were produced, few had actually reviewed the EIS materials and could not comment directly upon their content. Much of the information was of a general nature, speaking about issues at a high level and addressing concerns tangential to the project under consideration, but never adequately connected to the EIS materials in issue.

For example, Mr McCully could speak to the potential environmental and socioeconomic impacts of hydro developments, but he could not evaluate the proposed project on its merits and provide an assessment about whether the project would have more than a minimal impact upon the system.<sup>2</sup>

Further, the main environmental participant in the hearing failed to complete a cross examination of the proponent’s EIS; this hearing process operates most effectively when information entered into evidence is forced to withstand the rigour of scrutiny from disparate sources. In essence, many of the decisions relating to methodology and many of the conclusions concerning the significance of adverse effects rely on professional judgement. The degree of confidence that may be placed in that judgment depends on factors which include: the nature of the problem and how it is defined, the process which is utilized by the proponents to address the defined problem, the manner in which the process progresses, i.e., the competition of ideas and finally, the end product of the debate, i.e. rebuttal evidence. The competition of ideas serves to test evidence from varied perspectives and consequently strengthens the rigor of debate and the analysis of evidence.

While the Commission has provided an objective voice and tested the evidence presented during the proceeding, the more adversarial “competition of ideas” that may be best expressed by public participants has been unsatisfactory in some

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<sup>1</sup>See PCN’s presentation, March 17, 2004, volume 19, 2186-2273

<sup>2</sup>March 16, volume 18, 2026

circumstances.

The Commission should ensure that the proponents are held to the promises of minimal impacts that have been liberally peppered throughout the EIS. Since certain areas of evidence have not fully benefitted from the interplay of a true competition of ideas, the Commission should ensure that that which has been found wanting is applied in terms of the ongoing monitoring and assessment of the project and its impacts.

The adaptive management that is promised in the EIS for certain VEC's should be more than a mere safety net, it should equate with a state of the art security system, protecting our environment from any unforeseen impacts and consequences which may result from this project. There is a need for greater vigilance if the project is to go forward to ensure that every opportunity to discern and mitigate adverse impacts is seized upon.

## **Uncertainty**

There are two layers of uncertainty that may undermine confidence in the environmental assessment. First, there are the uncertainties that are an inherent part of the assessment process itself. These are the generic uncertainties that are an integral part of the process of prediction; they can be controlled or mitigated somewhat, but never entirely. Second, this process is mired with its own peculiar blend of uncertainty stemming from the environment being assessed, as well as the process ultimately chosen to assess that environment. This combination of uncertainties may not wholly undermine the project and demand that it be scuttled before it even pulls away from port, but it does warrant caution and more careful assessment of the project as it progresses.

### **1. Uncertainties of prediction.**

The assessment of environmental effects essentially attempts to determine how the baseline environment will unfold after the project under review has been constructed and what future impacts the project will have on the development of the ecosystem in question. Not only must potential impacts be discerned, but measures must be designed to mitigate these impacts and their potential significance after mitigation is applied. It has been admitted that there is always an element of uncertainty in every process of prediction.<sup>3</sup>

The process may be imbued with some certainty and the prognosticator's crystal ball transformed into a microscope, through the collection and analysis of baseline data. Without accurate baseline data and the means of translating it into meaningful and useful information concerning the environment, there is no medium by which

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<sup>3</sup>Hearing Transcript, April 13, 2004, Volume 19, 4655-56

prediction may be transformed into scientific deduction. However, it must be remembered that even the best, most extensive data can only really give a partial impression of what the future may be; there is always a level of uncertainty to which most scientists will avert.<sup>4</sup>

### **Tools of prediction**

The process of prediction is inherently uncertain; however, while scientists are still engaged in a predictive process, instead of turning to the tarot, they opt to employ modelling and supplement these models with baseline data. Uncertainty enters the process through the acknowledgement that while trends are taken into account, the future is essentially still an undiscovered country. The best model may be rendered impotent by insufficient data and the best data may be rendered mute or unintelligible by a model of questionable worth. Accuracy can never be totally guaranteed, it can only really be spoken of as a percentage of confidence that the end result is reasonably certain.<sup>5</sup>

It was acknowledged that longer periods of observation provide a more accurate picture of trends and over time. Further, it was admitted for some components that there was a need to strengthen the data base with further study as the project progressed.<sup>6</sup> The vast reservoir of data collected by traditional hunters and gatherers in Northern Manitoba may be contrasted with the relatively meagre volume of data collected since 1998 for some study areas for the project.<sup>7</sup> It was admitted that the traditional hunter's ability to predict numbers and trends concerning VEC's such as caribou was just as accurate, if not more accurate, than those predictions based on western scientific methodology.<sup>8</sup>

A keen example of this uncertainty in predicting future impacts may be discerned in Manitoba Hydro's own history concerning the CRD. From 1970-75 Manitoba Hydro conducted a thorough environmental review of the region before implementing the CRD and LWR.<sup>9</sup> Manitoba Hydro has variously described the study as "leading edge" for its time and an impressive environmental review for the standards of its time.<sup>10</sup> It has been likened to an environmental impact assessment; the studies collected

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<sup>4</sup>Hearing Transcript, Volume 17, 4166-67, 4171-72

<sup>5</sup>Id at 4166-67

<sup>6</sup> Hearing Transcript, Volume 19, at 4598

<sup>7</sup>Id

<sup>8</sup>Id at 4606

<sup>9</sup>Id at 4590-4595

<sup>10</sup>Id at 4591

data over a five year period and involved agents from the provincial government, the federal government, academics and an array of consultants. Its depth and scope were defended as a multiparty assessment, and "more than a mere data collection exercise".<sup>11</sup>

Despite the breadth and scope of this assessment, a key environmental effect was not foreseen: methyl mercury. At the time methyl-mercury was not commonly associated with reservoirs and impoundments and this historically detrimental effect went unconsidered in the initial assessment. A hydro representative admitted:

Prior to the Churchill River Diversion, mercury wasn't really found to be associated with reservoirs. The knowledge base wasn't there yet.<sup>12</sup>

And,

Mercury was an unforeseen effect at that point in time.<sup>13</sup>

Such an effect was unforeseen and unpredicted in 1975 despite input from various levels of government and scientific and academic consultants in a process which has been subsequently touted as "a very impressive piece of work"<sup>14</sup>.

The aftermath of this failed prediction has been historically significant. Mercury has become one of the most noted impacts arising out of the CRD. Commercial and domestic fisheries and resource gathering activities were significantly impacted by the stigma of mercury poisoning. While the effects of mercury could not have been anticipated when the initial studies were conducted, the impact of an unanticipated environmental effect serves as a cautionary tale. Even measuring what will happen to a stable and previously undisrupted environment is fraught with uncertainty.

The 1975 Report also managed to over-predict the effects of erosion. Before the CRD, engineers predicted a great deal more erosion. While this miscalculation has been welcome, it points to the inherent uncertainties that may cripple scientific process of prediction.<sup>15</sup> Over-estimation still points to a lack of certainty and an inability for models to always account for every variable. Even with a stable ecosystem as a baseline, the future can only be spoken of in terms of probabilities and percentages of certainty. It is far easier to measure impacts once they have occurred than to

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<sup>11</sup>Id at 4592

<sup>12</sup>Id

<sup>13</sup>Id at 4594

<sup>14</sup>Id at 4591

<sup>15</sup>Id at 4595

predict the nature or severity of impacts with any degree of accuracy.

## **2. Uncertainties in MH/NCN's Methodology**

There are many aspects of uncertainty permeating the EIS presented by MH/NCN. A key question which has been raised by the evidence but which has not been satisfactorily resolved concerns whether the CEA process chosen was adequate to this particular task. There are three areas of the EIS which raise issues of uncertainty and create concerns about the potential future impacts of this project. First, there is insufficient justification for the approach that was ultimately adopted based on the Practitioner's Guidelines. Second, there are internal inconsistencies in the methodologies that MH/NCN used that raise questions concerning whether the CEA process used was best practice for this particular project. Third, MH/NCN has failed to provide adequate information concerning any independent expert evaluation of the assessment methodology that was employed to determine cumulative effects.

### **A. Support in Guidelines and best practice**

A CEA studies changes to the environment that are caused by an action in combination with other past, present and future actions to determine whether the incremental effects of the project under review push a VEC beyond an acceptable threshold. Thus, there are two lines of inquiry that the process must follow: first the total cumulative effect of the various actions and activities affecting a VEC must be identified, and second, the degree that the project in question affects the particular VEC in question must be determined.<sup>16</sup>

The CEA methodology that was ultimately utilized to assess the environmental impacts of Wuskwatim demands further review and rigorous follow-up study should the project be implemented. The path chosen by MH/ NCN requires careful scrutiny to ensure that it does not lead towards an unforeseen ecological disaster. Based on their assessment of "professional practice" and based on their views of what the CEAA Guidelines recommend, MH/NCN held that current and past projects examined as part of the baseline for the EIA, did not need to be considered for the purposes of the CEA analysis.<sup>17</sup> The panel cited section 3.1 of the CEAA Guidelines section 3.1 in support of their CEA methodology:

I can give you a quote in the guide that says if you take the practice, which is not at all unusual, its quite common, of continuing to include in the baseline for the initial assessment the past and current projects, then the key distinction for cumulative effects is the examination of some specific future projects that haven't yet been built. That effectively is the approach we took and that is effectively the

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<sup>16</sup>EIS, Volume 10, 2.2.1

<sup>17</sup>Id at 3.4



way in which the guide would discuss it if you went further on to section 3.1. It discusses that approach in that context.<sup>18</sup>

Further, the panel stated that in performing a CEA:

The requirement as we see it is that the overall environmental assessment has to meet certain tests. It has to include in its consideration current, past and future projects. By including past and current projects in the baseline, our view is that we are meeting that requirement.<sup>19</sup>

The panel conceded when pressed that section 3.1 did not explicitly state or endorse their method as "best practice" but reiterated that their method was consistent with the practice laid out in Section 3.1.<sup>20</sup>

While MH/NCN's interpretation of the guidelines may be acceptable, it was admitted that it is not the only method of assessment that may be inferred.<sup>21</sup> Their methodology may be acceptable in assessing some projects, but there is some lingering doubt as to whether such practice is appropriate for this project given the historical and ecological baseline that is being assessed.<sup>22</sup> These choices may need to be justified in this respect. It is not enough to say "its best practice", it should clearly be demonstrated that it is best practice in these circumstances. A greater level of comfort as to whether the panel's interpretation of the guidelines was indeed "best practice" may be provided through some independent third party criticism of the methodology, or in essence a second professional opinion. This may come before the project receives government approval, in the form of some independent expert assessment of the methodology or afterwards in the form of rigorous monitoring and testing of the predictions and assumptions made.

While MH/NCN chose to follow one analytical pathway, it was not the only route suggested by the Guidelines. There is another view of the CEEA Guidelines relied upon by MH/NCN that should be noted.

When Section 3.1 is considered along with Section 2.1, the proponent's CEA practice reads more like a loose, impressionistic interpretation of what is suggested by CEEA

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<sup>18</sup> Hearing Transcript, Volume 16, 3668

<sup>19</sup>Id at 3669

<sup>20</sup>Hearing Transcript, Volume 19, 4644

<sup>21</sup>Id at 4645-46, see also discussion on May 26, 2004, Hearing Transcript, Volume 27, 6581-6605

<sup>22</sup>Hearing Transcript, Volume 19 at 4574-80

than the "direct quote" that MH/NCN suggested at one point.<sup>23</sup> Section 3.1 does not definitively set out, as initially suggested, that it is considered acceptable best practice to look at only future projects if past and current projects are considered as part of the EIA baseline. Section 3.1 does not expressly endorse such a practice but merely discusses CEA's generally.<sup>24</sup> At a high level analysis, the section relates how the assessment of cumulative effects is unique, or different from the assessment of effects traditionally performed as part of an EIA. Both employ the same basic framework, but as discussed in Section 2.1 and Section 3.1, the CEA considers the broader regional effects of the project while the EIA considers more direct, local effects. The analytical framework is similar, but the focus is considerably different.<sup>25</sup>

It could be argued that best practice may entail performing an EIA on the local project effects and then using the data accumulated under the EIA to assist in scoping and analyzing the broader regional issues under the CEA. Effectively using one process to lay the groundwork for the next phase of assessment.

The proponents rely upon a section under Section 3.1 which sets out, "what a project-specific cumulative effects assessment fundamentally needs to do.":

A CEA, for a single project under regulatory review, should fundamentally do the following:

1. Determine if the project will have an effect on a VEC
2. If such an effect can be demonstrated, determine if the incremental effect acts cumulatively with the effects of other actions, either past, existing or future.
3. Determine if the effect of the project, in combination with other effects, may cause a significant change now or in the future in the characteristics of the VEC after the application of mitigation for that project

With the exception of the consideration of future actions, the above are identical to the requirements of a good EIA (the consideration of the effects of other actions is not necessarily new to CEA, as the existing environmental setting of a project has typically recognized other actions at least within the EIA's study area)<sup>26</sup>

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<sup>23</sup>Hearing Transcript, Volume 16 at 3668

<sup>24</sup>Hearing Transcript, Volume 19, at 4643-44

<sup>25</sup>See CEAA Practitioners Guidelines, s. 2.1 at CASIL Exhibit 1003 Tab 5; See discussion, Hearing Transcript, Volume 19, 4638-46

<sup>26</sup>Hearing Transcript, Volume 19, 4642;

Again, this merely points out that the analytical structure is similar, but the content and scope of examination are dramatically different. EIA's look only at the local area, so a baseline study for the purposes of an EIA may include the cumulative impacts of past and present projects, but the examination of these impacts would be less expansive than the regional study that would occur under a CEA.

This is set out in Section 2.1 of the CEAA Practitioner's Guidelines:

Cumulative effects are not necessarily that much different from effects examined in an EIA; in fact, they may be the same. Many EIAs have focussed on a local scale in which only the "footprint" or area covered by each action's component is considered. Some EIAs also consider the combined effects of various components together (e.g., a pulp mill and its access road). A CEA further enlarges the scale or the assessment to a regional level. For the practitioner, the challenge is determining how large an area around the action should be assessed, how long in time, and how to practically assess the often complex interactions among the actions. In all other ways, CEA is fundamentally the same as EIA and, therefore, often relies on established EIA practice.<sup>27</sup>

In cross-examination MH/NCN acknowledged that there are two separate approaches that could have been taken in applying the Guidelines to a CEA. Of the Guideline it was said:

It doesn't direct you to do only this. It allows you to do this as part of good practice. You could write up-- there has been some questions given to us by the CEC as to different ways you could tackle writing a cumulative effects assessment. You could do it as an integral part of the job, the way we have done it. And in that sense the EIS guidelines we were given, we interpreted to direct us towards using this as an integral part of our assessment. You could also do it I guess in terms of the guide as a separate document entirely, separately analyzed, separately written up as an entirely separate volume, and some practitioners in some circumstances may do that. We did not. We took the integral approach.<sup>28</sup>

The proponent's CEA is complicated by the very environment that is being assessed. Perhaps the methodology being employed in this assessment would be appropriate for assessing cumulative effects in some circumstances, but the peculiar circumstances of this baseline environment may demand a meticulous and thoroughly justified review. The project is not being constructed in an environment that is unfolding naturally: this

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<sup>27</sup>CEAA Guidelines 2.1., CASIL Exhibit 1003, TAB 5

<sup>28</sup>Hearing Transcript, Volume 19, 4645

is a disrupted environment due to the effects of the CRD.<sup>29</sup>

Wuskwatim is being constructed on a regulated river system that diverts flows from the Churchill river down the Nelson/ Burntwood system and further alters the natural rhythms of the ecosystem through altering the seasonal flows that should naturally flow down the Burntwood River.<sup>30</sup> The aftermath of the CRD has been described by some participants as environmentally and socially catastrophic; even MH has admitted that there have been "major adverse impacts" due to the CRD.<sup>31</sup> "Best practice" in these circumstances may demand a more searching approach to assessing the problem of cumulative effects.

### **B. Inconsistencies in the approaches taken in the EIS**

The approaches taken to assessing cumulative effects in the EIS are rendered more dubious due to some apparent inconsistencies in assessment practice and explanations concerning assessment practice.

In assessing actions to be included in the CEA analysis the EIS materials state that the effects of past and existing projects were incorporated into the pre-project baseline. The materials state that where on-going effects of these developments were expected to result in measurably different conditions in the future than at present, they were considered in the CEA.<sup>32</sup> Thus, as the CRD was included in the baseline assessment under the EIS, it was excluded from the CEA for almost all VECs.

The only exception that could readily be noted was the white spruce and the balsam fir which predominantly grow within 300 metres of water within the project region. The EIS sets out that the CEA considered ongoing CRD losses with respect to these two VECs:

Because balsam fir and white spruce are rare species in the region, ongoing CRD erosion losses were included in the assessment of cumulative effects on balsam fir and white spruce to ensure that those losses were taken into account. CRD continues to affect these species and high quality habitat in the area. The total area of high quality habitat loss is relatively small for other VEC's. CRD erosion will eventually cease once the shoreline reaches non-erodible materials or when banks

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<sup>29</sup>EIS Volume 1, 2-2

<sup>30</sup>Id

<sup>31</sup>Hearing Transcript, Volume 16, 3672

<sup>32</sup>EIS, Volume 10, 3.4

stabilize.<sup>33</sup>

In cross examination this was described less as a strategic analytical choice and more as a personal preference on part of the individual assessing the particular VEC:

There were a couple of exceptions where the analyst...looking at it specifically wanted to think about the problem under cumulative effects, while everybody else was looking at it from the point of view of a baseline effect. So they called it a cumulative effect, and it was a shoreline tree, and they were looking at the issue of erosion.<sup>34</sup>

This inconsistency strikes to the core of the CEA methodology debate. There are two separate rationale's for why the assessment of these particular VEC's were different, i.e., why the CRD was included in the CEA. There is the EIS version, which sets out a rational justification for including the effects of CRD only where the ongoing effects will result in measurably different future conditions, and then there is the version in oral examination where the panel stated that it was an aberrant individual choice of a single practitioner, but had no practical difference analytically. When asked whether there was a conceptual difference between the two analyses, ie. assessing the effects of the CRD as part of an evolving baseline and assessing the CRD as part of a CEA for a VEC, it was stated:

Conceptually, if you do it properly, it doesn't matter whether you approach the problem as part of the baseline, or you approach it the way that one particular tree was looked at. ...The point in the end is, did they do the job of looking at it, yes or no? And that is the requirement for good practice, and hence the requirement also in the law for CEAA<sup>35</sup>

This inconsistency implicitly sets out that there are two different notions concerning "good practice" at work. One practitioner obviously thought that it was best practice to assess the effects of the CRD as part of a CEA. The rest assessed the CRD as part of the "evolving" baseline in the EIA. This may be fact specific and entirely acceptable or this may speak to some disagreement about the level of comfort with the assessment approach adopted. The blanket inclusion of all past projects in the baseline for the purposes of the CEA, no matter their magnitude or the severity of their effects, may not be considered best professional practice to all practitioners. It was not even considered best practice to all of the practitioners involved in the assessment of this project. This speaks to the necessity of further review and justification of the CEA methodology employed for the projects.

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<sup>33</sup>Wuskwatim Generation Project EIS, Volume 1, 7-80

<sup>34</sup>Hearing Transcript, Volume 19, 4649

<sup>35</sup>Id at 4650

### **C. Lack of expert evaluation: Dr. Duinker**

Scoping for the CEA relied upon a combination of literature reviews and workshops which included representatives from MH and NCN, as well as input from Dr. Duinker, an external expert that was retained by the proponents to assist in developing the model for the CEA portion of the EIS.<sup>36</sup> The proponents advised that Dr. Duinker provided some intermittent input throughout the development of the EIS and that he was provided with a final copy of the EIS for review after it was filed. Dr. Duinker was not asked for, nor did he provide a written review or critique of the assessment process that was adopted and employed for the purposes of the EIS.<sup>37</sup> The only real indication of Dr. Duinker's views on the EIS is found in testimony which states, "I think overall, he felt that the process that was used was correct."<sup>38</sup>

The one expert second opinion of the CEA process on the record reads more like a non-committal shrug than any real professional assessment of the proponent's practices. Given that a CEA is integral to the proper assessment of environmental effects and given that there are still questions concerning the potential impacts that projects such as the CRD are having, the dearth of any documented and publicly available input from Dr. Duinker or any other outside experts in the field of cumulative effects is disappointing.

Some expert report or critique outlining what best professional practice for this particular assessment would be invaluable given the nature of past environmental impacts and given the controversial nature of the CEA methodology employed. Input from Dr. Duinker is especially warranted given the form of CEA that hydro ultimately adopted.

### **The importance of assessing cumulative effects**

The past and continuing effects of the CRD loom large over the Wuskwatim area and over this environmental assessment. The cumulative effects of past and ongoing projects may be considered integral to this assessment process. Past environmental impacts haunt many of the communities in the area and the spectre of future environmental and social disruptions arising from further hydro developments such as Wuskwatim is of grave concern.

In addition to monitoring the direct impacts that human activities have on species, it is also necessary to be aware of possible indirect impacts on ecosystem health. These impacts may include the effect that human activities have on the interactions between

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<sup>36</sup>EIS, Volume 10, 2.2.2

<sup>37</sup>Hearing Transcript, Volume 16, 3720

<sup>38</sup>Id

various species in an ecosystem.<sup>39</sup> It was remarked in the presentation of Dr. Bayne that some of the issues affecting ecosystem biodiversity in the northern boreal forest and overall ecosystem health did not seem in his opinion to be well addressed in the EIS.<sup>40</sup> Evidence was given that developments cause slow changes in ecosystems and that the addition of each new human activity or small incremental change to the equation may result in total detrimental changes to the ecosystems:

The reality is very few individual developments will ever cause a species to go [extinction] or disappear from the landscape. What it does is it causes a slow change to the ecosystem with the addition of each little human activity.<sup>41</sup>

Dr. Bayne discussed the interconnected web of incremental impacts on various species that may accumulate and detrimentally impact upon a vulnerable species such as the woodland caribou. While a transmission corridor may cut through a relatively infinitesimal proportion of the total boreal forest, the cumulative effects are not confined within the physical ambit of the project's footprint but ripple outwards both spatially and temporally.<sup>42</sup>

Dr. Bayne lacked the requisite first hand knowledge of the full EIS or the area itself to fully comment upon issues that were brought up in his evidence.<sup>43</sup> He gave little more than a general discussion; however, this general information has raised issues that were never really satisfactorily addressed. Again, this was a missed opportunity where an expert in the field may have been able to comment on the quality of the EIS concerning these issues, but was not sufficiently armed to properly execute the task. While the value of the evidence to this proceeding was peripheral, it points to avenues that may need to be explored or monitored in the future to ensure that there are no surprises.

These issues concerning ecosystem impacts, as well as other issues, that were raised and fully canvassed may need to be addressed at some future point. General information may at least uncover areas that require rapt attention and consideration when monitoring programs are established and designed. That these issues may exist, but have not been canvassed in the evidence tasks future monitoring programs with the responsibility to consider the potential impacts these issues may have, and to establish programs designed to at least look for these issues.

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<sup>39</sup> See generally, Hearing Transcript, Volume 10, 2478-2516

<sup>40</sup>Id, at 2476

<sup>41</sup>Id at 2478-79

<sup>42</sup>Id at 2478-2516

<sup>43</sup> Id at 2476, 2496-97, 2508, 2513

This is not an explosive immediate impact of the construction of the transmission corridor but a series of additive cumulative impacts which build over time and detrimentally change the character of the ecosystem and how the components of the ecosystem interrelate and function. The immediate impacts of the construction and operation of a project may pale in comparison to those small impacts that continue unremarked over time. These slow degradative effects on the boreal forest need to be thoroughly assessed and rigorously studied.

### **Conclusions:**

The proponents have argued that "a CEA is an EIA done well", and consequently by doing a thorough EIA, it is not necessary to include projects in the CEA that were already assessed as part of the baseline for the EIA. This assessment has not been as thoroughly tested as perhaps it requires given the uncertainties inherent in the process and given the potentially serious impacts that may be wrought through error, or through failing to consider incremental or time lagged effects. Should the project proceed based on the EIA and the CEA provided, the accuracy of these predictions should be subject to scrupulous monitoring and rigorous assessment. The danger of unanticipated effects and time-lagged effects that this assessment may have missed or that could not have been foreseen looms large in the wake of the CRD and its environmental and social impacts.

### **The social importance of CEA**

The decision not to include the CRD as part of the CEA, even if supported by MH/NCN's interpretation of the CEAA Guidelines may be a source of further acrimony and distrust in these historically affected communities. These communities live with a collective sense of perceived past deceptions and transgressions on the part of MH arising from the CRD experience.<sup>44</sup> There is a cumulative distrust of MH and their activities in the region that must be overcome.<sup>45</sup> The decision not to consider the CRD as part of a comprehensive cumulative effects assessment will ring of further deception to some, even if the cumulative effects were extensively considered in the EIA. This again speaks to the requirement for further documentation of the decision not to include both past projects and ongoing projects in the CEA.

The need to ensure that the CEA has been as thorough as possible stems not only from the environmental havoc that past projects have wrought on the ecosystem, but from the human consequences that flow from the historic and ongoing environmental disruptions along the Burntwood river system.

Whether intentional or not, there may be some concern that MH/NCN has deliberately chosen this methodology of assessment, which may be perceived by some as

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<sup>44</sup>See, for example, presentation by PCN, Hearing Transcript, Volume 9.

<sup>45</sup>See discussion, Hearing Transcript, Volume 27, 6611-6618



burying past and ongoing project effects within a homogenous evolving baseline<sup>46</sup>:

The thing that we are not doing is what they call a post project impact assessment, for individual past projects. We are not trying to isolate which past projects caused which effect that we are seeing today. We are trying to look at the trend for that variable, mercury, TSS, whatever, reflecting all of the factors that are currently affecting it. All of these projects and activities that have been occurring to date that are affecting its trend line to the best of our ability, if that helps. We are not trying to get into the debate as to who caused what in that trend line, we are trying to understand where it is going.

Again, while this may have been a perfectly rational choice, some might view it as an attempt to avoid quantifying the damage of the CRD during this public process. While the effects of the CRD are not under review, they are relevant if they will impact cumulatively with the effects of Wuskwatim. If the process chosen does not adequately assess the continuing environmental impacts of ongoing projects such as the CRD, then it is inadequate. The real questions people want answered are: What is happening to the environment. What have past projects done, and what are ongoing projects doing? What will this proposed project add cumulatively to the present equation?

The EIS volume 10, 6.3, dealing with existing regional and local stressors sets out<sup>47</sup>:

It is recognized that any evaluation of pre-development conditions should be approached under the caveat that the ultimate goal of this undertaking is to assist in predicting effects of the proposed development. In other words, it is important to consider the effects of past activities in terms of gaining an understanding of how these activities continue to affect present (i.e., existing) environment.

How can small additive impacts be discerned and long term detrimental trends or synergistic interactions be discovered if only the overall trends are evaluated as part of a homogenous baseline? If you are only looking at the trends and not at what specifically is motivating them, how can you adequately mitigate? While again, this methodology employed by the proponents may be adequate to the task, it needs to be tested rigorously and justified over the long term, especially if a similar methodology is to be followed on subsequent projects.

It must also be noted that after much discussion of the issue of thresholds on May 26, the question concerning what the actual thresholds are for various VEC's remains

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<sup>46</sup> Hearing Transcript, Volume 27, 6645-46

<sup>47</sup>EIS, Volume 10, 6.3 at A-28

unanswered.<sup>48</sup> If the determination of thresholds is a matter of professional judgement some indication of what the professional adjudges the approximate threshold to be for each VEC and where the VEC stands in relation to the threshold is required. How can the concerned public know or understand the effects of the project or the state of the environment if such information is unavailable? To say effects will be short-term, local and minimal and therefore not significant does not place the VEC in any context against which future impacts can be measured.

The methodology employed may be accurate and the ultimate assessment correct but the approach in the EIS is not readily comprehensible to the public and of little value in reassuring the public that VEC's are not being pushed beyond their individual limits of tolerance, or that the ecosystem as a whole is not being edged towards a future cataclysm.

### **Conclusions:**

This methodology needs to be rigorously tested and justified to the communities that are affected by the project, the surrounding communities and the general public. There must be a regular dissemination of information to the public to inform them about the project, and what impacts it is having.

## **Can the Baseline be justified?**

### **What is the baseline?**

Environmental impacts and their significance are determined using the baseline environment which serves as the standard against which the potential changes are measured. Environmental effects are determined by examining how it is anticipated the environment will unfold without the project in place against what is expected to happen with the project in place.<sup>49</sup> This may seem like an elementary calculation, but it is one which may be riddled with uncertainties that are further compounded when a disrupted baseline is used as a measuring stick.

### **Why is the historical baseline important?**

Temporal bounding refers to defining the relevant time scales for consideration in a CEA for the project under review. An extended time-scale allows for the assessment of time-lagged effects from both existing projects and the proposed development under review. Some proponents use time scales which range from pre-development (with little or no development) to a far future with or without the project in question.<sup>50</sup>

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<sup>48</sup>Hearing Transcript, Volume 27, 6587-6605

<sup>49</sup>Wuskwatim Generation Project EIS, Volume 1, 2-2

<sup>50</sup>EIS, Vol 10, 5.4.4 at A-16 and A-17

The literature states that the temporal scales covered from CEAs are generally longer than for a traditional EIA. It has been stated that the ideal assessment should cover a period long enough to incorporate the long term, indirect effects of the proposed project. The chosen time scales for the study must be adequate to the task of accounting for the frequency of perturbations, incremental environmental change and also be able to distinguish continuous events and time lagged effects.<sup>51</sup>

While some proponents may use the present as the baseline for impact assessment and continue the assessment through the life of the project, there are other options available such as taking a broader view of cumulative impact assessment and using a range of scenarios to assess how cumulative effects might affect a specific VEC or indicator over time. Such scenarios may include the consideration of a pre-development baseline. The pre-development scenario would be based on current conditions without all existing human developments and infrastructure. This scenario may provide a means to assess how much specific VECs have already been affected by human developments and infrastructure.

The importance of establishing a proper baseline for the purposes of a CEA was set out in the CEA workshop backgrounder contained in Volume 10 of the EIS:

Consideration of present conditions is a critical component of CEA, because a clear understanding of present environmental conditions is fundamental to the predictive ability and subsequent monitoring of the potential effects of a proposed development on these aspects. The characterization of the existing environment usually requires a reasonably prolonged period of measurement time (i.e., several or more years) in order to account for natural variability (e.g. seasonal variation, inter-annual variation) and in order to discern and delineate trends. Traditional knowledge would provide longer term trend information. However, its application to the present day regulated river setting (as opposed to pre-development setting) would need to be considered.<sup>52</sup>

It is stated that the further back in time the greater the dependence on qualitative analysis and conclusions due to lack of descriptive information, increasing the uncertainty in conclusions.<sup>53</sup> Fortunately, extensive environmental data was gathered pre-CRD as part of the CRD/LWR studies that occurred from 1970-75. While the quality of data and the methodologies may not be of comparable quality to today's standards, the study was considered "leading edge" and MH has trumpeted the standards of the monitoring and research conducted as comparable to an environmental assessment.<sup>54</sup>

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<sup>51</sup>Id

<sup>52</sup>EIS, Volume 10 at A-17

<sup>53</sup>EIS, Volume 10 at A-17

<sup>54</sup>Hearing Transcript, Volume 19 at 4591

MH acknowledges in Volume 10 of the EIS concerning cumulative effects that, “the central issue in temporal bounding is the incorporation of a prolonged time-scale for assessing effects in order to evaluate potential long-term or chronic effects”<sup>55</sup>, such as time-lagged effects or bio-accumulation from phenomena such as mercury in the food chain. The EIS states that “the minimum time scale considered in CEA should incorporate assessment of conditions prior to development of the proposed project (i.e., present conditions) as well as future projections.”<sup>56</sup>

In terms of uncertainty inherent in using a historical baseline, the EIS notes the important role that traditional knowledge may play in such a circumstance. Traditional knowledge may enhance the foundation of any historical baseline, given the fact that it is a database of information about regional environmental conditions that extends back to time immemorial.<sup>57</sup> Given MH’s own studies in the region prior to the CRD and the vast reservoir of traditional knowledge available, some historical baseline analysis could have been provided for the purposes of the CEA.<sup>58</sup>

MH must justify their choice of baseline and their choice in CEA analysis. Both are connected and both choices are put into question by the decision not to use the pre-CRD environment as a point of reference for the analysis and the choice not to include the CRD as part of the CEA. Given the importance of the CRD to the region and the consequent impact that it has had on the region, such a controversial decision must be carefully scrutinized and monitored, especially in light of future developments that are almost certain to follow Wuskwatim.

There was some examination of the historical baseline for select VEC’s within the EIS format, where it was considered appropriate in order to understand the nature of the baseline. Such VEC’s included erosion, mercury and sediment, but in terms of the conceptual framework MH/NCN reiterates that it was only considering the baseline as it exists at present and focussing their attentions on the future rather than setting a time period to “look backward”<sup>59</sup>.

We did not set a specific time period like some studies did and said, well we are going to look backward ten years and forward ten years. I’m paraphrasing a CSR report done by DFO for the project in Quebec, which they literally talked about

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<sup>55</sup>EIS, Volume 10, A-16

<sup>56</sup>Id, A-17

<sup>57</sup>Id

<sup>58</sup>Hearing Transcript, Volume 19, at 4606

<sup>59</sup>Hearing Transcript, Volume 19 at 4648

their parameters that way. We didn't do it that way in terms of going back.<sup>60</sup>

### **Present character of baseline**

MH/ NCN state that this is not a static baseline, but is an evolving baseline and that for the purposes of the CEA they did not look at pre-CRD environments:

We are not reviewing past projects from the standpoint of how they, how that prior pre-project environment existed. We are looking at what is there now and how it will evolve, change as a result of actions that have already taken place. So it is not static, it is changing. We know that and we are taking that into account.<sup>61</sup>

The true nature and character of this baseline is the essential question that must be determined in order to conduct a complete assessment. Without a clear indication of what the baseline environmental conditions are, this essential measurement tool is of dubious value to the assessment process. Thus, it is essential to understand what the current baseline is.

Confidence in the current baseline is a major assumption in the process. For example, in the EIS concerning the aquatic environment it was assumed that information collected from pre-diversion studies and in the decade following diversion would be of limited value in describing current conditions, as over time new shorelines have formed and fish populations have established in the altered environment.<sup>62</sup> This may or may not be true, the assertion was never adequately called into question by any of the participants through the course of the hearing and no contrary evidence disputing or testing these assumptions was put on the record or tested during the hearing. Further, it is stated:

For the purposes of the EIS, it was assumed that the existing aquatic environment represents a relatively stable state.<sup>63</sup>

It goes on further to state that this assumption was based on studies from other regulated systems where the post-development fish community was no longer experiencing significant annual changes in terms of abundance and species composition

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<sup>60</sup>Id

<sup>61</sup>EIS, Volume 10, 2590

<sup>62</sup> Wuskwatim Generation Project, EIS, Vol 1, 6.1

<sup>63</sup>Id

20-25 years after development as well as stability observed over the last decade.<sup>64</sup> Again, these assumptions were not tested in the sense of being subject to a fully competitive interplay of ideas incorporating the perspectives from various participants, bolstered by independent scientific studies.

The proponents do note “the aquatic system may still be undergoing some changes as a result of CRD; these changes may be masked by other activities (annual variation in commercial fish harvests) which would introduce a larger amount of variation into the system.”<sup>65</sup> This is a level of uncertainty that was never adequately challenged through the introduction of independent expert analysis.

To assess the effects of Wuskwatim, one must first determine how this unstable environment will unfold on its own. There is some inherent uncertainty in this given the fact that there may still be environmental impacts from the CRD unfolding, unforeseen or unnoticed. Uncertainty in the baseline may compound any ability to accurately predict how this new project will impact upon the environment and whether it will react cumulatively with the ongoing impacts of the CRD in a manner that breaches some environmental thresholds.

#### **Conclusion:**

Since a proper environmental impact assessment has never been performed on the CRD it may have been prudent to include the CRD as part of the CEA as well as the EIS to ensure that this variable was thoroughly considered. At the very least, the decision not to include the CRD in the CEA should have been reviewed by an independent expert and such review should have been made publicly available.

The impact of not including the CRD in the CEA may resonate beyond the formalities of the CEA. People in the region have been forced to endure the environmental and social consequences of the CRD/LWR. There has been some outcry for a comprehensive environmental assessment of the CRD system to determine what its effects have been and how it is acting cumulatively with other impacts on the environment. It has been argued that before any new projects are added to the system, the affects of past projects should be fully assessed and mitigated to the extent possible.<sup>66</sup>

Whether the panel’s choice of baseline or assessment process was ultimately the best professional practice for the situation may only ultimately be determined once the project is built and its effects are felt. These choices need to be actively tested, proven and if need be mitigated as operations proceed.

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<sup>64</sup>Id

<sup>65</sup>Id

<sup>66</sup>See for example, PCN’s presentation Hearing Transcript, volume 9 at 2235

## Assessment of Significance

### Methodology

The EIS states that the environmental impacts were insignificant for almost every VEC studied. Ultimately this assurance in the relatively benign nature of project effects depends upon the management of future mitigation.

The CEAA Guidelines state that both the EIA and the CEA follow a similar framework: scoping, analysis, mitigation significance and follow-up. Although the CEAA Act requires that the determination of significance be made after mitigation is taken into account, significance may also be considered as part of a two-step process where an analysis of the determination of significance is made before mitigation measures are taken into account.<sup>67</sup>

The significant difference between the two approaches is set out in Section 3.1 of the Guidelines. Where mitigation precedes significance, significance reflects residual effects and sets out essentially a "best case scenario".<sup>68</sup> Where significance precedes mitigation the significance reflects the worst-case situation before mitigation is applied, and therefore provides an understanding of what may happen if mitigation fails or is not as effective as predicted.<sup>69</sup>

Recent practice finds mitigation usually considered before significance is determined as it is considered to be a more accurate reflection of the eventual outcome; however, there is an implicit assumption that the mitigation measures are as accurate and effective as described. There is a further assumption that all potential effects from the project have been predicted and can be mitigated. Thus, while this more familiar practice presents the more likely scenario, there are attached uncertainties and caveats. Essentially there is a contrast between a "best case" scenario and a "worst case" scenario. While the CEAA Act stipulates that the an analysis where mitigation precedes significance must be performed, there is nothing barring the additional analysis where significance precedes mitigation.<sup>70</sup>

### Thresholds

Another uncertainty which may impact upon significance concerns the thresholds used to determine whether the project is having an impact or significant effect on a VEC. EIS,

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<sup>67</sup>Hearing Transcript, Volume 19, at 4653 -54

<sup>68</sup> Hearing Transcript, Volume 19, at 4652-55

<sup>69</sup>Id

<sup>70</sup>Hearing Transcript, volume 19 at 4653

Volume 10, 5.4.8. sets out that “the determination of significance of a cumulative impact/ effect is perhaps the most important component of the CEA...and often the most challenging.”<sup>71</sup>

It has been admitted that “it is very, very hard in practice” to define thresholds for many of the things that are being assessed.<sup>72</sup> While some VEC’s have regulatory standards against which significance may easily be measured, many VEC’s do not have legislated or regulatory thresholds of tolerance by which the proponent is bound. For these VEC’s the EIS sets out that, “significance is determined largely using professional judgement.” and “Professional judgement should be established on carefully delineated rational criteria.”<sup>73</sup> These measures are somewhat qualitative and subjective and involve the use of values by those assessing the project.<sup>74</sup>

The problem with thresholds is that MH/NCN have only given vague and general reference to what the actual thresholds are. There has been a great deal of discussion concerning the notion of thresholds, but the evidence hasn’t given an indication of where VECs are in relation to the thresholds or what the thresholds are for specific VEC’s. While it is admitted that thresholds are difficult to define, no transparent, scientific or object definition of any threshold has been given outside of those thresholds which are determined by regulations. In attempting to describe or explain thresholds the panel stated:

The issue that we are grappling with is not how to do this part of cumulative effects, it is how to define these thresholds, I submit to you, in a clear, objective way that is not dependent on an individual project, but is dependent on an assessment of the environment status today, in this area, any area, independent of the project under review.<sup>75</sup>

On the issue of thresholds and the determination of significance, Chapter 10 of the EIS sets out that as certain VEC’s do not have standards or guidelines that may serve as ready thresholds for the purposes of assessing significance, “significance is determined largely using professional judgement.”<sup>76</sup> It states that such decisions should be based on the VEC, discussions with NCN and assessment by reviewers.

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<sup>71</sup>EIS, Volume 10, 5.4.3., A-20

<sup>72</sup>Hearing Transcript, Volume 27, at 6587

<sup>73</sup>Id

<sup>74</sup>Id at 6594

<sup>75</sup>Id at 6589

<sup>76</sup>EIS, Volume 10, A-20



The EIS goes on to discuss methods for determining thresholds which include defining thresholds based on ecological or social perspectives.<sup>77</sup> Such thresholds as described could include: a subjective desired state, a trend in a VEC(sustainable harvest levels or population size) or a specific quantitative value or range of values.<sup>78</sup>

Where significance is not easily defined, as MH/NCN complain in these circumstances, the EIS recommends that it is in the best interest of the proponent to develop complete and comprehensive mitigation and environmental management plans.<sup>79</sup>

There has been some discussion of thresholds in relation to the issue of land use planning<sup>80</sup>:

In theory people looking at this type of a problem, lets say in the Arctic under the CARC type of guides and comments started to say,well, perhaps we should be looking at this region where all the projects are occurring and trying to find standards, so that when different projects come along we can measure whether they are taking our environment in this area or that area beyond some standard. That way we take regional charge, if you like, of this process and free ourselves of project by project increment, incremental type analysis.

There is no way that that by itself is a panacea. It is much easier in a virgin environment where you haven't yet had a bunch of projects. But in practical terms, we have been looking at the environments that we have been discussing, trying to come to grips to help ourselves, our clients and the public, and the regulators, where we can to understand where these thresholds might exist. And if it is not transparent, if it is not clear to you, frankly, it isn't always clear to us. It is an evolving area, it is hard to deal with, but the objective and the challenge to us is the type of thing I am describing, independent of any one project.

Such explanation is unsatisfactory and only succeeds in further confusion. While there may be difficulties in implementing a land use management plan, the adoption of such a plan may assist in the determination of intelligible thresholds of change for VEC's that the concerned public can both understand and have some positive input into.

Given the difficulty in determining thresholds, regional land use planning may be of assistance to addressing concerns regarding the significance of adverse effects from past projects as well as future projects being planned for this region of Northern Manitoba. Such a model of development planning may provide a proactive approach

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<sup>77</sup>Id, 5.4.8. at A-21

<sup>78</sup>Id

<sup>79</sup>Id

<sup>80</sup>Hearing Transcript, volume 27 at 6559

to the issue of determining adverse effects and thresholds.

### **Uncertainty/ Access Management Plan**

MH has stated in cross examination that the CEA Act requires that mitigation precede the determination of significance.<sup>81</sup> However, this statutory requirement does not prevent an analysis of the worst case scenario. Such a scenario may be invaluable in order to evaluate the range of significance of environmental effects for various VEC's. This is especially true where the significance of environmental impacts on VEC's could be severe should mitigation fail. A key example may be found in the access management plan for the road leading to the generation station.

The access management plan is designed to mitigate potentially detrimental environmental impacts upon various VEC's. Generally, the restriction of access is designed as a means of controlling impacts due to increased human access to a region that has seen very limited impacts from human activities in the past. The access road will allow greater access to traditional hunters and gatherers from NCN, but it may also invite an unsustainable interest from other outside groups of resources gatherers in the area as well as sport hunters. There is a genuine concern about pressures on the resource base and depletion through over hunting vulnerable species such as the woodland caribou.<sup>82</sup> This access road could potentially open this environment up to a world of environmental concerns.

The access management plan is a means of addressing many potential environmental impacts on VEC's. Potential impacts that were identified in the EIS include over harvest of various VEC's such as caribou, beaver, muskrat and moose, impacts on recruitment rates of caribou and moose due to vehicle collisions, mortality due to wildlife control actions, predation and disease, stress due to human activities such as construction and traffic, and increased fires due to human activities.<sup>83</sup> The access management plan is relied upon, along with some other measures for some VEC's to mitigate these impacts. However, the significance of the impacts for the VEC may ultimately depend on the success of the plan.

In the case of Woodland caribou the access management plan in combination with an education plan to promote conservation and awareness of the caribou as a vulnerable species is being relied upon to mitigate the potential impact of over harvest on the species. Road signs are also being used to mitigate potential impacts due to road

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<sup>81</sup>Hearing Transcript, Volume 19 at 4653

<sup>82</sup>See discussion, Hearing Transcript, Volume 18 at 4346- 4354

<sup>83</sup>Wuskwatim Generation Project EIS, Volume 1, at 7-58 to 7-73

collisions.<sup>84</sup>

These latter two mitigation measures rely entirely on human receptivity to the measures employed and depend upon people voluntarily submitting to these measures. The fallibility of such programs was discussed to an extent by Dr. Schaefer in his evidence. In discussing the inherent uncertainty in measures such as wildlife conservation in terms of mitigating the impact of over harvest on species such as the Woodland Caribou he stated that in Canada the wildlife management regime works on a system of common consent. There are not enough conservation officers to enforce the rules if citizens do not agree to abide by them.<sup>85</sup> It was warned that it takes a small number of determined rule-breakers to significantly impact upon a vulnerable species. Dr. Schaefer gave the example of the Red Wine Mountain herd where 32 caribou were taken out of a herd of 100 by determined poachers.<sup>86</sup>

It was stated that one of the most difficult uncertainties surrounding the project may be the quantity and likelihood of over harvest, and it was suggested that given the uncertainty of mitigation that rigorous adaptive management must be employed<sup>87</sup>:

I would like to emphasize the role of adaptive management. Predictions had been made with respect to the effects of woodland caribou as a result of this EIS. I believe it is incumbent on the proponent, if this project goes ahead, to test those predictions. In other words we need to treat developments such as this as an experiment. And therefore, some annual monitoring before, during an after construction of projects like these are vital if we are to increase our knowledge about the effects of this kind of project on sensitive species like woodland caribou.<sup>88</sup>

### **Adaptive management**

Adaptive management is integral to this process and to the success of measures such as the access management plan. Adaptive management is described as a systematic process for continually improving management policies and practices by learning from the outcomes of operational programs. Its most effective form –“active” adaptive management – employs management programs that are designed to experimentally compare selected policies or practices, by evaluating alternative hypotheses about the system being managed.

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<sup>84</sup>Wuskwatim Generation Project EIS, Volume 1, at 7.9.2.1

<sup>85</sup>Hearing Transcript, Volume 20 at 4731

<sup>86</sup>Id at 4716

<sup>87</sup>Id at 4732

<sup>88</sup> Id at 4717

Adaptive management follows a six step cycle where uncertainty about the practice being conducted is acknowledged at the outset and policies and practices concerning continuing assessment are designed not only to mitigate but to test the adequacy of the practice adopted and reveal the critical knowledge that is currently lacking. Monitoring is key in this respect as well as continuing analysis of the outcomes in consideration of the original objective, and the incorporation of these outcomes into the results of future decisions. It is a process of continual adaptation, experimentation development of the best scientific knowledge about the problem and how to manage it in light of a base of information that may be continually modified through further study and trial and error type experiences.<sup>89</sup>

Given the fact that this is not a controlled laboratory experiment, but a real development that will have real and material impacts on the people and the environment in the area, extreme caution is warranted. The process is designed to allow projects to proceed responsibly in the face of scientific uncertainty, but requires testing, refining and improving the practices adopted. The approach taken should be formal, systematic and rigorous to allow for the maximum amount of data to be collected and synthesized in order to build upon and test current knowledge, explore alternatives and adapt models and forecasts appropriately to changing circumstances alterations in predictions about future outcomes.

### **Strengths and weaknesses of adaptive management**

Since the measure of adverse effects is determined after mitigation is taken into account, the measure of "significance" is not an absolute certainty, but can only be estimated or predicted based on the available data and professional judgement. Such a measure of significance depends on the level of confidence in the initial assessment, ie, what effects there will be and how severe these effects will be, as well as confidence in the ultimate success of mitigation measures

MH/NCN admits the inherent uncertainties and dangers in the adaptive management process:

It leaves open the process of making sure that somebody is paying attention to the mechanism called adaptive management, and if they don't , it will not do what it is intended to do. If somebody doesn't do the monitoring, somebody doesn't review the results, somebody doesn't have regular sessions to assess whether or not there is a need for new action, then adaptive management, dependent as it is on human beings, will not do what it is assumed to be doing.<sup>90</sup>

There is an inherent danger in promising a monitoring program as a panacea for all of the uncertainties which impact upon the assessment process. While a sound monitoring

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<sup>89</sup>Draft Road Access Management Plan at 13

<sup>90</sup>Hearing Transcript, Volume 19 at 4664

and adaptive management plan may inoculate the project area from further detrimental impacts, it may also serve as a placebo, designed to comfort, but ultimately impotent. Danger lies in poor design and inconsistent follow up.

The strengths of monitoring and adaptive management lie in the implicit recognition that there is imperfect knowledge concerning how the environment will react to further stress. As adverse effects due to implementation of the project occur the initial mitigation measures are reassessed and refined. Thus, monitoring serves the dual purpose of improving the knowledge of the project and its effects as well as, ensuring the adequacy of mitigation and adapting such mitigation.

The risks of monitoring and adaptive management flow from the fact that it requires a leap of faith concerning the ultimate environmental effects of the project and the ability to manage the potential negative impacts that may occur. The management plan is essentially an ongoing experiment the requires vigilant oversight and an ability to instantly detect adverse effects and react to them and mitigate their impacts upon the environment.<sup>91</sup>

A further risk comes from the perception of conflict of interest when the proponent is the party that is responsible for the monitoring and for developing the plan. This has been a recurrent issue throughout the hearing, along with the recurrent issue of "trust and credibility".<sup>92</sup>

### **Independent environmental monitoring**

There is some precedent for using an independent environmental monitoring agency as a management tool. This model has been employed in resource developments in the North West Territories, in particular, this model was used for the Ekati mine.<sup>93</sup> While not an absolute cure to any deficiencies which may have beset this process, independent environmental monitoring may serve many important purposes.

One purpose that this form of monitoring model may serve concerns curing inherent deficiencies in the public review process and answering lingering questions as to the sufficiency of the EIS and the quality of detail in the environmental management strategy that will be used to mitigate the significant effects. An independent monitoring agency could prepare an annual overview report of the monitoring programs and results and this report could be published with an annual environmental assessment report from the company. The annual report could be made public and be accompanied by an overview report of the proponents. The review could report on compliance with the environmental effects monitoring.

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<sup>91</sup>Hearing Transcript, Volume 20, 4717

<sup>92</sup>Hearing Transcript, Volume 27 at 6611

<sup>93</sup>Hearing Transcript, Volume 18 at 4372

Annual reporting could potentially be an invaluable tool for the purposes of keeping the public and the government informed about how issues of concern raised or insufficiently addressed during the review process are progressing. Regular forums for public participation and input into the development of monitoring programs are also recommended.

In terms of the level of public concern surrounding the issue of cumulative effects, it is recommended that the proponents periodically prepare a report taking a longer view of environmental effects monitoring in the context of natural variability and review the actual performance of Project activities as compared to predictions in the EIS and evaluate how the adaptive management strategy has performed over time.

Such an agency could serve as an oversight or audit mechanism responsible for reviewing the design of monitoring programs and their results and examining the environmental management systems in place, testing their ability to respond appropriately to problems as they arise. Key aspects of the mandate of such a program may include:

- ◆ providing an integrated approach to achieving the recommendations made by the regulatory panel,
- ◆ serving as a public watchdog for the regulatory process and the implementation of recommendations,
- ◆ compiling and analyzing relevant environmental quality data to review, report, and make recommendations concerning environmental effects monitoring, cumulative impacts, and monitoring regulatory programs and activities
- ◆ providing an accessible and public repository of environmental data, studies and reports
- ◆ providing programs for the effective dissemination of information to Aboriginal peoples and the general public about the project and the monitoring and regulation of the project.

In addition it should be noted, as recommended by Dr. Shaeffer, that the benefits of this project should extend beyond mere economics.<sup>94</sup> While the primary driver of the project may be economic, there is also an opportunity to advance our understanding of the ecology of the region and to study how the various aspects of the boreal environment respond to stresses caused by hydro development. Both applied and peer reviewed research should be encouraged and fostered by MH/NCN. Beyond the immediate benefits to scientific and ecological knowledge, such research may also serve as a

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<sup>94</sup>Hearing Transcript, Volume 20, 4717

foundation for baseline studies for further developments in the region.

## Conclusions and Recommendations

The Terms of Reference set out that there are essentially two areas where this commission must make recommendations:

1. The Commission must consider whether or not to recommend the issuance of *Environment Act* licences to the proponents for the Wuskwatim proposals
2. The Commission must consider whether to recommend any measures which are required to mitigate any adverse environmental, socioeconomic and cultural effects resulting from the Wuskwatim proposals or whether to recommend any necessary future monitoring and research.

In determining the question of whether an *Environment Act* licence should be issued, it should be noted that the EIS has stated, and representatives of MH/NCN have affirmed throughout the process that any adverse effects stemming from the project will be insignificant or rendered negligible through the employment of planned mitigation measures.

Further, there has been little evidence put forth on the record by the participants, or elicited through cross examination, that puts the quality or content of the EIS or its conclusions into question. On the balance of information presented the proponents may need to be taken at their word. Ultimately, as set out in the EIS, the Wuskwatim generation station will be a small project; it is operating within a regulated system and will work within the operational parameters of that system. There is on the record no clear evidence that it will impact upon system operations in a significantly detrimental manner.

As to the question of any follow-up, mitigation or continuing research it should be noted that the information contained in the EIS has not had to withstand the rigor of debated spurred by the competition of ideas. If the EIS is to be accepted at face value, it is imperative that there is further testing and monitoring of the assumptions contained in the EIS format and inherent in the assessment process.

There must be regular evaluation of the performance of adaptive management measures as well as regular evaluation of the success of mitigation measures. MH/NCN should not be left alone to do this monitoring; some third party oversight should be provided. There has been plenty of discussion concerning the model of independent monitoring being utilized in the NWT. There should be some investigation into whether this would be an appropriate model to adapt to the resource development activities that continue to blossom in Northern Manitoba's boreal forest.

An independent monitoring agency would serve many vital functions. Such an agency could review the design of monitoring programs and examine the results or the environmental management systems in place, testing their ability to respond to problems as they arise.

The independent monitor could serve as a Watchdog, preparing an annual report of the monitoring programs in place and their result and ensuring that information concerning the project is made publicly available. In this regard such an agency could be tasked with holding regular forums to educate the public about continuing developments concerning the project and elicit participation and input from the public in order to enhance the development of monitoring programs.

Given the concerns expressed during the hearing by participants regarding the CEA, this independent monitoring agency should also be tasked with preparing periodic reports on cumulative effects, take a longer view of environment effects monitoring, and review the performance of project activities as compared to predictions made in the EIS.

Due to the persistent concerns regarding the cumulative effects assessment, the methodology relied upon by MH/NCN should be rigorously tested and regularly reviewed. This could occur as part of the independent monitoring program activities. Regardless of who is doing it, there should be some regular reporting as to both the adequacy of the methodology chosen as well as the incidence of cumulative effects, the degree of mitigation required and the success of mitigation measures implemented.

Further, Dr. Duinker should be contacted and a report based on his assessment of the CEA process in the EIS should be requested. It would be instructive for the evaluation of this project (and future project planning) to know what praise or criticisms he had concerning the methodology chosen and how it was applied in the circumstances.

It should also be considered whether large scale land use planning is appropriate for this region that is undoubtedly going to see more resource development in the future. Land use on a broader scale than the resource management area may need to be considered and other interests may need to be invited to the discussion table. Given the difficulty in determining thresholds for VEC's, perhaps it is wise to start developing acceptable thresholds for resource development and change in the northern boreal region, before the die is irretrievably cast and some unmitigable threshold crossed. As it stands today there are no real thresholds in place for many VEC's in the area unless they are subject to government standards or regulation. Having a design incorporating the concerns and advice of many stakeholders may help to control the extent of environmental change in the area and avoid any future calamities.



As suggested by Dr. Shaeffer, the benefits of this project should be more than just economic given the environmental and social damage that has already been done to the region by past hydro developments. There exists an opportunity to contribute to science and further understanding of various VEC's as well as other important environmental issues. Extensive applied research and peer reviewed research should be performed. Such research should be made publicly available, either by the proponents through an easily accessible medium or by an independent monitoring agency.