Manitoba Hydro
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September 7th, 2012

Mr. Terry Sargeant
Clean Environment Commission
305-155 Carlton St.
Winnipeg, MB R3C 3H8

Dear Mr. Sargeant:

RE: Bipole III Transmission Project – Response Package #7

Please find enclosed responses to information requests which were submitted to Manitoba Hydro on August 24th 2012.

We trust the enclosed responds appropriately to all Round Two information requests (#359 - #528) and finalizes the information request process. Manitoba Hydro's records indicate that all outstanding information requests have been completed and all imposed deadlines have been met.

Should you have any questions or require further clarification of our comments and information requests please do not hesitate to contact me at 360-4394.

Regards,

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sj/tk

Clean Environment Commission

Bipole III Transmission Project

Package #7

September 7th 2012

Manitoba Hydro

Date	August 24 2012
Reference	CEC/MH-III-039, CEC/MH-III-038, CEC/MH-III-037d, CEC/MH-V-164, CEC/MH-V-169 and Section 6.2.6.6
Source	CAC/MH Round 2-1
Question	CEC/MH-VII-359

Question:

In section 6.2.6.6 of the EIS, Manitoba Hydro presents areas of habitat for American marten, beaver, moose, and elk that would be affected by various project components. CEC/MH-III-039, CEC/MH-III-038, CEC/MH-III-037d present additional details regarding the modelling exercises employed by Hydro in the development of the EIS. Although it appears that these values were generated by habitat models, the basis for them is not clear for all species.

Please confirm that estimated areas of wildlife habitat that would be affected by the project were generated by habitat models.

Response:

Yes, the estimated areas of wildlife habitat that would be affected by the project were generated by habitat models.

Please see *MCWS/MH-TAC-002i* and *CEC/MH- VII-360* for additional information regarding the VEC habitat models.

Date	August 24 2012
Reference	CEC/MH-III-039, CEC/MH-III-038, CEC/MH-III-037d and CEC-II-013
Source	CAC/MH Round 2-2
Question	CEC/MH-VII-360

Question:

Appendix D of the Bird Technical Report and Appendix B of the Mammal Technical Report present a number of habitat models for wildlife species. The Bird Technical Report's Appendix D provides information about the habitat requirements of various species; however, similar information is not included in Appendix B of the Mammal Technical Report. Both reports present source code for the variables used, but a description of the variable presented by the source code is often lacking, as is detailed information about model mechanics.

a) Please provide definitions for variables that have not been defined in the habitat models.

b) The models described in the bird and mammal reports appear to be Boolean models that identify areas as either suitable or not suitable habitat. Please confirm that this is the case.

c) If the models are not Boolean, please provide detailed information about model mechanics.

Response:

a) Habitat models for VEC species were constructed using habitat data from the Land Cover Class Enhanced for Bipole III (LCCEB) dataset. Detailed descriptions of LCCEB land cover classes are in Wulder and Nelson (2003) and the numerical variable designations for landcover types used in modeling are in Geobase (2009) and in Appendix E of the Bipole III Birds Technical report (Table E-2).

b) Models were used to identify high quality habitat. Further descriptions on the use of modelled habitat data is documented in Section 3.2.1 of the Bipole III Mammals Technical Report as well as interrogatory *MCWS/MH-TAC-002i*. For those models indicating the selection for hydrographic features, the National Hydro Network dataset available from GeoBase (2012) was used.

With the exception of woodland caribou, other mammal and bird models are Boolean models. A few models (e.g., bald eagle, beaver) were constrained spatially, including distances to key variables such as lakes and streams, or by expected species ranges.

References:

GeoBase.2009. Geobase Land Cover, circa 2000-Vector Feature Catalogue. Publ. by Centre for Topographic Information, Earth Sciences Sector, Natural Resources Canada. 6 pp.

GeoBase.2012. National Hydro Network (NHN). Available from http://www.geobase.ca/geobase/en/data/nhn/index.html. Accessed August 27, 2012.

Wulder, M.A. and T. Nelson. 2003. EOSD Land cover classification legend report, version 2. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, British Columbia. Canada. Pp. 83

Date	August 24 2012
Reference	CEC/MH-VI-206, 205, 203, 201, CEC/MH-III-044, Mammal Technical Report: Appendix B
Source	CAC/MH Round 2-3
Question	CEC/MH-VII-361

Question:

In CEC/MH-VI-208, Hydro asserts that moose habitat availability does not appear to be a limiting factor. CEC/MH-VI-206 discusses habitat evaluation using moose habitat models, CEC/MH-VI-205 discusses the use of related data in cumulative effects analysis. CEC-VI-201 provides additional information regarding the moose model. CEC-VI-203 provides insight into the analysis of fragmentation effects in terms of high density moose areas and high quality habitat. The availability of both wintering and calving habitat can be important in the maintenance of viable moose populations; however, habitats that support various life functions often differ in their characteristics. The life function(s) being assessed in the moose habitat model are unclear.

a) Please indicate the life function for moose (e.g. Calving, wintering) being assessed by the model.

b) If more than one life function is represented, please indicate how they were combined.

Response:

a) The model parameters described in Section 3.4.2.3 (*Habitat Modeling Analysis and Constraints – Moose*) identify early to mid successional year-round food and cover life requisites. Winter thermal cover is considered in the broad habitat model. Wetland areas are also captured in the model. Coding variables used for the moose model are described in *CEC/MH-VII-360*.

b) Other life functions, such as reproductive (known calving and rutting), special habitat requirements (mineral licks) were not included in the model. In Manitoba, the minimum area for the application of multi-life requisite (life function) models is suggested to be 36 square miles (Palidwor et al 1995). The area of the Final Preferred Route (FPR) constitutes such a small proportion of total life requisite habitat (i.e., the home range of a moose), the application of multi-life stage models over large areas would have marginalized the overall evaluation of effects on moose. Therefore, application of such models was deemed inappropriate for evaluating alternative routes and the FPR.

For additional information, please see the following responses: *MCWS/MH-TAC-002i* regarding information on habitat models developed for VEC species and *CEC/MH-III-049* regarding thermal cover.

References:

Palidwor, D.L., D.W. Schindler, and B.R. Hagglund. 1995. Habitat Suitability Index Model - Moose Ver 2.0. Manitoba Model Forest: pp. 151

Date	August 24 2012
Reference	CEC/MH-III-037d, CEC/MH-III-038, CEC/MH-III-039, Bird Technical Report: Appendix D; Mammal Technical Report: Appendix B
Source	CAC/MH Round 2 – 4
Question	CEC/MH-VII-362

Manitoba Hydro's EIS indicates that field studies were conducted to determine the distribution and relative abundance of wildlife in areas that would be affected by the project. It is unclear how this information was incorporated into the models that were developed and/or if it was used to assess their accuracy. The response to CEC/MH-III-037d indicates that "field data were then again applied to habitat models for environmental assessment purposes and the identification of ESSs." References to the relationship between field studies and modeling also can be found in CEC/MH-III-038 and CEC/MH-III-039. However, it remains unclear how the data was used to assess the accuracy of the model and the statistical analyses in support of model validation do not appear to have been provided.

Question:

a) Please provide information regarding the extent to which data collected in the field were used in model development and validation.

b) Please provide the results of statistical analyses used for model validation.

Response:

a) Data from the bird surveys were used to assess the fit of expert models to mapped habitat classes and species distributions. The results of field studies were also used to validate expert models which indicate habitat use and the possible extent of habitat loss or alteration for VEC species in the Project Study Area. The McNemar test (Zar 2010) was used to validate the predicative power of bird modeled habitat areas.

Field data collected for boreal woodland caribou were used in the development of resource selection function (RSF) models for calving and winter habitat (see Bipole III Supplemental Caribou Report). Field data for other mammal VEC species were not collected for the purpose of validating models as adequate literature exists to characterize high quality habitat for environmental assessment purposes.

b) The results of these statistical tests are found in Table 4-5 of Bipole III Birds Technical Report. As indicated in a) above, statistical analysis of field data for mammals was not necessary for model validation.

Date	August 24 2012
Reference	CEC Information Request # 6 Question CEC/MH-VI-351
Source	CAC/MH Round 2 – 5
Question	CEC/MH-VII-363

Question:

The response to this question indicates that Manitoba Hydro will 1) meet with affected communities to review the draft EPP and 2) engage with the communities on an ongoing basis during construction.

a) In the meetings to review the draft EPP, will Manitoba Hydro raise the prospect of establishing partnerships to engage in community-based monitoring? If not, why not, given that the benefits of community-based approaches are well established in the Canadian literature?

b) Will the ongoing community engagement extend beyond construction, to the operations and maintenance phase of the project? If not, why not, given that the benefits of long-term community engagement are well established in the Canadian literature?

Response:

Manitoba Hydro does not intend to establish partnerships for community-based monitoring during the meetings with affected communities to review the Draft EPP. Manitoba Hydro will continue with existing relationships and will build new relationships with local communities, resource management boards and provincial and federal agencies for monitoring for the Project.

Manitoba Hydro is intending to meet with communities annually during the construction phase. During the maintenance phase of the Project, Manitoba Hydro will continue to engage local communities in discussions regarding ongoing maintenance including

vegetation management. Manitoba Hydro will meet with communities upon request during the operations phase of the project.

Date	August 24 2012
Reference	CEC Information Request # 6 Question CEC/MH-VI-352b and CEC Information Request #4 Question CEC/MH-II-0021
Source	CAC/MH Round 2 – 6
Question	CEC/MH-VII-364

Question:

The responses to these questions 1) reiterate the organizational structure for providing feedback from environmental auditing and 2) indicate that environmental auditing has not yet occurred in the Wuskwatim project.

a) Would Manitoba Hydro please provide recent examples of changes to its Environmental Protection Program stemming from an environmental audit? Similarly, please provide examples, if any, of changes to the program stemming from environmental monitoring results.

b) Please also provide the most recent ISO 14001 Audit Report.

Response:

a) An opportunity for improvement (related to 4.5.4 Control of Records) was noted during an internal audit in September 2011 that is subsequently being addressed with the development of an enhanced data management system (EPIMS - Environmental Protection Information Management System) for environmental monitoring data collected as part of the Bipole III Environmental Protection Program. The EPP is continually improved based on feedback from staff involved in implementing the program as results from monitoring and comments/concerns expressed during follow up/information meetings with communities. Response *CEC/MH-VI-358a* provides the following example of an update to the EPP stemming from monitoring observations/results:

"...during the annual monitoring in 2010 a heron rookery was identified in proximity to the Wuskwatim Transmission Project, the specialist identified the need for bird diverters to be installed on adjacent transmission line spans. Diverters were installed and the site was added to the monitoring program to determine mitigation effectiveness."

b) Manitoba Hydro does not currently have authority to release third-party audit reports. A draft report will be produced following completion of the September 21 Environmental Management System audit. We will endeavor to seek permission to provide this draft report in response to the information request at that time.

Date	August 24 2012
Reference	CEC/MH-VI-324(2)a, CEC/MH-VI-327g
Source	CAC/MH Round 2 – 7
Question	CEC/MH-VII-365

The response to CEC/MH-VI-324(2)a states that there has never been a failure of the entire Dorsey Station. The response to CEC/MH-VI-327g states that experience has shown that it can require up to 3 years to procure and replace specialized HVdc equipment. Note there is no 327g – assume 327a is the proper reference.

Question:

a) What specific experience is Manitoba Hydro referring to?

b) Please indicate those occasions when there have been outages of the station due a partial failure/problem at the station that affected its ability to function as fully required, the equipment that needed to be replaced and the time it took to restore the station to full capability.

Response:

a) As explained in *CEC/MH-VI-327a*, the experience referred to is the time required to procure and install specialized HVdc equipment, which requires up to 3 years. This experience is based on Manitoba Hydro operating an HVdc system for forty years and through industry collaboration with other HVdc users and suppliers.

b) There have been numerous outages due to a partial failure of the station that affected its ability to function as fully required. The duration of these outages is dependent on whether replacement is necessary or a repair can be made. Should replacement of equipment be necessary then availability of spares on site and the extent of the work necessary to remove the existing equipment and install the spare becomes critical. If it is necessary to procure equipment then there is the necessary procurement

time to order, design, manufacture, test and deliver equipment. Since this equipment is generally custom and manufactured overseas, there is risk associated with manufacturing and shipping that could extend the procurement process. There have been instances where a failure, a converter transformer, for example, has resulted in a partial outage of more than one year. Additionally, we are currently responding to inquiries from Cahora Bassa (South African HVDC System) seeking to purchase spare equipment from Manitoba Hydro as a result of equipment failure where they are faced with over a year of outage time. For the scenario of the catastrophic failure of the Dorsey station, a substantial clean-up and procurement program would be necessary. The time required to procure and replace the damaged equipment and rebuild the station to full capacity of 3 years is considered optimistic.

Date	August 24 2012
Reference	CEC/MH0VI-324(2)a
Source	CAC/MH Round 2 – 8
Question	CEC/MH-VII-366

Question:

To what extent did the use of temporary wood pole structures during the 1996 event limit the capability to deliver less than 2,000 MW?

Response:

Temporary wood pole structures were erected and Bipole I and II were operated in a parallel mode to restore the HVdc to 75% of capacity.

Date	August 24 2012
Reference	CEC/MH VI-324(2)b, Teshmont 2001 Report, page 6-2
Source	CAC/MH Round 2 – 9
Question	CEC/MH-VII-367

Question:

a) Do any of the improvements identified in CEC/MH-VI-324(2)b address the potential for a local fire within the panel banks? If not, why not?

b) If yes, to what degree has the probability of an outage in the panel banks been reduced since the Teshmont 2001 Report?

Response:

a) Improvements made to the relay building that directly impact the probability and consequence of relay panel fire include;

- Improved lightning protection associated with the building
- Ongoing transition from electromechanical relays to digital relays
- New 100% redundant smoke management system
- Improved fire retarding on cables
- The halon fire suppression system was replaced by a pre-action sprinkler system. A two stage alarm is generated from this system, which notifies operators in the control room. Stage 1 is activated from any single smoke detector. Stage 2 is activated by two smoke detectors of different types (one ionization type and one photoelectric type).

b) A study to determine the reduction in the probability of an outage due to a fire in the 230 kV relay building has not been done since the improvements described in *CEC/MH-VI-324(2)b.*

Date	August 24 2012
Reference	CEC/MH-VI-327a, Optimization of Reliability (Selection of Optimum Return Period of Design Load) - Referenced at Chapter 3, page 3-179
Source	CAC/MH Round 2 – 10
Question	CEC/MH-VII-368

Question:

a) Please confirm that Bipole 1 and 2 were built to Reliability Level 1 (50 year return rate) as described on page 7 of the above referenced Optimization Report.

b) Please confirm that improving the design to Reliability Level 3 would reduce the probability of an outage due to tornados by a factor of 10 (i.e, a 500 year return rate).

c) As each line is capable of carrying 2,000 MW, would the anticipated line outages affect necessarily reduce the amount of power the lines would otherwise be expected to carry?

d) What is the order magnitude of the costs for improving the design of Bipole 1 and 2 to this level? Would it exceed construction cost of the new Bipole 3 lines?

Response:

a) Existing Bipole I and II transmission lines were designed approximately 40 years ago. At that time, deterministic design method was commonly used in designing transmission lines. That method involved application of design loads from the Canadian Standards Associations (CSA) standard increased by overload factors, which were meant to compensate for various unknown. It is difficult to establish precise accuracy of that design and assign its reliability level due to a completely different design method used. However, it is estimated that approximate reliability level is in the range of 25-150 year return period depending which loads are considered (vertical or horizontal).

b) The Bipole III transmission line is not being designed to withstand tornado wind loads. This is due to the fact that at present no design methods exist to provide reliable protection against tornados. Tornados have dramatically different and very complex wind profile when compared to wide front winds. They are still subject of engineering studies and laboratory experiments. Increase of design to the 500-yr reliability would certainly provide some additional protection against tornados. However, it is impossible to quantify such gain as the Bipole III transmission line is being designed for ice and wind weather loads and not for tornado loads.

c) If you are asking if an outage of one Bipole line affects the loading capability of the remaining lines, the answer is no.

d) Manitoba Hydro has not estimated the cost of increasing the design of Bipole I & II to a higher reliability level as this is not a viable reliability solution.

Date	August 24 2012
Reference	CEC/MH-VI-328b
Source	CAC/MH Round 2 – 11
Question	CEC/MH-VII-369

Question:

Based on Manitoba Hydro's recent experience regarding price escalation for the commodities used in the required equipment, how reasonable is the assumption of inflation at CPI?

Response:

Commodity prices tend to be very cyclical and long term forecasts are not widely available. Historically the price swings for Manitoba Hydro's construction projects have tended to track Consumer Price Index (CPI) over the long run. Forecasts for the CPI are available from a large number of sources making it Manitoba Hydro's best estimate of future price escalation.

Date	August 24 2012
Reference	Volume 1, S. 2.2.3, page 2-5 to 2-6 and Figure 2.2-1, CEC/MH-V-150 and Attachments (2011 Load Forecast and 2010/11 Power Smart Annual Review)
Source	CAC/MH Round 2 – 12
Question	CEC/MH-VII-370

Question:

a) Page 2-5 of Section 2.2.2 and Figure 2.2-1 both use calendar year references (e.g. 2017). However, the documents referenced in the response to CEC/MH-V-150 (i.e. the 2011 Load Forecast and the Power Smart Annual Review) both use fiscal year references (e.g.2017/18). Please clarify whether the 2017 value referenced in the text and figure in Section 2.2.2 is based on 2016/17 or 2017/18.

b) Is the actual 2010/11 load reported in the 2011 Load Forecast (Table 4) assumed to include the impact of incentive-based DSM programs as set out in 2010/11 Power Smart Annual Review (Exhibit E.5) for actual 2010/11. If not, please explain.

c) Is the reduction for DSM used in the formula presented in CEC/MH-V-150 based on the net difference between the incentive based DSM forecast for the year less the actual incentive based DSM reported for 2010/11 (per Power Smart Annual Review – Exhibit E.5). If not,please explain how the DSM adjustment is derived and provide a numerical example using 2016/17.

d) Please confirm that the 170 MW attributed to Rate/Load Management Programs in 2010/11 is all from the industrial Curtailable Rate program. If not, what other program impacts areincluded and how much of the total is from curtailable rates?

e) With respect to the Exhibit E.5 of the Annual Power Smart Review document, please explain what is meant by “average winter demand”.

f) Is the 170 MW attributed to Rate and Load Management Programs for 2010/11?

- the amount by which these programs were actually used to reduce the average winter demand in 2010/11, or
- the average load under contract and by which the average winter demand could have been reduced if necessary in 2010/11?

g) If the response to part (f) is that its the amount "under contract" (i.e., the second bullet), please indicate the amount (i.e., average MWs) by which Rate/Load Management programs actually reduced 2010/11 average winter demand.

h) Please reconcile the 2008/09 actual value for Rates/Load Management reported in the Power Smart Annual Review (190 MW) with the total average on-peak value of 349.4 MW for 2008/09 reported in Appendix 10.8 (Table on page 5) of the 2010-2012 GRA Application.

Response:

Prior to providing the responses for each section of this information request, it is important to point out that the focus in determining the deficit of power was to make an evaluation of the order of the power shortage during the considered catastrophic outage over the years. It should be noted that a few MWs of difference in the computed deficit in each year would not result in differing the need for a reliability solution, time frame or its size. It is the deficit in the order of 1500MW in year 2017, its increasing trends and the potentially long duration of the outages that has urged the need for a reliability solution.

a) 2017 value referenced in the text and figure in Section 2.2.2 is based on 2016/17.

b) The actual 2010/11 load reported in the 2011 Load Forecast is assumed to include the impact of the activity to date under certain portions of incentive-based DSM programs as set out in 2010/11 Power Smart Annual Review (Exhibit E.5). Self generation and load management programs are excluded.

c) The reduction for DSM used in the formula presented in *CEC/MH-V-150* is effectively based on the net difference between the incentive based DSM forecast for the year less the actual incentive based DSM reported for 2010/11.

d) 170 MW is based on 81% of the Total "at generation" value of 210.3 MW shown on page 62 of the 20010/11 Power Smart Annual Review, under Rate/Load Management Programs.

e) "average winter demand savings" is the demand savings presented as an average of the winter AM and PM system peak savings.

f) The 170MW (154.5 at meter) of curtailable load is the average load, which could have reduced the average winter demand in 2010/11 if all customers on the program were curtailed during the time of system peak.

g) The Rate/Load Management Program was used eleven times throughout the 2010/11 winter period, of which nine of these curtailments were for 50 MW of load (at meter). The other two curtailments were for 124 MW and 25 MW respectively.

h) The 349.4MW as referenced in the question is the total of the four curtailable customers average on-peak MW shown in Appendix 10.8 (Table page 5 of the 2008/09 Curtailable Rates Report) of the 2010-2012 GRA application. Therefore the 349.4 MW is the 2008/09 twelve month average total on-peak load of which only part is designated as curtailable load. The 172.8 MW relates to the "average winter adjusted curtailable load" whereas the 349.4 relates to the "average annual unadjusted total load" of the customers is the program.

It should also be noted that although DSM may be significant in the rate application, it is rather a small component in the deficit calculation under the catastrophic outage considered for the reliability solution. Also the curtailable load is not assumed to be available over the long term due to the current short-term nature of the contractual arrangements. In addition, the conditions under which curtailment can be exercised do not include the potential long duration of the catastrophic outage.

Date	August 24 2012
Reference	CEC/MH-V-150, CEC/MH II - 023
Source	CAC/MH 2-13
Question	CEC/MH-VII-371

Question:

The response to CEC/MH V-150 states that "Wuskwatim generation of 200MW is included after the year 2012". However, page 2-5 of Section 2.2.3 and CEC/MH-II-012 both state that Wuskwatim is in-service in 2011/12. Please reconcile.

Response:

Wuskwatim consists of three units with varying in-service dates. The responses assume that the three units will be placed into service at varying dates in the fiscal year 2011/12 and Figure 2.2-1 (Section 2.2.3) so indicates. The first unit was placed into service on July 5, 2012 and the remaining two units are expected to go into service later in 2012.

Date	August 24 2012
Reference	CEC/MH-V-149, CEC/MH IV-150
Source	CAC/MH Round 2 - 14
Question	CEC/MH-VII-372

Question:

The text on page 2-5 and CEC/MH-V-150 both make reference to 900 MW of import capability and the Figure 2.2-1 suggests this 900 MW capability extends through to 2025. However, the response to CEC/MH-V-149 makes reference to an increase in firm import capability of at least 750 MW after 2019/20.

a) CEC/MH-V-149 states that the imports limits shown in the Table may not be available simultaneously on all three interfaces. Please add an extra row that shows the simultaneous import limit (across all three interfaces) under each of the three noted conditions.

b) Since some of the catastrophic events (e.g. tornados/downbursts) are expected to occur in the summer, please provide a similar Table showing summer imports limits.

c) MH-V-149 states that the 900 MW limit used in Chapter 2 was "was based on a consideration of the maximum (non-firm) winter Transfer Limits calculated and experienced in the operating horizon as shown in the above table". Please explain more fully the derivation of the 900 MW as the non-firm winter Transfer Limits across the three interfaces are reported as 900 MW, 282 MW and 400 MW respectively.

d) CEC/MH-V-149 suggests that with the 750 MW additional firm import capability the total firm import capability will increase to at least 1450 MW after 2019/20. Please explain the basis of the 1450 MW when the existing capability is 900 MW and 750 MW more is being added.

e) Please explain why Figure 2.2-1 in Section 2.2.3 does not reflect any increase in import capability after 2019/20.

f) Please provide a revised version of Figure 2.2-1 incorporating the anticipated increase in import capability after 2019/20 and also provide a calculation of the resulting peak deficit for 2025.

Response:

a) The simultaneous transmission import capability depends on the many factors such as the generation schedules, voltage control equipment availability, critical line outages and thermal loading capability of the transmission lines, both in the Manitoba system and the systems in United States and neighbouring provinces. The simultaneous transfer capability at each interface is not available. Maximum transfer limits are normally calculated for each interface. The availability of the maximum transfer limit is less in the summer than the winter due to increased maintenance outages. The 900MW import level is a feasible transfer level that can be achieved at any one time over the three interfaces. The 900MW is based on the 700MW of firm transfer and 200MW of non-firm transfer. Normally transmission planning for Manitoba load serving is based on firm transmission and dependable generation being in place.

b) The table below shows the 2012 summer transfer capability. Please see *CEC/MH-V-149* for definitions of the table heading.

Actual transfer up to the Total Transfer Capability is not possible. Non-firm transfer on each interface can be scheduled up to the Transfer Limit. A transmission reliability margin is subtracted from the Total Transfer Capability to establish the maximum Transfer Limit. The actual import from Ontario depends on the level of Winnipeg generation – increasing import is only possible when Winnipeg River generation is reduced. The actual import on each interface is also dependent on transmission availability. In the summer of 2010, the Ontario non-firm import was zero for the summer due to an outage of one 115 kV circuit.

Interconnection	Firm Transfer Capability for the Planning Horizon Import	Non-Firm Total Transfer Capability for the Operating Horizon Summer Import	Non-Firm Transfer Limit for the Operating Horizon Summer Import
US	700 MW	1050 MW	850 MW
Ontario	0 MW	300 MW	244MW
Saskatchewan	0 MW	400 MW	75 MW

c) The 900, 282 and 400 MW non-firm Transfer Limits referred to in the table of *CEC/MH-V-149* are the maximum non-simultaneous import levels on each interface which are only available under the most favourable operating conditions, when studied individually. Therefore all 1582MW cannot be assumed to be available for planning or operating purposes, both due to transmission constraints as well as generation availability constraints. Therefore for planning of the import, only 900MW out of the 1582MW is assumed available.

d) Note that the 1450MW refers to firm import capability, and does not include the 200MW of non-firm import in the 900MW of assumed import capability. The 1450 MW consists of the existing firm import capability of 700MW plus a minimum increase of firm import capability of 750MW from the new interconnection facility assuming Bipole III, and Keeyask and Conawapa are constructed and result in future export contracts.

e) Note that the 1450MW of increased firm import capability would only be available if and only if after Bipole III is built, subsequent new northern generation is developed along with a new high voltage interconnection to the United States. However, in calculating the deficit of supply of the existing system for the catastrophic Bipole I & II outage under consideration, that figure 2.2-1 is based on the assumption that Bipole III is not built, and the subsequent future northern generation and US interconnection are not available. Therefore, only the existing import capabilities are used in Figure 2.2-1.

f) As explained in part e), Figure 2.2-1 remains as provided.

Date	August 24 2012
Reference	CEC/MH-V-149,
Source	CAC/MH Round 2 - 15
Question	CEC/MH-VII-373

Question:

The response to CEC/MH-V-149 explains that the import limits provided in the previous GRA represent the portion of the Total Transfer Capability applicable to the operating horizon. However, the response to sets out an import limit of 1950 MW for January 2024, which is well beyond the operating horizon. Also, in the same response an import limit of 630 MW is quoted for January 2010, which is roughly equivalent to the pre-Riel Sectionalization limit quoted in CEC/MH-V-150.

a) Please explain the basis for the 1950 MW value (including the assumed contribution from new interconnections) and its equivalent 630 MW value also reported in PUB/MH I-143 e).

b) Please explain the difference between this 1950 MW import limit and the longer term 1450 MW value referenced in CEC/MH-V-149.

Response:

a) *CEC/MH-V-149* does not refer to a 1950 MW import limit or a 630 MW number. In PUB/MH I-143 e), the 1950 MW import level assumes that Bipole III, Keeyask, Conawapa and a new Manitoba-US 500 kV tie line are in place. An initial planning objective of the new 500 kV tie line was to increase long term firm import capability by 1100 MW over the existing long term firm MH-US import capability of 700 MW. The response to PUB/MH I-143e uses a non-firm import of 850MW for the 2010 Winter peak. The 1950 MW import is the sum of the 850 MW and the assumed 1100 MW import due to the new 500 kV tie line.

The 630 MW referred to in PUB/MH I-143e reflects the amount of contracted export that can be curtailed, and is not a transmission import capability.

b) The planning of a future new Manitoba – United States 500 kV tie line is in its preliminary stages. *CEC/MH-V-149* reports that the "new interconnection is expected to increase the long term firm import capability by at least 750 MW" but does not preclude an increase in import of 1100 MW.

Date	August 24 2012
Reference	CEC/MH-V-150
Source	CAC/MH Round 2 - 16
Question	CEC/MH-VII-374

Question:

a) Please explain why Manitoba Hydro's wind farm purchases are not assumed to make any contribution towards meeting the deficit.

b) What is average (dependable) annual output attributable to the St. Joseph and St. Leon wind farms?

c) What is the average (dependable) winter output attributable to these wind farms?

d) Please explain why there is no allowance/load reduction attributed to "public appeals", particularly as they have been utilized in the past (Section 2.2.2, page 2-4). How much load reduction (%) was achieved through public appeals during the September 1996 event?

Response:

a) There is no reasonable assurance that it will be windy during high load periods, which would severely limit any potential contribution that could be attributed to wind generation. In addition, wind turbines have operating restrictions during extremely cold weather, the very period in which the Manitoba load reaches its annual winter peak. Therefore, as the wind turbines cannot be relied upon to be operating when the Manitoba load reaches its winter peak, Manitoba Hydro does not count on wind generation as a winter capacity resource. However, from a long-term planning perspective, there is an annual amount of energy from wind generation that is relied upon.

b) For planning purposes, the annual amount of energy available from the St. Joseph and St. Leon wind farms that is considered dependable is 777 Gegawatt-hours.

c) The dependable energy output from the St. Joseph and St. Leon wind farms is determined on an annual basis not a seasonal basis.

d) Public appeals are not guaranteed to result in predictable and sustained load reduction. In 1996, a public appeal for voluntary load reductions was forwarded to the News Media, resulting in a load reduction of approximately 100 MW. More recent public appeals for load reduction as a result of unplanned outage events have not resulted in any noticeable reduction in demand.

Date	August 24 2012
Reference	CEC/MH-V-150
Source	CAC/MH Round 2 - 17
Question	CEC/MH-VII-375

Question:

The calculation of the supply deficit utilizes the total load forecast for Manitoba Hydro. The response also states that two units of Kettle generation are able to connect to the northern part of the AC system to be delivered to the load.

a) Apart from the use of the Kettle units to service load, can any of the other northern generation be used to service local (northern) load requirements when there is an outage on the current HV DC system?

b) If yes, what percentage of Manitoba Hydro's total peak load and overall annual domestic energy sales does this local load represent?

Response:

a) Any generator connected to the ac transmission network can serve the local load connected to the ac network. Other generators in the northern area include Kelsey, Jenpeg and Wuskwatim. There are no other generators besides the two Kettle units, normally connected to the isolated Northern Collector System supplying the HVdc that can be connected to the ac transmission network.

b) Not applicable.

Date	August 24 2012
Reference	CEC/MH-II-007k, CEC/MH-II-007q, CEC/MH-ii-019b
Source	CAC/MH Round 2 - 18
Question	CEC/MH-VII-376a

Question:

The first three referenced responses describe compensation programs for agriculture, landowners/tenant operators and trappers respectively. Are there any other "compensation programs" that will be triggered by Bipole III (including the Riel Station). If so, please identify.

Response:

Other than what was conveyed in the above references (*CEC/MH-II-007k, CEC/MH-II-007q & CEC/MH-II-019b*) there are no other forms of agricultural compensation for Bipole III (including the Riel Station) available to landowners/tenant operators and trappers.

Date	August 24 2012
Reference	CEC/MH-II-007k, CEC/MH-II-007q, CEC/MH-ii-019b, CEC/MH-V-154
Source	CAC/MH Round 2 - 18
Question	CEC/MH-VII-376bc

Question:

b) Are the costs of these various compensation programs included in the cash flows for Bipole III as set out in CEC/MH-V-154? If yes, are they included in the Capital spending or the annual OM&A?

c) If not, how would the cost of these programs impact the cash flow set out in CEC/MH-V-154?

Response:

Yes, the costs of the compensation programs described in the reference documents are included in the capital spending cash flows for Bipole III.

Date	August 24 2012
Reference	CEC/MH-II-008a, CEC/MH-V-154
Source	CAC/MH Round 2 - 19
Question	CEC/MH-VII-377

Question:

a) What (if any) are the incremental costs of the planned site for the Keewatinoow Converter Station, relative to the optimal location assuming the proposed Conawapa Generating station was not going to be constructed.

b) Please indicate how these incremental costs impact the cash flow for Bipole III as set out in CEC/MH-V-154.

Response:

The planned location was deemed to be the optimal location; therefore there are no incremental cost differences.

Date	August 24 2012
Reference	CEC/MH-II-023
Source	CAC/MH Round 2 - 20
Question	CEC/MH-VII-378

Question:

a) Please provide a copy of the Dr. R. Billington report.

b) Please indicate what year's dollars the $10/kWh is quoted in and convert the value to 2010$.

c) Please provide the calculations supporting the $20 B value quoted for a one-year outage at Dorsey.

Response:

a) The report titled Manitoba Customer Interruption Cost Evaluation by R. Billington, PowerComp Associates 110 Ltd, dated October 31, 2001 is attached as *CEC/MH-VII 378(2)*.

b) For purposes of the illustrative calculation in *CEC/MH-II-023*, the $10/kwh was assumed to be in 2010$.

c) Assuming a peak supply deficit about 1500MW as shown in Fig.2.2-1 and the fact that approximately one third of the time of not meeting the load demand shown in Fig. 2.2-2, the cost to the Manitoba economy could be estimated as follows:

Cost = Energy deficit for the year * cost of unserved MWh

= Area under the deficit part of the load duration curve * $10 /kWh

= (1500MW*(365*24 hours*1/3)*1/2))*1000kW/MW*$10/kWh = $21.9B /year

The above estimate excludes the cost of importing 900MW for the assumed one year period.

Date	August 24 2012
Reference	Teshmont 2001 Report, CEC/MH-II-034
Source	CAC/MH Round 2 - 21
Question	CEC/MH-VII-379

Question:

Page 6-2 of the Teshmont 2001 Report identifies two possible fire-related events regarding the 230 kV relay building that represent the highest potential risk impact to Manitoba Hydro – i) a low probability fire involving the loss of the entire facility and ii) a more probable event involving a local fire within the panel banks.

a) Does the quoted one in 29 year probability of an outage due to a fire represent the combined probability of either event occurring? If not, what does it represent?

b) What is the probability of a fire leading to the loss of the entire building?

c) What is the probability of a local fire within the panels?

d) In the Teshmont Report (page iii), the outage time associated with a fire is given as "weeks to months". At the time Teshmont 2001 Report was prepared what was the expected (average) outage time associated with each of the two events identified in the Preamble? Also for each of the two types of events, please identify the probability that the outage will last longer than i) one month, ii) three months, iii) six months or iv) one year.

Response:

a) The quoted one in 29 year probability was based on the analysis of all fire risks which could lead to the loss of entire station.

b) 1 in 29 year return.

c) 1 in 21 year return.

d) A major fire involving the loss of entire station would take up to three years to restore the power due to the complexity of the HVdc system. Depending on the levels of damages, a local fire within the panel banks could have a down time up to six months as per the evaluation in the Teshmont 2001 report.

Date	August 24 2012
Reference	Teshmont 2001 Report
Source	CAC/MH Round 2 - 22
Question	CEC/MH-VII-380

Question:

a) The Teshmont Report (page 6-3) suggests that the probability of an outage due to fire could be significantly reduced ("to as low as once in 160,927 years") assuming there were highly effective Fire Detection/Protection systems in place. Has Manitoba Hydro investigated and/or implemented improved fire detection/protection as suggested by Teshmont since the Report was prepared?

b) If yes, what progress has been made towards reducing the probability of an outage due to either a local fire or one impacting the entire station and what are the current probabilities associate with the occurrence of either i) a local fire or ii) a fire leading to the loss of the entire station?

c) If yes, what is the current probability of either event occurring?

d) What future actions are planned to further reduce the impact of fire at Dorsey? If none, please explain why.

Response:

a) Please see responses *CEC/MH VI 324(2)b* and *CEC/MH VII 367*.

b) Please see responses *CEC/MH VI 324(2)b* and *CEC/MH VII 367*.

c) Please see response *CEC/MH VII 367*, part b.

d) At this time there are continuing investigations of additional options to reduce the impact of fire at Dorsey. These options include development of a Mobile Emergency

Relay Facility (MERF) to partially replace the relay building should an event occur and/or building an additional relay building to separate the functions of the station from a single facility.

In the case of the MERF facility the logistics of building and maintaining a mobile trailer and the practicality of connecting in an emergency situation is under review.

Adding additional relay buildings at Dorsey is difficult in-terms of space and the logistics of cutting protection and control circuits over to a new facility, considering working in an operating station. The feasibility of such a cutover as well as timing and scheduling of the work to minimize outage risks is under review.

Date	August 24 2012
Reference	Teshmont 2001 Report
Source	CAC/MH Round 2 - 23
Question	CEC/MH-VII-381

Question:

a) The Teshmont 2001 (pages 3-14 to 3-15 and 3-19) identifies three types of tornado/downburst events that could impact on the Dorsey Station and reports the probability of each occurring. Based on the design of the Dorsey station at the time of the Report please indicate for each type of event (i.e., point, union and intersection) the expected duration of the resulting outage.

b) On page (iii) the Teshmont 2001 Report indicates that the probability of a "tornadoes, down bursts striking part of Dorsey" is 0.00025. How was this value determined from the various probabilities set out in Table 3-7?

c) The Teshmont 2001 Report (page iii) states that the duration of an outage at Dorsey due to tornadoes/downbursts could be a "month to year or more". Is the range of duration affected by the type of event that occurs (e.g. point, union or intersection)? What is the probability that the outage would last more than i) 3 months, ii) 6 months, or iii) a year?

d) Have any changes been made to the Dorsey station since the Teshmont 2001 Report that would alter either the probabilities of an outage due to a tornado/downbust or the resulting outage duration. If yes, please indicate what the changes were the impacts they have hadon the probabilities and durations reported in response to part (a).

Response:

a) Durations of outages are given as ranges in the table on Page iii of the 2001 Teshmont report since the extent of damage from a wind event could vary greatly.

Tornados or downbursts that hit the converter buildings would be the most difficult to recover from and would be at the higher end of the range given in the table on Page iii of the 2001 Teshmont Report.

b) The value would be taken from a curve or interpolated from the Dorsey - union data given for Event 2 in Table 3-7. In Table 3-7 a value is given for 95 mph wind of 0.000277 which is very close to the interpolated value of 0.00025 for 98 mph wind as given in Table 3-8.

c) The answer given in a) addresses the duration related to the type of event. The probabilities of outages lasting for a specific duration were not determined.

d) The probabilities are based on the wind withstand levels for the structures and some structures have been changed. For example, the converter buildings roofs have been upgraded to a higher wind withstand and the relay building has been hardened to withstand a much higher wind speed. Thus the probability of damaging the Dorsey converter buildings would be reduced slightly, and the probability of the relay building being damaged would be reduced significantly.

Date	August 24 2012
Reference	Teshmont 2001 Report
Source	CAC/MH Round 2 -24
Question	CEC/MH-VII-382

Question:

a) The Teshmont 2001 (page iii) states that the duration of an outage at Dorsey due to widefront winds could be a "week to months". What is the expected average duration of such an outage? Also, what is the likelihood that the outage would last longer than i) one month, ii) three months, iii) six months or iv) a year?

b) Have any changes been made to the Dorsey station since the Teshmont 2001 Report that would alter either the probabilities of an outage due to a wide-front wind storm or the resulting outage duration. If yes, please indicate what the changes were and the impacts they have had on the probabilities and durations reported in the Teshmont 2001 Report

Response:

a) Durations of outages are given as ranges in the table on Page iii of the 2001 Teshmont report since the extent of damage from a wind event could vary greatly. An expected average duration was not determined. Wide front winds that affect the converter buildings would be the most difficult to recover from and would be at the higher end of the outage duration range given in the table on Page iii of the 2001 Teshmont Report.

b) The probabilities are based on the wind withstand levels for the structures and some structures have been changed. For example, the converter buildings roofs have been upgraded to a higher wind withstand and the relay building has been hardened to withstand a much higher wind speed. Thus the probability of damaging the Dorsey

converter buildings would be reduced slightly, and the probability of the relay building being damaged would be reduced significantly.

Date	August 24 2012
Reference	Teshmont 2001 Report, Section 2.2.1, page 2-2
Source	CAC/MH Round 2 - 25
Question	CEC/MH-VII-383

Question:

Section 2.2.1 states that "Wide front windstorm, fire, or tornado damage at Dorsey Station could cause an outage that shuts down the HVdc system for up to three years". Please reconcile this statement with the outage durations quoted for each of these events in the Teshmont 2001 (page iii). In doing so, please indicate, for each of the three events, the likelihood that the outage could last 3 years or more.

Response:

All the weather events (wide front wind, tornado) and fire hazards have potential to cause an outage up to three years depending on the magnitude of damages, spare parts available and etc. Time frame "up to three year" covers all durations less than the 3 years. The basis for the estimated three years and why it could be more than 3 years is provided in *CEC/MH-VII-365*.

Date	August 24 2012
Reference	Teshmont 2001 Report, Teshmont 2006 Report
Source	CAC/MH Round 2 - 26
Question	CEC/MH-VII-384

Question:

a) The Teshmont 2001 (page iii) states that the duration of an outage affecting the DC transmission lines due to icing would last "weeks". What is the expected average duration of such an outage? Also, what is the likelihood that the outage would last longer than i) two weeks, ii) one month, or iii) two months?

b) The Teshmont 2001 (page iii) states that the duration of an outage affecting the DC transmission lines due tornadoes/downbursts would last "days to weeks". What is the expected average duration of such an outage? Also, what is the likelihood that the outage would last longer than i) one week, ii) two weeks, or ii) one month?

c) The Teshmont 2001 (page iii) states that the duration of an outage affecting the DC transmission lines due to wide-front wine storms would last a "week to a month". What is the expected average duration of such an outage? Also, what is the likelihood that the outage would last longer than i) one week, ii) two weeks, or iii) one month?

d) The Teshmont 2006 Report indicates (page v) that with outages due to a tornado or a downburst wind service could be restored in a few days which is considerably shorter than the outage period noted in the Teshmont 2001 Report. Please reconcile.

e) Do the event probabilities and other durations set out in the Teshmont 2006 Report (page v) reconcile with those in the Teshmont 2001 Report (page iii). If not, for which events does Manitoba Hydro consider that either the probability or duration has changed as a result of the 2006 Report?

Response:

a) Durations of outages are given as ranges in the table on Page iii of the 2001 Teshmont report since the extent of damage from an icing event could vary greatly. An expected average duration was not determined. The probabilities of outages lasting for a specific duration were not determined.

b) Durations of outages are given as ranges in the table on Page iii of the 2001 Teshmont report since the extent of damage from a tornado/downburst event could vary greatly. An expected average duration was not determined. The probabilities of outages lasting for a specific duration were not determined.

c) Durations of outages are given as ranges in the table on Page iii of the 2001 Teshmont report since the extent of damage from a wide-front wind event could vary greatly. An expected average duration was not determined. The probabilities of outages lasting for a specific duration were not determined.

d) The 2006 report indicates that temporary lines could be restored in a few days. Outages would be required to transfer from the temporary lines to the repaired line and this would add to the overall outage duration. The 2001 Report indicates that the outage could be a few days to weeks also on Page 2-2 thus the 2001 and 2006 Reports are consistent.

e) The 2006 Report is consistent with the 2001 Report where applicable. The probabilities have changed only slightly in the 2006 report due to more years of data and refined modeling techniques. For example the return period for a dc line tornado outage in the 2001 Report was 1 in 17 years and in the 2006 Report was 1 in 16 years.

Date	August 24 2012
Reference	Teshmont 2001 Report, Teshmont 2006 Report, CEC/MH-V-150, 2011 Load Forecast Attachment, CEC/MH-II-023
Source	CAC/MH Round 2 - 27
Question	CEC/MH-VII-385

Question:

The Teshmont 2001 Report indicates (page iii) that outages (affecting either Dorsey or the DC lines) due to tornados/downbursts would occur in summer and potentially last for Dorsey from weeks to up to a year or more and for the DC lines for days to weeks.

The Teshmont 2006 Report indicates (page v) that line outages due to tornadoes or downburst would probably occur in the summer (or April to September) and last days to weeks with temporary lines restoring service in a few days. Table 24 of the 2011 Load Forecast indicates that the 2016/17 peak load for the months of May through October is less than the annual forecast peak by more than 1,500 MW – the projected deficiency for that year in the event of an outage on the current Bipole I & II system.

a) Please provide (for the year) 2017 graphs similar to Figure 2.2-3 (January 2017) for each of the other 11 months of 2017.

b) Based on Figure 2.2-2 what is the total amount of energy (kWhs) that would not be supplied in 2016/17 and how does this value break down by month?

c) Please provide (for the year 2025) graphs similar to Figure 2.2-3 for all months of that year.

Response:

a) Forecast of the duration curve on a monthly basis is not available to be provided.

b) Estimated energy unserved during the catastrophic outage

= area under the deficit part of the load duration curve for year 2017

= 1500*(365*24*1/3)* 1/2 *1000 (assuming approximately triangular area)

= 2190000000 kWh

Forecast of the duration curve on a monthly basis is not available therefore, the breakdown of the energy unserved by the month is not provided.

c) Forecast of the duration curve on a monthly basis is not available to be provided

Date	August 24 2012
Reference	CEC/MH-III-057, CEC/MH-V-152, Section 2.2.3, Figure 2.2-1, Teshmont 2001 Report, page (iii)
Source	CAC/MH Round 2 - 28
Question	CEC/MH-VII-386

Question:

The response to CEC/MH-III-057 states: "System reliability studies have concluded that the likelihood of such events occurring, when combined with severe consequences of prolonged major outages, warrant substantial system improvements to reduce dependence on Bipoles I and II and the Dorsey Station. The potential effects of such an event could have serious consequences to the health, safety and security of Manitobans. As discussed in response CEC/MH-II-023 a one-year outage at Dorsey converter station, could result in societal costs of $20 billion (based on an estimate of $10/kwh). The Project will reduce dependence on the existing Bipole I and II transmission lines and the Dorsey Station to ensure that a reliable supply of electricity is accessible to Manitobans today as well as to future generations."

The response to CEC/MH-V-152 states that "Manitoba Hydro has assessed the risks to the Manitoba supply and determined the need to mitigate this large outage (the loss of Bipole I and II) based on careful consideration of many different factors including …" Figure 2.2-1 illustrates that there has been a potential for a shortfall in supply due to a catastrophic outage of Bipole I & II and/or Dorsey since before 1985. There is no suggestion in the Teshmont 2001 Report (page 5-1) that the probabilities associated with various catastrophic events are increasing overtime.

a) Why was there no need for an alternative to reduce the dependence on Bipole I & II and Dorsey in the late 1980's through to post the year 2000, whereas now there is? More specifically what has changed in terms of the factors considered (CEC/MH-V-152),

that now supports the need for alternatives (such as Bipole III) to "support" the existing HVDC system of Bipole I & II and Dorsey?

b) If there was such a need during this earlier period, why wasn't a case made for Bipole III to be in-service during this period and/or why was the initial Bipole I&II and Dorsey configuration implemented?

c) Please provide any analysis that Manitoba Hydro has performed to demonstrate that the current probabilities and resulting consequences of an outage on the HVDC system have reached the "tipping point" where they now exceed the cost of mitigation alternatives such as Bipole III (lines and station).

d) Please provide the documentation that was submitted to Manitoba Hydro's senior management and Board of Directors justifying the need for the Bipole III project for purposes of obtaining project approval.

Response:

a) There has been the need to reduce the dependence on Bipole I & II and Dorsey ever since supply deficit grew to be unmanageable to Manitoba load growth. Planning for a Bipole III began in the early 1990's. While the main driver of the project in the early days was related to potential export sales, BPIII's ability to improve reliability was always a prime benefit of the Project. It should be noted; however, that the supply deficit was considerably less than the estimated 1500MW for 2017. For a variety of reasons over time, the proposed construction of Bipole III was deferred due to cancelation of power sale to Ontario, routing restrictions, etc.

Factors that accelerated the need to address reliability included:

- The weather events experienced, the increasing severity of these events and the frequency, especially in Manitoba.
- The 1996 wind event that caused an outage of both HVdc lines.
- The 2007 Elie tornado - although it didn't affect the Bipoles, it was dangerously close to the Dorsey station.
- The 2007 wind event that destroyed Dorsey station bus work.
- The blackouts in other jurisdictions with common mode failures as the root cause.
- The growing supply deficit in Manitoba for the catastrophic outage due to load growth.
- The Teshmont studies that quantified the weather related vulnerability.

During the period where BPIII plans were deferred, Manitoba Hydro did implement other projects which addressed reliability by reducing the supply deficit such as Riel Sectionalization and Wuskwatim.

b) As explained in part a), BPIII has been on the horizon for the last two decades. The current configuration BP I & II is the result of past decisions. It appears that the decision was driven by economics and potential for failure of both Bipoles was not a consideration at that time.

c) The decision to implement Bipole III is explained in Chapter 2 of the EIS and parts a) and b) above.

The following documentation was submitted to Manitoba Hydro's senior management and Board of Directors justifying the need for the Bipole III project for purposes of obtaining project approval:

1. Minimum Transmission Requirements for HVdc Bulk system reliability. SPD 01/07 dated 2001.07.04. Please see attachment *CEC/MH-VII-386(2).*
2. Manitoba HVDC Reliability Alternatives Phase I SPD 06/05 dated April 13th 2006 (previously filed with the CEC).

3. Manitoba HVDC Reliability Alternatives Phase I SPD 06/11 dated 2006/10/04. (previously filed with the CEC).
4. Reliability Alternatives for Mitigating the Risks of a Dorsey or Interlake Corridor Outage. Cost review and Reliability Implications. Dated October 2011 (previously filed with the CEC).

Date	August 24 2012
Reference	Teshmont 2006 Report
Source	CAC/MH Round 2 - 29
Question	CEC/MH-VII-387

Question:

The 2006 Report concludes (page x) that "providing separation between the corridor for the Bipole I and 2 transmission lines and the corridor for the Bipole 3 transmission line appears to be more effective at reducing the probability of simultaneous outages of al three lines compared to strengthening the transmission lines". The Report also states (page 35) that "designing a line to with stand 290 km winds represents a major increase in cost and provides less benefit than the selection of a separate route".

a) Please provide the analysis that compares the cost of a strengthened Bipole 3 using the InterLake route to the cost of Bipole 3 using a Western route and the current design and supports this conclusion.

Response:

a) As concluded by the 2006 Teshmont report and detailed in the responses to the *CEC/MH-VII-496* and *CEC-MH-VI 336b*, the Interlake corridor was not acceptable for the Bipole III route in comparison to Bipole west route. Therefore, no cost estimates were analyzed.

As clearly indicated in the Table 3-3 of the Teshmont 2006 report, strengthening the Bipole III line from the current design level (161km/h) by 30% (209km/h) on the Interlake Route only results in marginal improvement, which is at least four times less effective than the addition of Bipole III on the west route assuming a design of 161 km/h.

Date	August 24 2012
Reference	Teshmont 2012 Report, CEC/MH-IV-132
Source	CAC/MH Round 2 - 30
Question	CEC/MH-VII-388

Question:

The Teshmont 2012 Report (page ii) states transmission lines are generally designed based on reliability level (i.e., Reliability Levels I, 2 and 3). The Report's assessment is based on a Bipole 1 and 2 design corresponding to Reliability Level 1 and Bipole 3 corresponding to Reliability Level 2. The Report also recommends that "where the Bipole III transmission line comes within 50 kM of the Bipoles I and II transmission lines that the Bipole III transmission line be strengthened to the next level (page 60).

a) Based on the current design (i.e., prior any changes due to the design change investigations referenced in CEC/MH-IV-132), what is the reliability design level for Bipole III (e.g. is it all designed to Reliability Level 2)?

b) Does the current cost estimate for Bipole 3 reflect this design? If not, what design is the cost estimate based on and what is the project cost based on the current design?

c) What is the estimated impact on the currently reported project cost of strengthening the design of Bipole 3 to Reliability Level 3 in those areas noted in response to CEC/MH-IV- 132?

d) Please explain why Manitoba Hydro is using a separation criterion of 40 km when the Teshmont 2012 Report recommended improved design where the separation was less than 50 km.

e) How many more kilometres of line would be affected if the separation criterion was 50 km as opposed to 40 km?

Response:

Bipole III is currently designed to have a level 2 reliability of 1 in 150 year return. This applies to the entire line and the cost was included in the present project budget.

Strengthening the design of Bipole III to Reliability Level 3 in the areas (340km line segments) identified in the Teshmont 2012 report costs a premium of $6M.

A separation criterion of 40 km was used as a guideline when evaluating the west Bipole preferred route. The selection of the Bipole III Final Preferred Route considered biophysical, socio-economic, land use, and technical factors. A few segments of the Bipole III Final Preferred Route has a separation distance less than 40km due to these factors.

Date	August 24 2012
Reference	Teshmont 2012 Report
Source	CAC/MH Round 2 - 31
Question	CEC/MH-VII-389

Question:

Do the event probabilities regarding the failure of Bipole I and II as set out in the Teshmont 2012 Report (pages 30, 39 and 41) reconcile with those in the Teshmont 2001 Report (page iii). If not, for which events does Manitoba Hydro consider that either the probability or duration has changed as a result of the 2012 Report?

Response:

The 2001 study did investigate the failure rate of the Bipole III line only (not the simultaneous failure of three bipoles) assuming different loading capacity as shown on line 21 of Table 3-7. In particular, the 2012 study took a more comprehensive approach and went further with a statistical reliability analysis which included detailed modeling of the transmission line tower designs with various return periods of tower failure, weather hazards, and the specific line route. Instead, the study carried out in 2001, was based on the probability that weather events can exceed the tower design loading criteria (1 in 50 years return period or higher) of the Bipoles I & II lines, no detailed analysis of tower loading strength were attempted due to the limitation of technology at the time.

The major difference between the 2001 and 2012 report was related to the severe weather events of wind, or combined wind/ice storms due to the progress of simulation approaches. The probability of failure for Bipole I & II was estimated to be 1 in 90 year return in terms of wind events only, and 1 in 20 year return for severe combined ice and wind event. In comparison, the previously estimated probability of failure for the Bipole I & II lines in terms of wind event was 1 in 250 year return and shall be superseded. The probability of failure due to combined wind and ice events were not explicitly examined

in the 2001 report. The performance of tornado events were found to be very close in two reports considering the evolvement of approaches and weather data updates. The probability assessment of downburst was not attempted, and such a probability is estimated to be same as the tornado events on a conservative basis.

Date	August 24 2012
Reference	CEC/MH-III-057, CEC/MH-V-152, CEC/MH-II-023, Teshmont 2001 Report, page (iii), Optimization of Reliability (Selection of Optimum Return Period of Design Load) - Referenced at Chapter 3, page 3-179
Source	CAC/MH Round 2 - 32
Question	CEC/MH-VII-390

Question:

The Optimization of Reliability Report (page 23) includes an analysis which compares the present value of the incremental cost of designing the line to meet different levels of reliability against the present value of the expected repair cost based on the probability, duration and cost of repairing the outages associated with the different levels of reliability.

a) Has Manitoba Hydro prepared any similar type of analysis comparing the cost of Bipole III with the expected economic and societal costs of not building Bipole III – based on the probability and duration of outages as set out in the Teshmont Report and the cost of outages as reported in CEC/MH-II-023?

b) If yes, please provide the results.

c) If not, please provide such an analysis noting any simplifying assumptions necessary to complete the work.

Response:

The impact on the Manitoba economy was demonstrated considering the loss of Dorsey for a year, a societal cost of about $20B. Please refer to *CEC/MH-VII-378* for the calculations.

Date	August 24 2012
Reference	CEC/MH-V-154, CEC Wuskwatim Review – CAC/MSOS/MH/NCN I – NFAAT–3
Source	CAC/MH Round 2 -33
Question	CEC/MH-VII-391

Question:

a) With respect to CEC/MH-V-154, please confirm that the "in-service dollars" represent the nominal dollars as spent in the year noted. If not, what is the basis for the values?

b) Please confirm that the Base Dollars column represents the in-service dollars for the year discounted to 2010 using a discount rate of 6.1%.

c) Please explain the basis for using what appears to be a nominal discount rate of 6.1% discount rate. In particular, please explain the why a nominal rate of 6.1% is used when Manitoba Hydro's Hurdle Rate Policy (as filed in the CEC Hearing dealing with Wuskwatim) calls for using a 5.98% real discount rate when assessing core business projects.

Response:

a)"In-service dollars" represent the nominal value of a project, including all interest costs incurred, as of the in-service date of the Project.

b) Base dollars represent the estimated cost of the Project components without consideration of escalation or interest costs. Base dollars reflect the estimated costs as if all costs were incurred in the study year. They are not the discounted value of the in-service costs.

c) The discount rate used in the response to *CEC/MH-V-154* is a real discount rate (not nominal). The discount rate used in analysis of core projects is linked to the long-term cost of borrowing and will vary as the forecast of the cost of borrowing varies.

Date	August 24 2012
Reference	CEC/MH-V-153
Source	CAC/MH Round 2 - 34
Question	CEC/MH-VII-392

Question:

a) Please provide a breakdown of the cost for each alternative as between:

- Actual project costs
- Corporate/Capital Overheads
- Contingency Allowance
- Interest During Construction (if applicable)

b) To extent the project costs for each alternative include a contingency allowance, please describe the types of contingencies the allowance is meant to capture and what types of contingencies it is not designed to capture.

c) Was any independent 3rd party review performed regarding the reasonableness of the cost estimate for Bipole III or the other alternatives considered? If yes, please provide.

Response:

a) A breakdown for each of these cost components is not available on a comparative basis. A breakdown was provided in *CEC/MH-V-153* & *CEC/MH-V-154*. Interest during construction and inflation (per CPI) are included (please see responses provided for *CEC/MH-VII-435* & *CEC/MH-VII-436*.)

b) Contingency is meant to capture uncertainty associated with the project. Examples could include, weather events, unforeseen site conditions and large variability in costs. Contingency is not designed to captures items such as major scope changes, changes to ISD or schedule sequence.

c) No third party review of the cost estimate for Bipole III as a whole was performed. An external consultant was engaged to review the estimate of some of the estimated costs of the two converter stations. Manitoba Hydro is not willing to provide a copy of that review because public disclosure of the details regarding some of the estimated costs would prejudice its ability to secure fair and competitive bids for the supply of the sophisticated equipment for the converter station should potential bidders know what Manitoba Hydro has estimated and budgeted for.

Date	August 24 2012
Reference	Optimization Of Reliability (Selection Of Optimum Return Period Of Design Loads) Technical Report Bp3-Tr-03, October, 2011, P.8; Also Annex A, Pp.30-33
Source	CAC/MH Round 2 - 35
Question	CEC/MH-VII-393

Question:

The report states that: "Table 2 below summarizes ice and wind conditions for the Northern and Southern sections of Bipole III…"

a) Could Manitoba Hydro explain what wind and and ice data (date range and locations) is available for these calculations.

Response:

Selection of the wind and ice design loads has been done based on analysis of the existing historical weather data obtained from Environment Canada. The data from the following stations in proximity of the Bipole III route was analyzed in detail (numbers in brackets indicate number of years of data): Winnipeg (54), Portage (28), Dauphin (37), The Pas (36), Thompson (39).

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.i
Source	CAC/MH Round 2 - 36
Question	CEC/MH-VII-394

Question:

The Nelson River HVDC Transmission System is vulnerable to fire, ice storms, terrorism, tornadoes, and other natural and manmade hazards that could prevent power transmission for months, perhaps up to a year or more. If the outage is during the winter, the societal costs to the province could be tens of millions of dollars per day, as well as the risk of loss of life.

Could Manitoba Hydro confirm that the societal costs of an outage vary by time of year and, in particular, that winter weather extremes (e.g. ice storms) carry higher potential societal costs than weather extremes in other seasons (e.g. tornadoes).

Response:

Manitoba Hydro has worked with Dr. R. Billington, one of the world's leading experts in power system reliability to evaluate the societal costs of an outage. The costs associated with power supply interruptions are influenced by the duration and frequency of outage events, the time of interruption occurrence, the availability of advance warning information and the extent of the outage. Therefore, the societal cost of an outage will likely vary with time of year.

The electric power interruptions can impact the customer in various aspects including the direct economic impact, direct social aspects and a range of indirect impacts. Direct economic impact may consist of lost production, idle but paid for resources, process restart costs, spoilage of raw materials or food etc. Direct social aspects include customer inconveniences, loss of leisure time, uncomfortable building temperatures and personal injury or fear etc. Indirect impact may include the costs related to civil

disobedience and looting during an extended blackout etc. Further, the cost of an interruption in electricity supply to a particular customer is related to the degree to which the activities interrupted are dependent on electricity.

Therefore it's hard to quantify the society costs of an ice storm vs. the tornado without the details of the events.

Based on Dr. R. Billington findings, an outage is estimated to carry a societal cost of $10/kwh in Manitoba.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.vi (also p.9-2)
Source	CAC/MH Round 2 - 37
Question	CEC/MH-VII-395

Question:

The site of the proposed Riel Converter Station will need to be protected from floods since it lies in the Red River flood plain outside current flood control infrastructure facilities.

a) Could Manitoba Hydro confirm that flood risk was considered in the choice of the Riel Converter Station, including the cost associated with mitigation against an extreme flood event?

Response:

a) Flooding risk was considered in the confirmation of Riel as the site for the Bipole III inverter. Riel site is elevated and graded to protect against the risk of a one in 700 year flood. The flood mitigation is mainly provided by the site's aesthetic berms on the North and East, the floodway berm on the West, and earthworks of the water reservoir on the South. The cost of approximately $4M was minimal as material for the work was obtained from the floodway expansion project which coincided with the Riel Reliability Project that is establishing the Riel 500/230 kV station.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.3-3
Source	CEC/MH Round 2 - 38
Question	CEC/MH-VII-396

Question:

> Minneapolis, toppled near Floodwood, 300 km east of Grand Forks. Gusts of over 161 km/h (100 mph) were measured at a number of recording stations, with the highest being 183 km/h (114 mph) at the Grand Forks Airforce Base. In year 2000, gusts of 179 km/h (111 mph) were recorded at Devils Lake, 120 km west of Grand Forks. These winds are considerably higher than the maximum gust of 140 km/h (87 mph) recorded in Manitoba. Environment Canada suspects that higher winds have occurred in southern Manitoba, but not at the Environment Canada weather stations.

Could Manitoba Hydro indicate whether it has considered, via its own analysis or a commissioned study, whether there is a relationship between extreme wind speeds and latitude? If so, what is that relationship and how does it affect the application of U.S. evidence of extreme wind events to southern and northern Manitoba?

Response:

The 2001 report considered only the wind data from Environment Canada for its analysis. The results of wind data from stations in Winnipeg, Brandon, Rivers, Portage, Gimli, Dauphin, The Pas, Gillam, and Thompson were used to establish the primary underlying reference. During the course of the study, several wind events in the U.S. were observed to have higher wind thresholds. Inquires with Environment Canada indicated that such events may likely occur in Manitoba as well. Therefore, it's recommended in the 2001 report that such types of wind data be considered in the future analysis. The U.S data were considered in the 2006 and 2012 reports.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.3-4
Source	CAC/MH Round 2 - 39
Question	CEC/MH-VII-397

Question:

The report states that: The design wind speeds for Pole 1 of BiPole 1 are lower than those used for the buildings built later and are used to establish probabilities of exceedance of design limits in this study.

Does this sentence mean that the lowest design wind speeds for Pole 1 or Bipole I were used to establish the risk of damage to Bipoles I and II from an extreme wind event? If so, does this not bias the estimates of the probability of damage from an extreme wind event upward? If not, please explain.

Response:

The use of the lowest building wind withstand is used to indicate the point at which the converter buildings start to fail. It is understood that the newer buildings will withstand slightly higher winds. There is also the consideration that the failure of one building can produce missiles which can cause premature failure of the other buildings. There are also common controls and operating facilities in the oldest building whose damage would compromise all of Bipole I and to some extent Bipole II.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.3-4 (also p.3-20)
Source	CAC/MH Round 2 - 40
Question	CEC/MH-VII-398

Question:

The report states that: The environment Canada occurrence rate of 2.5 tornados per 10,000 km2 per year was also included as part of a sensitivity analysis.

a) Could Manitoba Hydro explain the statistical relationship between Environment Canada's occurrence rate and Applied Research Associates' base rate of 1.28 tornadoes per 10,000 km2 per year?

b) Could Manitoba Hydro explain why the tornado frequency data by census tract could not be used to assess the variability of tornado frequency around the base rate, i.e. to identify the 95 percent confidence interval for statistical risk and sensitivity analysis?

Response:

a) For the Winnipeg area, Environment Canada estimated that the frequency of tornado days is 2.5 per 10,000 km^2 per year in the time of the 2001 analysis. Considering the fact that the tornado statistics were related to the reporting of the events and there is low population density in the northern and east Manitoba. Concerns were raised that the 2.5 values may not be the statistically representative of the region, as Winnipeg only cover a small area considered in the study. As indicated in section 3.2.1 of the report, the field expert (Applied Research Associates) has adjusted the data to 1.28 to account for the improved reporting due to the increasing population density, improved report networks and technique, more trained observers and the establishment of community warning systems in the areas.

b) Due to the nature of tornado event reporting (i.e. population related), the remote areas (northern Manitoba) considered for the study, relative limited data set of the base, statistical analysis was not performed. Instead, the lighting density data was used as an index to gain confidence of the data distributions and the various sensitivity of tornado rates were analyzed.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.3-19
Source	CAC/MH Round 2 - 41
Question	CEC/MH-VII-399

Question:

Boundary Layer Wind Tunnel Laboratory notes that tornado and downburst winds may not have the same effect on the behaviour of structures as would "normal" winds (Appendix 1). Thus, it is difficult to establish the magnitude of the tornado winds that will damage the Bipole 1 and Bipole 2 transmission lines. This may be particularly true of transmission line structures where designs depend on specific wind load distributions that may not be the same as those resulting from tornadoes or downbursts. Manitoba Hydro is carrying out a research program with Boundary Layer Wind Tunnel Laboratory to investigate possible failure at wind speeds considerably lower than expected.

Please provide the results of the research program to investigate possible failure of Bipole I and II transmission lines at lower wind speeds.

Response:

The research work is still ongoing and we do not have conclusive answers.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.4-5
Source	CAC/MH Round 2 - 42
Question	CEC/MH-VII-400

Question:

The maximum observed wind speed during each icing event, as well as the maximum ice accretion amount during the event, were analyzed. An extreme-value analysis was carried out on the data in order to develop estimates of various return period ice accretion amounts.

Please explain in more detail how the "extreme-value analysis was carried out.

Response:

Extreme value analysis is a widely used statistical method to determine the probability of worst case or rare events. For Manitoba, data from many weather stations of differing durations was statistically analyzed to determine icing and wind speed probabilities.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.4-7
Source	CAC/MH Round 2 - 43
Question	CEC/MH-VII-401

Question:

> Dorsey Converter Station and Riel Converter Station will be about 40 km apart. The separation between the Bipoles 1 and 2 dc transmission lines and the Bipole 3 dc transmission line is less than 200 km over 75% of the transmission line route. Thus, the Bipoles 1, 2, and 3 transmission lines, as well as much of the ac transmission system network in southern Manitoba, could be affected by the same ice storm.

a) Please indicate whether the route selection for Bipole III provides optimal reliability of transmission if there is some significant probability of an ice storm that could affect Bipoles I, II and III.

b) Please indicate how Manitoba Hydro proposes to mitigate the risk of an ice storm that would affect Bipoles I, II and III simultaneously.

Response:

a) Manitoba Hydro has conducted various weather risk assessment (ice, wind and tornado) of the exiting HVdc transmission system and the proposed Bipole III to maximize the system reliability since the 90's. Teshmont 2001, Teshmont 2006 and Teshmont 2012 reports were commissioned for such considerations. Manitoba Hydro has followed good utility practice to reduce the weather risks as much as possible when selecting the Bipole III west route with the considerations of other environmental factors.

b) Due to the wide area that can be impacted by ice storms, the most effective reduction in risk is to provide with the maximum physical separation of critical facilities as possible. As indicated in the EIS submission, the entire Bipole III dc line is designed with higher mechanical tower loading criteria (1 in 150 year return) to follow the IEC

industry recommendation. In some sections of Bipole III line where the separation (distance between BP III and BP I & II) is compromised by other selection criteria, even higher mechanical tower loading criteria (1 in 500 year return) will be applied to enhance its reliability against the wind and ice events.

Date	August 24 2012
Reference	Teshmont (2001) Volume 1 Main Report No. 276-70000, p.6-4
Source	CAC/MH Round 2 - 44
Question	CEC/MH-VII-402

Question:

Manitoba Hydro may wish to review their risk control measures, including policies, standards, guidelines, and procedures, that should be in place to improve the reliability with respect to fire at Dorsey Converter Station, where the probability of a fire interrupting the power transmission of both bipoles for a period of months is relatively high.

a) Please indicate whether Manitoba Hydro has reviewed its risk control measures with respect to fire at the Dorsey Converter Station. If a review has occurred, what was the outcome in terms of specific recommendations and actions?

b) Please indicate whether Manitoba Hydro has reviewed its risk control measures with respect to other risks (e.g. extreme wind and ice events) at the Dorsey Converter Station. If a review has occurred, what was the outcome in terms of specific recommendations and actions?

c) Please indicate whether Manitoba Hydro has considered investing in improvements to the Dorsey Converter Station that would mitigate risks, including extreme wind and ice events, as an alternative to the construction of Bipole III.

Response:

a) Manitoba Hydro has reviewed its risk control measures with respect to fire at Dorsey Converter Station. Improvements include: improved lightning protection associated with the building, ongoing transition from electromechanical relays to digital relays, installation of a new 100% redundant smoke management system, improved fire retarding on cables, the halon fire suppression system was replaced by a pre-action

sprinkler system, and converter building roof fire risk has been reduced. Please see *CEC/MH-VI-324(2)b* and *CEC/MH-VII-367*.

b) Manitoba Hydro has reviewed its risk control measures with respect to other risks (e.g. extreme wind and ice events) at the Dorsey Converter Station. Examples of improvements are the relay building has been encased in a very high wind withstand structure, and the wind withstand of the converter building roofs has been increased. Bipole III has been recommended to mitigate risk through geographically separate facilities.

c) Manitoba Hydro has considered investing in improvements to the Dorsey Converter Station that would mitigate risks, including extreme wind and ice events, as an alternative to the construction of Bipole III, but this option was not deemed a viable alternative and is inconsistent with world practice.

Date	August 24 2012
Reference	Teshmont (2006) Report No. 1660-10000, p.i
Source	CAC/MH Round 2 - 46
Question	CEC/MH-VII-403

Question:

The report states that: "It is current practice in North America to use a deterministic approach when planning the location of utility facilities, rather than using probabilistic methods."

a) Please explain how a "deterministic approach" to planning the location of utility facilities can address the risks of catastrophic outage and contribute to risk assessment and management

Response:

There are many factors that are considered when locating transmission facilities. The decades of experience in the power industry and learning from major blackouts have resulted in some common approaches being used that are sometimes not based on statistical analysis.

A good summary of best practice is the 1967 report written for the U.S. federal government on the major 1965 northeast blackout. The blackout led to the formation of NERC which sets North American reliability standards. To quote from the report "In utilizing hydroelectric resources or fuels at mine-mouth sites, concentrations of generation and distances of transmission may not conform to the intrinsically most reliable system development, in such instances special attention must be given to the strength of the transmission system and associated controls to assure that the reliability of the supply is not impaired."

The report goes on to specifically warn against over concentration of transmission, which is very applicable to the Interlake corridor, “Notwithstanding the increased difficulty of securing transmission rights-of-way, recognition should be given to the need for constructing lines on separate rights-of-way to assure the maximum possible reliability. Maximum reliability can only be obtained by avoiding excessive concentration of transmission capacity on a given right-of-way…”.

The report goes further in warning against over concentration of generating capacity and associated switching facilities. “Over-concentration of generating plant capacity implies increased risk to system security…” and “Substation switching arrangements should be utilized which avoid excessive concentration of critical circuits thereby exposing the system to serious loss of transmission capability should such a substation be partially or totally interrupted.”

The report summarizes by saying “The sound application of foregoing principles should eliminate any widespread or cascading interruptions to service resulting from all credible contingencies, whether arising from natural causes such as tornadoes and lightning, accidents such as aircraft flying into a critical transmission line, power equipment failures, or system disturbances caused by the sudden loss of a large block of generation or load.”

Currently, Manitoba Hydro applies a combination of deterministic and probabilistic approaches in system expansion planning.

Date	August 24 2012
Reference	Teshmont (2006) Report No. 1660-10000, p.38
Source	CAC/MH Round 2 - 47
Question	CEC/MH-VII-404

Question:

The report states that: "The consideration of whether or not it is appropriate to use probabilities associated with weather events for the evaluation of the routing options for the Bipole 3 dc transmission line raises a number of issues including:

• Is a probabilistic analysis a suitable basis for establishing design criteria for high consequence events? Even if there is a low probability of an event occurring, the event could happen tomorrow.

• Is it appropriate to use a probabilistic evaluation of weather events to evaluate low probability/high consequence events?"

a) Does Manitoba Hydro consider it appropriate to use probabilities associated with weather events to evaluate routing options for Bipole III and other aspects of the design of the transmission system?

b) Does Manitoba Hydro support a probabilistic analysis as a suitable basis for establishing design criteria for high consequence events? What alternative analysis would Manitoba Hydro consider "suitable"?

c) Does Manitoba Hydro consider it appropriate to use a probabilistic evaluation of weather events to evaluate low probability/high consequence events? What alternative analysis would Manitoba Hydro consider "appropriate"?

Response:

a) Manitoba Hydro does consider it appropriate to use probabilities associated with weather events as input in evaluating routing options for Bipole III and other aspects of the design of the transmission system. Many other factors come into play such as environmental concerns, regret theory, technical considerations, grid reliability considerations, economic considerations, future grid expansion, regulatory requirements, etc.

b) Manitoba Hydro uses probabilistic analysis as part of the input to design criteria for high consequence events. Other factors include those mentioned in a) above.

c) Manitoba Hydro does consider it appropriate to use a probabilistic evaluation of weather events as one of the inputs in evaluating low probability/high consequence events. Other factors to consider include those given in a) above.

Also please see response provided for *CEC/MH-VI-337*.

Date	August 24 2012
Reference	Teshmont (2006) Report No. 1660-10000, p.v
Source	CAC/MH Round 2 - 48
Question	CEC/MH-VII-405

Question:

The report provides Table ES-1

a) Would Manitoba Hydro agree that this information is also available in the first table Teshmont (2001)?

Response:

The 2001 report evaluated the risks of Manitoba HVdc system in terms of fire, ice storms, wind storms, vandalism, train accidents and other hazards. Both the assessment to Bipoles I & II transmission system and Dorsey station were conducted and the key findings were summarized in the first Table of the 2001 Executive Summary.

The 2006 report is an update of the 2001 report regarding the weather risk assessments of MH HVdc transmission system (Bipole I & II) only. The approach has progressed and has become more explicit. More weather data were collected in the 2006 report. For example, the wind analysis was categorized as tornadic and non-tornadic types due to their distinguish features. Another key development was the consideration of multiple tornado outbreaks (i.e. multiple tornadoes occurring within the same event) that could affect multiple transmission line systems. The key findings listed in ES-1 of the Teshmont 2006 report shall be considered to supersede the results of Teshmont 2001 in terms of the Bipole I & II transmission system.

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.i-ii
Source	CAC/MH Round 2 - 49
Question	CEC/MH-VII-406

Question:

The report states: "Increasing the physical spacing between the Bipoles I and II and the Bipole III corridors results in a decrease in the probability of severe weather events impacting all three dc transmission lines. The Bipole III Preliminary Preferred Route is generally closer to the Bipoles I and II transmission lines than the Bipole III West Route that was studied in the 2006 report [1] (Figure ES-2) and hence the probability of failure for all three dc transmission lines based on the Preliminary Preferred Route is higher than for the 2006 West Route, when considering the same climatic design loading criteria for all three dc transmission lines. The probability of all three dc spacing between the Bipoles I and II corridor and the Bipole III corridor; however, it is beyond the mandate of this study to suggest changes in the Preliminary Preferred Route for the Bipole III transmission line. As a result, the only means of reducing the probability of severe weather events impacting all three dc transmission lines is to strengthen the Bipole III transmission line by designing to higher climatic design loading criteria."

a) Can Manitoba Hydro confirm that the original West route in Teshmont (2006) provided greater reliability of electricity supply than the preliminary preferred route chosen?

Response:

The 2012 Teshmont study evaluated the probabilities of failure (i.e., collapse) for single and multiple lines considering the final preferred Bipole III west route. The 2012 study also included some analysis of the 2006 West Route as a comparison with the 2011 Preliminary Preferred Route for the Bipole III transmission line.

In terms of tornado performance, the Bipole III Final Preferred Route (FPR) was found to provide similar reliability enhancement (1 in 3700 years event) as the 2006 west route (1 in 3765 years event), an improvement of 200 times in comparison to the existing system. Wide front winds including wind and ice combinations remain the greatest threat to all three dc transmission lines. As shown in Table 5-1 of the 2012 Teshmont report, assuming the same tower reliability design of Bipole III as the existing Bipole I & II towers (approximate level 1), the probability of failure due to severe weather events (wind/ice combined) is about 1 in 60 years. Higher tower loading reliability criteria (level 2) will reduce the probability of failure to about 1 in 200 years for the Bipole III FPR.

Please refer to the response provided for *CEC/MH-II-023*.

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.iii
Source	CAC/MH Round 2 - 50
Question	CEC/MH-VII-407

Question:

The report states: "Considering the consequences of an outage of all three dc transmission lines, that Bipole III is being proposed as a reliability improvement for serving loads in southern Manitoba, and assuming that the routing of the Bipole III transmission line cannot be changed significantly, it is recommended that where the Bipole III transmission line comes within 50 km of the Bipoles I and II transmission lines that the Bipole III transmission line be strengthened to the next level, Reliability Level 3. The study shows that for separation distances less than about 50 km, there is an accelerated increase in the probability of all three dc transmission lines being simultaneously compromised compared to separation distances greater than 50 km. The length of the Bipole III transmission line that is within 50 km of the Bipoles I and II transmission lines is approximately 340 km."

a) Can Manitoba Hydro provide an estimate of the cost of strengthening Bipole III to Reliability Level 3 over these 340km?

Response:

The estimated cost premium of designing 340km sections of the Bipole III transmission line to the level 3 reliability level is around $6M, based on the line locations estimated in the Teshmont report and tower types.

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.47
Source	CAC/MH Round 2 - 51
Question	CEC/MH-VII-408

Question:

The report states: "A reliability analysis of the HVDC transmission lines based on the effects of wind and ice was not investigated in previous studies for the HVDC transmission lines, but was carried out as part of this study. The reliability of the HVDC transmission lines cannot be determined from the weather hazard alone since it requires the integration of the probabilities related to weather events and the structural capacities of the transmission lines. The reliability is a function of the length of the lines, their separation, and the tower capacity to sustain severe weather hazards."

a) Please provide a comparison of the length of the lines for the preferred preliminary route and the West route in Teshmont (2006).

b) Please provide a comparison of the length of the Bipole III transmission line that is within 50 km of the Bipoles I and II transmission lines for the preferred preliminary route and the West route in Teshmont (2006).

Response:

In the 2006 Teshmont report, the general corridors (Interlake, east and west) were considered adequate to compare the relative reliability risks in term of extreme weather events, and the specific routing had not been planned in any detail in any one corridor at the time. The West corridor was estimated to be in the range of 1200km to 1450km, and the longest distance was selected for the 2006 Teshmont study. The final preferred preliminary route of 1364km was evaluated in the 2012 report.

As indicate the 2012 report, there is about 340km line sections of the Bipole III Final Preferred Route, which are within the 50km separation distance to Bipole I & II based on the preliminary assessment. The west route in Teshmont 2006 report consists of about 100km line segments (entering both converter stations) within the 50km separation distance to Bipole I & II.

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.ii
Source	CAC/MH Round 2 - 52
Question	CEC/MH-VII-409

Question:

The report states: "The Preliminary Preferred Route of the Bipole III transmission line passes through the Thompson Nickel Belt and is within 26 km of the Bipoles I and II corridor. Manitoba Hydro subsequently investigated alternative routes for the Bipole III transmission line to avoid the mining claim area. The proposed alternative route reduced the distance between the Bipole III transmission line and the Bipoles I and II transmission lines to less than 20 km, as shown in Figure ES-4. The relocation of the Bipole III transmission line in this area for this short segment."

a) Please explain what considerations were given to alternative routes that avoided the mining claim but were farther from Bipoles I and II to increase reliability

Response:

Consideration was given to four options in the Thompson Nickel Belt (TNB) one of which was outside the TNB and further from Bipole I and II (See Option 1, with associated sub-options, on map 7- 13 Chapter 7 of the EIS). Response provided for *CEC/MH-II-015a* explains the route review process, including considerations taken into account, in relation to the TNB.

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.17
Source	CAC/MH Round 2 - 53
Question	CEC/MH-VII-410

Question:

The report states: "The Bipole III transmission line Preliminary Preferred Route is generally closer to the Bipoles I and II transmission lines than the Bipole III transmission line West Route studied in the 2006 report."

a) Please explain what considerations led to the choice of the Preliminary Preferred Route in comparison to the West Route in Teshmont (2006). Were these considerations strictly environmental?

Response:

No comparison was done of the western route provided in the 2006 Teshmont report and the preliminary preferred route. This route was developed solely for a preliminary risk assessment of a western route.

Please refer to the response provided for *CEC/MH-II-003a.*

Date	August 24 2012
Reference	Teshmont (2012) Report No. 4078-001-001-Rev00, p.54
Source	CAC/MH Round 2 - 54
Question	CEC/MH-VII-411

Question:

The report states: "The United States Climate Extremes Index represents an arithmetic average of 6 indices of weather extremes in the contiguous United States to give a single annual measure of the frequency of extreme events. Although it does not track all types of extremes – tornadoes, for example, are not included – it does provide a useful approximation of trends in weather extremes on a regional scale. The long term variation or change of this index represent the tendency for extremes of climate to either decrease, increase, or remain the same."

a) Please explain how this information is useful if we do not know the effect of latitude and other factors on the frequency of extreme weather events.

Response:

The Teshmont 2012 report provided some insights of future climate change. Similar to the analysis of Environment Canada that the weather data and future trend is inclusive, the weather data collected in the U.S. showed similar complexity and uncertainty due to the impact of climate change.

Date	August 24 2012
Reference	CEC/MH-V-152, 153, The Sustainable Development Act and Sustainable Development Guidelines
Source	CAC/MH Round 2 - 55
Question	CEC/MH-VII-412

Question:

In its response to CEC/MH-V-153, Hydro provides the cost estimates for each of the three alternatives. In its response to CEC/MH-V-152, Hydro states:

Bipole III is considered the most cost effective solution in comparison to other alternatives to improve the system reliability.

a) Please demonstrate that full cost accounting was used in comparing the cost estimates of the three alternatives.

b) Please demonstrate that full cost accounting was used by Manitoba Hydro in determining that "Bipole III is considered the most cost effective solution in comparison to other alternatives to improve the system reliability."

Response:

a) As described in the Bipole III Environmental Impact Statement – Chapter 2 Need and Alternatives – Section 2.3.1 – Evaluation Criteria for Project Alternatives, alternatives were compared based on the following criteria:

- Project cost
- Implications to Manitoba Hydro during an extended catastrophic HVdc outage
- Implications to Manitoba Hydro during non-catastrophic outages and normal operation
- Ability to facilitate future system expansion and enhance operational flexibility.

b) Bipole III was demonstrated to be the lowest overall cost project; the most beneficial during an extended catastrophic outage; provide more benefits during normal operation, and has lower operational cost during non-catastrophic outages; and can facilitate potential future generation.

Date	August 24 2012
Reference	CEC/MH_II_007k
Source	BPC/MH-1
Question	CEC/MH-VII-413

Question:

Responding to a question about the percentage of farmers who use aerial spraying, Manitoba Hydro states, in CEC/MH-II-007k, "While the presence of the transmission line does not preclude aerial spraying on a quarter section it will restrict its use in proximity to the line".

(a) (i) Has Manitoba Hydro done any analysis of lost productivity due to diminished ability to aerial spray?

(ii) If so, please provide.

(b) (i) Has Manitoba Hydro analyzed the extent to which the line will impact aerial spraying (ie. the quantity of land that will be impacted).

(ii) If so, please particularize?

(c) (i) Is Manitoba Hydro contemplating any compensation specifically for diminished ability to aerial spray?

(ii) If so, particularize.

(d) Does Manitoba Hydro recognize that the impacts of not being able to apply crop protectants aerially go far beyond the land beneath the line?

(e) Does Manitoba Hydro agree that, because aerial spraying is more expensive than ground-based methods, it is used when ground based spraying is impossible as, for

example, following a prolonged rain which makes the field inaccessible or when the crop stage is so advanced that ground-based systems would cause mechanical damage?

(f) (i) Does Manitoba Hydro agree that, in these kind of situations, aerial equipment is in high demand and that not all farmers who would like to hire aerial equipment are able to do so because aerial applicators, with more business than they can handle, will decline the business where a transmission line is involved in favour of less risky (and often less expensive) jobs?

(ii) Does Manitoba Hydro agree that, by running a transmission line through or along a farmer's field, it has put that farmer at a competitive disadvantage in hiring aerial equipment?

(g) Does Manitoba Hydro agree that a transmission line adds one more constraint (beside wind and spray-susceptible adjacent crops, for example) that can make it necessary to fly short passes across a field making the job more time-consuming and more expensive?

(h) Does Manitoba Hydro agree that a crop lost or partially lost to weeds that cannot be sprayed has an impact on weed populations, and yields, for several years?

(i) Does Manitoba Hydro agree that, in the case of registered seed growers, missing a necessary spraying operation can cause a weed infestation that may cause the grower to have to discontinue growing registered seed on that land until the land is cleaned up from the weed infestation caused by the missed spraying operation?

Response:

a) Manitoba Hydro has not undertaken analysis of lost productivity due to diminished ability to aerial spray.

b) Manitoba Hydro has not specifically analyzed the quantity of land affected by the presence of the transmission line in relation to aerial spraying. Please see response provided for *CEC-MH-II-007k.*

c) Yes. Please see response provided for *CEC-MH-II-007k*

d) Manitoba Hydro recognizes that it will restrict the aerial application of crop protectants in proximity to the line and not just beneath the line.

Parts e) - i)

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). These questions are not in relation to a previous information request.

Date	August 24 2012
Reference	CEC/MH-II-007k
Source	BPC/MH-2
Question	CEC/MH-VII-414

Question:

In responding to CEC/MH-II-007k, Manitoba Hydro attaches its fact sheet titled Landowner Compensation Information. The fact sheet informs that right-of-way easement agreements will be required but it does not disclose how farmers will be contacted to arrange for easement agreements.

(a) (i) Has Manitoba Hydro sent out its own employees already to arrange for easement agreements?

(ii) Has or will Manitoba Hydro subcontract this responsibility?

(b) Is Manitoba Hydro aware that an Alberta firm, Evolve Space Strategies Inc., purporting to represent Manitoba Hydro has been making contact with landowners over the summer months with the objective of obtaining for Manitoba Hydro the "the right, license and easement to enter upon" lands named in the agreement and to "use, excavate, construct, place, operate, inspect, maintain, repair, alter, add in or remove on, under, across, along, over, through or from the right-of-way (for) a transmission line…"?

(c) Is Manitoba Hydro aware that each landowner is being offered the sum of $1.00 (one dollar) for granting this right, after which easements will be negotiated in accordance with Manitoba Hydro‟s landowners‟ compensation policy?

(d) If Manitoba Hydro is aware of this activity, would it explain why it is taking this action well before obtaining the environmental licence and before the Clean Environment Commission has completed these hearings?

(e) If Manitoba Hydro has authorized this activity, does it acknowledge that, in so doing, it may not be in compliance with the *Environment Act*?

(f) If it is not aware of this activity, will Manitoba Hydro commit to having the activity discontinued until such time as an environmental license is granted?

Response:

(a) i) At this point in time, Manitoba Hydro has not sent out its own employees to arrange for easement agreements.

(a) ii) In April 2012, Manitoba Hydro issued an open tender for the Acquisition of Right of Way Easements Services for Bipole III.

(b) In June 2012, Evolve Surface Strategies Inc. was awarded the contract for the Acquisition of Right of Way Easements Services for Bipole III.

(c) The sum of $1.00 is the provision of consideration for the offer and acceptance of a legal agreement. In addition, Landowners are presented with a non-refundable cheque in the amount of $225.00 which represents a deposit or advance payment for compensation owed as part of the terms of this agreement.

(d) Due to timeline constraints, these visits are being conducted in advance of an *Environment Act* Licence with the understanding the Bipole III Transmission Project will not proceed until all necessary permits and licenses have been granted.

(e) Only right-of-way easement acquisition activities are being conducted in anticipation of an *Environment Act* License. To our knowledge, there are no activities being conducted that are not in compliance with the *Environment Act*.

(f) Not applicable.

Date	August 24 2012
Reference	CEC/MH-II-013
Source	BPC/MH-3
Question	CEC/MH-VII-415

Question:

In CEC/MH-II-013, Manitoba Hydro, responding to a question about unverified desktop information, indicated its intent to use bird diverters where it encountered bird species of concern but it gave no indication as to their effectiveness. The relevant portion of the response is:

In considering locations along the proposed Bipole III route that have shown multi-year use, such as by the great blue heron, these nest sites have been verified with fieldwork, identified as environmentally sensitive sites, and all potential overlaps with the FPR were delineated and reported in the EIS. Recommended Mitigation measures for these multi-year sites included buffers to avoid the site, avoiding sensitive time periods, and the installation of bird diverters.

While yellow rail are not colonial in the strictest sense, they can be found in loose groups during the breeding season, where they build multiple nests for brooding. Surveys will be conducted along the FPR prior to clearing if construction occurs in the spring. Mitigation measures for identified yellow rail nesting areas included buffers to avoid the site, avoiding sensitive time periods, and the installation of bird diverters.

Moreover, in responding to a question about the performance of bird diverters in poor light conditions (fog, dusk, and dark), Manitoba Hydro states, in CEC/MH-IV-126:

Through the alternate routing process, potentially substantial bird-wire strikes were avoided by bypassing areas attractive as staging areas and having high waterfowl concentrations (e.g., Minnedosa pothole country). Potential areas attractive to birds but

not avoided through the alternate routing process were identified as environmentally sensitive sites where bird-diverters should be present.

Although bird-diverters cannot prevent all bird-wire collisions (Jenkins et al. 2010, Barrientos et al. 2011) and there is reduced effectiveness of these devices in fog, dusk and the dark, bird-wire collisions are expected to be reduced through the placement of bird diverters and the overall impact of Bipole III development on bird species and their populations in Manitoba is expected to be negligible.

Based on species specific flight behaviours and morphology, bird-diverters have varying levels of success in preventing bird-wire collisions with transmission lines (Jenkins et al. 2010, Barrientos et al. 2011). Marked lines are more effective at decreasing bird wire collisions than unmarked ones, with a typical decrease in collisions ranging between 50-80% (Jenkins et al. 2010). Barrientos et al. 2011 found that the mortality rate was 78% lower on marked lines compared to unmarked lines.

Some studies indicate that up to 65% of collisions can be averted with diverters, others about 53%. That, however, applies only to those areas with deflectors. The Final Preferred Route passes through more than 700 km of the Mississippi Flyway. Birds stage as well as stop to feed along this entire segment. Deflectors do not work effectively in conditions of poor visibility, even though many birds, particularly geese, fly in these conditions.

a) Why is Manitoba Hydro planning to use bird diverters in only some places, instead of along the entire route from just below Wekusko Lake to the Riel converter station?

b) Even with diverters, and knowing of their limitations in poor weather, is a 35 to 50% residual death rate acceptable to Manitoba Hydro?

Response:

As one of many mitigation measures, the use of bird-diverters was recommended to further reduce the potential for bird-wire collisions in areas known to potentially have higher densities of birds, or locally defined movement areas which could not be avoided through the alternate routing process.

a) Areas identified as environmentally sensitive sites (ESS) that were selected for the placement of bird-diverters, were based on their proximity to waterways (i.e., local movement corridors) and along major flyways. This resulted in about 134 sites along the Bipole III Final Preferred Route that were recommended for bird diverter placement (Table 4-9 of the Bipole III Birds Technical Report). The placement of bird diverters is expected to further minimize the potential for bird-wire strikes and where the potential for bird-wire strikes should already be considered as being quite low (Avian Power Line Interaction Committee 1994). Areas that were not designated as ESSs were determined to have a further decreased risk of bird-wire collisions, resulting in habitat areas along the Bipole III route that did not require further protection measures.

b) The number of bird-wire collisions expected for the Project is expected to be very low. The effect of bird-wire collisions on bird populations therefore is likely negligible to small. The placement of bird diverters in ESS areas as prescribed (refer to the Environmental Protection Plan) is anticipated to reduce the very low number of collisions further by about 50 to 80%.

References:

Avian Power Line Interaction Committee. 1994. Mitigating bird collisions with power lines: the state of the art in 1994. Edison Electric Institute. Washington, DC, USA

Date	August 24 2012
Reference	CEC/MH-III-035
Source	BPC/MH-4
Question	CEC/MH-VII-416

Question:

Would Manitoba Hydro please provide the following information on outages from ice storms that have occurred since Bipoles I and II have been commissioned?

(a) Information on the ice storms in December 1977, February and March 1983, April 1984 and 1991 and the estimated load lost due to downed power lines and the restoration times for each storm during these periods?

(b) (i) indicate whether, during any of the storms in (a.1) above, the HVDC Bipole I and II lines were affected?;

(ii) if so, in what ways?

(c) Indicate whether the electrode lines failed during the storms in (a.1) above due to icing or wind, and if so, when and for how long they were out of service?

(d) Indicate the consequence to the operation of Bipoles I and II if an electrode line failed and had to be removed from service?

(e) Elaborate on what plans, if any, are in place to minimize the risk of failure of the electrode lines?

(f) Indicate what the ice loading criteria are for the Bipole I and II lines?

(g) (i) When DC current loading from existing northern generation is conveyed to Dorsey through the transmission lines of Bipoles I and II, when spread over three bipoles, will it reduce and therefore lower conductor temperature above ambient temperature and thus increase the risk of icing on the DC transmission.

(ii) Has Manitoba Hydro considered this impact on risk?

(iii) Does Manitoba Hydro agree that ice storms are a major concern because of the wide spread area of ice storms that could impact all three bipoles?

(iv) Has Manitoba Hydro determined expected DC conductor temperature above ambient temperature during ice storm conditions when only Bipoles I and II are in service and when all three bipoles are in service?

(v) If so, what is such DC conductor temperature rise and will it have any impact on prevention of conductor icing?

(vi) If not, why not?

(vii) Has Manitoba Hydro considered what DC conductor temperature above ambient temperature is needed to prevent ice build-up during an ice storm and whether this can be achieved with all northern generation in service, with power additional to the needs of Manitoba exported to the U.S. (even if Manitoba has to give such power away or pay the U.S to take it) such that the extra current on the export lines, and in particular the 500 kV line, will contribute to increased conductor temperature and reduce the probability of it icing up as well?

Response:

a) There is minimal corporate data available for these events so we cannot provide details on the information requested. The December 1977 ice storm resulted in customers in south central Manitoba being without power for 5 to 7 days. The April 1984 storm caused some 230 kV steel transmission towers near Oakville to fail, as well as some 115 kV and 66 kV wood pole structures.

b) Bipole I and II were not affected by any of the storms cited in (a)

c) There is no recollection that the electrode lines failed.

d) If an electrode line fails, the Bipole would have to be removed from service. However, the simultaneous failure of both electrode lines is highly unlikely.

e) Manitoba Hydro has no plan in place to minimize the risk of failure of an electrode line.

f) The Bipole I & II lines are designed to withstand various conductor loading conditions as follows:

- 25.4 mm of ice, no wind
- 12.7 mm of ice, 113 km/h gust wind
- No ice, 161 km/h gust wind

g) While Manitoba Hydro can take certain actions to raise conductor current on the HVdc lines, there is not enough dc current available to load the lines to prevent icing due to the large conductor size. This is also the case for the 500 kV and 230 kV transmission lines. Additionally, preventing ice build on the conductors only addresses part of the problem as the non-current carrying shield wires, insulator strings and tower structures also are subject to icing. Icing events have occurred on the towers, insulator strings and shield wires of the dc lines that have resulted in dc outages. See also *CEC/MH-VII-424*.

Date	August 24 2012
Reference	CEC/MH-III-035
Source	BPC/MH-5
Question	CEC/MH-VII-417

Question:

The response states in part that the risks of the catastrophic failures of the Manitoba Hydro‟s HVdc system with and without Bipole III were evaluated in three major reports completed in 2001, 2006 and 2012. The establishment of an independent Riel station, substantially distant from Dorsey Station will help protect reliability of supply in the event of catastrophic loss of Dorsey Station. The probability of losing two converter stations is negligible.

(a) Please confirm that an independent station such as Riel will reduce the risk of losing two converter stations to a negligible risk.

(b) If so, explain the reason for terminating the Bipole III transmission line at Riel with the proposed line to be located on the western side of the province?

(c) (i) Has Manitoba Hydro considered other locations for the terminus of Bipole III that would reduce the length of the line, as an example, locating it at the LaVerendrye 230KV Station on the west side of Winnipeg?;

(ii) An explanation of any other locations considered and why they were rejected;

(iii) Any studies; opinions or analysis on other selection locations.

(d) Considering that, in the Reliability Report, it is mentioned that Bipole II valves will be replaced starting in 2019, would Manitoba Hydro please indicate when the valves of Bipole II were installed?

(e) (i) Considering that Poles 3 and 4 of Bipole 11 were installed at different times, would Manitoba Hydro please indicate whether the replacement valves for these poles will similarly be installed at different times?;

(ii) If not, explain why?

(f) (i) Considering that Table 2.3-1 of Chapter 2 of the EIS indicates that Bipole III meets reliability requirements until 2025, provide an indication of what alternatives, if any, are under consideration to alleviate the problem beyond this date?;

(ii) Provide any studies; opinions or analysis as to those alternatives;

(iii) If there are no alternatives under consideration beyond 2025, provide an explanation as to why not.

(h) (i) Whether any future interconnections from Manitoba to the USA will have any relevance as to the location of Bipole III on the existing 230Kv and 500Kv substations on the periphery of the City of Winnipeg?;

(ii) If so, an explanation as to in what respects.

Response:

a) The Teshmont Report dated October 2001 titled Probability of Catastrophic Outages of Bipole I and II indicates that "a tornado is very unlikely to damage both Dorsey and Riel because of the distance between the stations and the direction that the tornado would have to travel". Similarly, damage from wind downbursts will not simultaneously impact both the Dorsey and Riel Stations as typical storm track of such downbursts are typically 25 km wide. Downbursts normally result in a smaller damage area than tornadoes. The probability of damage to both stations due to a tornado/wind event was estimated to be 9.7×10^{-10}. The Dorsey and Riel Stations, as well as much of the ac transmission system network in southern Manitoba, could be affected by the same ice storm due to the wide spread nature of such storms. A probability was not calculated for the icing event. The south-central portion of Manitoba is the area prone to severe icing. This area does not include the area around Dorsey or Riel.

b) Please see response provided for *CEC/MH-VI-305.*

c) Manitoba Hydro has not considered other sites for the Bipole III southern converter for the reasons provided in Manitoba Hydro's response to *CEC/MH-VI-305.*

d) Bipole II was completed in 3 stages: 1978 – stage 1 (1000MW of valves +/- 250kV); 1984 – stage 2 (1500MW of valves +500kV /- 250kV); 1985 – stage 3(2000MW of valves +/-500kV)

e) Valve replacement project details are not finalized. Please see response provided for *CEC/MH-VII-428*.

f) Manitoba Hydro is not considering any specific alternatives to address the reliability after 2025. Plans for addressing reliability will depend on factors such as load growth and overall Manitoba Hydro future system development decisions.

h) Bipole III is proposed to address reliability, and future interconnections will not impact the location of the Bipole III line and associated converters.

Date	August 24 2012
Reference	CEC/MH-III-064
Source	BPC/MH-6
Question	CEC/MH-VII-418

Question:

Manitoba Hydro‟s response indicates the preliminary assessment indicates that the section of underground transmission line for Bipole III would be about 3 to 6 times the cost of the corresponding overhead section and the life expectancy of underground cables is about half of that of overhead lines and the failure rates are high (failure every 3 to 17 years)

The following clarification is required on information pertaining to underground HVDC cables.

(a) (i) Documented evidence is requested to validate the claim that HVDC underground cable failure rates are high (failure every 3 to 17 years) [Do not refer simply to the Farlinger et al 2011 report.]

(ii) Does Manitoba Hydro agree that cable length would be a factor?

(iii) If Manitoba Hydro does not agree, please explain why not.

(iv) Indicate the corresponding length of HVDC underground cable to which failure intervals of 3 to 17 years apply.

(b) (i) Indicate why only long distance HVDC underground cable was investigated and reported on in the Farlinger et al 2011 report as stated in Section 2.4.2 of Chapter 2 of the EIS.

(ii) Does Manitoba Hydro agree that a modern trend in planning HVDC transmission is to use overhead transmission lines as much as possible and to employ underground or

underwater HVDC cable only where environmental or social sensitivities warrant such cable in which case the HVDC cable lengths tend to be short (perhaps several kilometres)?

(iii) If Manitoba Hydro does not agree, please explain why not.

(iv) Was consideration placed on the use of limited lengths of underground or underwater cable?

(v) If it was not, please explain why not?

(c) (i) Indicate why it is reported in Section 2.4.2 of Chapter 2 of the EIS that: "Underground or subsurface transmission at the 500 kV voltage level, even in favourable terrain conditions, is on average five to six times more costly than overhead transmission" when the Europacable report entitled "An Introduction to High Voltage Direct Current (HVDC) Underground Cables" (http://www.europacable.com/images/Document_Uploads/Introduction_to_HVDC_Underground_Cables_October_2011.pdf) reports on Page 3: "While the cost factor for the HVDC cable is only to 2 – 3 compared to HVDC overhead line of the same capacity, the converter stations required to connect to the AC system entail significant investment costs. These need to be considered when seeking to integrate a DC link into the existing meshed AC systems in Europe"? Please comment.

(ii) Provide all studies, plans, analysis, including calculations, utilized by Manitoba Hydro to render its conclusion that underground or subsurface transmission is on average five to six times more costly than overhead transmission.

(iii) Did Manitoba Hydro consider underground transmission for shorter distances, such as under arable agricultural land?

(iv) If so, please provide all studies, plans and analysis, including calculations relating to such considerations.

Response:

a) (i) Please see response *CEC/MH-VI-335a.* The failure rate data for underground cables comes from CIGRE and is based on 500 kV and lower voltage cables.

(ii) There is insufficient data available on cable failure rates to form conclusive trends relating failure rates to cable length.

(iii) See part a) ii.

(iv) The failure rate of every 3 to 17 years stated on page 58 of the above report is based on the information provided in table 12, 13, and 14 of the Farlinger et al 2011 report. As per table 6 of the report, the failure rates apply to route lengths of 175km to 263km which represent cable lengths of 525km to 1052km. Please note that the cable length is a multiple of the route length and number of cables needed for the scheme. Also please see response *CEC/MH-VI-335a*.

b) (i) The report by David Farlinger et al 2011 considered many HVdc and ac cable schemes consisting of a combination of various lengths of O/H, U/G and U/Water segments of line making up the complete north south routes.

(ii) For bulk power transmission over land, the most frequent transmission medium used is the overhead line. Historically, Manitoba Hydro and other utilities around the world have built high voltage transmission lines overhead, provided land for right-of-ways was available. Such designs, using ac or dc transmission, are the most economical method of transporting bulk electric power over long distances and have a proven record of acceptable reliability at minimum cost.

(iii) See part b) ii.

(iv) & (v) Please see response provided for *CEC/MH-VI-335b*

c) (i) Introduction_to_HVDC_Underground_Cables_October_2011.pdf (The Europa Cable Report) bases the cost comparison on a simple generic cost estimate of the cables given in page 11 of the same report. "Experience of HVDC underground cabling and their cost is currently limited. Based on analysis conducted by Realise Grid2 in 2010, the cost of

HVDC underground cables (two cables, +/- 350 kV, 1,100 MW) is between 1 – 2.5 million euros per km. With that, the cost factor for HVDC underground cables compared to an HVDC overhead line is 2 – 3 times."

Considering the above cost for U/G cables and the Bipole III O/H line cost estimates, the cost of U/G cables is 3-9 times that of the O/H line costs, after correcting for the voltage, power and the currency exchange. Thus well within the range of 5-6 times.

Also it should be noted that the cost estimates in the report by David Farlinger et al 2011 are based on detailed analysis of many HVdc and ac schemes of O/H, U/G and U/Water segments of the line, in consideration of the north south transmission in Manitoba, including the compensation and transition stations etc. Therefore the costs are more applicable to Manitoba context.

(ii) Please see section 7 of the report titled "Potential Use of Submarine or Underground Cables for Long Distance Electricity Transmission in Manitoba" by David Farlinger.

(iii) Please see response provided for *CEC/MH-VI-335b*

(iv) No detailed analysis was done.

Date	August 24 2012
Reference	CEC/MH-IV-134
Source	BPC/MH-7
Question	CEC/MH-VII-419

Question:

In responding in CEC/MH-II-134 to a question about looking forward to anticipate the changes that Agriculture is likely to undergo during the life of the Bipole III transmission line, Manitoba Hydro does not appear to acknowledge that the pace of change in agriculture is so rapid that it is virtually impossible to route a transmission line through intensively cropped agricultural land without creating serious negative agricultural impacts over the life of the line.

a) (i) Given this predictable impact of the Bipole III transmission line on agriculture and also taking into account the vulnerability of an overhead line to bird strikes in the cropped areas of southern Manitoba, would Manitoba Hydro advise as to whether it considered an underground line from the Yellowhead Highway to Riel using a route north of the Trans-Canada Highway that crosses fewer rivers and highways and that is 125 km shorter than the FPR and which, considering its shorter length, would have lower line losses and would be more compatible with the existing system.

(ii) If it has considered this alternative, would Manitoba Hydro please explain why this mode of transmission and this route was not chosen?

(iii) If it was not considered, would Manitoba Hydro please explain why not?

Response:

a) Please see responses provided for *CEC/MH-III-064* and *CEC/MH-VI-335b*.

Date	August 24 2012
Reference	CEC/MH-IV-144
Source	BPC/MH-8
Question	CEC/MH-VII-420

Question:

Manitoba Hydro does not appear to acknowledge that the pace of change in agriculture is so rapid that it is virtually impossible to route a transmission line through intensively cropped agricultural land without creating serious negative agricultural impacts over the life of the line. Yet, in responding in CEC/MH-II-144 to a question about compensation, Manitoba Hydro acknowledges that route selection and tower placement on agricultural land may cause impediments to farming activities such as seeding, spraying, irrigation, and cultivation, and loss of productive land.

a) Would Manitoba Hydro please explain why it relies on a compensation policy that ends after only ten years?

b) (i) Would Manitoba Hydro indicate whether it would consider a compensation policy for agricultural land for ten year segments of the life of the line, and is re-evaluated on the ninth year for the next ten year segment?

(ii) Would Manitoba Hydro consider providing compensation to land owners on an annual basis as opposed to a lump sum basis? (iii) If not, please explain.

c) If such a policy would not be considered, would Manitoba Hydro explain how it plans to deal with negative impacts on agricultural land which cannot be foreseen today but, given past trends, are almost certain to escalate in magnitude and seriousness in the future?

Response:

a) Manitoba Hydro does not rely on a 10 year compensation policy for landowner compensation. For explanation of the compensation policy please refer to *CEC/MH-II-007q.*

b) (i) No. Manitoba Hydro developed a comprehensive land compensation policy that is based on a one-time lump sum payment for as long as an easement is required.

(ii) No. To manage the administration and costs of obtaining and maintaining easements for transmission line rights of way, Manitoba Hydro has opted to offer one-time comprehensive land compensation.

c) Please see the response provided for *CEC/MH-IV-134.*

Date	August 24 2012
Reference	CEC/MH-IV-144
Source	BPC/MH-9
Question	CEC/MH-VII-421

Question:

Manitoba Hydro acknowledges that route selection and tower placement on agricultural land may cause impediments to farming activities such as seeding, spraying, irrigation, and cultivation, and loss of productive land.

a) Given that Manitoba Hydro recognizes the costs, inconvenience, negative environmental impacts and the safety risks that an in-field transmission line causes wherever it is located in the field, would Manitoba Hydro explain why, in segments where the line will run near a roadway, the Final Preferred Route has been routed 40 m inside the field instead of on the property line?

Response:

This is explained on pages 7-50 and 7-51 in Chapter 7 of the EIS.

Date	August 24 2012
Reference	CEC/MH-V-149
Source	BPC/MH-10
Question	CEC/MH-VII-422

Question:

Manitoba Hydro‟s response states; "For purposes of calculating the supply deficit following the loss of Bipole I & II that are presented in the EIS Chapter 2, a simultaneous Transfer Capability of 900 MW import was assumed to be available over the Manitoba – United States, Manitoba – Ontario and Manitoba- Saskatchewan Interfaces". The table on page 146 of Manitoba Hydro‟s response provides Transfer Limits as Firm Transfer Capability, Non-Firm Total Transfer Capability and Non-Firm Transfer Limit, the latter two for Winter Import.

(a) (i) Does Manitoba Hydro agree that in times of catastrophic events on the system all methods of supply would and should be considered and every effort be made to import as much power available under the Non- Firm Transfer limits on all three interconnections?

(ii) Does Manitoba Hydro agree therefore, the limit assumed for import should be 1582 MW and not 900 MW, as the Non- Firm Total Transfer Capability totaling 1870 MW would, as stated, not all be available simultaneously.

(b) If not, please provide any system impact studies to indicate that the assumptions are wrong and the 900 MW limit is the correct limit.

(c) Please provide the import limits for the off-peak months if they differ from those provided under the non-firm capability associated with Winter Import.

Response:

a) (i) Manitoba Hydro would agree all supply options would be exercised in real time following a catastrophic event.

a) (ii) Manitoba Hydro does not agree that the maximum non-firm transfer limit on all interfaces should be used in developing a plan to mitigate an outage of an actual event. As explained in *CEC/MH-V-149*, Manitoba Hydro must base its plans on firm import. The firm import into Manitoba is 700 MW, and is only available on the Manitoba – United States interface. Manitoba Hydro has assumed that 200 MW of non-firm import may be available at various times during the outage, however, this assumption imposes risk of not being able to serve some load.

b) The 700 MW firm import limit was established coincident with the construction of the last Manitoba- United States interconnection, the Glenboro-Rugby 230 kV line. As shown in *CEC/MH-V-149*, the firm import from Saskatchewan and Ontario is zero. An increase in firm transfer on these two interfaces will require construction of new transmission facilities in both provinces. The non-firm import varies based on system conditions such as generation schedules, generation outages and transmission outages.

c) The maximum import on any one interface under optimum conditions is shown as the Non-firm Total Transfer Capability for the Operating Horizon in *CEC/MH-V-149*.

Please see response provided for *CEC/MH-VII-372*

Date	August 24 2012
Reference	CEC/MH-V-150
Source	BPC/MH-11
Question	CEC/MH-VII-423

Question:

The curve shown on page 2-6 of the EIS is based on existing facilities and not on the development plan. Supply shortfall = Demand – Supply where: Demand = Base load Forecast including the savings from DSM: computed for each year. In the example on page 150 of Manitoba Hydro"s response to CEC/MH-V-150, in the calculation of the 2017 supply deficit, the demand is shown as: Demand in 2017= System peak load 2017 – DSM 2017 = 4800 MW (from the 2011 Load forecast).

Although the System peak load for the 2012 Load forecast is available, would Manitoba Hydro provide

i. the associated DSM figure for the years 2017 through to 2025.

ii. for the years 2017 through to 2025, the DSM values for the month of July associated with the 2012 forecast.

iii. for the years 2017 through to 2025, the southern generation capability for the month of July, and please indicate if this would be representative of the other off-peak months of May to October.

iv. a figure for July 2017 determined on the same basis as that represented on Figure 2.2-3 page 2-8 of the EIS for the month of January 2017 using the 2011 forecast.

Response:

It is important to note that calculating the deficit to the accuracy of the final MW would not be meaningful given that the forecast values of supply and demand estimates cannot be 100% accurate.

i) The forecast DSM figures for the years 2017 through 2025 are: 150, 169, 186, 200, 214, 222, 231, 240, 249 MW respectively.

ii) The forecast DSM figures for the month of July are not available and were not used in the deficit calculation in *CEC/MH-V-150*.

iii) What has been assumed in the deficit calculation is 100% of rated generation for all generators assuming normal water conditions. This generation assumption may be optimistic since lower water flows and unit outages would reduce the supply availability and increase the supply deficit. Being forecast figures, variations on both supply and demand sides of the deficit calculation may occur at peak in any given year. Supply deficit curve reported in chapter 2 for the winter peak represents a realistic scenario and the situation could be much worse.

iv) Forecast of the load duration curve on a monthly basis is not available to be provided.

Date	August 24 2012
Reference	CEC/MH-V-152
Source	BPC/MH-12
Question	CEC/MH-VII-424

Question:

Manitoba Hydro identified the present day vulnerability of the Manitoba Hydro HVdc system (Bipole I and II and 2 associated converter stations) to catastrophic type events.

(a) Has Manitoba Hydro determined the temperature of the Bipoles I and II conductors under extreme icing conditions to see if indeed ice would form on the conductors with all available generation in operation that feeds into the Bipoles at the Nelson River end?

(b) If fully loaded Bipoles I and II can prevent ice forming on the conductors due to achieving adequate conductor temperature, has Manitoba Hydro explored exporting excess power out of the Province, even if this surplus power must be given away or they have to pay to export it?

(c) If under extreme icing conditions, has Manitoba explored the temperature that can be achieved on the ac export lines, and in particular the 500 kV transmission line to the U.S. when Bipoles I and II are fully loaded to minimize the possibility of conductor icing forming?

(d) If Bipole III is installed to reduce risk to transmission power flowing from the Nelson River, has Manitoba Hydro determined that dc conductor temperatures will be achieved on all three Bipoles, and how much this will increase the risk of icing failure in the transmission lines of all three bipoles?

Response:

a) b) c) d) Please see response provided for *CEC/MH-VII-416*.

Due to the wide area that can be impacted by ice storms, the most effective reduction in risk is to provide redundancy with the maximum physical separation of critical facilities as possible.

Date	August 24 2012
Reference	CEC/MH-V-153 & CEC/MH-V-154
Source	BPC/MH-13
Question	CEC/MH-VII-425

Question:

Manitoba Hydro's response provides, in Table 1.1, capital cost estimates of the Bipole III option (Alternative 1). Also, Manitoba Hydro's response to CEC/MH-V-154 provides the annual cash flows (in millions of dollars).

For the Riel converter station and the 230kV switchyard plus the Riel ground electrode line, provide a cash flow of (in-service dollars and another in base dollars 2010) for a 2017 in-service date.

Response:

The cash flow, for in-service dollars and base dollars 2010, for a 2017 in-service date for the Riel Converter Station and 230kV Switchyard and the Riel Electrode Lines & Property is shown below.

Annual cash flows (in millions of dollars)

Years	Riel Converter Station and 230kV Switchyard		Riel Electrode Line & Property	
	In-service dollars	Base Dollars (2010)	In-service dollars	Base Dollars (2010)
Actuals (2010)	13	13	0	0
2011	21	19	0	0
2012	44	40	4	3
2013	87	77	6	6
2014	162	138	1	1

Years	Riel Converter Station and 230kV Switchyard		Riel Electrode Line & Property	
	In-service dollars	Base Dollars (2010)	In-service dollars	Base Dollars (2010)
2015	156	120	5	5
2016	165	119	0	0
2017	160	106	0	0
2018	70	36	0	0
2019	11	3	0	0
Total cost	889	671	17	15

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Date	August 24 2012
Reference	CEC/MH-VI-234
Source	BPC/MH-14
Question	CEC/MH-VII-426

Question:

Manitoba Hydro in part states that "Wind generation is an intermittent resource and cannot be relied upon for reliability purposes to meet peak loads."

(a) (i) Will Manitoba Hydro clarify this statement by indicating if it is referring to the peak for every day of the year?

(ii) If not, then what periods could wind be relied upon?

Response:

Wind turbines have operating restrictions during extremely cold weather, the very period in which the Manitoba load reaches its annual winter peak. Therefore, as the wind turbines cannot be relied upon to be operating when the Manitoba load reaches its winter peak, Manitoba Hydro does not count on wind generation as a winter capacity resource. However, from a long-term planning perspective, there is an annual amount of energy from wind generation that can be relied upon.

Date	August 24 2012
Reference	CEC/MH-VI-250
Source	BPC/MH-15
Question	CEC/MH-VII-427

Question:

Manitoba Hydro has indicated that the type of conversion technology it intends to use (line commutated, or voltage sourced) has not been determined?

(a) Explain why Manitoba Hydro has not made the decision, when according to the EIS the decision was to be completed in late 2011.

(b) Provide Manitoba Hydro"s cost estimate which it has prepared for the LCC alternative as an upper limit of costs?

(c) Provide a table of in-service costs and cash flows in 2010 dollars be provided as well as the present value costs in 2010 dollars for this upper end limit of costs.

Response:

a) At the time of preparing the EIS, Manitoba Hydro was in the process of investigating and evaluating voltage source converter technology for Bipole III, and a final decision was originally planned to be made before the end of 2011 based on this evaluation. However, the rapid pace of development of voltage source converter technology as it would apply to Bipole III required that a decision be made based on actual vendor offerings and prices rather than estimated values. As such, the conversion technology will be determined by Manitoba Hydro during the procurement process.

b & c) The cost estimate and cash flows provided in *CEC/MH-V-153* and *CEC/MH-V-154* are representative of LCC and VSC technology.

Date	August 24 2012
Reference	CEC/MH-VI-260a
Source	BPC/MH-16
Question	CEC/MH-VII-428

Question:

Manitoba Hydro states that the life span of converter facilities is normally considered to be in the order of 50 years but some equipment has to be replaced or refurbished at lesser intervals. However, based on EPRI guidelines (EPRI, Life extension guidelines of existing HVDC systems, EPRI Guideline 0682819-2, Dec 2007) the replacement of controls, thyristor valves, converter transformers and possibly cooling for Bipole II will be necessary in the next several years.

(a) (i) Has Manitoba Hydro evaluated the economic cost of relocating the Bipole II converter station to another location taking into account the substantial costs of replacement and refurbishment of Bipole II equipment if Bipole II inverter is left at Dorsey station?

(ii) If so, what are these costs that compare upgrading Bipole II with its converter remaining at Dorsey Station vs relocating the Bipole II inverter to a different site? (Note: This response should take into account that if Bipole II inverter is relocated, while it is under construction the existing Bipole II inverter would remain operational so that switch over outage time would be a minimum and could be delayed for a period of time, while the existing Bipole II inverter remains operational.) (iii) If Manitoba Hydro has not evaluated the economic cost of relocating the Bipole II converter station to another location, why not?

Response:

a) Manitoba Hydro has been refurbishing components of the HVdc Bipole I & II on an ongoing basis. Consequently, there is no plan to replace the entire Bipole II converter at one time. The current plan is to replace the Bipole II converter valves in the 2018-2024 time frame. The estimated in-service cost of the Bipole II valve replacement for Henday and Dorsey is $234 M. Outage costs are not included in the estimate as Bipole III is assumed to be in-service so there is spare DC capacity.

In comparison, a preliminary cost to relocate the Bipole II Dorsey converter to Riel has been estimated to be $1.78 B. The estimate includes the cost of the replacement of the converter valves at Henday plus the cost of a 70 km 500 kV dc line between Dorsey and Riel (extension of the Bipole II line). Henday valve replacement is considered necessary in this scenario, for reasons of compatibility with the new valves in the south as well as minimizing outage time thereafter. Outage costs would not be significant for upgrading and replacing BPII equipment if the BPIII was in service; however in this scenario where BPIII is assumed not to be in service, significant outage costs will be incurred despite efforts to minimized outage times. Outage costs are estimated at a conservative $100M and are included in the estimated cost of relocating Bipole II . The cost of relocation to a site other than Riel would increase the cost further as additional transmission would be required to move the power to the load serving stations in southern Manitoba.

While the relocation of Bipole II converter from Dorsey would reduce the consequences of an extended outage of Dorsey, it would not address the risk of outage of the Bipole I and II lines. Consequently, the relocation of Bipole II from Dorsey is not considered a viable alternative to address the reliability problem.

Date	August 24 2012
Reference	CEC/MH-VI-305
Source	BPC/MH-17
Question	CEC/MH-VII-429

Question:

The request was in part "why not place the Riel Converter station in the central or western portion of the province to minimize additional length, while also being able to connect into the southern grid?"

(a) Since Laverendyre has been suggested as site as a possible location should Bipole II be relocated, why has this station not been considered as a location for the termination of Bipole III now.

(b) Does Manitoba Hydro agree that such relocation would result in a saving of 100 to 120 kilometers line of DC for a saving of 100 to 120 million dollars in line costs?

(c) Does Manitoba Hydro agree that Bipole II could then be relocated to Riel in the future?

(d) Does Manitoba Hydro agree there would be less agriculture land and owners affected with such a route?

Response:

Manitoba Hydro has not considered other sites for the Bipole III southern converter for the reasons provided in Manitoba Hydro's response to *CEC/MH-VI-305*.

Date	August 24 2012
Reference	CEC/MH-VI-311
Source	BPC/MH-19
Question	CEC/MH-VII-430

Question:

In responding to a question on the predictable negative impacts on the breeding, wintering and calving areas of woodland caribou, a threatened species, several of which will be transected by the transmission line, Manitoba Hydro states, in CEC/MH-VI-311: *Potential effects on calving areas were examined and are reported in the Bipole III Caribou Technical Report (Sections 3.4, 3.5, and 4.5). The Final Preferred Route (FPR) avoids known calving areas and potential critical caribou calving habitat, and has minimal impacts on core winter use areas. A revised analysis of potential effects on winter summer and calving areas has been updated in the Bipole III Supplemental Caribou Technical Report.* Page 31 of the *Supplemental Caribou Technical Report* finds that 3.43% of calving areas are impacted in the Wabowden range and 2.99% in The Bog range.

a) (i) Does Manitoba Hydro agree that the response in CEC/MH-VI-311 is factually incorrect?

(ii) If not, would Manitoba Hydro please explain? (iii) If so, would Manitoba Hydro please correct the error?

Response:

The information provided in *CEC/MH-VI-311* was incorrect due to an editing error in the response. The intended response was: *Potential effects on calving areas were examined and are reported in the Bipole III Caribou Technical Report (Sections 3.4, 3.5, and 4.5). The FPR avoids* ***almost*** *all known calving areas and potential critical caribou calving habitat.* ***Based on habitat modeling it is anticipated that only 0.5 % and 0.46%***

of the total calving and winter habitat respectively available in the Bipole III corridor will be affected. Note that the original Caribou Technical report provides analysis data for the entire Final Preferred Route by ecoregion. The calculations of calving habitat in the supplemental report are based on revised modeling using updated data for the Wabowden and The Bog evaluation ranges. All numbers and data presented in each report are based on the results of predictive modeling.

Date	August 24 2012
Reference	CEC/MH-VI-311
Source	BPC/MH-19
Question	CEC/MH-VII-431

Question:

In responding to a question on the criteria used for determining the feasibility of mitigation measures, Manitoba Hydro states, in CEC/MH-VI-311: Manitoba Hydro uses an adaptive management approach to mitigation where necessary. If a particular mitigation measure is found to be ineffective in reducing a potential effect, alternative measures would be developed, implemented and monitored. Woodland Caribou are a threatened species. Manitoba Hydro is proposing to route Bipole III through some portions of their wintering and calving range in all three ranges involved. The right-of-way will eventually regrow but taller trees will be cut. This younger growth will attract other animals, including moose, along with their predators (wolves, as well as black bear). There is a high risk that the Bipole III transmission line will reduce recruitment to herd size and subsequent viability, considering that current recruitment rates are already low.

a) (i) Should the results of monitoring the Woodland Caribou herds in the vicinity of the line demonstrate diminished populations (despite planned mitigation measures), does Manitoba Hydro have any current plans for alternative measures?

(ii) If so, please particularize what possible alternative measures Manitoba Hydro has prepared. (iii) In particular, how does Manitoba Hydro plan to replace vegetation removed for the right-of-way if this is shown to be a serious problem as a result of the monitoring?

Response:

The management of caribou populations is the responsibility of Manitoba Conservation and Water Stewardship. Any alternative measures will ultimately be discussed with Manitoba Conservation and Water Stewardship if a concern is identified through monitoring with respect to the caribou population.

Population declines in boreal woodland caribou ranges are not a result of one factor but rather a combination of issues from a variety of sources, including habitat fragmentation, increased predation, different land uses and other factors not yet understood.

Date	August 24 2012
Reference	CEC/MH-VI-324 (2)a
Source	BPC/MH-20
Question	CEC/MH-VII-432

Question:

Manitoba Hydro has described several severe weather events that have or could have impacted Bipole I and II and the Dorsey Station.

(a) For each event described in the response, indicate the cause of the event, the extent of the damage and the duration of the outage.

(b) (i) In view of the response, provide Manitoba Hydro‟s analysis that a new duration for such an outage to take 6 to 8 weeks?

(ii) Provide an estimate of down time until one pole of the four poles could be returned to service.

(iii) Provide an estimate of down time until one Bipole could be returned to service.

(iv) Provide an estimate of down time until all repairs are completed.

Response:

a) Please see the response provided for *CEC/MH-VII-324(2)a*

b) (i) The 1996 event took down the Bipole lines about 2 miles away from Dorsey, in the month of September, at what can be considered as a favourable location and at a time with favourable weather for restoration work. An event at a less favorable location or during less favorable weather than in the 1996 event that would delay the restoration much longer than what was experienced. The 6-8 weeks has been estimated in consideration of many factors as explained in

response *CEC/MH-VI-338*. However, depending on the remoteness of the location, the season and the prevalent weather conditions, this estimate may be conservative. Please also see response *CEC/MH-VII-442.*

(ii) No other estimate than the 6-8 weeks can be provided without information of the length of line that is affected, severity of the destruction, location and the weather that is prevalent. As suggested in (b)(i) the 6-8 week estimate may be conservative.

(iii) Cannot provide an estimate without information of the length of line that is affected, severity of the destruction, location and the weather that is prevalent.

(iv) Please see response (b) (iii) above.

Date	August 24 2012
Reference	CEC/MH-VI-324 (2)b
Source	BPC/MH-21
Question	CEC/MH-VII-433

Question:

Manitoba Hydro indicates a number measures undertaken to reduce the probability of a fire event to the relay building and the Dorsey site.

(a) What is the return period in years (which was 29 in the Teshmont 2001 Report) now expected to be?

(b) Is it greater than in 200 years?

Response:

Please see the response to *CEC/MH-VII-367 a.*

Date	August 24 2012
Reference	CEC/MH-VI-327a
Source	BPC/MH-22
Question	CEC/MH-VII-434

Question:

Manitoba Hydro in part states that "Establishing another major power injection point, removed from Dorsey, in the south is the only reliable solution."

In view of the above why has the relocation of Bipole II not been considered as an alternative, be it Riel or Laverendrye?

Response:

As explained in the EIS Chapter 2, and in *MH/CEC-II-023*, Bipole III was recommended as it enhances the reliability of supply to Manitoba load and exports by addressing the outage of the Bipole I & II lines and the outage of the Dorsey Station. The relocation of Bipole II to another location is not considered a viable alternative as it does not addresses the risk of outage of the Bipole I & II lines, and it would cause costly outages of the Bipole II.

Date	August 24 2012
Reference	CEC/MH-VI-328a
Source	BPC/MH-23
Question	CEC/MH-VII-435

Question:

Manitoba Hydro states that the $3.28 billion cost of Bipole III includes interest during construction.

What interest rates have been used in the calculation of in-service costs?

Response:

The following interest capitalization rates were used in the estimation of the Bipole III in-service costs:

Fiscal Year	Interest Capitalization Rate
2010/11	6.8%
2011/12 – 2016/17	7.3%
2017/18 – 2019/20	7.4%

Date	August 24 2012
Reference	CEC/MH-VI-328b
Source	BPC/MH-24
Question	CEC/MH-VII-436

Question:

Manitoba Hydro states that the "Cost of inflation for required equipment, materials and labor was based upon Manitoba Hydro's projection of Canadian Consumers Price Index."

What are the numbers assumed by Manitoba Hydro for these projections?

Response:

The following rates for Canadian Consumer Price Index (CPI) were used in the estimation of the Bipole III in-service costs:

Fiscal Year	Canadian CPI
2010/11	1.9%
2011/12	2.1%
2012/13	2.2%
2013/14	2.2%
2014/15	2.1%
2015/16	2.1%
2016/17+	2.1%

Date	August 24 2012
Reference	CEC/MH-VI-331e
Source	BPC/MH-25
Question	CEC/MH-VII-437

Question:

Manitoba Hydro states that "The costs found on the website are generation costs expressed in $/kW of installed capacity."

(a) (i) What did Manitoba Hydro use in its costs for capacity in the Alternative 2 case?

(ii) In addition what inflation rates and interest rates during construction were used?

Response:

a) (i) The cost for capacity for Alternative 2 was estimated as $1190/kW in 2010$ and includes the total cost for generator and associated facilities.
(ii) The inflation rates were based Canadian CPI as provided in *CEC/MH-VII- 436,* and interest rates during construction were based on Manitoba Hydro's forecast of Interest Capitalization Rates as provided in *CEC/MH-VII- 435*.

Date	August 24 2012
Reference	CEC/MH-VI-335a
Source	BPC/MH-26
Question	CEC/MH-VII-438

Question:

Failure rates for underground HVDC cables were quoted from the David Farlinger et al report as 3 to 17 years based on cable lengths of 525 km to 1052 km on the basis of 4 cables (2 per pole) being laid. Manitoba Hydro considers this information to be correct and does not need any further information. Request: BPC/MH-26

(a) Would Manitoba Hydro confirm that the values they stand by for failure cable rates are based only on underground HVDC cables capable of operating at ± 500 kV DC.

(b) The Farlinger report page 44 can identify only two 500 kV DC land cables, one the Neptune monopole project that went into service in 2007 and 23 km, and the other the double monopole link from Sardinia to Italy that went into service in 2009 and is 14 km. Would Manitoba Hydro please provide the failure rates for these two land cables, excluding the first year of operation.

(c) If not, since there is little experience in the performance of land HVDC cables at 500 kV and please explain how they and the Farlinger report can justify the quoted failure rate presumably based the limited experience of 500 kV land cables or on lower voltage (450 kV and lower) land cables and for undersea 500 kV HVDC cable as being applicable for land cables at 500 kV.

(d) Would Manitoba Hydro confirm that the quoted failure rate for HVDC 500 kV land cables excludes the first year of operation where splicing problems may result in a high failure rate, which when remedied will cause failure rate to be substantially improved.

Response:

a) As mentioned in the report by David Farlinger et al, the failure rate data for underground cables comes from CIGRE and is based on 500 kV and lower voltage cables. The lower voltage cables are also influential as they are less electrically stressed. There is very little information on failure rates of cables in general, and minimal operating experience with 500 kV DC cable systems in service. The expected date of maturity for this type of cable is at least 15 years away.

b) Failure rates of the Neptune monopole project and the monopole link from Sardinia to Italy are not available to Manitoba Hydro.

c) Please refer to part a).

d) Please refer to part a).

Date	August 24 2012
Reference	CEC/MH-VI-335b
Source	BPC/MH-27
Question	CEC/MH-VII-439

Question:

The cost of HVDC land cables is quoted as being 3-6 times that of an overhead line and that even for short sections found the cost to be prohibitive.

(a) Would Manitoba Hydro explain why the cost of HVDC land cables is 3-6 times that of an equivalent overhead line when the 2011 report by Europacable entitled “An Introduction to High Voltage Direct Current (HVDC) Underground Cables” (www.europacable.com) quotes this cost on page 3 to be 2-3 times the cost of an overhead DC line of the same capacity.

(b) Would Manitoba Hydro please indicate what factors a short underground HVDC cable in suitable terrain would be cost prohibitive when the only two 500 kV HVDC land cables identified in the Farlinger report (page 44) are applied in operating HVDC transmission projects and were presumably not cost prohibitive.

Response:

a) Please see response *CEC/MH-VII-418*.
b) Manitoba Hydro has no cost information of the 500 kV HVDC land cables identified in the report by Farlinger et al (page 44).

Date	August 24 2012
Reference	CEC/MH-VI-337
Source	BPC/MH-28
Question	CEC/MH-VII-440

Question:

Manitoba Hydro was asked "if the probability of an outage was lower and/or the duration shorter would there be a point at which the "risk" would be deemed to be acceptable? If yes, please indicate what that pint (sic) is and how it is determined". Manitoba Hydro responded "In the case of the catastrophic loss of Bipole I & II, Manitoba Hydro has taken the approach of assessing the relative risk related to the simultaneous loss of supply."

(a) Would Manitoba Hydro describe what other transmission alternatives it has studied in addition to the three alternatives presented in the EIS and why they were not included in the EIS?

Response:

The three alternatives presented in the EIS were the only alternatives identified as these were the only feasible alternatives that could enhance the reliability of supply to Manitoba load and exports by addressing the outage of the Bipole I & II lines and the outage of the Dorsey Station. Other options such as strengthening of the existing HVdc lines and converter stations were not considered viable.

Date	August 24 2012
Reference	CEC/MH-VI-338
Source	BPC/MH-29
Question	CEC/MH-VII-441

Question:

Manitoba Hydro has asked if any attempt has been made to determine how to minimize HVDC line outage duration……. to a period that is significantly less than six to eight weeks…… such as an inventory of spare parts.

Identify the amount of inventory of spare towers, spare poles and conductors.

Response:

The Manitoba Hydro transmission line emergency response plan includes both permanent and temporary replacement options.

Manitoba Hydro has a permanent structure inventory to replace up to 8 kms of HVDC transmission line. Additional lengths will be replaced temporarily with wood pole structures.

Manitoba Hydro also maintains mutual assistance agreements that enable access to additional materials from neighboring utilities during emergency situations.

Date	August 24 2012
Reference	CEC/MH-VI-338
Source	BPC/MH-30
Question	CEC/MH-VII-442

Question:

Manitoba Hydro indicated that it has made an effort to minimize the duration of outage due to simultaneous Bipole I and II line failure through specialized equipment and an inventory of spare materials. Manitoba Hydro also recognized that "depending on the remoteness of the location, the season and the prevalent weather conditions, this estimate (of 7 to 8 weeks) may be conservative.

(a) (i) Since helicopters are an essential means to build or reconstruct transmission towers and cable in challenging locations, has Manitoba Hydro investigated how the use of helicopter technology could be developed to reduce the 6 – 8 weeks of tower outage time?

(ii) If helicopters were not considered, then why not?

(b) If so, then why would the judicious use of helicopters not contribute to reducing the 6 – 8 weeks of tower outage time down to about the 5 days to restore DC operation after the 1996 storm that blew down DC towers just north of Dorsey?

(c) Is the 6 – 8 weeks of tower outage time established to get one set of temporary towers in place to apply parallel operation on one circuit of Bipoles I and II, or is it to fully restore transmission lines for both bipoles?

Response:

a) Helicopters are a tool that we list in our emergency response plan. Our locally available helicopters can only lift 3-5000 lbs at one time, and not for extended periods or for long distances. Sky Crane type helicopters are not readily available in

the Manitoba area, and can take up to 1 week to even arrive in the area. The use of helicopters is already incorporated into the restoration estimate of 6 – 8 weeks.

b) The event in 1996 was easily accessible, and close to suppliers. This made the transport of men and equipment and materials to site simple. Locations in northern Manitoba that require helicopter transport would not allow bucket trucks to access to the locations. Much of the work would be completed with small tools. Remote camps would need to be established to house workers. Supply lines would need to be created to bring in food and supplies. An event in the Spring/Summer/Fall could be in a location that is very wet, and therefore landing pads and work pads would need to be built before any work could begin. An event in the winter would limit the use of helicopters to daylight hours only, which can be significantly shorter than in the summer.

c) The 6 to 8 weeks is the estimated time to restore one dc line

Date	August 24 2012
Reference	CEC/MH-VI-340b
Source	BPC/MH-31
Question	CEC/MH-VII-443

Question:

Manitoba Hydro states, "Alternative locations for the southern Converter Station were not considered as part of the Bipole III Project."

(a) (i) What other locations were considered?

(ii) Specify why they were rejected?

(b) Provide any studies to support these conclusions.

Response:

Manitoba Hydro has not considered other sites for the Bipole III southern converter for the reasons provided in Manitoba Hydro's response to *CEC/MH-VI-305*.

Date	August 24 2012
Reference	CEC/MH-VI-340c
Source	BPC/MH-32
Question	CEC/MH-VII-444

Question:

Manitoba Hydro states that "While Manitoba Hydro has done some preliminary analysis of an additional 500kVtransmission line between Doresy and Riel, no plans have been committed to date."

(a) Explain why in its website in an article entitled "Bipole III Project Concept" Manitoba Hydro has stated that a 500kV transmission line will be required to link Dorsey and Riel stations in Southern Manitoba.

(b) Is Manitoba Hydro only talking about a line from Laverendrye to Riel, for which there is an existing undeveloped right of way.

(c) Would this be required when the new 500kV interconnection is built?

Response:

a) The Riel Reliability Improvement Initiative project, currently under construction, will modify the existing 500 kV high voltage international transmission line running from the Dorsey Station north of Winnipeg past the Riel Station site and on to Minnesota. The project involves cutting and re-terminating the Dorsey to Minnesota line (sectionalizing the line at Riel) resulting in a Dorsey to Riel 500 kV line and a Riel to Minnesota 500kV line. The Project also establishes new 500–230-kV transformation at the Riel Station site, an alternative point for putting power into the southern Manitoba 230 kV transmission system.

b) Manitoba Hydro has no current plans for a 500 kV line from LaVerendrye to Riel. The undeveloped right–of-way is intended to accommodate future transmission lines of any voltage (230 kV or 500 kV) between stations such as St.Vital, Riel, LaVerendre and Dorsey to form a south loop around Winnipeg. As stated in *CEC/MH-VI-340c*, the corridor may accommodate a line between Dorsey and Riel associated with a new 500 kV Manitoba – United States interconnection.

c) Please see the response to part b above.

Date	August 24 2012
Reference	CEC/MH-V-175; 178; 278-280
Source	BPC/MH-33
Question	CEC/MH-VII-445

Question:

Manitoba Hydro describes how the direct and indirect stakeholder consultations took place. Round 4 of the EACP which was started beginning in the fall of 2010 after the Preliminary Preferred Route (PPR) had been identified as an outcome of the consideration of alternate routes presented in Round 3 consultations and which resulted in the identification of the Final Preferred Route (FPR).

a) Would Manitoba Hydro please explain why landowners along the southern portion of the line which will traverse some of Manitoba's most productive agricultural land were not contacted individually until 26 July 2010 by mail, by which time the PPR had already been chosen?

b) Would Manitoba Hydro please explain why it scheduled meetings to discuss the location of the PPR at Landowner Information Centres (LICs) held in 2010 during the months of September and October at exactly the time when many landowners are occupied with harvesting their crops and at a time when it was difficult to get away to attend a meeting?

c) Would Manitoba Hydro please provide the number of landowners, by line segment, if possible, who attended meetings about the PPR at the LICs both in absolute terms and as a percentage of the invitations sent out?

d) Would Manitoba Hydro please explain why it refers to the process in the meetings in the LICs as "consultation" when it was little more than a process to inform landowners that the PPR had been determined and that it would traverse their land?

e) Would Manitoba Hydro please provide the number of landowners, by line segment, if possible, who received invitations to attend meetings at the LICs but who did not attend and who were subsequently contacted by telephone and/or e-mail about the PPR both in absolute terms and as a percentage of the invitations sent out?

f) (i) Would Manitoba Hydro please confirm if it attempted to contact in person every landowner whose land was traversed by the PPR but who did not attend a meeting at the LIC?

(ii) If it did not, would Manitoba Hydro please explain why?

g) Would Manitoba Hydro please provide the number of landowners, by line segment, if possible, who were engaged in one-on-one communication about the PPR either face-to-face, by telephone or by e-mail both in absolute terms and as a percentage of the invitations sent out?

h) Would Manitoba Hydro please reveal the date on which the FPR was identified?

i) Would Manitoba Hydro please provide the actual number of landowners whose land is traversed by the FPR?

Response:

a) Manitoba Hydro undertook 3 rounds of consultation prior to the release of the preliminary preferred route. Round 1 and 2 provided opportunities for the public and stakeholders to identify opportunities and constraints with regards to routing. During Round 3 beginning in September of 2009, Manitoba Hydro presented three, three mile wide corridors which traversed the study area. It was not considered feasible or practical to notify all potentially affected landowners directly by mail within all of the multiple route corridors during this Round. Manitoba Hydro chose other methods to present the route alternatives to the public including stakeholder meetings and open houses and used broad notification methods to reach as many people as possible. From the feedback received from participants and stakeholders, the PPR was developed. Once the PPR was determined, all landowners on or within ½ mile of the route were notified

directly and invited to participate in a Landowner Information Centre or an Open House to discuss their landholdings in relation to the route.

b) Manitoba Hydro was aware of the timing and therefore offered the opportunity for landowners to discuss their land holdings over the phone via the project information line, as well as at Landowner Information Centres located along the PPR. Manitoba Hydro began Round 4 of the EACP (presentation of the PPR) July 26th 2010. Following the notification letter, Manitoba Hydro initiated the Bipole III Information Line which remains operational today so that landowners could contact Manitoba Hydro with questions regarding the PPR and their notification package at any time. Manitoba Hydro undertook Landowner Information Centres along the PPR commencing August 30th and ran till November 9th of 2010. Manitoba Hydro was present at each location from 8:00am till 9:00pm. A complete listing of locations is provided in Appendix B of the EACP Technical Report, Table 9

c) Manitoba Hydro did not track participation by route segment. Manitoba Hydro offered numerous locations where landowners could attend LICs and meet face to face with Manitoba Hydro staff. Further, the Project information line was and continues to be available to landowners who wish to discuss specific land holdings. In total, 298 Landowner Information Centre Forms were completed which assisted the Project team in determining the Final Preferred Route. For further information regarding the information received from the LICs and the locations in which they were filled out in please refer to Appendix E of the Environmental Assessment Consultation Program Technical Report.

d) The preliminary preferred route was presented to landowners with the goal of receiving feedback that would assist Manitoba Hydro in determining a Final Preferred Route (FPR) as part of the consultation program. Landowners within a ½ mile of the line were invited to participate in Landowner Information Centres as small adjustments were anticipated (north/south of a road allowance, on/off a ½ mile line, etc.). Feedback provided by landowners was considered in the determination of the FPR. Appendix 7B – Preliminary Preferred Route Adjustments, Map Series 7 - 1200 of the EIS denotes all stakeholder and landowner route adjustment considerations which were provided to

Manitoba Hydro during Round 4. In consultation with local landowners, Manitoba Hydro undertook changes to the PPR such as the Tourond adjustment which is discussed in the supplemental material filed with Manitoba Conservation and Water Stewardship in February of 2012.

e) Manitoba Hydro did not undertake follow up calls for landowners who decided not to attend an Open House or LIC. Direct notifications were sent to all landowners within a ½ mile of the PPR. Manitoba Hydro notified all landowners within a ½ mile of the PPR by direct mailings to the address listed on the land title. Manitoba Hydro also notified the public about activities being undertaken by using radio, postcard notifications, and posters. Manitoba Hydro provided the Bipole III toll free Information Line and the Bipole III email address to contact the project team to discuss the project and their landholdings.

f) Manitoba Hydro did not have intentions to contact each landowner in person but relied on direct notification letters and other notification processes which are outlined in detail in Section 7.0 and Figure 3.0 of the Environmental Assessment Consultation Program Technical Report.

g) Due to the nature of land titles and landholdings which may be held under a variety of names, Manitoba Hydro does not have this information.

h) The FPR was released to affected landowners and landowners within a ½ mile of the FPR on November 23rd, 2011. Affected landowners and those within a ½ mile were notified prior to the public news release of the FPR which occurred on December 1st, 2011.

i) 440 private property owners are traversed by the FPR. 80 individuals are traversed by the FPR who currently rent crown land.

Date	August 24 2012
Reference	CEC/MH-II-003a; Agriculture Technical Report (Section 7.1.1/8.0/8.2.1) (EIA, Vol 12, Table 7A-1, 11 of 14, Section 10)
Source	BPC/MH-34
Question	CEC/MH-VII-446

Question:

Manitoba Hydro states that the route evaluation process was developed by discipline specialists. As noted in Sec 8.0 (page 50), the Agriculture Technical Report found that in Route Sections 11, 12, and 13, that Route B was the least impact (see Sec 7.5, page 47) followed by Route C. Yet Manitoba Hydro (presumably the "panel of specialists" noted in Appendix 7A of the EIA) selected Route A.

(a) Please explain in detail the basis for this decision or change. Include in this explanation the priority or weighting attached to the criteria which drove the final selection.

(b) Manitoba Hydro appears to be at odds with Neilsen and Associates (Neilsen) in respect of what constitutes a good or superior route. Neilsen perceives Route B is superior, and a review of the matrix tables in Appendix 7A appear to bear this out. The following table sets out the Route Segments within the Route Sections, and notes the Cumulative Ratings, which are summed for this small, intensively farmed area.

Route	Route Section/Rating Units					Total for the Route
	11		12		13	
A	A20/9		A21/13	A22/12	A23/AS	46
B	B26/12		-		B28/22	34
C	C27/11	C28/10	C30/15		C31/18	54

Despite the lower impact rating for Route B, Manitoba Hydro selected Route A through these sections. Please explain in some detail how the Matrix and its un-weighted rating

system fails to capture the important criteria which leads to the selection of a preferred route that, on the face of it, will have higher impacts.

(c) (i) From Long Plain to Riel, the area is described as having intensive agricultural development. In such locales one might conclude that nearly all of the natural ecosystems have been either eliminated or radically altered. Further, human habitation levels are generally much higher, with farmsteads and acreages. Please provide with some detail, an explanation of how the Biophysical, Socio Economic, Land Use, and Technical criteria were weighted or evaluated to determine a route other than the one indicated by the matrix numerical analysis.

(ii) In respect of the matrix analysis process, please indicate how MH balances the widely variable land uses in the different route Sections when the same 28 criteria are listed for each section.

(iii) Are the environmental issues considered with the same weight in Route Section 2 as in Route Section 13?

(d) (i) Confirm that typically in a side-by-side route segment comparison, portions of a route many be substituted for one another such that the superior overall route will be a compendium of lowest impact route segments. However, in order to do this, the segments being compared must be on a level footing. This means common start and finish points, and some ability to exchange one for the other. It generally means, as well, that an artifact of the ranking system will not skew the results; i.e. lengths of compared segments will be similar.

(ii) Please explain how we can rationally conduct a side by side review of the potential route segments in Sec 11, for example, when A20 appears to be half the length of B26.

Response:

a) The discipline specialist was requested to independently fill in the Route Selection Matrix (RSM) with their analysis of level of constraint for each segment in each section. In this case the agricultural specialist did that and rated the constraints on agriculture as being M or medium for alternative B in Sections 11, 12, 13. In fact the

only segment rated as having a high constraint for agriculture was segment C27 in Section 11. Also in sections 11, 12 and 13, the segments with the lowest accumulated score for 23 criteria were chosen for the PPR. The 23 criteria were not weighted but subject to a consistent scoring method using 0 for Low (L) to 5 for Very High (VH) in the RSM based on the level of constraint as explained in Appendix 7A (EIS Chapter 7).

b) The chart provided is inconsistent with the intended design of the RSM. The matrix was never designed to add scores between sections. The matrix was designed to compare alternative segments within identified sections only. As an example, there is no B segment in Section 12 and hence no score to add to other sections unlike routes A and C. As pointed out in a) above the segments with the lowest score in Sections 11,12, and 13 respectively were the segments chosen for the PPR.

c) (i) The RSM was designed with limited criteria specific weighting (see c) (iii) below). The system accounts for the relevancy of a particular criteria by its score. As the reader will note many criteria are rated L or low in a large portion of the matrix in intensive agricultural areas. The score for an L rating is 0 which means that that criteria does not add to the numeric score for that segment.

(ii) The same criteria are used from section to section for consistency. As explained in c) (i) above the relevancy of a particular criteria in a section can be determined by its score. However many criteria are relevant in all sections irrespective of land-use (E.g. birds).

(iii) The 23 criteria used in the numeric assessment portion of the RSM were not directly weighted per se with coefficients or multipliers. Several criteria had opportunity to score higher than other criteria by having the additional rating of VH or Very High, which implies some weighting. The only other opportunity for a higher score for a criteria was where there was Aboriginal Traditional Knowledge (ATK) available that expressed some sensitivity for a particular criteria. If this was identified, additional scoring could be added to that particular criteria by increasing its rating by one level. This is demonstrated in the RSM. As such environmental criteria were used the same way in sections 2 and 13 but as explained in c) (i) above a low score for a criteria removed it from contributing to the total segment score. So

while fragmentation was an important criteria in section 2 it did not contribute to segment scoring in Section 13.

d) (i) Manitoba hydro cannot confirm the approach described in d)i because that was not exactly the methodology used. Sections were delineated based on decision points between alternative routes. Due to geography some sections (E.g. Section 8) required multiple segments and crossovers in order to have a comparison between multiple routes through a section. Equal length segments were not required for the methodology used.

(ii) Equal segment length did not prevent composite assessment scoring by specialists for each segment and criteria. The agricultural constraint was rated based on the approach described in Appendix 7A (EIS Chapter 7). Numerical scoring of segments was only one part of the selection process for each section as indicated in the RSM.

Date	August 24 2012
Reference	CEC/MH-II-007e
Source	BPC/MH-35
Question	CEC/MH-VII-447

Question:

Manitoba Hydro‟s response to this IR shows limited understanding of the pivot/power line interaction.

(a) Has Manitoba Hydro sent, or it is considering sending, engineers to say, Southern Alberta where AltaLink has many miles of power lines in steel towers adjacent to irrigated fields to see how these land uses may be compatible?

(b) Will the same concerns for conflict exist if the line is placed in the ½ mile position?

Response:

a) Not at this time.

b) If the towers are placed on the half-mile line as they are in some areas the potential conflict with ¼ section pivots may be reduced. To prevent a water stream coming in contact with a conductor, pivots may have to be modified or any end guns turned off when approaching the transmission line. Modifications to equipment or adjustment in operations would have to be discussed with the landowner.

Date	August 24 2012
Reference	CEC/MH-III-007g
Source	BPC/MH-36
Question	CEC/MH-VII-448

Question:

Manitoba Hydro stated that agriculture was one of 28 criteria used in review of alternative routes.

(a) (i) What is the source of the Routing Guidelines as set forth in the two bullet columns on page 15 of the Agriculture Technical Report?

(ii) Have these been used in other jurisdictions?

(b) (i) Is there an order to the general guidelines on page 15, as there was to the agricultural activities on the top of the page?

(ii) If so, please provide the justification or explanation for the order.

(c) What selection process was used to select the final three alternative routes, as discussed on page 16?

(d) (i) Are the aerial photographs noted on page 16 used for the routing exercise available for review so that the quality of the routes may be more readily assessed?

(ii) Will Manitoba Hydro make these available in a timely fashion with the routes marked on them?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg*

Convention Centre Thursday, August 16, 2012. page 157 lines 5-9.). This question does not arise out of the answer provided in the referenced information request.

Date	August 24 2012
Reference	CEC/MH-II-007h
Source	BPC/MH-37
Question	CEC/MH-VII-449

Question:

Manitoba Hydro was not responsive to the request as to why severance is a significant impediment to efficient cropping operations. In Sections 6.5.2 and 6.5.3 of the Agriculture Technical Report, the discussion and tables indicate that tower placement on the edge of a road allowance or drainage ditch will create less impact than on a ½ mile (headland) location. (It appears these placements, with the roadside and drainage ditch configuration the 8 m towers, will generate roughly 9 to 10 m deflections into the crop land. The headland location will produce a 5 m projection into each field).

(a) The distinguishing feature appears to be a prospective "management unit split". Please describe this effect, and explain how it materializes, and the agricultural factors associated with such an impact.

(b) (i) Confirm that this severance factor is the basis for the difference in ranking.

(ii) If it is not, explain in detail the basis for the difference in the ranking.

(c) (i) In terms of a field unit, and managing the farming of the land when dealing with a tower in a field, given the length (over 400 m) between towers, and the prospect that there will be only 1 or 2 towers per quarter section, can Manitoba Hydro explain how a tower, a relatively small point source obstacle, will result in such a large response?

(ii) If, as indicated in CEC/MH-II-007h "severance is not necessarily a significant impediment to cropping operation" please advise why such a large increment is used in the rankings between road side and ditch side (both at 1) and ½ mile (at 3) when all are tower locations all at the edge of a field.

(d) In the discussion on pages 32 and 33, Sec 6.5.3 of the Agriculture Technical Report, it appears that the roadside, ditch side, and headland (½ mile) placements are relatively equivalent. If this is so, why is there such a large difference (1 vs 3) in the ranking; especially when the next most problematic rank is essentially a midfield situation ranked at a 4, only 1 unit higher?

(e) Please confirm that the decision of Manitoba Hydro referenced in Sec 6.1 (page 27) of the Agriculture Technical Report to place the towers midfield created more agricultural problems than routing on headlands.

Response:

a) If the line is mid-field or aligned diagonally, the landowner may choose to re-align field boundaries along the edge of the hydro line. This could then lead to two different parcels of land with different crops or different management practices.

b) (i) The severance is not the determining factor in the different ratings – line position in the field is the determining factor. On the edge of the road allowance or drainage ditch has a lesser effect on field operations.

c) (ii)The severance is not the determining factor in the different ratings – line position in the field is the determining factor. On the edge of the road allowance or drainage ditch has a lesser effect on field operations.

d) (i) It is not only the tower but the line that creates an obstacle in the field.(eg., limitations on aerial spraying)

d) (ii)The half mile, in the field and on the diagonal create more impediments for the land operator.

e) The ½ mile is not equal to the edge of the road allowance as the landowner may own the land on both sides of the hydro line creating the equivalence of a mid-field placement. On the quarter mile line and on the diagonal are the most difficult line placements for the farmer.

f) Manitoba Hydro did not decide to place the tower line in ”midfield”. The decision was to place the tower line in-field 33 m from the road allowance or drain. Also between PTH 16 and Riel station the decision was made to place the tower line approximately 42 m in-field to allow large equipment to maneuver between the tower and a road allowance. These in-field tower placements likely create more potential agricultural issues than placement of the towers on the ½ mile line or headland position.

Date	August 24 2012
Reference	CEC/MH-II-007h
Source	BPC/MH-38
Question	CEC/MH-VII-450

Question:

Manitoba Hydro stated that field or management severance is not necessarily a significant impediment to cropping operation.

(a) In Sec 8.2.4 (page 57) of the Agriculture Technical Report, the baseline data notes that "the line placement (especially on the ½ mile or diagonal) will cause management severance on 38% or 31.5 km of the line:" Explain the emphasis on this point when the IR reply CEC/MH-II-007h discounts field severances as a major issue.

(b) Why is the Impact Rating in Sec 6.5.2 of the Agriculture Technical Report so much greater for "half mile line" than for road side? (200% higher)?

(c) Will Manitoba Hydro agree that the swing out into the field is the smallest when a tower sits astride a property line? In regard to road side placement, just how close to the boundary of the road allowance will the outside tower leg be, and then how far into the field will the inside tower legs be?

Response:

a) IR *CEC/MH-II-007h* does not discount field severance as a major issue. The response indicates that that field or management severance is not necessarily a significant impediment to cropping operation. The response indicates that it depends on the location of the line on the land and crop and crop management practices of the landowner.

Also, the actual quote from page 57 of the Agricultural Technical Report is "The line placement (especially on the ½ mile or diagonal) will cause management severance on 38% or 21.4 km of the line".
To explain the quote from the Agricultural Technical Report, management severance is likely to only occur where the line is well in-field or there is a diagonal crossing of cropland. The proposed in-field placement of 33 m to the centre-line of the transmission line was considered in-field placement in the Agricultural technical report and reasons given for that position (Agricultural Technical Report p. 5). In addition after Round 4 consultation consideration was given to place the transmission line in-field slightly further to accommodate large sprayer equipment between a property boundary and the transmission towers (See EIS Chapter 7 pages 7-50 and 7-51). It is not likely that farmers would create a management severance for the small strip of land for the T-line easement that is within 40 metres of a property boundary.

b) Land on the ½ mile could be owned by the same landowner leading to a management severance.

c) Conductor swing-out occurs either side of the transmission line and is usually at maximum swing between transmission towers. Tower placement "astride" a property line does not change the amount of swing-out that could occur into a field, which depends on the wind direction and strength, and conductor and ambient air temperature.

As indicated in a) above in-field placement is proposed to be extended to 42 m from the edge of ROW to the centreline of the transmission line for cultivated agricultural land from PTH 16 to Riel Station. That alignment would put tower legs at approximately 38 m and 46 m from the edge of a road right-of-way, respectively.

Date	August 24 2012
Reference	CEC/MH-II-007h
Source	BPC/MH-39
Question	CEC/MH-VII-451

Question:

Manitoba Hydro defines field or management severance

If the placement of a tower 33 m or 42 m into a field *"will not result in the operator creating two fields"*, why would placement of a tower anywhere in a field create severance?

Response:

At 33 or 42 m into the field for the transmission line, the landowner would not necessarily consider splitting the field on this line (or management severance). At ¼ mile, ½ mile, or diagonal placement, the decision may be to change field boundaries for crop production.

Date	August 24 2012
Reference	CEC/MH-II-007q
Source	BP/MH-40
Question	CEC/MH-VII-452

Question:

Manitoba Hydro describes proposed compensation specifics.

(a) (i) There are no specifics on the components of the 1 time formula. Please provide, in detail, all the costs of inputs, yields, equipment costs, and areas impacted for the various tower locations, so that the proposed compensation methodology may be reviewed.

(ii) Provide the rate and the justification for the capitalization rate to be employed. Select three representative areas along the line for the data to be provided.

(b) The concept of Intangible Adverse Effect (IAE) is well known in Surface Rights compensation. Please advise how much IAE will contribute to the 1 time compensation.

(c) In comparing the proposed Manitoba Hydro compensation scheme compare to oil and gas compensation, and to wind farm compensation, use specific examples.

(d) This document is silent on the process to be followed if the landowners cannot agree with Manitoba Hydro in respect of appropriate compensation. Please detail the process for acquiring land rights when the owner will not enter an agreement.

Response:

(a)(i) The costs are taken from the most current publication of the Manitoba Agriculture, Food and Rural Initiatives (MAFRI) entitled "Guidelines for Estimating Crop Production Costs". The yields used are from the Manitoba Agricultural yearbook. A 10 year running average is used with a 33% increase applied, to reflect exceptional farm management

practices. The prices are the most current price found in the Manitoba Agricultural Services Corporation (MASC) website.

(ii) The cap rate was established in consultation with the major banks. The most popular investment for a value under $100,000 was determined to be a three year GIC. The annual rate for this product published in the financial section on the closest Saturday to Jan 1 and July 1 was used.

(b) Intangible Adverse Effects (IAE) are an unknown until the structure placement is determined. IAE can only be determined on a case by case basis. Please refer to *CEC/MH-II-007q* for Manitoba Hydro's compensation policy that addresses AEI as Ancillary Damage Compensation.

(c) Those other compensation models are usually for-profit investor owned entities and their compensation policies are influenced accordingly. These models were not used as reference for the Bipole III model for these reasons. As such, a comparison has not been made.

(d) Manitoba Hydro's policy is to negotiate the property rights it needs subject to fair and consistent compensation policies once the approval has been received by the appropriate government agencies. Manitoba Hydro does have the ability to expropriate its property interests and typically would only do so as a last resort once all other alternatives have been exhausted.

Date	August 24 2012
Reference	CEC/MH-IV-144
Source	BPC/MH-41
Question	CEC/MH-VII-453

Question:

Manitoba Hydro was asked to file more complete information and answers to demonstrate that it understands the severity of the impact of the Bipole III transmission line on agriculture.

Manitoba Hydro stated it does not intend to carry out any more analysis. As a result, further clarification of Manitoba Hydro"s position is required.

(a) The 3rd paragraph on page 23 of the Agriculture Technical Report references a 230 kV transmission line that might have presented a routing opportunity given that it is a pre-existing linear disturbance. What specific rationale was used to determine "that separation from 230 kV lines was necessary"?, or was that rationale one that the author, or Manitoba Hydro sees as appropriate in all situations? (Please consider the discussion in Sec 7.4.1.6 of the EIS in this reply).

(b) In the summary on page 26 of Soil Based Routing Opportunities, it appears that the "best routing opportunities" are found furthest to the north. Does the term "best routing opportunities" mean most flexibility to route the line due to the fewest soil based constraints?

(c) (i) Also on page 26, did the final route avoid Areas 6 and 7?

(ii) If not, please provide the length of the route through those areas.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not arise out of the answer provided in the referenced information request and Manitoba Hydro's understanding of the severity of the impact on agriculture.

Date	August 24 2012
Reference	CEC/MH-VI-236a
Source	BPC/MH-42
Question	CEC/MH-VII-454

Question:

Manitoba Hydro has indicated that tower locations will not be determined before the start of the CEC Hearing. As a result, further clarification is required.

(a) Sec 6.0, page 27 of the Agriculture Technical Report discusses the Routing Methodology. Was a decision made to relocate the routing from primarily ½ mile lines to various distances in from a road allowance?

(b) Confirm that Manitoba Hydro understands that road side, ditch side, and ½ mile (headland) positions all allow farming "by" the tower, while a placement 40 m or more into a field requires farming "around" a tower.

(c) What was the basis for this decision to place towers in the field in preferences to the edge of a field?

(d) What agricultural impact experience or knowledge was involved in this decision?

(e) Was this decision in any way a result of a desire by Manitoba Hydro to lessen the construction difficulties by guaranteeing easy access next to a roadway?

Response:

a) No, the decision was made to move the transmission line in-field from the road allowance edge or drain where it occurred on the preferred route. This was indicated to land owners during Round 4 consultation on the PPR. There was no plan to move 1/2 mile line locations in favour of various distances from road allowance.

b) Yes, Manitoba Hydro would agree with this statement

c) See page 27 of the Agricultural Technical Report.

d) The decision was made on a technical basis for the reasons indicated on page 7 of the Agricultural Technical Report.

e) No. The towers are to be placed in field (33 -42 m) for the technical reasons cited on page 27 of the Agricultural Technical Report.

Date	August 24 2012
Reference	CEC/MH-VI-236a
Source	BPC/MH-43
Question	CEC/MH-VII-455

Question:

Manitoba Hydro has indicated that tower locations will not be determined before the start of the CEC Hearing. As a result, further clarification is required.

(a) (i) In respect of the tower placements and concern by landowners, has Manitoba Hydro investigated the area of impact (m2 or acres) created by the various tower placements?

(ii) If not, please do so and provide estimates of the Loss of Use and Adverse Effect areas affected for the various locales set out below:

a. ½ mile (Headland placement, 2 legs each side of fence)

b. 33 m into a field

c. Midfield

(Note: Equipment size used to generate these estimates should be typical for Southern Manitoba.)

Response:

(a) (i) With reference to *CEC/MH-VI-236a Manitoba* Hydro has not performed any preliminary engineering work regarding individual tower spotting.
(ii) Although specific tower spotting has yet to be determined, Manitoba Hydro has investigated the area of impact related to the various typical tower alignments proposed for the Bipole III Transmission line.

Tower alignments "b" (33 m into a field) and "c" (Midfield) are both classified as a "Tangent" alignment. By definition, a tangent alignment is one where the location of a tower in relation to a property line leaves sufficient room to operate farm equipment freely around all four sides of a tower. Tower alignment "a" (½ mile) is referred to as a "Straddling ¼ Line" and the affected area calculations are relative to half of the area of the "Tangent" alignment.

The "Loss of Use and Adverse Effect" area calculations for these alignments are as follows:

a. Straddling 1/2 mile Line

Total Affected Area = 0.276 acres

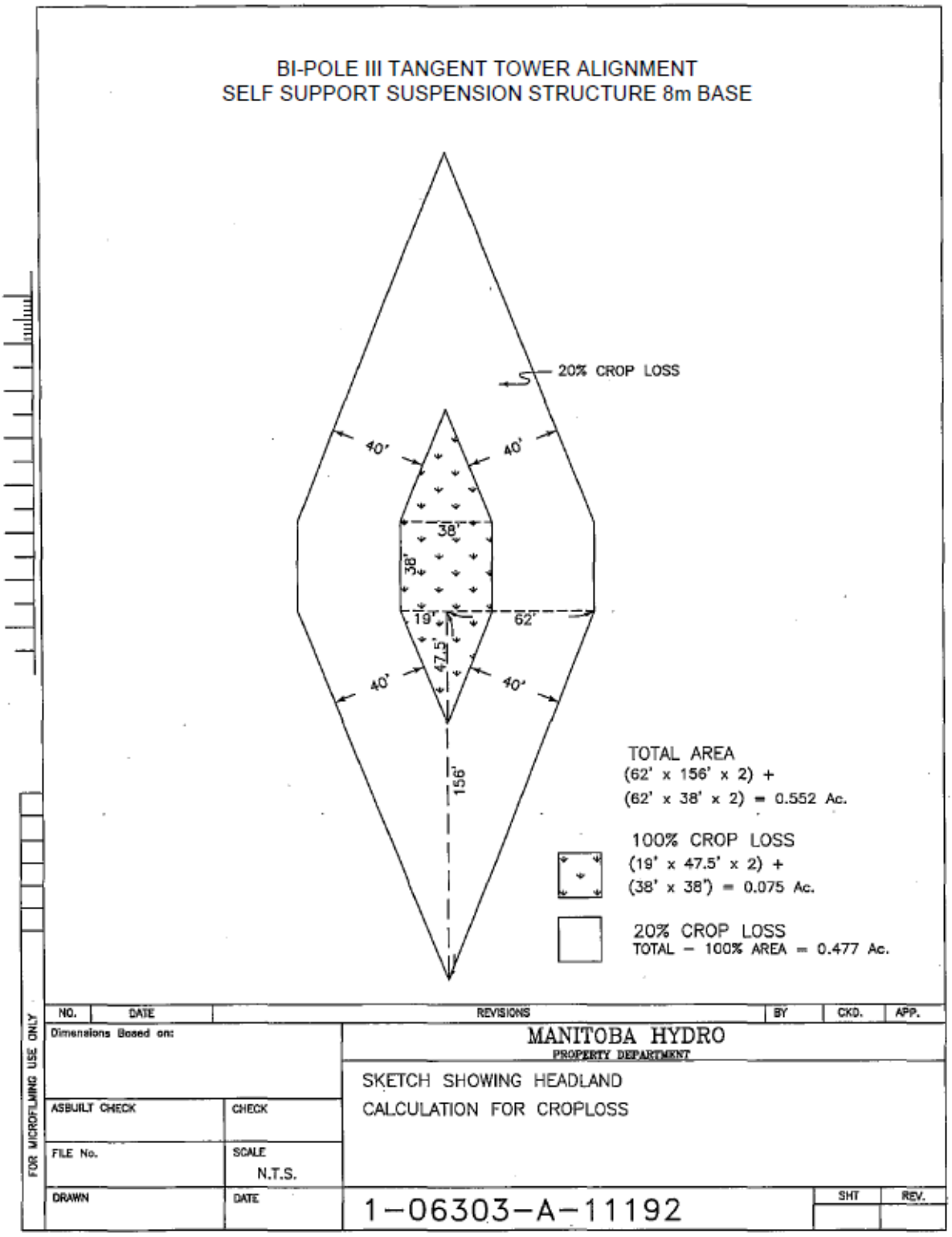
- 100% Crop Loss = 0.0375 acres
- 20% Crop Loss = 0.2385 acres

b. + c. Tangent

Total Affected Area = 0.552 acres

- 100% Crop Loss = 0.075 acres
- 20% Crop Loss = 0.477 acres

The sketch on the following page demonstrates how the "Loss of Use and Adverse Effect" areas were calculated.


BI-POLE III TANGENT TOWER ALIGNMENT
SELF SUPPORT SUSPENSION STRUCTURE 8m BASE
20% CROP LOSS
40'
40'
38'
38'
19'
62'
47.5'
40'
40'
156'
TOTAL AREA
(62' x 156' x 2) +
(62' x 38' x 2) = 0.552 Ac.
100% CROP LOSS
(19' x 47.5' x 2) +
(38' x 38') = 0.075 Ac.
20% CROP LOSS
TOTAL - 100% AREA = 0.477 Ac.
NO. DATE REVISIONS BY CKD. APP.
Dimensions Based on:
MANITOBA HYDRO
PROPERTY DEPARTMENT
SKETCH SHOWING HEADLAND
CALCULATION FOR CROPLOSS
ASBUILT CHECK
CHECK
FILE No.
SCALE
N.T.S.
DRAWN
DATE
1-06303-A-11192
SHT
REV.
FOR MICROFILMING USE ONLY

39

Date	August 24 2012
Reference	CEC/MH-VI-236a
Source	BPC/MH-44
Question	CEC/MH-VII-456

Question:

Manitoba Hydro stated that tower location involves inputs, including restrictions identified by landowners.

(a) Table 18 in Sec 8.2.1. (page 54) of the Agriculture Technical Report describes the proximity of Residences and Barns that are within a 270 m defined distance of the edge of the ROW. Given the 66 m width of the ROW, please confirm the objective was to enumerate the number of homes and barns within 300± m of the conductors.

(b) (i) How is the reader of Table 18 supposed to use this date in evaluating the route?

(ii) Is similar data provided for the corresponding segments in for example, Section 13 for B28 or C31?

(c) (i) Referencing the 270 m separation distance, what is the intent of identifying this distance?

(ii) Is it deemed a minimum setback? (iii) What sort of mitigation is planned when a residence is within that distance?

(d) (i) A review of the map series 50K does not show any deflections of the alignment when a homesite is encountered. For example, in Sec 13, Bb3, SW 12-8-5-E1, the home is only 75 m from the ROW. What are the planned mitigation strategies Manitoba Hydro intends to use?

(ii) Which one is their preferred option?

(e) In specific regard to Section 13, it is noted in Sec 8.2.1 that 58% of the length of this segment is "in the field". Please explain the specific pros and cons of this decision in relation to the option of route placement on the ½ mile or headland position.

Response:

a) The table was part of baseline information for the preferred route. Its purpose is to show proximity of houses and barns to the preferred route as an inventory and a check on the preferred route selection. The 270 m distance was selected for initial planning and review purposes. It does approximate a 300 m distance from transmission line conductors.

b) (i) The table is simply an inventory of what occurs along the preferred route.

(ii) No similar data is provided in the Agricultural Technical Report for other segments considered in route selection. However, the agriculture criteria for route selection considered dwellings and farm yards (See Appendix 7A p.7A-7).

c) (i) See response to a) above

(ii) No it is not considered a minimum setback. There is no minimum setback for residences or farm structures from the edge of the right-of-way.

(iii) There is a buy-out option for landowners with residences within 75 m of the transmission line per the Bipole III Landowner Compensation policy.

d) (i) See response to c) (iii) above.

(ii) The preferred option is up to the landowner affected.

e) Route selection in Section 13 was constrained by the high level of agricultural development and density of residences. Avoidance of residences and farm facilities was a main determinant in routing in that area.

Date	August 24 2012
Reference	CEC/MH-VI-236c
Source	BPC/MH-45
Question	CEC/MH-VII-457

Question:

Manitoba Hydro stated that tower placement preferences was provided by landowners and that Manitoba Hydro will continue to collect site specific tower preference locations.

(a) (i) In Sec 6.1 (page 28) of the Agriculture Technical Report, the concerns voiced by farmers during round four are generically described. Did farmers indicate a preference, or note which placement would create the least impact?

(ii) If so, please provide the background and further information on their "concerns" and preferences.

(b) (i) In respect of the agriculture impact ratings as discussed in Sections 6.3 and 6.4 of the Agriculture Technical Report, are the ratings simply the order of the Rating Descriptions?

(ii) Was any weighting applied?

(iii) The first 7 appear to be soil class related categories, while No. 8 is a management system. How would this kind of system rank a stretch of route that intermingled say, 10 quarters of soil with irrigation potential (Rating 7) with 10 quarters of active irrigation systems in place (Rating 8)?

(iv) What rank would be created?

Response:

a) Stakeholder feedback received regarding tower spotting has been varied and dependent on the activities being undertaken on specific land holdings. As noted in *CEC/MH-VI-236c*, Manitoba Hydro is still collecting tower spotting preferences from landowners during the easement negotiation process.

b) In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not arise out of the answer provided in the referenced information request.

Date	August 24 2012
Reference	CEC/MH-VI-279
Source	BPC/MH-46
Question	CEC/MH-VII-458

Question:

Manitoba Hydro stated that landowners were provided with localized maps of the preliminary preferred route.

(a) Were they provided with maps of the final preferred route?

(b) (i) A review of the maps that show the final preferred route reveals that the alignment within the fields in highly inconsistent. It jumps from headlands to midfield to road or ditch side throughout its length. Given that the alternate routes are not mapped out to the same degree of detail as the preferred route, is it true that the total agricultural impact rating number will be affected by the various decisions of the route makers as to where the line will be placed in a given field? To provide an example, if 10 miles of fields in Categories 4 – 7 (20 quarter sections) were compared on each of 3 alternates tower placements, and No. 1 was all road side, it would carry a contribution to the ranking of20. Route No. 2 on the half mile would contribute 60, while Route No. 3, a quarter mile placement, would generate 80. Ostensibly, each of these alternates could have had the line placed at one of the other available placements.

(ii) Using Map Folio 50K Map Series, Map 84, all the possible tower placements are seen on one map. Explain in detail the rationale for the line placement in the field for each stretch of the different alignments. Please be sure to include why that selection was deemed to be the best possible placement within each segment.

Response:

a) Landowners who were located on or within a half mile of the Final Preferred Route (FPR) were provided a notification letter which was accompanied by a localized topographic map of the FPR in relation to their landholdings. These letters were mailed November 23rd 2011 for both affected landowners and landowners located within a ½ mile of the FPR prior to the public release December 1st.

b) In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not arise out of the answer provided in the referenced information request.

Date	August 24 2012
Reference	CEC/MH-VI-279
Source	BPC/MH-47
Question	CEC/MH-VII-459

Question:

The process of route evaluation generally includes a process of comparison as the route planner (and the reviewing agency, in this case the CEC) seeks the superior routing. Here, despite obvious disconnects between the route evaluation matrix numerical impact analysis, and the final preferred route put forward for approval, only one final routing has been presented. A lack of alternate routings leaves the CEC with only the option of an up or down recommendation.

Why did Manitoba Hydro not select a number of alternative route segments from which the CEC might provide, as an independent review agency, a recommendation on the final routing?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not arise out of the answer provided in the referenced information request and provision of the topographical maps.

Date	August 24 2012
Reference	None
Source	MWL/MH-1
Question	CEC/MH-VII-460

Question:

Was trapping data from the past 60 – 70 years analysed for any of the following species (this data is held by Manitoba Conservation):

a. Wolverine
b. American Marten
c. Beaver
d. Grey Wolf

If trapping data was considered please provide the data used, with explanation as to how Manitoba Hydro applied this information in selecting the Bipole III corridor. If trapping data was not used in the EIS or selection of Bipole III corridor explain why not.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-2
Question	CEC/MH-VII-461

Question:

Did Manitoba Hydro undertake a review and/or research to increase understanding of Treaties 1, 2, 4, and 5, prior to the selection of the preferred Bipole III corridor (as the current preferred route for Bipole III traverses all of these Treaty areas)? If so, please provide examples as to how the EIS considers the different treaties.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous information requests submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-3
Question	CEC/MH-VII-462

Question:

Draft Environment Protection Plan, p. 72-73

• "A draft Access Management Plan will be provided for review by affected stakeholders including government departments, First Nations, Aboriginal communities, rural municipalities, environmental organizations and land owners."

• "The plan will be completed and implemented prior to the commencement of the construction phase for the Project. Once implemented, the management plan will be reviewed after each construction season and/or annually and results from the reviews will be used to adjust plan provisions to ensure continued effectiveness."

a. Manitoba Hydro to provide a copy of this "draft Access Management Plan" for review prior to the start of hearings?

b. Manitoba Hydro to provide a template or sample, or example Access Management Plan for this or other transmission projects.

c. How will Manitoba Hydro determine, which environmental organizations qualify as "stakeholders" to review the Access Management Plan?

d. Will the annual review of the Access Management Plan be shared, with results made public? Posted in the public registry under the Environment Act?

Response:

a) Manitoba Hydro is not prepared to share a draft access management plan as discussions with Manitoba Conservation and Water Stewardship and local communities have not been concluded.

b) Manitoba Hydro does not have Access Management Plans for transmission projects available for the public although the Access Management Plan for the Keeyask Infrastructure Project can be found at: http://keeyask.com/wp/wp-content/uploads/2009-07-31a-EA-Report-Appendix-E.pdf

c) Manitoba Hydro will not determine which environment organizations qualify as stakeholders to review the Access Management Plan; however, an organization may request a meeting with Manitoba Hydro to discuss the Access Management Plan.

d) The Access Management Plan will be discussed with Manitoba Conservation and Water Stewardship as part of the annual review of the Environmental Protection Plan. Manitoba Conservation and Water Stewardship will be responsible for posting on the public registry.

Date	August 24 2012
Reference	CEC/MH-II-008b
Source	MWL/MH-4
Question	CEC/MH-VII-463

Question:

Hydro has not adequately responded to CEC/MH-II-008b (see Manitoba Hydro Response Package #4, July 31, 2012 at p. 49). The question is if there has ever been any transformer or insulating oil spills in regards to the existing converter stations for Bipole I & II. The response instead focuses on upgrades to Dorsey in 2009 and upgrades to Radisson and Hendlay in 2009.

a) Manitoba Hydro to answer the question: has an oil spill, or other similar contamination problem, ever occurred at a converter station in Manitoba?

b) In regards to the upgrades to converter stations in 2004 and 2009 Manitoba Hydro to provide further detail as to the nature of the upgrades and why they were needed.

c) Is Manitoba Hydro acquiring easement rights for the entire Bipole III corridor right of way?

d) If so how wide is the easement being sought? What proportion of the project study area and local study area will be covered by easements?

e) As there is little information about right of way easements in the EIS materials, Manitoba Hydro to provide clear information as to what rights .of use and access the easements for the Bipole III right of way Manitoba Hydro would hold

f) Manitoba Hydro to provide full information about why the right of way easements are not shown on any maps in the EIS, and explain how these compare to the study area, project area, and corridor width.

g) Manitoba Hydro to provide maps of the intended right of way easements for the Bipole III corridor.

h) What about drill hole rights? Manitoba Hydro to provide information about the current process to gain access for drill holes in advance of Bipole III test drill holes being dug, combined with their relationship to the easements for right of way

i) Manitoba Hydro to provide information about right-of-way easements notification, access to information etc.

Response:

a) Yes. Oil has been *released* from oil-containing equipment at converter stations owned by Manitoba Hydro. Note that Manitoba Hydro defines a release as:

> "any escape of a product from its vessel that occurs outside of normal work procedures and/or the practice of due diligence. Further, a 'Release to the Environment' is defined as: the deposit of a deleterious substance in water frequented by fish or a fish habitat; and/or a hazardous material that is in contact with air, land or water beyond a containment or mitigation system." Manitoba Hydro Hazardous Materials Handbook, (2012).

Most releases that have occurred were from the oil-containing device into secondary containment and thus not in the environment.

As per the response provided in *CEC/MH-VI-259b*, Manitoba Hydro reports all reportable releases to the appropriate authorities. As outlined is response *CEC/MH-II-21* Manitoba Hydro employs numerous measures to prevent the release of oil from oil-containing devices and to mitigate risk to human safety and the environment should a release occur.

b) The upgrades performed at Dorsey, Radisson and Henday were related to the installation of a buried pipe system below oil filled equipment to collect and convey released oil to an oil trap building; construction of an oil trap building to recover oil; and the addition of perimeter ditches and interceptor ponds.

The upgrades were necessitated to meet Manitoba Hydro's environmental goals, reduce the risk of fire spread in the event of a large oil filled transformer fire, and to align with industry practices for environmental protection.

Parts c –i:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question is not in relation to a previous information request, so it will not be answered.

Date	August 24 2012
Reference	CEC/MH-II-015b
Source	MWL/MH-5
Question	CEC/MH-VII-464

Question:

"Once a right-of-way for a transmission line is approved, the Mineral Resources Branch would remove the surface rights from where the right-of-way is located, essentially leaving existing mining claims or leases unaffected except for the narrow band of land where surface rights have been removed."

a. Will mineral rights and existing mineral tenure be removed for the Bipole III right-of-way?

b. Did the preferred corridor selection avoid existing mineral rights and tenure when decisions were made?

c. What happens to existing mining claims and leases that are in the right-of-way for Bipole III.

d. Provide a map of the right-of-way combine a corridor of 66 meters – all four sections of Bipole III.

e. What is the land quantum for the right-of-way easements?

Response:

a) Manitoba has a system of dual land tenure where surface rights and mineral subsurface rights can be separate and owned by different parties. Disposition of a parcel of land can be either surface or mineral and can be granted jointly or severally, where both rights co-exist, and if necessary secured. Accessing the surface rights of a separate owner, should these rights exist, may create loss or damage which must be

accounted for, and reflects a restricting influence. A valid mineral disposition (i.e., claim, mineral exploration licence, or quarry permit) grants the holder the legal right to access the surface of the land for exploration, extraction and development purposes. Crown land subsurface mineral rights are held by the Crown. The subsurface mineral rights within the Bipole III right-of-way could or would remain without conflict unless the surface is somehow affected through the mining process. The existing mineral tenure associated with a claim or lease would remain in place. In the case of private lands, mineral rights may or may not be held by the property owner. As with Crown lands, the surface rights on privately-owned land for the transmission line right-of-way easement would be removed. In either case, removal of surface rights would be as a result of a disposition through Crown Lands or a private landowner. If subsurface mineral rights are held by a private owner, negotiation could be required between Manitoba Hydro and the owner should there be any concerns with respect to the mineral rights.

b) Existing mineral exploration license areas, mining claims, mineral leases, and quarry leases were considered in the route selection process for Bipole III, along with numerous other routing criteria. Potential interactions were minimized to the extent possible in selecting a preliminary and Final Preferred Route.

c) Once a right-of-way for a transmission line is approved, Manitoba Hydro would request the right to limit withdrawal of mineral rights from Crown Lands as part of a right-of-way application for Crown lands. The Crown Lands and Properties Agency would look to the surface requirements (i.e., removal of surface rights), and the Mineral Resources Branch would initiate the limitation on mineral withdrawals. This essentially leaves any existing mining claims or leases unaffected except for the narrow band of land taken for the right-of-way easement (66 m for Bipole III) where surface rights are removed. Subsurface rights could or would remain without conflict for claims and leases within the Bipole III right-of-way unless the surface is somehow affected through the mining process.

d) A map showing mineral resource use with the Final Preferred Route is provided in Chapter 6 of the EIS, specifically Map 6-32. In addition, the EIS includes two map folios

that show the Final Preferred Route on a set of 1:250,000 and 1:50,000 scale maps. The map folios showing the entire length of the 66 m transmission line are the 250K Map Series and 50K Map Series.

e) Based on existing data available at the time of EIS submission, the quantum of land crossed by the 66 m right-of-way easement for the Final Preferred Route affecting existing mining claims or leases consists of the following: approximately 56 hectares (ha) of mineral claims; and approximately 160 ha of quarry lease areas, and approximately 698 ha of mineral exploration license areas are affected by the route. No mineral lease areas are affected by the 66 m right-of-way.

Date	August 24 2012
Reference	None
Source	MWL/MH-6
Question	CEC/MH-VII-465

Question:

It would appear that the analysis for section 6 of the corridor is missing from the EIS (see: 7-46 to 7-47).

Manitoba Hydro to provide analysis for Section 6.

Response:

Section 7.3.3 of EIS Chapter 7 where pages 7-46 and 7-47 occur is for identifying new segments or alterations made to any of the alternative routes shown in Round 3. There were no modifications to the routing presented for Round 3 in Section 6. As such there is no corresponding heading for this section.

Date	August 24 2012
Reference	None
Source	MWL/MH-7
Question	CEC/MH-VII-466

Question:

Chapter 8, s. 8.2.1.2 mentions the risk of "permafrost degradation" (i.e. the loss of permafrost). The loss of permafrost will contribute to greenhouse gas (GHG) emissions, but no reference to permafrost can be found in the Bipole III GHG technical report.

a. Did the GHG analysis take into consideration the increase in GHGs from permafrost degradation?

b. How many kilometres of permafrost lands will the corridor travel over?

c. How much permafrost lands will be taken up by the northern converter station site and access roads?

d. How much permafrost will be affected by road building, work camps, and infrastructure previously licenced for Bipole III?

e. How much permafrost will be affected or included in the right of way easements for Bipole III?

f. Manitoba Hydro to provide a map to show both continuous and discontinuous permafrost locations along the Bipole III corridor, and in project area

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre*

Thursday, August 16, 2012. page 157 lines 5-9.). These questions do not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-VI-264
Source	MWL/MH-8
Question	CEC/MH-VII-467

Question:

CEC/MH-VI-264 states "Manitoba Hydro has only recently in the last two years begun to apply herbicides on Bipoles I and II." Yet in Chapter 8 (8-7 "Herbicide Residues") the EIS states: "Since 1985, Manitoba Hydro has significantly reduced the use of soil residual herbicide products for management of vegetation (operation phase) along transmission rights-of-way. The original request asked for decade of data.

a. Manitoba Hydro to provide data on all herbicide use on rights of way and corridors since 1985, including the types of and volumes of herbicide used in each year since 1985 through to 2012.

b. What is Manitoba Hydro's definition of a 'significant reduction' as referenced above? Compared to what ?

c. How much herbicide has Manitoba Hydro been using annually since 1985? Including what types? And what Volumes?

d. How often is each herbicide applied? Where ?

e. How does Manitoba Hydro's practices for application of pesticides, and herbicides compare with other industry practices?

f. Are annual reports with actual pesticide used in any given year available to the public?

g. What are the restrictions to Pesticide Use Permits?

Response:

a) It appears the reference cited by the participant in this information request is in error. Assuming that the participant intended to refer to information request *CEC/MH-VIII-244* related to pesticide application on Bipoles I and II. A complete inventory of herbicide use since 1985 is not relevant to assessment of the Bipole III Transmission Project in relation to vegetation management. The information sought on all herbicide volumes and types is reported to the Province as per the requirements of the pesticide use permits on an annual basis.

b) As herbicides are applied, they inhibit a particular enzyme required by the targeted plant for growth. Application of the herbicide late in the targeted species growing season will decrease seed production resulting in fewer plants the following season. With this reduction in plant production, herbicide use will also be reduced.

c) This question is a repeat of a.

d) Manitoba Hydro has a spraying program that evaluates the current infrastructure to determine when and where herbicide application is to be undertaken. Vegetation surveys are undertaken for the sub transmission and distribution lines to determine vegetation type and growth. Additionally, the mechanical brush control data are reviewed as this data provides the information related to the height and abundance of re-sprouting. As well, a review of the herbicide tree control data is undertaken, as there will be a small percentage of the trees that will have survived the treatment.

e) Manitoba Hydro is not privy to data (volumes) from other industries employing herbicides on their properties. Manitoba Conservation and Water Stewardship is the responsible authority for the issuance of pesticide use permits and the associated volumes used per year by various industry sectors. Please contact them for additional information.

f) Section 10 of the Manitoba Regulation 94/88R, states: "Before the end of the calendar year for which a pesticide use permit is issued, the permit holder shall submit to the Department a final report on a form provided by the Department".

Manitoba Hydro submits on an annual basis the required report to the Pesticide Section of Manitoba Conservation and water Stewardship.

http://www.gov.mb.ca/conservation/eal/pesticide/permit.html

g) Restrictions on the pesticide use permit generally comprise of the following:

- What may be applied where at what rates
- Other restrictions such as:
  - Proximity to water
  - Parks, schools, etc.
  - Public consultation
  - Sensitive features – such as aquifers, soil type,
  - No application by air

Date	August 24 2012
Reference	None
Source	MWL/MH-9
Question	CEC/MH-VII-468

Question:

8-33 "... Mitigation measures that will be employed to minimize or preclude any potential for impairment of groundwater quality along rights-of-way will include the following:

-No herbicides are used in clearing new rights-of-way. (Manitoba Hydro et al. 2003);

-If herbicides are required to control vegetation growth, all applicable permits and provincial regulations will be followed;

-On private lands, prior to any vegetation management work, landowners or appropriate authorities will be contacted to obtain the necessary permission; and

-Based on the above mitigation measures there are no anticipated residual effects.

Request:

a. Again – how much herbicide is applied and how often?

b. Are water samples collected from nearby streams, lakes and water courses to ensure application of herbicides are at levels that do not impact surface or groundwater?

c. Are water samples taken before and regularly after application of herbicides?

d. Manitoba Hydro to provide samples of its record keeping, monitoring reports and evaluation of risk and success for existing herbicide application programs for existing especially transmission corridors.

e. Manitoba Hydro to provide a comparison and update on the herbicide application application program for the new Wuskwatim transmission corridors.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided. However, please see responses provided for *CEC/MH-VI-244a*, *CEC/MH-VI-244b* and *CEC/MH-VI-244c* for further information on this subject.

Date	August 24 2012
Reference	None
Source	MWL/MH-10
Question	CEC/MH-VII-469

Question:

8-8 – "… Through Project mitigation, the residual effect to surficial and bedrock materials is not anticipated to effect any of the valued environmental components of the soil and terrain environment. Residual effects to surficial and bedrock materials are anticipated to be adverse, of low ecological and societal importance, small magnitude, affecting the local assessment area on an infrequent basis over the long-term with irreversible effects that are within regulatory requirements and objectives regarding the use of minerals."

How was this 'residual effect' determined to be a small magnitude? Given proximity to the nickel belt, what steps were taken with provincial geologists and the Manitoba Geology Survey to come to the conclusions stated in the EIS? Were studies done regarding mineral potential, and assessment for economic mineral potential? If so Manitoba Hydro to provide to participants.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-11
Question	CEC/MH-VII-470

Question:

8.2.1.4 Environmental Effects Assessment and Mitigation (8-9) "... Potential environmental effects of the Project were identified using a combination of methods, including an environmental interaction matrix, feature mapping, professional opinion and review of Aboriginal Traditional Knowledge (ATK), key perspectives and comments from the Environmental Assessment Consultation Process and literature (Bipole III Terrain and Soils Technical Report)."

a. How were these various information sources used to arrive at these conclusions as to environmental effects ?

b. Was one method given greater value or priority over another?

c. Was field studies, and possible effects given highest priority?

d. Manitoba Hydro to provide ' feature mapping' used in determining levels of potential environmental effects, unless already provided in the EIS materials.

e. Manitoba Hydro to provide the interaction matrix mentioned in the EIS.

f. Manitoba Hydro to provide explanation as to how potential economic effects were assessed in relation to potential environmental effects.

g. Manitoba Hydro to provide explanation as to how potential effects on Aboriginal rights, traditional land uses, and protection of lands important to the land uses based in Aboriginal rights were assessed in relation to other potential effects fro the Bipole III corridor project.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-12
Question	CEC/MH-VII-471

Question:

(8-10): "The following mitigation measures are recommended…

Construction activities in southern Manitoba will be undertaken, where possible, under dry conditions in high compaction risk areas (Bipole III Terrain and Soils Technical Report) and moist conditions in high to severe wind erosion risk areas, where possible;"

Obviously Manitoba Hydro does not control the weather.

[Opposing conditions (dry conditions vs moist conditions) and mitigation measures will be hard to implement … Timing will be most likely be the overall deciding factor on when construction activities will proceed]

a. What happens if a wet year occurs?

b. Will Manitoba Hydro delay construction for a year or more if conditions are not dry?

c. What adaptive management methods in transmission line construction are used by Manitoba Hydro when the weather become wet?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-13
Question	CEC/MH-VII-472

Question:

8-12 – "Investigations determined that there are four existing sites along the transmission line route that have unstable or steep slopes within the Local Study Area (Chapter 6). These sites have been identified as ESS where tower placement and equipment access will be carefully selected to avoid de-stabilizing the slopes."

Where are these four sites? Manitoba Hydro to provide map showing these locations.

Response:

The four sites along the preferred route are (from Soils and Terrain Technical Report page 6.10 – 6.12):

- Sinclair River
- North Duck River
- Assiniboine River
- Overflowing River

Maps have previously been provided in the Soils and Terrain Technical Report. (Map Series 800 Water Erosion Prone Soils).

Date	August 24 2012
Reference	None
Source	MWL/MH-14
Question	CEC/MH-VII-473

Question:

8-14 "…Depending on the planned future use for the site, aggregate borrow sites **should** be closed, or reclaimed, in accordance with the Mine Closure Regulation, M.R. 67/99 and Manitoba Mine Closure Regulation 67-99 General Closure Plan Guidelines (Manitoba Industry, Trades and Mines 2006)."

Explain the approval process for an aggregate borrow site for a Manitoba Hydro permit. Are these publicly posted, are First Nations notified of the specific locations? Are the permits and location of these borrow pits connected to right of way easements?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-15
Question	CEC/MH-VII-474

Question:

(8-29) "Follow-up is not required in relation to GHG emissions other than to record project inputs and volumes to improve the accuracy of the GHG contribution…"

Does MB Hydro do anything to offset GHG emissions from their projects? On what basis is the statement above made – with respect to follow up not being required? Does Manitoba Hydro monitor and report GHG emissions during the life of a transmission project? Has Manitoba Hydro undertaken a risk assessment with respect to GHG emissions from transmission projects over time, and in relation to permafrost loss over time, identified GHG emissions during planning, construction, and operation phases of the life of a transmission system?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-16
Question	CEC/MH-VII-475

Question:

(8-31) "... The Project will require the construction of wastewater treatment lagoons, for the Construction Camp and the Keewatinoow Converter Station. However this will be subject to separate licensing under The (Manitoba) Environment Act and not assessed in this EIS."

Has the licensing process begun yet for the wastewater treatment lagoons? How many separate licences are involved in the entire Bipole III project? List and identify those existing, and those other environment licences intended. Manitoba Hydro to explain the rationale and decision making for the various staged licences for the entire Bipole III project.

Response:

There are two licences associated with the Project. As indicated in Chapter 2 of the Project EIS, a separate licence was pursued for the construction and operation of the wastewater treatment system associated with the camp. Manitoba Hydro received this licence from Manitoba Conservation and Water Stewardship August 28th 2012.

Date	August 24 2012
Reference	None
Source	MWL/MH-17
Question	CEC/MH-VII-476

Question:

(8-32) - "The main potential issue with transmission line construction in regards to groundwater is related to drilling for tower foundations, especially in sensitive areas such as artesian areas… result in a direct groundwater discharge to the surface or interconnections of aquifers if auger holes are not sealed properly or quickly enough… Interconnections of artesian saline aquifers with potable aquifers may result in degradation of groundwater quality."

Has Hydro any experience with the risks identified in the text above? Manitoba Hydro to provide information as to any instances of transmission towers affecting (including drill holes) groundwater, connections between aquifers, water quality etc. Manitoba Hydro to provide its emergency plan for such instances. Manitoba Hydro to provide comparative information on this potential environmental effect based on its Wuskwatim work camps.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-18
Question	CEC/MH-VII-477

Question:

(8-35) "… There are no mitigation activities required for the drawdown of groundwater at the camp due to reversibility of the effect and absence of impact to the surficial environment or other aquifer users. The residual effect of aquifer drawdown is characterized as negative in direction, medium term in duration, small in magnitude, confined to the Project Site/Footprint, will occur on a regular/continuous basis, and is reversible during the life of the Project. The effects are therefore considered to be not significant."

Manitoba Hydro to provide the basis and methodology for the statement above as to its assessment of environmental effects from drawdown of groundwater in an aquifer used for camp water supplies. Manitoba Hydro to provide its analysis and projections as to reversibility of aquifer drawdown effects. Manitoba Hydro to provide information on the potential impacts from drawdown of aquifers during dry summer (s)and the potential effects to surface water connected to the Nelson River and therefore fish habitat.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-19
Question	CEC/MH-VII-478

Question:

(8-37) "Aquifer quality and aquifer productivity are not anticipated to be affected by construction or operation of the Riel Converter Station, due to the absence of effect pathways/interactions. Water supply and wastewater disposal systems will be connected to the City of Winnipeg systems precluding effect pathways/interactions."

a) What would be impact of oil or other contaminant spill into the nearby City of Winnipeg Deacon Water Reservoir from the Riel Converter station?

b) What is the probability of this occurrence. Please show all calculations or supporting evidence used to arrive at this probability?

c) Did Manitoba Hydro review risk to streams, potential flow to ditches etc?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	MWL/MH-20
Question	CEC/MH-VII-479

Question:

(8-37) "The potential for aquifer quality to be impaired at the ground electrode sites exists due to leachate from the continually-saturated buried coke beds at the electrode sites… The requirement for the coke beds to be kept saturated may cause any naturally occurring components in this material to leach which could directly affect groundwater quality. Leachate from coke commonly contains metals such as aluminum, manganese, nickel and vanadium (Puttaswamy et al. 2010). Within in-situ experiments, metal concentrations were often found to not be significantly elevated; however, this was likely due to the metals being taken up by organic and inorganic constituents (peat, naphthenic acids and other dissolved organic carbon species) (Squires 2005; Baker et al. 2007; Baker et al. 2008). Minute to no levels of polycyclic aromatic hydrocarbons were found in coke leachate (Squires 2005)."

a. What are the impacts of coke (aluminum, manganese, nickel and vanadium) on groundwater, fish habitat, drinking water?

b. How will coke be handled during transportation?

c. How will code be handled during transportation construction?

d. Where will it be stored?

e. Could it be exposed to surface water during the installation process?

f. What are the effects from exposed materials at the ground electrodes sites during installation and after installation should there be an extreme weather event, with above normal rainfall? Did Manitoba Hydro use methodology that tested their

conclusions based on past and average water levels, weather, and leaching levels or did Mantioba Hydro include low likelihood, but extreme impacts scenarios in its self assessment for the EIS?

g. Did Manitoba Hydro go beyond in situ experiments in its analysis and self assessment? Did Manitoba Hydro undertake a review and research to determine any instances of acquifer, and water quality effects from leachate at existing similar converter stations?

h. Did Manitoba Hydro undertake any review of risk to aquifer, ground water, and surface water from the combined developments in the project area for the Converter Station? This would include then cumulative impact risk assessment for leachate from combined with other risks in the project area.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question is not in relation to a previous information request, so will not be answered.

Reference can be made to *CEC/MH-III-053b* for information on coke used at the ground electrode site. Manitoba Hydro can also advise that it will transport the coke material in accordance with all applicable regulations.

Date	August 24 2012
Reference	None
Source	MWL/MH-21
Question	CEC/MH-VII-480

Question:

(8-39) **-** "Underground irrigation systems will be installed at the ground electrode sites to allow for soil wetting during periods of dry soil conditions, with irrigation water being sourced from groundwater at the sites… The groundwater withdrawal requirements for electrode irrigation are anticipated to be minimal; therefore disturbance to aquifer productivity is not anticipated and there are no anticipated residual environmental effects."

Exactly how much water is required for irrigation – it is referred to as minimal – how much? At what pumping rate? Total per year ? How many sites?

Response:

The exact volume has not been estimated yet but will depend on the moisture conditions in any given year. The intent of irrigation is to keep the ground moist in the immediate vicinity of the electrode to improve conductance. The total area requiring irrigation in surface area terms would likely be less than a few hectares for a ring type electrode. Final design of the ground electrode has not been completed.

Date	August 24 2012
Reference	None
Source	MWL/MH-22
Question	CEC/MH-VII-481

Question:

(8-39) – "While not highly likely, an unintended groundwater discharge to the surface could result in a residual effect which would be negative in direction and could impact both the surface and subsurface environments. The surficial discharge may have high ecological and social importance depending on the quality of the discharging groundwater and the effect may range from low to high in magnitude. The geographic extent would likely be localized and the impact is considered to be short-term and sporadic. Reversibility of the impact would be dependent on the quality and quantity of the discharging groundwater. Saline groundwater discharges could also directly or indirectly affect other local environments (e.g., terrestrial/soils) and these effects could potentially outlast those to the groundwater or surface water environments. After mitigation measures and remediation activities, the residual effects are is anticipated to be not significant."

Manitoba Hydro to explain its methodology, and scientific basis for concluding that a ' surficial discharge that may have high ecological and social importance' and may not be reversible, may be saline water full of other minerals and chemical – is not significant.

Manitoba Hydro to provide information about any instances fitting the risks identified in its text above from the EIS, and what the environmental effects were.

Manitoba Hydro to provide its standards in terms of assessing environmental effects and identifying mitigation that may be needed vs assessing level of residual environmental effects after an incident has occurred.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question is not in relation to a previous information request, so it will not be answered.

Reference can be made to *CEC/MH-III-053b*, *CEC/MH-VII-115* and *MCWS/MH-II-010c* for more information on groundwater that has been requested through previous information requests and submissions to Manitoba Conservation and Water Stewardship.

Date	August 24 2012
Reference	None
Source	MWL/MH-23
Question	CEC/MH-VII-482

Question:

(8-44) "Petroleum coke is a solid, carbonaceous material that is placed around the ground electrode rod to increase its conducting surface. The rod along with the coke is located approximately 3 m under the ground. The coke has the potential to leach various hazardous substances, such as metals and PAHs (polycyclic aromatic hydrocarbons). Effects during construction include the deposition of fine particulate coke material resulting in an increase in Total Suspended Solids (TSS) of a water course and the introduction of PAH and metals to the water course."

a. What are the potential impacts of particulate coke materials on a watercourse, fish, aquatic species, etc.?

b. If it settles to the bottom of the stream could there be ongoing impacts to that watercourse due to the metals present in coke?

c. How long would particulate code material stay in the environment – soil, water, on plants, etc?

d. What occurs if the three meter depth for burying the rod and coke is insufficient ? How was the 3 meter depth determined? How was the site for the electrodes selected ? Based on land availability ? Based on least risk to waterways, ground water and aquifer? Manitoba Hydro to provide detailed explanation as to the site location for the Riel converter station and the electrode underground system.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question is not in relation to a previous information request, so will not be answered.

Please refer to *CEC/MH-III-053b* for information on coke used at the ground electrode site in response to a).

Date	August 24 2012
Reference	None
Source	MWL/MH-24
Question	CEC/MH-VII-483

Question:

(8-47) "Existing aquatic environment information was collected and analyzed for the project areas. This information included the review of available fish and fish habitat information, local knowledge obtained through ATK studies, and field studies conducted at a selected subsample (57) of the stream crossing sites for the transmission line, converter station, and ground electrode sites..."

The project requires overhead line crossings of 360 water courses.

Is this subsample (57 crossings) sufficient enough to draw conclusions? What local knowledge from ATK studies was applied to assess environmental effects risk to aquatic systems, and species? Did Manitoba Hydro ask Peguis First Nation to participate in ATK studies with respect to the location for the converter station and or the electrodes, underground irrigation system etc? Manitoba Hydro to provide the studies, sets of aquatic environmental information used to come to the conclusions in this section of the EIS. Which 57 stream crossings are referred to here and how was the subsample selected?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question is not in relation to a previous information request, so will not be answered.

Please refer to *CEC/MH-III-053b*, *CEC/MH-VII-115* and *MCWS/MH-II-010c* for more information on groundwater that has been requested through previous information requests and submissions to Manitoba Conservation and Water Stewardship.

Date	August 24 2012
Reference	None
Source	PFN/MH-1
Question	CEC/MH-VII-484

Question:

Sections of the Bipole III corridor and the Riel Converter station fall inside the Treaty Notification territory and traditional areas of Peguis First Nation, yet no meeting or open-house were held for Peguis First Nation, as they were for other First Nations and Municipalities in Manitoba.

Explain why Peguis First Nation was omitted from the Site Selection & Environmental Assessment Approach (SSEA)?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-VI-248
Source	PFN/MH-2
Question	CEC/MH-VII-485

Question:

The second component of the question: "Are their any examples in terminus settings for dc transmission where similar devices have failed, resulting in leakage?" remains unanswered.

a. Manitoba Hydro to provide more detail on how a figure of 1% was arrived at. Is this a best guess estimate, or is there a quantifiable justification in terms of the calculus used to arrive at this 1% figure?

b. Manitoba Hydro to provide the same information in respect to the probability if leakage of insulating gas from the switchgear at the Riel Converter Station. What is the probability of insulating gas leakage from the Riel Converter station? Please show all calculations used to arrive at this figure.

c. Manitoba Hydro to answer the second component of the question: "Are their any examples in terminus settings for dc transmission where similar devices have failed, resulting in leakage, or leakage occurred for other reasons?" Please answer this question in the context of the Riel Converter Station as well.

Response:

a) The probability of leakages is based on IEC Standard 62271-1, 2004 which requires an SF6 and SF6 mixture leakage rate of less than 0.5% and 1.0 % respectively, per year.

b) The probability of leakage due to failure is extremely difficult to calculate since industry failure data specific to SF6 is not readily available. Considering that failures may

or may not release SF6, a conservative estimate may be obtained from Cigre Technical Report 83, 1994, which references 4.7 minor failures for every 100 circuit breaker years.

The probability of leakages on a per equipment basis would be similar for Keewatinoow and Riel since the High Voltage equipment is similar.

Original question - Are there any examples in terminus settings for dc transmission where similar devices have failed, resulting in leakage?

c) There were five SF6 leakages at Manitoba Hydro terminus settings that resulted in a reportable release. Two of these were attributed to equipment that will not be utilized in Bipole III. A third is the result of a slow leak over a time frame of 15 years. The remaining two were attributed to equipment failure.

Date	August 24 2012
Reference	CEC/MH-II-021
Source	PFN/MH-3
Question	CEC/MH-VII-486

Question:

CEC/MH-II-021 (18Jul12 Response Package) outlines a number of mitigation measures to deal with the spill of, or combustion of insulating oil: "*Prevention and Mitigation:* To reduce the risk of a transformer tank breach and oil release, pressure release devices are installed on each converter transformer, which are designed to release internal tank pressure following a fault before a tank breach occurs. As well, the following measures will be put in place to reduce the risk to the environment:

-The converter station is designed to minimize the spread of fire,

-A fire suppression system as outlined in Section 3.5.2.1;

-A oil containment system as outlined in Section 3.5.2.1; and

-A spill response plan will be developed for each individual site and spill response materials will be available on each site.

The potential impacts to the environment without the measures outlined above would be the spread of the fire to other components of the converter station and potential contamination of the surrounding environment (land or water)."

a) What is the probability of potential contamination of the surrounding environment with and without the above-mentioned mitigation measures? Manitoba Hydro to provide details on the calculations used to arrive at the relative probability of risks for a converter station with and without the preventative and mitigating measures mentioned above.

b) What is the probability of a fire occurring? Please express this in terms the probability of a fire occurring every X years. Please show all calculations, or provide supporting studies, to verify this assumed probability of fire occurring?

c) Please provide more information on the risk of fire, in terms of the variety of scenarios that could result in a fire at the converter station.

Response:

a) Manitoba Hydro has not studied the probabilities of contamination of the surrounding environment with and without the measures mentioned for the Bipole III converter stations. The mitigation measures to be implemented will follow established standards, and will reduce the probability of contamination by varying amounts. The effectiveness of a specific mitigation measure depends on factors such as the prevailing site conditions and site location, the specific design of the mitigating system being used, the design life of the system, and how the system is operated and maintained.

b) Manitoba Hydro has not studied the probability of the occurrence of fires at the Bipole III converter stations.

c) Scenarios that could result in a fire at one of the Bipole III converter stations include:

i. High voltage outdoor oil-filled electrical apparatus fires due to failure of same or other nearby electrical equipment;

ii. Fire in the converter building or other buildings located within the station due to equipment failure in the converter valves, electronic systems, electrical systems, or building heating systems;

iii. Fire resulting from maintenance work, including welding, cutting, soldering, brazing, or other procedures requiring the use of open flame or electrical arcs;

iv. Fire resulting from poor housekeeping practices in office areas or shops within buildings;

v. Fire resulting from improper storage, handling or use of flammable liquids and/or gasses.

Fire prevention and suppression practices considered in the planning and design of the Bipole III converter stations to address these risks include:

i. Eliminating oil-filled equipment, where practical, from the design;

ii. Fire separation and strategic location and separation of oil-filled equipment within the station to minimize the potential for the spread of fires, and placing barriers between equipment where adequate separation cannot be attained;

iii. Addition of water deluge fire suppression systems and oil conveyance systems to oil-filled equipment;

iv. Monitoring of synchronous condensers hydrogen cooling gas purity during operation, with protection systems to ensure safe shutdown in the event of a loss of purity;

v. Monitoring of synchronous condensers for hydrogen gas leaks, with protection systems to prevent unsafe concentration of hydrogen gas;

vi. Selection and specification of materials for equipment that exhibit self-extinguishing or fire-retardant properties;

vii. Incorporation of multiple layers of fire detection systems and active fire suppression systems in buildings;

viii. Provision for specific buildings for the purposes of storing flammable liquids and/or gasses.

Additionally, the Manitoba Hydro Fire Manual is the basis of the fire prevention and protection program at Manitoba Hydro, and includes the principles, policies, practices and procedures pertaining to fire prevention and protection, reporting, inspections, testing, drills, audits, and training.

Date	August 24 2012
Reference	None
Source	PFN/MH-4
Question	CEC/MH-VII-487

Question:

We find little to no indication of Manitoba Hydro's understanding as to how aboriginal rights vary in accordance with each particular Treaty. We are mindful of the few references (Table 7 (pp. 87-90) in the Aboriginal Technical Report #1, which has a few mentions as to how Treaty 1 and/or Treaty 5 may constrain routing) but these provide little detail. There is also cursory mention of the different Treaty groups in Chapter 5. None of these elevate to a full analysis.

a) Did Manitoba Hydro undertake a review and/or research to increase understandings of Treaties 1, 2, 4, and 5 prior to the selection of the preferred Bipole III corridor?

b) Did Manitoba Hydro make any route decisions based on Treaty or specific First Nation territory?

c) Did Manitoba Hydro analyze how the text of each of the different numbered Treaties effects planning for the Bipole III project?

d) Did Manitoba Hydro take the specifics of each Treaty into account when choosing the preferred corridor?

e) Did Manitoba Hydro make any decisions based on Treaty or specific First Nation territory?

f) Provide examples as to how the EIS considers the different treaties?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	PFN/MH-5
Question	CEC/MH-VII-488

Question:

a. Page 84-85 of the *Bipole III Lands Of Special Interest and TLE Lands Technical Report* states: "There are seven First Nation communities that have been identified as having potential interaction with the final preferred route. These are as follows: [Fox Lake, York Factory, Tataskweyak, Opaskwayak, Sapotaweyak, Wuskwi Sipihk, Long Plain]"

b. Page 26 of the *Bipole III Lands Of Special Interest and TLE Lands Technical Report*: "Peguis First Nation identified, as part of their TLE, an area of land, largely in the Interlake between lakes Winnipeg and Manitoba and extending south of Dugald on the east side of Winnipeg in the R.M. of Springfield, where they are to receive the right of first refusal for any Crown land becoming available for sale or lease. If Crown land is identified and requested for acquisition, the province has agreed to provide the information to Peguis First Nation for their review. Map 21 shows the extent of the area involved. Five segments, A23, B28, B29, C30, C31 and the final three nodes of the alternative routes are ranked medium because of this potential conflict with Peguis First Nation interests. These segments are all located at the southern end of the alternative routes as they move toward the Riel Converter Station."

Given that the Bipole III transmission corridor cuts right across the Treaty Land Entitlement Notification Zone and the traditional territory of Peguis First Nation: why was Peguis not considered one of the seven First Nation communities that have been identified as having potential interaction with the final preferred route?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	PFN/MH-6
Question	CEC/MH-VII-489

Question:

"The preferred ground electrode site falls within the Peguis First Nation TLE Notification Area. Under agreement with the Province of Manitoba, if Crown land is identified and requested for acquisition, the province is to provide the information to Peguis First Nation for their review. **In the case of the ground electrode site, private and/or municipal lands are involved.** The scale of construction for the ground electrode will be substantially smaller than for the converter station site. Effects on the acquired property of the ground electrode site are expected to be negative, small, limited (site), and short-term in duration." *Bipole III Land Use Technical Report* p. 110.

Manitoba Hydro to provide a listing and a map of all Crown Lands being taken up by the Bipole III corridor, converter stations, and ground electrodes.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	PFN/MH-7
Question	CEC/MH-VII-490

Question:

Did Manitoba Hydro approach Peguis First Nation to hold workshops, gather ATK etc., before licensing Riel (1st instance) and/or before Bipole III EIS or CEC proceedings began in May 2012?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous information request submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-VI-274
Source	PFN/CEC-8
Question	CEC/MH-VII-491

Question:

Limited Aboriginal Traditional Knowledge (ATK) was obtained through Northern Lights Heritage services (see: *Aboriginal Technical Report #1*) and self-directed community studies (see: *Aboriginal Technical Report #1*). The Manitoba Metis Federation for instance was able to perform 50 surveys to identify some members' traditional areas of use. *CEC/MH-VI-274* states: "Outside of the CEC process, Manitoba Hydro is not planning to solicit any further public input on supplemental materials provided." The community consultation project for Peguis First Nation was only funded as of August 2012.

Are we correct in assuming that Peguis ATK and knowledge will not be incorporated in the EIS? Why leave Peguis First Nation out of the EIS?

Response:

Manitoba Hydro is not planning to revise the EIS that was submitted to the Province in December 2011, and as such new information will not be incorporated into the EIS at this time.

In July 2011, Manitoba Hydro provided some funding to assist Peguis First Nation in completing a Traditional Knowledge Study. Manitoba Hydro communicated at that time that it would welcome the opportunity to discuss any findings of the study. To date, no results of this study have been shared with Manitoba Hydro.

Date	August 24 2012
Reference	None
Source	PFN/MH-9
Question	CEC/MH-VII-492

Question:

What further analysis did Manitoba Hydro undertake with respect to Peguis First Nation traditional territory, which is larger than its notification zone for TLE?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first IR round (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-II-001f
Source	CEC/MH-359
Question	CEC/MH-VII-493

Question:

Some clarification is required regarding the VEC table provided.

Biophysical VECs

a) Please define "Scientific Importance". What does this mean: ecological niche, ecological role, used in lab experiments?

b) Why is this term only associated with birds and not the other biophysical VECs?

c) Please define, using examples where necessary, "Linkages to potential Project effects"?

d) Again this term is used almost solely in conjunction with the bird species, please explain?

e) Please more fully explain the application of "scientific importance" and "linkages to potential Project effects" for each of the VECs it has been applied to. Provide specific attributes that lead to these categorizations.

f) For the mammals please more fully explain, for each VEC where the terms have been used, what attributes lead to categorizing the species as Keystone, Umbrella or Indicator species. Do any of the characterizations apply to VECs other than mammals?

g) Why is there no VEC(s) that represents the canopy dwelling species?

Response:

a) All disciplines identified VECs, or parts of the environment that were considered important by the proponent, public, scientists and government involved in the assessment process. Importance may be determined on the basis of cultural values or scientific concern (Hegman et al. 1999). For bird species selected as VECs, scientific importance is defined as species that are keystone species, umbrella species, or indicator species. Scientific concerns included regulatory concerns (e.g., Species-at-Risk, hunted populations). Bird species that were considered scientifically important and scientific and other proponent and public concerns are listed in Table 3-1 in Section 3.2.4 of the Bipole III Birds Technical Report.

b) Most of the scientific terminology used by the discipline specialists is similar with some specific terminology related to some specialties. Although the term "scientific importance" was not used for other bio-physical components, terms such as keystone species, umbrella species and indicator species are used, which are part of the definition provided in a). These other terms are also used in the mammals discipline where the chosen VECs benefit, conserve or represent a group of species associated with similar habitat.

c) Linkages to potential project effects are defined as the pathway of direct and indirect effects associated with the construction and operation of the Bipole III Transmission Project. These were considered for each VEC species. Please refer to section 5.1.2 of the Bipole III Bird Technical Report for a description of potential project-related effects on bird VECs and bird groupings.

d) As in b) above, the various specialists used differing terminology, however all considered and assessed potential Project effects (direct and indirect) against their VECs. All disciplines used the same general approach to conduct the effects assessment (see Bipole III EIS Chapter 4 and the applicable supporting Technical Reports).

e) Indication of the scientific importance for bird VEC species can be found in Table 3-1 in Section 3.2.4 of the Bipole III Birds Technical Report. The range of potential project-related effects for VEC species include habitat loss or alteration, sensory disturbances

and mortality. These potential effects will occur directly or indirectly from construction and operation activities and were the focus of mitigation recommendations. There are differences for potential effects among bird groups (e.g., potential harvest relates only to regulated species or those used for domestic consumption purposes). The considerations and selection process for mammal VECs is described in Section 3.2.2 of the Bipole III Mammals Technical Report.

f) For each mammal VEC, the terms keystone, umbrella or indicator species are used in part as selection criteria, and were used further to describe their importance in the existing environment. Other scientific concerns that were used in mammal VEC selection criterion included regulatory concerns. The categorization of keystone, umbrella or indicator species followed definitions provided in the Mammals Technical Report glossary. For example, beaver is considered a keystone species because it is critical in maintaining the structure of an ecological community and whose impact on a community is larger than would be expected based on its relative abundance. Hypothetically, if the direct or indirect effects of the Bipole III Transmission Project were disproportionately high on beaver (which is not the case), this would then have the potential to affect a large number of other wildlife species. These terms were also used for birds in determining their scientific importance (refer to 'a' above).

g) There was no need for a specific VEC to represent canopy dwelling bird species because this ecological niche is captured indirectly by other bird VECs (e.g., pileated woodpecker). Even though the pileated woodpecker is not a 'canopy dwelling species', it requires mature deciduous and mixedwood forest to meet its life requirements. Many canopy dwelling bird species (e.g., red-eyed vireo) live in mature deciduous and mixedwood forest habitat. As such, the pileated woodpecker is an indicator species for a large number of canopy dwelling species. It should be noted that the pileated woodpecker is also considered a keystone species because of its importance in creating habitat for many other wildlife species. Bird community associations are described in Appendix E and F of the Birds Technical Report.

References:

Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling, and D. Stalker. 1999. Cumulative effects assessment practitioners guide. Prepared by AXYS Environmental Consulting Ltd. and the CEA Working Group for the Canadian Environmental Assessment Agency. Hull, Quebec. Pp. 143

Date	August 24 2012
Reference	CEC/MH-II-003a
Source	CEC/MH-360
Question	CEC/MH-VII-494

Question:

a) Is the method used to evaluate the route segments used by others?
Has MH used it previously?
If so was there any evaluation of the method's efficacy and applicability?
Any literature that supports the methodology used?
b) Was there any weighting of components in relation to availability of data or level of participation for each category and each line section? Reason being if there is uncertainty; any errors would then be on the conservative side.
c) What elements were evaluated to determine VH, H, M, L ratings?
d) Please provide specific examples for each evaluation criteria for each biophysical group, socio-economic group and land use.

Response:

a) Manitoba Hydro's method for routing a transmission line, the Site Selection and Environmental Assessment (SSEA), is a common method used in selecting utility corridors, although companies and jurisdictions will have differing names for the process. Manitoba Hydro has used this approach successfully for several decades with constant improvements over time as more information and knowledge become available and with technological advancements (e.g., GIS capabilities). The method has also been accepted by regulators on numerous previous transmission line projects within Manitoba (e.g. Wuskwatim 230 kV Transmission Project, Glenboro - Rugby - Harvey 230 kV Transmission Project, Rosser to Silver 230 kV Transmission Project, Gillam Station and Line Tap Project, Stall Lake to Flin Flon 230 kV Transmission Project, Laurie River to Lynn Lake Transmission Project) resulting in *Environment Act* Licences for the

aforementioned projects along with many others. Although there are many examples in the literature of routing models that assign criteria based values, the model used by Manitoba Hydro was customized by the study team to meet the needs of the Project.

b) There was no weighting of components in relation to availability of data or level of participation for each category and each line section in the route selection process.

c) The criteria (elements) that were evaluated by the discipline specialists and the approach taken to identify level of constraint, is provided in Appendix 7A EIS Chapter 7.

d) The evaluation criteria are provided in EIS Chapter 7, including Appendix 7A, Table 7A-1. Additional details on criteria rating are found in the discipline specific Technical Reports.

Date	August 24 2012
Reference	CEC/MH-II-005f
Source	CEC/MH-361
Question	CEC/MH-VII-495

Question:

a) Please provide a map, in such a scale to be able to discern major geographical features, including an approximation of the placement of the proposed line indicating existing, known and potential access sites to the ROW. Please clearly mark as a draft and subject to change as more evaluation takes place.

b) Please describe the attributes and the process of selection for access sites.

Response:

a) Manitoba Hydro is not prepared to share a draft map as discussions with Manitoba Conservation and Water Stewardship and interested parties have not concluded. Further discussions are expected to occur in conjunction with the review of the access management plan.

b) Previously provided responses *MCWS/MH-TAC-002a, CEC/MH-II-017*, *CEC/MH-III-121*, elaborate on access management planning considerations.

Date	August 24 2012
Reference	CEC/MH-11-015
Source	CEC/MH-362
Question	CEC/MH-VII-496

Question:

Has a risk assessment been done to determine what the level of risk would be if Bipole III was situated near Bipoles I & II?

Response:

Manitoba Hydro commissioned a study titled Teshmont Consultants Report on "A Weather Risk Assessment of the Existing and Proposed HVdc Transmission Lines.", Report No.: 1660-10000, October. 2006 (filed with the CEC) which assessed the risk of a failure of all three Bipole lines due to the same weather event for a Bipole III Interlake route (near Bipole I & II) compared to a route west of Cedar Lake/Lake Manitoba (West Route) and a route of east side of Lake Winnipeg. The study shows that locating the Bipole III transmission line on either the west or the east route is at least two to twenty times less likely to result in a simultaneous outage of all thee Bipole lines, depending on the weather event, when compared to Bipole III on the Interlake Route. Given the consequences of the simultaneous loss of all three Bipoles, Manitoba Hydro judged the Interlake Route for Bipole III to be unacceptable.

Date	August 24 2012
Reference	CEC/MH-III-055
Source	CEC/MH-363
Question	CEC/MH-VII-497ab

Question:

a) How many agricultural properties along the preferred route apply or could potentially apply liquid manure?

b) Was the same approach in routing taken regarding manure application as was taken in avoiding irrigated or potentially irrigated properties?

Response:

a) The number of agricultural properties along the preferred route that apply or could apply liquid manure was not inventoried.

b) No, as the use of a liquid manure injection system on agricultural land was not considered a major constraint for routing.

Date	August 24 2012
Reference	CEC/MH-III-055
Source	CEC/MH-363
Question	CEC/MH-VII-497c

Question:

How would compensation be applied in the case of application of liquid manure?

Response:

Compensation would be considered under Manitoba Hydro's Bipole III Landowner Compensation policy. Please refer to *CEC/MH-III-055* for further explanation on liquid manure compensation and *CEC/MH-II-007q* for eligible compensation.

Date	August 24 2012
Reference	CEC/MH-III-097
Source	CEC/MH-364
Question	CEC/MH-VII-498

Question:

Please provide the Heritage Resources Protection Plan (HRPP).

Response:

A Heritage Resources Protection Plan (HRPP) has not been finalized for the Project. The Draft EnvPP contains mitigation measures for heritage resources for use by Project personnel. The HRPP will be reviewed with interested parties and Heritage Resources Branch input prior to the start of construction.

Date	August 24 2012
Reference	CEC/MH-III-099
Source	CEC/MH-365
Question	CEC/MH-VII-499

Question:

Contrary to the response to question 097, 099 indicates that a HRPP will be developed. Please clarify whether this plan currently exists and provide a copy or when will it be available?

Response:

A Heritage Resources Protection Plan (HRPP) has not been finalized for the Project. The Draft EnvPP contains mitigation measures for heritage resources for use by Project personnel. The HRPP will be reviewed with interested parties and the Heritage Resources Branch input prior to the start of construction.

Date	August 24 2012
Reference	CEC/MH-IV-128
Source	CEC/MH-366
Question	CEC/MH-VII-500

Question:

A number of mitigating actions have been outlined to lessen impacts on Sharp-tailed Grouse. It was previously stated that the guy wires are a particular mortality factor for grouse.

If a population concentration or lek is found along the route would there be consideration to use free standing towers, instead of guyed towers, in the area?

Response:

Manitoba Hydro intends to use bird diverters or plastic sleeves on guy wires to improve their visibility, minimizing the potential effects of sharp-tailed grouse collisions with wires near leks. The use of free-standing towers instead of guyed towers will be considered where technically feasible, reasonable and practical.

Date	August 24 2012
Reference	Manitoba Hydro Supplemental Socio-Economic Filing
Source	MMF SIR#1
Question	CEC/MH-VII-501

Rationale:

On July 31, 2012, Manitoba Hydro filed supplemental materials to the Bipole III EIS with respect to the existing socio-economic environment. These supplemental materials include extensive information about First Nations in the Gillam region, but exclude any information with respect to the rights-bearing Métis community that lives, uses and relies on this region.

Review Comments:

The Métis are a distinct aboriginal people recognized in Canada's Constitution.1 The Supreme Court of Canada has affirmed that the Métis are a full-fledged rights bearing people2 and that s. 35 of the *Constitution Act, 1982* signaled that the time had finally come for the recognition of the "unique identity, culture and governance" of the Métis flowing from their distinctiveness as an aboriginal people.3 (emphasis added)

Rationale:

On July 31, 2012, Manitoba Hydro filed supplemental materials to the Bipole III EIS with respect to the existing socio-economic environment. These supplemental materials include extensive information about First Nations in the Gillam region, but exclude any information with respect to the rights-bearing Métis community that lives, uses and relies on this region.

Review Comments:

The Métis are a distinct aboriginal people recognized in Canada's Constitution.[1] The Supreme Court of Canada has affirmed that the Métis are a full-fledged rights

bearing people[2] and that s. 35 of the *Constitution Act, 1982* signaled that the time had finally come for the recognition of the "unique identity, culture and governance" of the Métis flowing from their distinctiveness as an aboriginal people.[3] (emphasis added)

Question:

a. Why has MH not provided any socio-economic information (i.e., demographics, governance structures, MMF services provided in area, etc.) about the distinct Métis community in the region in and around Gillam?
b. Does MH intend to provide supplemental filings on the socio-economic information about the Métis community in the region in and around Gillam? If the answer is no, please explain why not.
c. Why is the significant population of Fox Lake Cree Nation members living in Gillam not subsumed under the Gillam community for the purpose of this supplemental socio-economic information, yet the Métis community is? Please explain the difference in treatment between these similarly situated aboriginal groups living in Gillam?

Response:

Question (a) and (b)

Manitoba Hydro does not expect additional information will be provided to the CEC on this subject prior to the commencement of the hearing. The response to *CEC/MH-III-067* summarizes processes to date carried out by Manitoba Hydro and MMF to understand the extent of Manitoba Metis use of land and resources in the Project Study Area. The response to *CEC/MH-III-065* responds to the question about how the Manitoba Metis population was described in the EIS.

Question (c)

Particular attention was paid to the Town of Gillam and to Fox Lake Cree Nation because of the First Nation's longstanding, historical relationship with Manitoba Hydro in the

Gillam area, and the concerns they have consistently expressed about further Manitoba Hydro development in this region. These concerns are primarily linked to the potential for an influx of workers and new residents into the Gillam area if new Manitoba Hydro developments proceed, and the potential effects this may have on Fox Lake Cree Nation Members and to the services provided by both the First Nation and the Town of Gillam. Fox Lake has a sizeable population in the Gillam area and has established reserve lands at Bird and at Gillam. To date, similar concerns have not been raised by other parties in relation to the Town of Gillam or the Gillam area.

Date	August 24 2012
Reference	CEC/MH-III-065
Source	MMF SIR#2
Question	CEC/MH-VII-502

Original MMF IR:

Please explain why the Manitoba Metis population in the Project Study Area was not described? Please provide a description of the Manitoba Metis population in the Project Study Area based upon the sources identified in the review.

MMF Comments on MH Response: This response still does not provide a breakdown of the Métis population that lives with the study area or along the preferred route. It also does not provide any detailed information with respect to the governance and community organization of the Métis community (i.e., locations of MMF Locals in study area, MMF membership living in study area and locations along the preferred route, etc.). The MMF was not aware that the self-directed TLUKS study undertaken by the MMF was intended to be the source of all information about the Métis community within the EIS. The focus of the TLUKS was on the traditional land use of the Métis community – not its demographics, governance, socio-economic indicators.

Question:

Is MH intending to provide any additional information about the Métis community impacted by the project?

Response:

Manitoba Hydro is not intending to provide additional information with respect to this topic and cannot anticipate what further evidence may be presented on this topic during the course of the hearing.

The workplan agreed to by Manitoba Hydro and the MMF contemplated that the Metis Traditional Knowledge Study would include: “Identifying potential positive and negative effects by the Project on Metis land use and way of life including Metis spiritual, cultural, socio-economic, harvesting and other traditional and contemporary practices in the Project’s Study Area.”

Date	August 24 2012
Reference	CEC/MH-III-067– Response Package 4, Jul 31, 2012
Source	MMF SIR#3
Question	CEC/MH-VII-503

Original MMF IR:

Please provide detailed information concerning Manitoba Metis rights and interests in the Project Study Area and fully describe the nature and extent of Manitoba Metis use of land and resources in the Project Study Area and project component local study areas so that regulatory agencies charged with reviewing the BP3 application are fully apprised of the baseline conditions with respect to Manitoba Metis.

MMF Comments on MH Response:

MH has provided a high level summary of the findings of MMF's detailed interviews with 49 Manitoba Metis. The response does not include important findings from the MMF's Traditional Land Use and Knowledge Study Screening Survey including: almost 50% of all Manitoba Metis who returned their screening survey indicated they engage in traditional activities within the BipoleIII project area; Manitoba Metis who engage in traditional activities within the Bipole III project area reside in various locations throughout the Province, notably many do not reside within the project area.

Question:

Will MH be providing any additional consideration or analysis with respect to the findings of the MMF's TLUKS?

Response:

Manitoba Hydro (MH) is not intending to provide additional analysis with respect to the MMF report that was filed with the EIS. MH has however indicated its willingness to further discuss concerns related to the Bipole III Transmission Project, which have been

raised by the MMF, including how the findings of the TLUKS may relate to those concerns.

Date	August 24 2012
Reference	CEC/MH- III-052– Response Package 2. CEC/MH- III-050– Response Package 3. CEC/MH- III-093– Response Package 3. CEC/MH- III-043c– Response Package 4.
Source	MMF SIR#4
Question	CEC/MH-VII-504

Original MMF IR:

Please explain whether or not the effects assessment on moose populations and Aboriginal traditional use of moose, both related to increased harvester access in GHA's 6, 6A, 7, 8, 11, 12 and 19A was considered in light of the closure of many other GHA's to moose hunting in the central western and central eastern portions of the Province.

If the above was not considered, please advise if the conclusion regarding residual effects would change if these factors were fully considered.

MMF Comments on MH Response:

MH has put forth the view that the Bipole III corridor is not expected to significantly increase the ability of hunters to access new areas and/or create new opportunities for wolf predation on moose and concludes that the original EIS finding regarding residual effects and cumulative effects on moose and moose harvesting stand. MH has not considered in its response the issue of how its project may contribute to a delay in the re-opening of currently closed/voluntarily abstained from GHA's as a consequence of project-related effects, which could result in continuing and long term harvest pressure in remaining open GMA's, particularly those transected buy the Bipole III transmission corridor. Finally, although MH states that the Bipole III corridor is not expected to increase the ability of hunters to access moose hunting

areas within remaining open GHA's, the corridor does appear to create new access opportunities in GHA's 8, 10, and 11.

Question:

Did MH consider these issues (i.e., potential delay in the re-opening of currently closed/voluntarily abstained from GHA's as a consequence of project-related effects, creation of new access opportunities in GHA's 8, 10, and 1, etc.) in relation to their potential impact on Métis use as well as Métis rights in the determination of the preferred route? If no, why not.

Response:

As indicated, Manitoba Hydro considered the issue of access. These and other potential effects on moose are expected to be minimal as a result of the Bipole III Transmission Project. Manitoba Hydro is committed to working with regulators and stakeholders to minimize all potential effects on moose populations, including access. Manitoba Conservation and Water Stewardship is the authority responsible for the closure and re-opening of moose hunting. Also, please see response *MCWS/MH-TAC-011a* regarding the consideration of moose hunting closures on the conclusions in the Bipole III EIS.

Date	August 24 2012
Reference	CEC/MH- III-073 – Response Package 3
Source	MMF SIR#5
Question	CEC/MH-VII-505

Original IR:

Please explain if MH intends to consult with Manitoba Metis and the MMF regarding access management plans during the construction phase and with respect to any restrictions during the operational phase.

Question:

Does MH propose to meet with the MMF regarding its Environmental Protection Plan, including access management plan(s), prior to the commencement of the CEC Hearings?

Response:

Manitoba Hydro would like to meet with the MMF regarding the Environmental Protection Plan and access management plan(s). When the meeting(s) occur will depend on the availability of both Manitoba Hydro and MMF representatives who are required for the meeting(s).

Date	August 24 2012
Reference	CEC/MH-III-074 Response Package 4
Source	MMF SIR#6
Question	CEC/MH-VII-506

Original IR:

Please provide a map showing the proposed or likely locations of marshalling yards. If this information is not available, please explain how MH will work with MMF to ensure that marshalling yards are situated in locations which minimize or eliminate the potential for adverse effects on Manitoba Metis traditional use.

Question:

As MH indicates a map is not yet available, does MH propose to meet with the MMF regarding its Environmental Protection Plan, including access management plan(s), and proposed/tentative locations for marshalling yards prior to the commencement of the CEC Hearings?

Response:

Manitoba Hydro is would like to meet with the MMF regarding the Environmental Protection Plan and access management plan(s). When the meeting(s) occur will depend on the availability of both Manitoba Hydro and MMF representatives who are required for the meeting(s).

Date	August 24 2012
Reference	CEC/MH-III-075
Source	MMF SIR#7
Question	CEC/MH-VII-507

Original IR:

(b) Please provide information on any MH and/or Manitoba restrictions, if any, concerning hunting that were implemented in the vicinity of other marshalling yards associated with other projects. If there were restrictions, please provide details concerning the geographic extent and nature of the restrictions.

MMF Comments on MH Response:

Non-responsive.

Question:

What size of buffer did MH implement in the case of the Wuskwatim Transmission Project? What restrictions, if any, did MCWS implement in the case of the afore-noted project? In the case of the Wuskwatim project, did MH request that MCWS impose any restrictions on hunting and/or access by Aboriginal or other harvesters not engaged in construction-related activity?

Response:

There was not a set size for the buffers for the marshalling yards for the Wuskwatim Transmission Project. The buffers were determined on a case by case basis depending on the location of the marshalling yards.

Manitoba Hydro discussed with MCWS what options were available to limit access and hunting during construction. Manitoba Hydro is not aware of any hunting restrictions implemented by MCWS in relation to the Wuskwatim Transmission Line project.

Date	August 24 2012
Reference	CEC/MH-III-076
Source	MMF SIR#8
Question	CEC/MH-VII-508

Original IR:

Please explain if MH and/or Manitoba anticipate employing similar management measures for the BP III marshalling yards.

Question:

Please provide details on the management measures utilized for the Wuskwatim project marshalling yards, including any monitoring information regarding whether such measures mitigated Aboriginal harvester access or use of adjacent areas for traditional purposes.

Response:

Access for Aboriginal harvesters to areas adjacent to Wuskwatim Transmission Project components (such as borrow pits, marshalling yards, temporary camps) was facilitated as outlined below.

Safety was of primary concern during the construction phase for both construction workers, Aboriginal resource harvesters, and others who accessed the site. For this reason, while non-construction traffic was discouraged, Aboriginal resource harvesters, or others requiring access were not interfered with. However, those wanting to access the site were asked to identify themselves to construction site supervisors, prior to accessing project component sites in order to ensure any safety risks were communicated and managed. Manitoba Hydro also worked with registered trap line holders to provide updated information and locations of construction activities during their harvesting periods.

Date	August 24 2012
Reference	CEC/MH-III-077
Source	MMF SIR#9
Question	CEC/MH-VII-509

Original IR:

Please explain if MH intends to consult with Manitoba Metis and the MMF regarding access management plans during the construction phase.

Question:

Does MH propose to meet with the MMF regarding its Environmental Protection Plan, including access management plan(s), prior to the commencement of the CEC Hearings?

Response:

Please see response provided for *CEC/MH-VII-505.*

Date	August 24 2012
Reference	CEC/MH-III-078
Source	MMF SIR#10
Question	CEC/MH-VII-510

Original IR:

Please provide a map showing the proposed or likely locations of new borrow areas. If this information is not available, please explain how MH will work with MMF to ensure that borrow areas are situated in locations which minimize or eliminate the potential for adverse effects on MMF Citizen traditional use.

Question:

As MH indicates a map is not yet available, does MH propose to meet with the MMF regarding its Environmental Protection Plan, including access management plan(s), and proposed/tentative locations for new borrow areas prior to the commencement of the CEC Hearings?

Response:

Manitoba Hydro would like to meet with the MMF regarding the Environmental Protection Plan and access management plan(s). When the meeting(s) occur will depend on the availability of both Manitoba Hydro and MMF representatives who are required for the meeting(s).

Date	August 24 2012
Reference	CEC/MH-III-079
Source	MMF SIR#10
Question	CEC/MH-VII-511

Original IR:

Please provide information on any MH and/or Manitoba restrictions, if any, concerning hunting that were implemented in the vicinity of other project borrow areas. If there were restrictions, please provide details concerning the geographic extent and nature of the restrictions.

MMF Comments on MH Response:

Non-responsive.

Question:

What size of buffer did MH implement in the case of the Wuskwatim Transmission Project and what was the time duration of the restrictions? What restrictions, if any, did MCWS implement in the case of the afore-noted project? In the case of the Wuskwatim project, did MH request that MCWS impose any restrictions on hunting and/or access by Aboriginal or other harvesters not engaged in construction-related activity?

Response:

There was not a set size for the buffers for the borrow areas associated with the Wuskwatim Transmission Project. For the most part borrow areas were on the right of way proper or materials were taken from existing borrow areas off site. Any buffers applied would be determined on a case by case basis depending on the location of the borrow site.

Manitoba Hydro discussed with MCWS what options were available to limit access and hunting during construction. Manitoba Hydro is not aware of any hunting restrictions implemented by MCWS in relation to the Wuskwatim Transmission Line project.

Date	August 24 2012
Reference	CEC/MH-III-080
Source	MMF SIR#11
Question	CEC/MH-VII-512

Original IR:

Please explain if MH and/or Manitoba anticipates employing similar management measures for the borrow pits associated with the BP III project.

Question:

Please provide details on the management measures utilized for the Wuskwatim project borrow pits, including any monitoring information regarding whether such measures mitigated Aboriginal harvester access or use of adjacent areas for traditional purposes.

Response:

Access for Aboriginal harvesters to areas adjacent to Wuskwatim Transmission Project components (such as borrow pits, marshalling yards, temporary camps) was facilitated as outlined below.

Safety was of primary concern during the construction phase for both construction workers, Aboriginal resource harvesters, and others who accessed the site. For this reason, while non-construction traffic was discouraged, Aboriginal resource harvesters, or others requiring access were not interfered with. However, those wanting to access the site were asked to identify themselves to construction site supervisors, prior to accessing project component sites in order to ensure any safety risks were communicated and managed. Manitoba Hydro also worked with registered trap line holders to provide updated information and locations of construction activities during their harvesting periods.

Date	August 24 2012
Reference	CEC/MH-III-081
Source	MMF IR#8
Question	CEC/MH-VII-513

Original IR:

(a) Please provide a map showing the proposed or likely locations of non-commercial accommodations and construction camps. If this information is not available, please explain how MH will work with MMF to ensure that accommodation camps are situated in locations which minimize or eliminate the potential for adverse effects on MMF Citizen traditional use.

Question:

As MH indicates a map is not yet available, does MH propose to meet with the MMF regarding its Environmental Protection Plan, including access management plan(s), and proposed/tentative locations for accommodation camps areas prior to the commencement of the CEC Hearings?

Response:

Manitoba Hydro would like to meet with the MMF regarding the Environmental Protection Plan and access management plan(s). When the meeting(s) occur will depend on the availability of both Manitoba Hydro and MMF representatives who are required for the meeting(s).

Date	August 24 2012
Reference	CEC/MH-III-082
Source	MMF SIR#13
Question	CEC/MH-VII-514

Original IR:

Please provide information on any MH and/or Manitoba restrictions, if any, concerning hunting implemented in the vicinity of other project construction phase camps. If there were restrictions, please provide details concerning the geographic extent and nature of the restrictions.

MMF Comments on MH Response:

Non- responsive.

Question:

What size of buffer did MH implement in the case of the Wuskwatim Transmission Project and what was the time duration of the restrictions? What restrictions, if any, did MCWS implement in the case of the afore-noted project? In the case of the Wuskwatim project, did MH request that MCWS impose any restrictions on hunting and/or access by Aboriginal or other harvesters not engaged in construction-related activity?

Response:

Please refer to response provided for *CEC/MH-II-003d and CEC-MH-III-082.*

There was not a set size for the buffers for the other construction phase camps for the Wuskwatim Transmission Project. The buffers were determined on a case by case basis depending on the location of the temporary camp.

Manitoba Hydro discussed with MCWS what options were available to limit access and hunting during construction. Manitoba Hydro is not aware of any hunting restrictions implemented by MCWS in relation to the Wuskwatim Transmission Line project.

Date	August 24 2012
Reference	CEC/MH-III-083
Source	MMF SIR#14
Question	CEC/MH-VII-515

Original IR:

(c) Please explain if MH and/or Manitoba anticipate employing similar management measures for the temporary worker accommodation camps associated with the BP III project.

Question:

Please provide details on the management measures utilized for the Wuskwatim project accommodation camps, if any, including any monitoring information regarding whether such measures were effective if mitigating Aboriginal harvester access or use of adjacent areas for traditional purposes.

Response:

Please refer to response provided for *CEC/MH-II-003d , CEC-MH-III-082.*

In the case of the Wuskwatim Generating Station construction camp, Manitoba Hydro developed in consultation with the Nisichawayasikh Cree Nation (NCN) an access management plan that provided access through the site for the registered trapline holder and local resource users, all of whom were NCN members. In the case of the Wuskwatim Generating Station project, access to the construction camp was controlled through use of a security gate that was operated 24 hours a day. The trapline holder and resource users were permitted access, subject to whether any blasting was being done on a particular day. A process was put in place whereby local aboriginal harvesters submitted a form to the NCN Wuskwatim Implementation Office, in order to gain approval to harvest within access controlled areas of the project. Because very few

applications were received, a monitoring program was not necessary. However, of the requests received, all were granted and no concerns were indicated to Manitoba Hydro regarding the effectiveness of the process.

A contract was negotiated with NCN to provide the security services, including the staff manning the security gate. In addition, the project agreement for Wuskwatim provided for jointly staffed committees of NCN members and Manitoba Hydro staff whose function was to receive and address concerns of local resource users regarding movement through the construction site. Resource users and trappers who needed to travel through the construction site were required to observe provincial regulations regarding the safe transport of firearms and the use of firearms on roads and in the vicinity of workers.

Further, workers living in the Wuskwatim construction camp were subject to prohibitions on the possession of firearms in the camp.

During the course of construction, NCN members performed traditional ceremonies intended to address the concerns of NCN arising out of the transformation of the Wuskwatim site from its traditional appearance and uses into a hydro-electric dam.

Manitoba Hydro believes that the foregoing measures in the case of the Wuskwatim Generating Station project were successful in accommodating the needs of local resource users while at the same time facilitating the occupation of the site by and the work of a construction force that numbered over 1,000 men and women at times. The Wuskwatim Power Limited Partnership has engaged a consultant to study various aspects of the performance of the Wuskwatim contracts and the engagement of NCN members which study is presently underway and not expected to be completed for a number of months.

Date	August 24 2012
Reference	CEC/MH-III-085
Source	MMF SIR#15
Question	CEC/MH-VII-516

Original IR:

Please provide information on any MH and/or Manitoba restrictions, if any, concerning hunting implemented in the vicinity of other project converter stations both during construction and operational phases. If there were restrictions, please provide details concerning the geographic extent and nature of the restrictions.

Question:

What size of buffer does MH contemplate for the converter stations and what is the extent of time anticipated for these buffers to be in effect? What restrictions, if any, does MCWS implement in the case of existing converter stations? Has MH discussed with MCWS any restrictions on hunting and/or access by Aboriginal or other harvesters not engaged in construction-related activity in the vicinity of the converter stations, during construction and operational phases, and if so, what, if any, restrictions are contemplated?

Response:

Manitoba Hydro (MH) will restrict firearms in project locations during the construction period in order to ensure project personnel safety; it is anticipated that a 300 m buffer will be in effect around work sites and the Conawapa access road (just north of the Sundance turnoff). MH's Safe Work Procedures will apply to the Bipole III Transmission Project and any firearms that may be allowed into the project locations will need to be duly authorized as per those procedures.

Any restrictions related to hunting or the discharge of firearms are governed under the applicable federal and provincial statutes, which are enforced by either Manitoba

Conservation and Water Stewardship (MCWS) or the RCMP. Manitoba Hydro and MCWS have not discussed any potential restrictions on hunting or access to these areas to date.

Date	August 24 2012
Reference	CEC/MH-III-086
Source	MMF SIR#16
Question	CEC/MH-VII-517

Original IR:

(c) Please explain if MH and/or Manitoba anticipates employing similar management measures for the converter stations associated with the BP III project.

Question:

Please provide details on the management measures utilized for existing converter stations, including any monitoring information regarding whether such measures were effective in mitigating any effects on Aboriginal harvester access or use of adjacent areas for traditional purposes.

Response:

The existing converter station sites are comprised of a cleared area of land with high voltage equipment, ancillary equipment and numerous buildings to house other equipment and systems for operation of the station. A fence is located on the perimeter of the sites to ensure the security of the equipment and systems within the stations. One or more gates are typically located along the fence to restrict access to authorized personnel only for the purposes of operations and maintenance of the facility. Access through these gates are typically monitored and/or controlled by personnel working at the stations.

Manitoba Hydro does not have management measures in place outside the station fence for existing converter stations.

Date	August 24 2012
Reference	CEC/MH-III-087 Response Package 2
Source	MMF/MH Round 2 - 10
Question	CEC/MH-VII-518

Original IR:

(a) Has MH monitored impacts on plant gathering by Aboriginal harvesters within existing transmission line rights-of-way, and if so, how does this information inform the conclusions made about the significance of impacts on traditional plant gathering?

Question:

Given that MH states it has not undertaken any monitoring on transmission line impacts on gathering by Aboriginal harvesters, on what basis were the conclusions made in the EIS regarding assessment of effects on “domestic resource use” (EIS Chapter 8, pg 8-284)? The response does not consider the potential short and long term effects of avoidance practice by Aboriginal harvesters within and adjacent to the transmission corridor due to concerns about chemicals introduced for right of way vegetation management. Does MH intend to include contaminant monitoring (including establishing baseline conditions) of plants important to Aboriginal harvesters in its Environmental Protection Plan?

Response:

The conclusions in Chapter 8 related to “domestic resource use” were informed by the Resource Use Technical Report, which used a combination of desktop studies, information gathered from the Environmental Assessment Consultation Program and Geographic Information Systems (GIS) analysis to assess the potential effects of the Bipole III Transmission Project and the ATK process.

Rather than conducting contaminant monitoring of plants, Manitoba Hydro will consider non-chemical vegetation management in clearly identified sensitive sites that contain plants that are of importance to Aboriginal harvesters.

Date	August 24 2012
Reference	None
Source	SIR MMF #11
Question	CEC/MH-VII-519

MMF Comments on MH Response:

CEC did not provide this MMF IR to MH. MMF asks that it be provided to Manitoba Hydro as a part of the second round of IRs.

Question:

Please reassess the potential environmental effect on moose populations and habitat in GHA 12 by considering the cumulative effect of coal exploration, the pending designation of all or a portion of GHA 12 as a Wildlife Management Area, existing closure of various GHA's in central western Manitoba to moose hunting, in combination with the potential for increased access by harvesters and/or wolf predation associated with the HVdc ROW.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.).

Date	August 24 2012
Reference	CEC/MH-III-096
Source	MMF SIR#19
Question	CEC/MH-VII-520

Please explain the basis or rationale for why First Nations who are similarly situated as Metis communities, are not included in the proposed Community Development Initiative?

There was a grammatical error in MMF's original IR12. It should have read "Please explain the basis or rationale for why First Nations who are similarly situated as Metis communities, are not included in the proposed Community Development Initiative? The information request pertains to MH's indication that First Nation's whose associated Resource Management Area is traversed by Bipole III are eligible for the Community Development Initiative. That is, a number of First Nations whose Reserves are situated beyond 25 km's will be eligible for the Community Development Initiative, however, the same criteria are not advanced for other communities (some of which have Metis populations) who also reside within and rely upon the resources within these Resource Management Areas.

Question:

Please explain the basis or rationale for why First Nations who are similarly situated as Metis communities and may have significant off-reserve populations living in towns, cities or Northern Affairs Communities, are included in the proposed Community Development Initiative which Métis communities are excluded?

Response:

Please see response provided for *CEC/MH-III-095.*

Date	August 24 2012
Reference	CEC/MH-III-096
Source	MMF SIR#20
Question	CEC/MH-VII-521

Please explain the basis or rationale for why First Nations who are similarly situated as Metis communities, are not included in the proposed Community Development Initiative?

There was a grammatical error in MMF's original IR12. It should have read "Please explain the basis or rationale for why First Nations who are similarly situated as Metis communities, are not included in the proposed Community Development Initiative? The information request pertains to MH's indication that First Nation's whose associated Resource Management Area is traversed by Bipole III are eligible for the Community Development Initiative. That is, a number of First Nations whose Reserves are situated beyond 25 km's will be eligible for the Community Development Initiative, however, the same criteria are not advanced for other communities (some of which have Metis populations) who also reside within and rely upon the resources within these Resource Management Areas.

Question:

Would MH consider providing CDI funding directly to MMF, its regions or its Locals if requested by membership of Métis communities?

Response:

No, Manitoba Hydro will be providing funds directly to the First Nations, Community Councils, Rural Municipalities, and incorporated towns or villages that are eligible for the Community Development Initiative (CDI). However, those that receive CDI funds may choose to work with other entities or organizations in the projects or initiatives that they undertake using the funds.

Date	August 24 2012
Reference	None
Source	GP/MH-1
Question	CEC/MH-VII-522

Question:

a) What would be the estimated costs to ratepayers (expressed in cents (Cdn $) per kilowatt hour), if only BP3 were built for reliability purposes, without any further generation projects in northern over the lifetime of the BP3 project?

b) In comparison to above, what would be the estimated costs to ratepayers (expressed in cents (Cdn $) per kilowatt hour) compared to the following situations:

i) if BP3 were not built at all;

ii) if Keeyask, but not Conawapa were built;

iii) if Conawapa, but not Keeyask were built;

iv) if both Conawapa and Keeyask were built;

In answering the above scenarios please outline the underlying assumptions insomuch as is possible.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	GP/MH-2
Question	CEC/MH-VII-523

Question:

a) By MH's calculation by how much was this peak energy deficit reduced based on DSM? When expressing this number please express in terms of both MW of the peak deficit?

b) By what percentage does MH estimate Manitoba can reduce power consumption in the event of a catastrophic failure of Bipole I & II? In providing this number please provide estimates for each month of the year, in terms of the percentage of power reductions that Manitoba Hydro estimates is feasible.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	GP/MH-3
Question	CEC/MH-VII-524

Question:

a) Manitoba Hydro to provide more detail on the exact reason why wind turbines shut down below -30 °C?

b) Manitoba Hydro to indicate what research it has conducted or reviewed in terms of cold-weather wind generation, and what the results of these studies were?

c) Is Manitoba Hydro aware of weather other wind turbines in Canada and around the world also shut down when ambient temperatures drop below -30 °C?

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-VI-234
Source	GP/MH-4
Question	CEC/MH-VII-525

Question:

a) Can MH comment on “dependable” wind energy and how this could contribute to maintaining loads in an emergent situation?

b) Has MH performed any studies to determine the reliability advantages of having numerous wind farms geographically spread out across the province, or even across the continent?

c) If wind cannot be relied upon to meet peak loads, Can MH explain why recent export contracts have provisions whereby MH uses its hydro electric system to store wind energy from North Dakota and Minnesota?

Response:

a) Wind generation has value in the Manitoba Hydro system as an energy resource and contributes to the overall supply on an annual basis. However, wind generation cannot be relied upon to be available during peak demand periods in emergent situations.

b) Manitoba Hydro has not undertaken specific studies to determine the reliability of having numerous wind farms geographically across the province.

c) As indicated in part a) wind has value as an energy resource.

Date	August 24 2012
Reference	None
Source	GP/MH-5
Question	CEC/MH-VII-526

Question:

a) What component or components would need to fail to cause a three-year shut-down.

b) In the event of a converter station failure, could MH rush the order in less that three years for an additional charge? If so, what would be the approximate additional charges?

c) Is MH in service contracts with the providers of electrical converter station? If so, please provide an outline of how the service contracts deals with emergency equipment repairs and replacements.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	None
Source	GP/MH-6
Question	CEC/MH-VII-527

Question:

a) Please provide further information on the studies performed in the early planning analysis in regards to utilizing the Riel station as a back up to Dorsey. Please provide as much detail as possible including costs, and full copies of any studies commissioned or performed.

Response:

In accordance with CEC direction, Manitoba Hydro will only be responding to Round 2 Information Requests if they are seeking further information on responses received in the first round of information requests (*Transcript of Proceedings held at Winnipeg Convention Centre Thursday, August 16, 2012*. page 157 lines 5-9.). This question does not appear to arise out of any previous IR submission and no reference was provided.

Date	August 24 2012
Reference	CEC/MH-VI-234
Source	GP/MH-7
Question	CEC/MH-VII-528

Question:

a) Please provide any studies that Manitoba Hydro has commissioned, performed, or reviewed in regards to biogas generation in Manitoba?

b) Please provide any studies that Manitoba Hydro has commissioned, performed, or reviewed in regards to solar electric generation in Manitoba?

Response:

a) Manitoba Hydro supports research and initiatives related to biofuel generation technologies and participates in industry forums that discuss these technologies. As indicated in *CEC/MH-VI-234*, biofuel technologies are currently less economically and financially viable than other alternatives available to Manitoba Hydro.

b) Manitoba Hydro supports research and initiatives on solar energy and participates in industry forums that discuss these technologies. As indicated in *CEC/MH-VI-234*, solar power is currently one of the most costly resources available on a commercial scale.