

Manitoba Hydro Undertaking #105

Manitoba Hydro to file a copy of the signed version of PUB Exhibit #19.

The CPJ included in PUB Exhibit #19 has been superseded by three separate CPJ's as follows:

- a) Bipole III Western Routed T/L & 2000 MW Converters – Transmission Line Addendum 06a in the amount of \$1,259.9 million.
- b) Bipole III Western Routed T/L & 2000 MW Converters – Converter Stations Addendum 06b in the amount of \$1,828.5 million.
- c) Bipole III Western Routed T/L & 2000 MW Converters – Collector Lines Addendum 06c in the amount of \$191.4 million.

The three CPJ's have been signed by the respective Division Managers and Vice-Presidents and have been approved by Executive Committee (Minute 1348.01 dated March 31, 2011).

A copy of the three approved CPJ's is attached for information.

**CAPITAL PROJECT JUSTIFICATION ADDENDUM
FOR**

**Bipole III Western Routed T/L & 2000MW Converters
TRANSMISSION LINE
Addendum Number 06a**

REVIEWED BY:
(Owning Dept Manager)

Ron Meyer
2011/03/30

NOTED BY:
(if applicable)

Coordinating Div:

S. Raily 2011/03/30

Constructing Div:

Designing Div.:

Financial:

C. Nieuwenburg 2011.03.30

RECOMMENDED FOR IMPLEMENTATION:

Owning Div. Manager:

G. Newfield
2011 03 30

Business Unit V.P.:

K. Homofelch
2011.03.30

PREV. APPROVED BUDGET \$: (Use \$ value from approved CPJ or last approved CPJ Addendum)	\$1,081,923,000
REVISED BUDGET \$: (Total Net Cost)	\$1,259,915,000
START DATE: (1 st Cost Flow)	2001 06
PREV. APPROVED ISD: (Use In-service Date from approved CPJ or last approved CPJ Addendum)	2017 10
REVISED ISD: (Indicate "Mult" if more than 1)	2017 10
RISK MATRIX/ BUSINESS CASE TIER:	Tier 2 (950 points)
INVESTMENT REASON: (Category and % Split)	Operational Enhancement (60%) New/increased Gen. Delivery (20%) Capacity Enhancement (20%)

OWNING DIVISION:	TRANSMISSION PLANNING & DESIGN
I.M. NODE NUMBER:	1.5.2.1.1.1
W.B.S. NUMBERS:	P:04218, P:04221, P:10155, P:14518

MAJOR ITEM **DOMESTIC ITEM**

PREPARED BY: Project Owner: Pei Wang
Project Manager: Adele Poulin

DATE PREPARED: 2011.03.30

REPORT NUMBER:

FILE NUMBER (Optional):

ADDENDUM NUMBER	DATE (yyyy mm dd)	REVISION	REVISED BY	APPROVED BY
05	2007 05 15	Revised western route placeholder. Increase costs due to Construction and material cost increases.	A.A. Poulin / J.B. Davies / K.L. Kent	MH Board of Directors (Minute #786-07-05)
04	2005 06 23	Western route placeholder. Defer the in-service date by five years from 2012 10 to 2017 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1090.06)
03	2004 04 06	Defer the in-service date by two years from 2010 10 to 2012 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1030.05)
02	2003 11 12	Defer \$2,462,000 worth of budget requirements from 2003/04 to future years.	C.A. Nieuwenburg	Executive Committee (Minute #999.05)
01	2003 05 08	Change northern termination from Radisson to Henday, increasing length by 20 km and costs by \$8,245K.	J.B. Davies / K.L. Kent	Executive Committee (Minute #993.03)
-	2001 06 13	Original CPJ	J.B. Davies / K.L. Kent	Executive Committee (Minute #900.11)

MANITOBA HYDRO CAPITAL PROJECT JUSTIFICATION ADDENDUM

Project Name (This section is required for all Addendums).

Bipole III Western Routed T/L & 2000MW Converters – **TRANSMISSION LINE**

Recommendation (This section is required for all Addendums).

Increase the budget by \$177,991,000 for the Transmission Line components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex, to a revised total of \$1,259,915,000, in order to incorporate the following:

- review of the base estimate for the property, design and construction of the HVdc transmission line, and of the licensing and environmental assessment for the overall complex (total increase of \$152,122,000);
- inclusion of contingency for the above-mentioned components (total increase of \$49,353,000); and
- the resultant changes to interest and escalation (decrease of \$23,485,000).

Project Scope (This section is be filled out only if there is a change to the scope).

The scope of this portion of the Bipole III complex includes the following major components:

- Design and construction of a western-routed 500kV HVdc transmission line from the Keewatinooow Converter Station to the Riel Converter Station, approximately 1341km in length.
- Licensing and environmental assessment for the overall Bipole III complex (i.e., including the 2000 MW converters and AC collector system).
- Property acquisition and/or easements for the 500kV HVdc transmission line.

Background (This section is be filled out only if there is information relevant to the recommendation).

CPJ Addendum #04, submitted in April 2005, was the first introduction to the Capital Expenditure Forecast of a western-routed 500kV HVdc transmission line with 2000MW of converters. The budget submitted with CPJ Addendum #04 was preliminary only, pending completion of studies by System Planning. It was based on an estimate prepared by Teshmont Consultants in 2001.

CPJ Addendum #05, submitted in May 2007, addressed an increase of 45km to the length of the transmission line, as well as increases being experienced in transmission line material and construction costs due to market prices. The cost estimates for licensing, property and contingency were not updated at that time.

This CPJ Addendum #06a covers a budget increase of \$177,991,000 in association with the Transmission Line components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex:

- 500kV HVdc Transmission Line (base increase of \$140,714,000):
 - Design change from double to triple conductor, in order to lower the surface field gradient to accepted worldwide practices and thus minimize the likelihood of anomalous flashovers that have been experienced on the existing bipoles in the past 20 years.
 - Incorporation of the Transmission Line Agreement for unionization of construction labour.
 - Application of the revised corporate policy for compensation for private property.
- Licensing & Environmental Assessment for the Bipole III complex (base increase of \$4,912,000):
 - More comprehensive aboriginal and community consultations.
 - Additional studies related to converter size.

Background (This section is be filled out only if there is information relevant to the recommendation).

- c) Property Acquisition and/or Easements for the Transmission Line (base increase of \$6,497,000):
 - More privately-owned land associated with the western route.
- d) The revised budget also includes contingency at \$49,353,000 (Project Risk Analysis section contains details).

The above changes to the base estimate and contingency, and a change in base dollars from 2007 to 2010, result in a net decrease of \$23,485,000 to forecasted escalation and interest.

JUSTIFICATION—BUSINESS CASE ANALYSIS (SUMMARY):

Justification and Link to Corporate/Business Unit Goals (This section is required for all Addendums).

A third 500kV HVdc transmission line with converter stations rated for 2000MW will provide for increased reliability to the Manitoba Hydro system, due to the critical risk to the Province and the Corporation of a Dorsey Converter Station outage or an Interlake (Bipole I and II) corridor outage. It will also provide an increase in southern power due to reduced line losses on the existing Bipoles I and II (approximately 76MW in normal steady state operation prior to the addition of new generation into the northern collector system).

ANALYSIS OF ALTERNATIVES: (This section is be filled out only if there is a change to which alternative is being recommended).

Economic Analysis

Discount Rate	%	For current corporate rates see G911
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Recommended Option	NPV Benefits (Costs)
No change.	

Other Alternatives Considered	NPV Benefits (Costs)

Project Risk Analysis - (This section is be filled out only if there is a change to the project risk).

A total of \$49,353,000 of contingency (approximately 6% of the base estimate) is included in the budget amount for CPJ Addendum #06a, to cover the following:

- a) 500kV HVdc Transmission Line (contingency of \$39,967,000 or 5% of the base estimate):
Potential changes to the detailed route selection or line length.
- b) Licensing & Environmental Assessment (contingency of \$9,386,000 or 15% of the base estimate):
Potential for greater requirements for aboriginal and community consultations, and for more extensive environmental monitoring and assessments during construction.

Project Risk Analysis - (This section is be filled out only if there is a change to the project risk).

The following risks create a potential for additional costs:

- Market conditions for transmission line construction labour, materials or commodities.
- Unforeseen geotechnical conditions.
- Further changes to corporate policy for private property compensation.

Some of the schedule-related risks associated with meeting an October 2017 in-service are as follows:

- Environmental License to be received by September 2012.
- Certain activities will need to proceed in parallel with the environmental licensing process:
 - acquiring permits to work on crown lands,
 - purchase of some materials and/or purchase of extra towers and foundations types to accommodate unexpected conditions due to lack of geotechnical information,
 - temporary permits for site investigation activities (including field drilling) in order for design of foundations to be finalized and materials ordered for the construction start date.
- Completion of the northern portion of the line is based on having five winter seasons for access and construction.

Capital Budget Estimate - (This section is required for all Addendums).

The impact on annual budget requirements is as follows (in thousands of dollars):

Fiscal Year	Previous CPJ / CPJ Addendum	This CPJ Addendum	Increase (Decrease)
Prev. Actuals	\$ 17,207	\$ 24,613	\$ 7,406
2010/11	\$ 5,801	\$ 16,118	\$ 10,317
2011/12	\$ 10,235	\$ 24,830	\$ 14,595
2012/13	\$ 146,630	\$ 59,866	\$ (86,764)
2013/14	\$ 181,825	\$ 162,043	\$ (19,782)
2014/15	\$ 201,556	\$ 298,935	\$ 97,379
2015/16	\$ 216,344	\$ 318,454	\$ 102,110
2016/17	\$ 227,477	\$ 234,575	\$ 7,098
2017/18	\$ 71,665	\$ 120,055	\$ 48,390
2018/19	\$ 3,184	\$ 426	\$ (2,758)
2019/20	\$ -	\$ -	\$ -
Total	\$ 1,081,923	\$ 1,259,915	\$ 177,991

Proposed Schedule (This section is be filled out only if there is a change to the project schedule).

No change.

Related Projects (This section is be filled out only if changed).

No change.

Reference Documents (This section is be filled out only if changed).

No change.

**CAPITAL PROJECT JUSTIFICATION ADDENDUM
FOR**

**Bipole III Western Routed T/L & 2000MW Converters
CONVERTER STATIONS
Addendum Number 06b**

REVIEWED BY:
(Owning Dept Manager)

RA FOR RME

NOTED BY:
(if applicable)

Coordinating Div:

Constructing Div:

Designing Div.:

Financial:

PREV. APPROVED BUDGET \$: (Use \$ value from approved CPJ or last approved CPJ Addendum)	\$1,104,197,000
REVISED BUDGET \$: (Total Net Cost)	\$1,828,532,000
START DATE: (1 st Cost Flow)	2001 06
PREV. APPROVED ISD: (Use In-service Date from approved CPJ or last approved CPJ Addendum)	2017 10
REVISED ISD: (Indicate "Mult" if more than 1)	2017 10
RISK MATRIX/ BUSINESS CASE TIER:	Tier 2 (950 points)
INVESTMENT REASON: (Category and % Split)	Operational Enhancement (60%) New/increased Gen. Delivery (20%) Capacity Enhancement (20%)

RECOMMENDED FOR IMPLEMENTATION:

Owning Div. Manager:

[Signature]

Business Unit V.P.:

[Signature]
11 03 30

OWNING DIVISION: NEW GENERATION CONSTRUCTION

I.M. NODE NUMBER: 1.5.2.1.2.1

W.B.S. NUMBERS: P:14363, P:14364, P:15533, P:15540, P:15541, P:15544

MAJOR ITEM **DOMESTIC ITEM**

PREPARED BY:

DATE PREPARED: 2011.03.29

REPORT NUMBER:

FILE NUMBER (Optional):

05	2007 05 15	Revised western route placeholder. Increase costs due to Construction and material cost increases.	A.A. Poulin / J.B. Davies / K.L. Kent	MH Board of Directors (Minute #786-07-05)
04	2005 06 23	Western route placeholder. Defer the in-service date by five years from 2012 10 to 2017 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1090.06)
03	2004 04 06	Defer the in-service date by two years from 2010 10 to 2012 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1030.05)
02	2003 11 12	Defer \$2,462,000 worth of budget requirements from 2003/04 to future years.	C.A. Nieuwenburg	Executive Committee (Minute #999.05)
01	2003 05 08	Change northern termination from Radisson to Henday, increasing length by 20 km and costs by \$8,245K.	J.B. Davies / K.L. Kent	Executive Committee (Minute #993.03)
-	2001 06 13	Original CPJ	J.B. Davies / K.L. Kent	Executive Committee (Minute #900.11)
ADDENDUM NUMBER	DATE (yyyy mm dd)	REVISION	REVISED BY	APPROVED BY

MANITOBA HYDRO

CAPITAL PROJECT JUSTIFICATION ADDENDUM

Project Name (This section is required for all Addendums).

Bipole III Western Routed T/L & 2000MW Converters – **CONVERTER STATIONS**

Recommendation (This section is required for all Addendums).

Increase the budget by \$724,335,000 for the Riel and Keewatinoow Converter Station components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex, to a revised total of \$1,828,532,000, in order to incorporate the following:

- review of the base estimate for the property, design and construction of the Riel and Keewatinoow Converter Stations and 230kV Switchyards (total increase of \$474,226,000);
- inclusion of contingency for the above-mentioned components (total increase of \$138,926,000); and
- the resultant changes to interest and escalation (increase of \$111,183,000).

Project Scope (This section is to be filled out only if there is a change to the scope).

The scope of this portion of the Bipole III complex includes the following major components:

- Design and construction of the 2000 MW Riel Converter Station and 230kV AC Switchyard.
- Design and construction of the 2000 MW Keewatinoow Converter Station and 230kV AC Switchyard.
- Property acquisition and/or easements for the Riel and Keewatinoow Converter Stations.

The proposed budget assumes use of voltage source converters for both the Riel and Keewatinoow Converter Stations without synchronous condensers at the Riel Converter Station.

Background (This section is to be filled out only if there is information relevant to the recommendation).

CPJ Addendum #04, submitted in April 2005, was the first introduction to the Capital Expenditure Forecast of a western-routed 500kV HVdc transmission line with 2000MW of converters. The budget submitted with CPJ Addendum #04 was preliminary only, pending completion of studies by System Planning. It was based on an estimate prepared by Teshmont Consultants in 2001.

CPJ Addendum #05, submitted in May 2007, did not include re-estimates for the converter stations, nor was contingency included for the converter stations, as these components had not yet been reviewed in detail.

This CPJ Addendum #06b covers a budget increase of \$724,335,000 in association with the Riel and Keewatinoow Converter Station components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex:

- Riel Converter Station and 230kV AC Switchyard (base increase of \$169,355,000):
 - Converter and HVdc equipment costs have remained relatively unchanged when comparing 2009 mini-spec pricing versus the escalated 2001 estimate figures; however, there were no explicit indirect costs in the 2001 estimate and no interfacing costs.
- Keewatinoow Converter Station and 230kV AC Switchyard (base increase of \$286,069,000):
 - Converter and HVdc equipment costs have remained relatively unchanged when comparing 2009 mini-spec pricing versus the escalated 2001 estimate figures; however, there were no explicit indirect costs in the 2001 estimate and no interfacing costs.

Background (This section is be filled out only if there is information relevant to the recommendation).

- Site development costs have increased for the following reasons: the previous budget assumed that the Conawapa Generating Station infrastructure would be built ahead of Bipole III and therefore costs associated with a construction camp and work areas would be covered by that project’s budget; mechanical services such as fire, water, sewer and oil containment, along with security and environmental requirements, were not considered in the 2001 estimate; the site size has increased and soil conditions are worse than identified in the 2001 estimate; the transformer change-out method and the emergency response buildings were not included in the 2001 estimate.
- c) Property Acquisition and/or Easements for the Converter Stations (base increase of \$18,802,000): Property costs for Riel and Keewatinoow Converter Stations were not included in the 2001 estimate. Costs for the Riel site are more substantial than the Keewatinoow site, and include \$6.4 million for station site properties, and \$12.3 million for buffer properties that have been purchased from private owners.

In addition to the above, the revised budget also includes the introduction of contingency at \$138,926,000 (Project Risk Analysis section contains details).

The changes to the base estimate and inclusion of contingency, along with the change in base dollars from 2007 to 2010, result in an increase of \$111,183,000 to forecasted escalation and interest.

JUSTIFICATION—BUSINESS CASE ANALYSIS (SUMMARY):

Justification and Link to Corporate/Business Unit Goals (This section is required for all Addendums).

A third 500kV HVdc transmission line with converter stations rated for 2000MW will provide for increased reliability to the Manitoba Hydro system, due to the critical risk to the Province and the Corporation of a Dorsey Converter Station outage or an Interlake (Bipole I and II) corridor outage. It will also provide an increase in southern power due to reduced line losses on the existing Bipoles I and II (approximately 76MW in normal steady state operation prior to the addition of new generation into the northern collector system).

ANALYSIS OF ALTERNATIVES: (This section is be filled out only if there is a change to which alternative is being recommended).

Economic Analysis	
Discount Rate	% For current corporate rates see G911

Recommended Option	NPV Benefits (Costs)
No change.	

Other Alternatives Considered	NPV Benefits (Costs)

Project Risk Analysis - (This section is to be filled out only if there is a change to the project risk).

A total of \$138,926,000 of contingency (approximately 11% of the base estimate) is included in the budget amount for CPJ Addendum #06b, to cover the following:

- a) Keewatinoow Converter Station and 230kV AC Switchyard (contingency of \$71,960,000 or 12% of the base estimate):
 - Potential changes to equipment costs due to a limited number of suppliers worldwide and variability of exchange rates until contracts are signed.
 - Potentially higher costs due to northern work conditions.

- b) Riel Converter Station and 230kV AC Switchyard (contingency of \$66,966,000 or 11% of the base estimate):
 - Potential changes to equipment costs due to limited number of suppliers worldwide and variability of exchange rates until contracts are signed.
 - Uncertainty with protection, cyber security and building strength (physical security).

The following risks create a potential for additional costs:

- Potential for greater requirement for engineering, project management and construction management.
- Potential for poor site conditions during construction.
- The potential requirement for synchronous condensers at the Riel Converter Station.

The assumed use of new technology in the form of voltage source converters at both the Keewatinoow and Riel Converter Stations represents an additional risk factor. Confirmation or otherwise of the feasibility of this technology is expected by late 2011.

Capital Budget Estimate - (This section is required for all Addendums).

The impact on annual budget requirements is as follows (in thousands of dollars):

Fiscal Year	Previous CPJ / CPJ Addendum	This CPJ Addendum	Increase (Decrease)
Prev. Actuals	\$ 4,243	\$ 30,423	\$ 26,181
2010/11	\$ 6,812	\$ 46,255	\$ 39,443
2011/12	\$ 14,092	\$ 59,696	\$ 45,604
2012/13	\$ 24,477	\$ 148,883	\$ 124,406
2013/14	\$ 141,783	\$ 300,258	\$ 158,475
2014/15	\$ 207,019	\$ 290,185	\$ 83,166
2015/16	\$ 344,041	\$ 294,281	\$ (49,759)
2016/17	\$ 291,378	\$ 308,460	\$ 17,082
2017/18	\$ 70,351	\$ 347,692	\$ 277,341
2018/19	\$ -	\$ 2,398	\$ 2,398
2019/20	\$ -	\$ -	\$ -
Total	\$ 1,104,197	\$ 1,828,532	\$ 724,335

Proposed Schedule (This section is be filled out only if there is a change to the project schedule).

No change.

Related Projects (This section is be filled out only if changed).

No change.

Reference Documents (This section is be filled out only if changed).

No change.

CAPITAL PROJECT JUSTIFICATION ADDENDUM FOR

Bipole III Western Routed T/L & 2000MW Converters COLLECTOR LINES Addendum Number 06c

REVIEWED BY:
(Owning Dept Manager: Ron Mazur)

Ron Mazur
2011/03/30

NOTED BY:
(if applicable)

Coordinating Div: Shane Mailey

S. Mailey 2011/03/30

Constructing Div:

Designing Div.:

Financial:

C. Nieuwenburg 2011.03.30

RECOMMENDED FOR IMPLEMENTATION:

Owning Div. Manager:

J. Neufeld
2011 03 30

Business Unit V.P.:

H. Nijmofschek
2011.03.30

PREV. APPROVED BUDGET \$: (Use \$ value from approved CPJ or last approved CPJ Addendum)	\$61,715,000
REVISED BUDGET \$: (Total Net Cost)	\$191,438,000
START DATE: (1 st Cost Flow)	2001 06
PREV. APPROVED ISD: (Use In-service Date from approved CPJ or last approved CPJ Addendum)	2017 10
REVISED ISD: (Indicate "Mult" if more than 1)	2017 10
RISK MATRIX/ BUSINESS CASE TIER:	Tier 2 (950 points)
INVESTMENT REASON: (Category and % Split)	Operational Enhancement (60%) New/increased Gen. Delivery (20%) Capacity Enhancement (20%)

OWNING DIVISION:

TRANSMISSION PLANNING & DESIGN

I.M. NODE NUMBER:

1.5.2.1.3.1

W.B.S. NUMBERS:

P:15534 - P:15537, P:15542,
P:15543, P:15696, P:15697

MAJOR ITEM



DOMESTIC ITEM



PREPARED BY:

Project Owner: Pei Wang
Project Manager: Adele Poulin

DATE PREPARED:

2011.03.30

REPORT NUMBER:

FILE NUMBER (Optional):

05	2007 05 15	Revised western route placeholder. Increase costs due to Construction and material cost increases.	A.A. Poulin / J.B. Davies / K.L. Kent	MH Board of Directors (Minute #786-07-05)
04	2005 06 23	Western route placeholder. Defer the in-service date by five years from 2012 10 to 2017 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1090.06)
03	2004 04 06	Defer the in-service date by two years from 2010 10 to 2012 10.	J.B. Davies / K.L. Kent	Executive Committee (Minute #1030.05)
02	2003 11 12	Defer \$2,462,000 worth of budget requirements from 2003/04 to future years.	C.A. Nieuwenburg	Executive Committee (Minute #999.05)
01	2003 05 08	Change northern termination from Radisson to Henday, increasing length by 20 km and costs by \$8,245K.	J.B. Davies / K.L. Kent	Executive Committee (Minute #993.03)
-	2001 06 13	Original CPJ	J.B. Davies / K.L. Kent	Executive Committee (Minute #900.11)
ADDENDUM NUMBER	DATE (yyyy mm dd)	REVISION	REVISED BY	APPROVED BY

MANITOBA HYDRO CAPITAL PROJECT JUSTIFICATION ADDENDUM

Project Name (This section is required for all Addendums).

Bipole III Western Routed T/L & 2000MW Converters – **COLLECTOR LINES**

Recommendation (This section is required for all Addendums).

Increase the budget by \$129,722,000 for the Collector Lines components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex, to a revised total of \$191,438,000, in order to incorporate the following:

- review of the base estimate for the property, design and construction of the 230kV collector lines for the Keewatinoow Converter Station, the construction power for the Keewatinoow Converter Station, the sectionalization of 230kV transmission line R49R at the Riel Converter Station, and the electrode lines for the Riel and Keewatinoow Converter Stations (total increase of \$73,222,000);
- inclusion of contingency for the above-mentioned components (total increase of \$17,203,000); and
- the resultant changes to interest and escalation (increase of \$39,297,000).

Project Scope (This section is to be filled out only if there is a change to the scope).

The scope of this portion of the Bipole III complex includes the following major components:

- Design and construction of three permanent and two temporary 230kV collector lines for the Keewatinoow Converter Station.
- Construction power substation for the Keewatinoow Converter Station.
- Design and construction for the Riel and Keewatinoow electrode lines.
- Sectionalization of 230kV transmission line R49R at Riel.
- Property acquisition and/or easements for the collector and electrode lines.

Background (This section is to be filled out only if there is information relevant to the recommendation).

CPJ Addendum #04, submitted in April 2005, was the first introduction to the Capital Expenditure Forecast of a western-routed 500kV HVdc transmission line with 2000MW of converters. The budget submitted with CPJ Addendum #04 was preliminary only, pending completion of studies by System Planning. It was based on an estimate prepared by Teshmont Consultants in 2001.

CPJ Addendum #05, submitted in May 2007, did not include re-estimates for the northern collector lines, the two electrode lines, the related property, or contingency.

This CPJ Addendum #06c covers a budget increase of \$129,722,000 in association with the Collector Lines components of the Bipole III Western Routed Transmission Line & 2000MW Converters complex:

a) Keewatinoow 230kV Collector Lines (base increase of \$35,756,000):

The 2001 estimate included only three collector lines, while this estimate has two more (temporary) collector lines. The two temporary lines are required in lieu of an earlier introduction of additional generation in the northern collector system. At the time of the 2001 estimate, the planned in-service for the Conawapa Generating Station (GS) was only two years after Bipole III. Now that the in-service for Conawapa GS is planned for several years later, two temporary lines are required in order to permit full use of a 2000MW rating for Bipole III in the event of a Dorsey Station or Bipole I / II outage.

In addition, the cost of transmission line material and construction has increased since 2001.

Background (This section is to be filled out only if there is information relevant to the recommendation).

- b) Keewatinoow Construction Power (base increase of \$23,381,000):
The 2001 estimate did not include the requirement for a construction power substation, as it was assumed it would have already been built for construction of the Conawapa GS. With the change in the sequence, the Bipole III project will now be the first development to require this construction power substation.
- c) Property Acquisition and/or Easements for the Collector and Electrode Lines (base increase of \$10,732,000):
The 2001 estimate did not include any property costs for the Keewatinoow collector lines or the Riel and Keewatinoow electrode lines.
- d) Sectionalization of 230kV Transmission Line R49R at Riel (base increase of \$1,955,000):
This had been included in the Riel Sectionalization project but was deferred to coincide with the Bipole III converters. It is required to accommodate and reliably transmit a 2000MW Bipole III at Riel.
- e) Riel and Keewatinoow Electrode Lines (base increase of \$1,398,000):
The cost of line material and construction has increased since 2001.
- f) The revised budget also includes contingency at \$17,203,000 (Project Risk Analysis section contains details).

The above changes to the base estimate and contingency, and a change in base dollars from 2007 to 2010, result in an increase of \$39,297,000 to forecasted escalation and interest.

JUSTIFICATION—BUSINESS CASE ANALYSIS (SUMMARY):

Justification and Link to Corporate/Business Unit Goals (This section is required for all Addendums).

A third 500kV HVdc transmission line with converter stations rated for 2000MW will provide for increased reliability to the Manitoba Hydro system, due to the critical risk to the Province and the Corporation of a Dorsey Converter Station outage or an Interlake (Bipole I and II) corridor outage. It will also provide an increase in southern power due to reduced line losses on the existing Bipoles I and II (approximately 76MW in normal steady state operation prior to the addition of new generation into the northern collector system).

ANALYSIS OF ALTERNATIVES: (This section is to be filled out only if there is a change to which alternative is being recommended).

Economic Analysis	
Discount Rate	% For current corporate rates see G911

Recommended Option	NPV Benefits (Costs)
No change.	

Other Alternatives Considered	NPV Benefits (Costs)

Project Risk Analysis - (This section is be filled out only if there is a change to the project risk).

A total of \$17,203,000 of contingency (approximately 15% of the base estimate) is included in the budget amount for CPJ Addendum #06c, to cover the following:

- a) Keewatinoow Collector Lines (contingency of \$8,952,000 or 13% of the base estimate):
Provides for potentially higher costs for material and construction labour.
- b) Keewatinoow Construction Power (contingency of \$5,451,000 or 23% of the base estimate):
Estimates are based on a conceptual Single Line Diagram only. The site size and exact location are not yet finalized. Backup power requirements are currently under review.
- c) Riel and Keewatinoow Electrode Lines (contingency of \$2,800,000 or 34% of the base estimate):
Line lengths are uncertain, as the Electrode sites for Riel and Keewatinoow have not been finalized. Also provides for use of steel towers if necessary for reliability.

The following risks create a potential for additional costs:

- Potential for poor site conditions during construction.
- Potentially higher costs due to northern work conditions.
- Further changes to corporate policy for private property compensation.

Capital Budget Estimate - (This section is required for all Addendums).

The impact on annual budget requirements is as follows (in thousands of dollars):

Fiscal Year	Previous CPJ / CPJ Addendum	This CPJ Addendum	Increase (Decrease)
Prev. Actuals	\$ 237	\$ 0	\$ (237)
2010/11	\$ 381	\$ 2,121	\$ 1,740
2011/12	\$ 788	\$ 19,917	\$ 19,130
2012/13	\$ 1,368	\$ 52,709	\$ 51,341
2013/14	\$ 7,924	\$ 30,141	\$ 22,217
2014/15	\$ 11,571	\$ 30,927	\$ 19,357
2015/16	\$ 19,229	\$ 34,255	\$ 15,026
2016/17	\$ 16,286	\$ 13,549	\$ (2,737)
2017/18	\$ 3,932	\$ 7,818	\$ 3,886
2018/19	\$ -	\$ -	\$ -
2019/20	\$ -	\$ -	\$ -
Total	\$ 61,715	\$ 191,438	\$ 129,722

Proposed Schedule (This section is be filled out only if there is a change to the project schedule).

No change.

Related Projects (This section is be filled out only if changed).

No change.

Reference Documents (This section is be filled out only if changed).

No change.