YUKON ENERGY CORPORATION

APPLICATION FOR

AN ENERGY PROJECT CERTIFICATE

AND

AN ENERGY OPERATION CERTIFICATE

REGARDING THE PROPOSED

MAYO HYDRO ENHANCEMENT PROJECT (MAYO B)

December 10, 2009

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1.0 INTRODUCTION

Yukon Energy Corporation ("**YEC**" or "**Yukon Energy**") hereby applies (the "**Application**") to the Minister of Justice (the "**Minister**") for an energy project certificate and an energy operation certificate (the "**Certificates**") for the proposed Mayo Hydro Enhancement Project ("**Mayo B**" or the "**Project**"). The Project has been designated by OIC 2009/220 as a "regulated project" under Part 3 of the *Public Utilities Act.* It is understood that, as required by Part 3 of the *Public Utilities Act,* the Minister will refer this Application for the Certificates to the Yukon Utilities Board (the "**YUB**", or the "**Board**") for a review.

The Mayo B Project involves enhancements to the existing Yukon Energy Mayo hydroelectric facilities in order to increase hydro generation capacity installed on the Mayo River from approximately 5 MW to approximately 15 MW, including the construction of a new powerhouse downstream of the existing powerhouse and the construction of related facilities, as well as adjustments to the management of water on the Mayo River system downstream of the existing Wareham Dam. The planned in-service date for Mayo B of late 2011 reflects requirements of Yukon Energy's funding agreement with the federal government for Mayo B and Stage 2 of the Carmacks-Stewart Transmission Project (**CSTP**) connecting the Mayo-Dawson (**MD**) and Whitehorse-Aishihik-Faro (**WAF**) grids. The timing for Mayo B also reflects the opportunity to displace diesel generation energy requirements associated with growing power loads on both grids.

While changes to the Mayo Lake operating regime (provision for an additional 1 meter of drawdown at Mayo Lake) were included in the February 27, 2009 Mayo B Project Proposal filed with the Yukon Environmental and Socio-Economic Assessment Board ("**YESAB**"), this component has been removed from the Mayo B project now under review by the YESAB Executive Committee. Yukon Energy amended the scope of the Project being reviewed by YESAB in order to facilitate a timely review of the Mayo B Project (absent 1 meter drawdown) and ensure the timelines required for substantial completion by March 2012 (as required by Yukon Energy's funding agreement with the federal government) were maintained.[1] Yukon Energy intends to proceed with licensing of the Mayo Lake enhanced storage as previously proposed with a separate Project Proposal filing with YESAB anticipated in fall of 2010.

In sum, Yukon Energy intends to proceed as follows with regard to licensing, construction and operation of the Project:

- The Mayo B Project will proceed through current regulatory processes on the basis that Mayo Lake will be operated within its existing licence parameters; and

[1] In a letter dated July 23, 2009, the YESAB Executive Committee concluded that with the exception of issues related to the additional one metre drawdown of Mayo Lake, all information supplied with respect to the Project was sufficient. Subsequently, Yukon Energy determined that there was a substantial risk that the federal funding requirement for substantial completion by March 2012 would not be met with the additional one metre drawdown of Mayo Lake retained in the current Mayo B Project Proposal. Yukon Energy removed the provision for an additional one metre drawdown of Mayo Lake from the Mayo B Project Proposal on the understanding that this would allow YESAB to complete the adequacy stage quickly, and move forward expeditiously with the assessment of the amended Mayo B Project to meet the federal funding time constraint.

- After the YESAB review of the Mayo B Project Proposal is concluded, and the additional information requested by YESAB is available regarding an additional one metre drawdown at Mayo Lake, Yukon Energy intends to file a new project proposal with YESAB relating specifically to an additional one metre drawdown of Mayo Lake.

Review of the Mayo B Project to date has included the following regulatory proceedings:

- **YUB Resource Plan Review:** Mayo B was included in YEC's 20 Year Resource Plan 2006-2025 (the "**Resource Plan**") as part of an inventory of hydro project options (see Appendix B of the Resource Plan) available to meet forecast load growth scenarios. The projects included in Appendix B of the Resource Plan represented "the primary alternatives identified based on review of the numerous studies conducted in Yukon." Mayo B was specifically discussed as one of a group of small projects being considered (within the 5 to 10 MW range). Small hydro projects in the range of 5 to 10 MW were considered potential candidates for development under the 25 MW industrial scenario or larger (see Resource Plan, Chapter 5). These projects could also potentially be part of a development plan under the larger 40 MW scenario.

- **Yukon Energy 2008/2009 General Rate Application:** The business case (justification, need for and alternatives to) for pursuing the Mayo B project was reviewed during recent YEC 2008/2009 GRA. The Project is reviewed in the Application document (Tab 5, page 5-20), in interrogatory responses (YUB-YEC-1-38 and YECL-YEC-1-5(b) REVISED reviews the business case for Project, while the response to UCG-YEC-1-89 provides detail on how the Project was identified as part of (and fits into) the overall 20-Year Resource Plan), and Undertaking #28 provides the near term load requirement context for considering the Mayo B project at this time. The Project was also subject to cross-examination by parties during the oral hearing and was further examined in Argument and Reply Argument filed during that proceeding. The GRA process included an assessment of need, alternatives and the basis for Mayo B as essentially the only renewable resource option that can feasibly be licensed and built for a 2011 in service date in order to displace diesel generation that would otherwise be needed to meet forecast load requirements on the two grids.

- **YESAB Project Proposal Screening:** A Project Proposal Submission to the YESAB Executive Committee was filed February 27, 2009. The review process to date has included a pre-screening adequacy review of the Project Proposal Submission; YESAB provided an Adequacy Report on April 30, 2009 and supplementary responses were provided over the period from May 15, 2009 to June 2, 2009 with final responses provided June 17, 2009. An Adequacy Review Report of the Supplementary Information Response was provided July 23, 2009, indicating further information was required on issues related to the additional one metre drawdown of Mayo Lake. As noted, on July 31, 2009 the initial YESAB submission was revised to remove reference to the Mayo Lake additional 1 metre storage option, and a concordance table was filed with YESAB in a letter dated July 31, 2009 noting sections of the Mayo B Project Proposal that were revised. The pre-screening adequacy review was

completed on August 7, 2009 and the subsequent public comment period was completed September 28, 2009. In response to supplemental information requests from YESAB on October 22nd relating to comments from DFO, Yukon Energy filed supplementary responses on November 13, 2009. An update filing was also provided by Yukon Energy on November 20, 2009. YESAB is in the process of reviewing these supplemental filings and preparing a Draft Screening Report. Subject to the adequacy of the supplemental filings, YESAB has informed YEC that it is planning to complete its Draft Screening Report for Mayo B by the end of January 2010.

On April 13, 2009, Yukon Energy applied for federal funding for the Yukon Green Energy Legacy Project: Mayo B Enhancement/CSTP under the Federal Green Infrastructure Fund (**GIF**) Guidelines. The Federal Government has committed up to $71 million in no cost grant funding to Yukon Energy for the Legacy Project (CSTP Stage 2 and Mayo B) with $53.35 million in funding committed to Mayo B through the **Federal Contribution Agreement** executed on August 31, 2009 (provided as Attachment E).

The Yukon Government is providing funding assistance to Yukon Development Corporation (**YDC**) for the Mayo B and CSTP Stage 2 projects through an annual contribution for the principal and interest payments related to $52.5 million of YDC's required borrowing for these legacy projects (see letter from the Minister responsible for YDC as provided in Attachment F). Up to $30.15 million of this no cost funding assistance will be provided to borrowing costs for the Mayo B Project.

The combined $53.35 million of federal no cost funding and $30.15 million in no cost Yukon Government funding assistance act to lower the Mayo B capital costs to be funded by ratepayers. This funding assists Yukon Energy to advance the enhancement of Yukon's renewable energy capability and the reduction of future Yukon diesel generation requirements.

Yukon Energy has carried out concept and preliminary engineering and related geotechnical field studies since summer 2008 through KGS Group ("**KGS**"), retained Peter Kiewit and Sons ("**PKS**") in June 2009 to participate in Project planning and costing for a potential target price construction contract approach, and proceeded in fall 2009 with an early selection competitive process for the long lead turbine/generator ("**T/G**") equipment.

On November 26, 2009, the Commissioner in Executive Council designated Mayo B as a regulated project under Part 3 of the *Public Utilities Act* pursuant to OIC 2009/220. As prescribed by OIC 2007/50, Yukon Energy's Application for the Certificates for the Mayo B Project includes the following sections:

- Applicant
- Project Description
- Project Justification
- Consultation
- Other Applications and Approvals

2.0 APPLICANT

The required information on the Applicant is as follows:

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3.0 PROJECT DESCRIPTION

3.1 PROJECT SUMMARY DESCRIPTION

Located in the Yukon interior, north of the Village of Mayo, the Project will add additional infrastructure to the existing Yukon Energy Mayo Hydro facility downstream of Wareham Lake to increase renewable hydroelectric generating capacity on the Mayo River system from approximately 5 MW to approximately 15 MW. This enhancement of YEC's existing hydro plant will not require any changes at Wareham Lake or to the Wareham dam, and will not involve any new dam. The Project will be developed at an estimated cost of $120 million to help supply growing MD and WAF grid power loads with renewable energy that displaces required diesel generation. The Project's development at this time has been conditional upon the completion of Stage 2 of CSTP to connect the two grids.

The immediate Project construction footprint area south of Wareham Lake is adjacent to the Silver Trail Highway. This system enhancement will alter the managed water regime, notably flows in the Lower Mayo River below the existing Wareham Dam facility. The Project lies within the Traditional Territory of the First Nation of Nacho Nyak Dun ("**NND**"). The precise location of each component of the Project will be finalized during the construction phase upon completion of detailed engineering design.

3.1.1 Existing Facilities and Project Components

The existing Mayo hydro facility ("**Mayo A**"), built to supply electricity to the United Keno Hill mine at Elsa in 1951, as well as serve the communities of Mayo and Keno, includes the following components (that will remain in service after completion of Mayo B and are not proposed to be modified with the Mayo B Project Proposal):

- **Wareham Dam** – The 32 metre high earthen dam that created Wareham Lake and continues to control the lake levels within a licensed range. From Wareham Lake, water passes through an intake structure and a tunnel to the powerhouse. The existing intake structure on Wareham Lake will not be modified for the Mayo B Project, as it is adequate for the anticipated increase in flows to the new powerhouse as well as the existing powerhouse.

- **Powerhouse** – Located on the Mayo River downstream of Wareham Lake, the plant has two generating units of approximately 2.7 MW each, which operate with 36 metres of "head" or vertical drop between Wareham Lake and the existing generating station. With respect to the Mayo B Project, the existing generating station will be retained to generate limited quantities of power by maintaining a 5 to 6 cms minimum flow through the plant on a near continuous basis (Yukon Energy considered various options with respect to flow regimes on the lower Mayo River – these options are discussed in the YESAB filing at section 6.2.4 provided as Attachment A2 of this filing). These minimum flow levels through the existing powerhouse are considered necessary to ensure the maintenance of salmon spawning and rearing habitat

through the lower Mayo River between the existing powerhouse and the new powerhouse.[2] This minimum flow level requires only one of the existing powerhouse's two turbines to operate at any given time, and typical generation at the existing powerhouse will be reduced in most instances to approximately 1 to 2 MW. Both turbines will remain at the existing powerhouse, providing the full plant capacity for backup power and flow release as required, such as during scheduled and unscheduled maintenance of the new powerhouse.

- **Mayo Lake Water Storage** – Approximately 50 km upstream of Wareham Lake, the Mayo Lake dam provides the ability to control the level of Mayo Lake within a licensed range subject to minimum flow releases. Water released from the lake flows to Wareham Lake where it is used to generate power. The Mayo Lake dam is a six meter high rock-filled wood structure, which was entirely rebuilt in 1988 and 1989. In developing the Mayo B proposal, options were considered related to the potential benefits available through enhancing the operation range of Mayo Lake (these are discussed at section 6.2.3.3 of the YESAB Project Proposal and provided as Attachment A2 of this filing). The proposal submitted to YESAB February 27, 2009 (and that Yukon Energy intends to pursue subsequent to the completion of review of the amended Mayo B Project) to enhance Mayo Lake storage reflects a "modified" increased storage regime consisting of maintenance of the existing maximum controlled elevation for Mayo Lake and reducing the controlled minimum elevation of Mayo Lake by 1 metre.[3]

In summary, the proposed new Mayo B Project components as described in Section 6.1 of the Project Proposal Submission to the YESAB Executive Committee (and as revised in July 2009 to delete the Mayo Lake enhanced storage and as updated November 20, 2009 to reflect ongoing design refinements resulting from geotechnical field studies and engineering) are as follows (see Figure A-1, Attachment A1):

1. **A new powerhouse** of approximately 10 to 12 MW of nameplate generating capacity,[4] with two Francis turbines, was described in the Project Proposal Submission as being located approximately 3.9 km downstream of the existing powerhouse, at a location that provides approximately 64 metres of head with a maximum design flow of approximately 19 cms. The power produced by the Mayo B plant was described as being stepped up by two transformers, located directly outside the powerhouse, to 69 kV and transmitted 3.6 km to the transmission grid at the existing Mayo Hydro Substation S249. Alternate powerhouse

[2] Section 6.2.4 of the Project Proposal Submission to YESAB notes that studies undertaken noted there would be environmental benefits of reducing the extent of river that experiences reduced flows, notwithstanding the significant reduction to power production potential for the Mayo B plant. As noted in Chapter 7 of the Project Proposal Submission, the proposed minimum flows for Zone 2 serve to ensure maximum in-situ preservation and enhancement of spawning (and to some degree rearing) conditions for salmon.

[3] The February 27, 2009 Project Proposal Submission to YESAB also included implementing a water management regime to ensure that minimum spring elevations are not in excess of 2.59 metres below the lake elevation on the previous September 15 more than 2 years in a row (i.e., at least one year in three the drawdown from September 15 elevation, to the minimum elevation the following spring, shall be less than 2.59 metres).

[4] Final design specification and optimization of the nameplate generating capacity, the number of turbines, the final head and precise maximum design flow, and the number of transformers (i.e., one versus two) to be determined.

locations were reviewed prior to filing of the YESAB Project Proposal and are discussed in detail in the Project Proposal Submission to YESAB (see Section 6.2.3.1 provided as Attachment A2 of this filing). The Project Proposal Submission noted at section 6.2.3.1 that the precise location of the powerhouse was subject to ongoing review within an approximate range of +/- 100 metres. Investigations to date have confirmed the planned powerhouse location as described in the Project Proposal Submission, subject to ongoing review within 600 metres further downstream to identify any cost-effective options to enhance head that are feasible within the Project's time requirements.[5]

2. **A new tunnel-penstock system** that will divert water from the existing intake tunnel to the new powerhouse. During the Project development process, the following conveyance options were extensively studied and considered:
   a) Significant effort was expended on geotechnical investigations during the course of summer of 2008 (overburden auger drilling and bedrock core sampling) and fall of 2008 (seismic refraction surveys) to determine whether an all-tunnel option was viable. This option was eliminated as a viable option due to cost risk as well as due to technological challenges associated with tunnel projects.
   b) A penstock-canal system was included as a second option in the initial Project Proposal Submission to YESAB; however, based on construction cost, construction risk and operating considerations, the canal part initially included in this Project component (approximately 2,500 m) was determined to not be cost effective and was subsequently replaced in fall 2009 with an extension of the penstock through the entire distance to the new powerhouse. This change primarily reflects field study outcomes on initial segments of the proposed penstock/canal route east of the existing powerhouse which have resulted in the need to modify and slightly extend the route (moving it to the north and closer to the existing road) to largely avoid a discontinuous permafrost zone confirmed in this area southwest of Five Mile Lakes, as well as the need in any event to extend the "upstream" penstock through the known area of elevated groundwater conditions directly south and southeast of Five Mile Lakes.
   c) With regard to the new tunnel extension at the existing intake, ongoing hydraulic investigations have indicated a likely need to modify the tunnel construction so as to move the connection to the existing tunnel closer to the intake structure in order to minimize the complexities and hydraulic conditions associated with expansion/modification work within the existing tunnel.

[5] Confirmation of precise final powerhouse location will be determined based on all relevant design and cost information to optimize the cost-effective net head secured (the location as shown in Figure A-1 provided as Attachment A1 remains as the default location – locations within up to approximately 600 metres of this site along the riverbank on the same geographic bench feature have been examined to date for possible optimization, taking into account overall head achieved and construction cost based on rock and geotechnical conditions for the powerhouse and associated penstock access. These investigations have confirmed that there is no basis to examine further any location options upstream of the default location, and that downstream options within this area to secure added head should continue to be examined (subject to timing constraints for finalizing turbine generator specifications and the need for refined geotechnical investigation in the area(s) required for construction).

3. **A new all-weather access road** to the new powerhouse from the existing YEC access road serving the current Mayo hydro facility. Final location and distance will be determined based on the final penstock routing and location of the new powerhouse.

4. **A new distribution line** of approximately 1,700 metres operating at 12.5 kV from the new powerhouse to the existing 12.5 kV distribution line to provide station service power and communication to the new powerhouse. Final location and distance will be determined.

5. **A new transmission line** of approximately 3,600 metres operating at 69 kV from the new powerhouse to the existing Yukon Energy substation (S249). Final location and distance will be determined.[6]

6. **Temporary construction-related facilities** including a work camp for a peak workforce of 120 workers, lay down areas, a concrete batch plant, and related facilities.[7]

Since filing the Project Proposal with YESAB, the Yukon Government has purchased the private property affected by construction of the Project. Yukon Energy will acquire from the Yukon Government all of the lands required for the new facilities to be built (at least as regards the new access road, new penstock/tunnel and new powerhouse), beyond those lands already held by YEC.

Figure A-1 (provided as Attachment A1) provides the most up to date Project Area Map.

The construction of the proposed Project is contemplated to occur concurrently with Stage Two of the CSTP, a project previously reviewed by the Executive Committee of YESAB as well as by the YUB. Stage Two CSTP will complete the 138 kV connection of the MD and WAF grids. Stage One of CSTP was completed in November 2008 and connected the Minto copper mine and Pelly Crossing to the WAF grid immediately displacing over 30 GW.h per year of diesel generation with surplus hydro generation.

There is no timetable or final plan for final disposition or decommissioning of the Mayo B Project facilities.[8] It will be 50 to 100 years before these facilities will require substantial refurbishment. As stated in Section 6.9 of the YESAB Project Proposal Submission, and reiterated here, the design life of the facility before substantial refurbishment is 50 to 100 years. This is so far into the future that it is not feasible today, based on available information and agreements, to provide meaningful assessment of

[6] Provision is also needed at the substation to connect the Mayo B line to the bus. Due to the range of non-Mayo B material planning considerations and requirements associated with this substation, engineering and construction for the substation is being addressed separately from the Mayo B Project (the Mayo B capital cost budget includes a set assignment of $0.6 million towards the substation project to cover costs for a least cost Mayo B connection option involving a simple single tap to the bus with appropriate disconnects for isolation).

[7] The work camp size has been increased from that included in the February 2009 Project Proposal to YESAB in order to accommodate a peak workforce of 120 workers reflecting construction camp experience provided by PKS and the prudence of providing for a larger camp to accommodate potential overlaps of workers on the site.

[8] The work camp and lay down area(s) are the two main areas to be reclaimed once construction of the Project is complete. The main goal for reclamation will be to return the areas to the state they were in before the Project began. Measures required in this regard are discussed in Section 6.9.1 of the Project Proposal filed with YESAB.

likely plans or their effects for rehabilitating the operational components and related infrastructure of the Project at the end of operational life. When decommissioning plans are required, Yukon Energy will submit these plans for regulatory review and approval prior to implementation.

3.1.2 Project Costs, Financing and Economics

The full potential of Mayo B to displace diesel generation assumes successful subsequent licensing of the Mayo Lake enhanced storage project. The design and development of the Mayo B facility accommodates, at no incremental construction cost, this full potential. Following its July 2009 revision to the Mayo B YESAB Project Proposal Submission, Yukon Energy must now proceed with a separate YESAB filing and review process to secure the required licences and approvals for Mayo Lake enhanced storage. Until the Mayo Lake licence change is approved, Mayo B's long term average annual net generation potential will be reduced by about 4 GW.h/yr.

Planning requirements for Mayo B have included extensive concept engineering and field work by KGS in 2008 and 2009 to identify and assess alternative ways of carrying out the Project and to provide capital cost estimates. These activities reflect the material geotechnical and other risks related to design and construction that need to be addressed with regard to this Project. In order to further address construction risks and in-service timing needs for Mayo B, Yukon Energy retained PKS in June 2009 to participate in Project planning and costing for a potential target price construction contract approach,[9] and proceeded in fall 2009 with an early selection competitive process for the long lead turbine/generator equipment.[10]

Estimates previously discussed during the 2008/2009 GRA (see response to YECL-YEC-1-5 Revised) reflected activities oriented towards a "Level 3 – Feasibility" stage of study,[11] and were subject to design refinement, and changing market conditions (including general economic conditions for construction in western Canada). These project cost estimates reflected a period of study in 2008 and early 2009 oriented towards confirming the technical ability to construct the Project, and the timing and configuration of major Project components.

[9] An early competitive selection of a construction contractor was pursued to allow YEC, via a MOU with a successful contractor, to establish procedures to negotiate, before the end of 2009, an open book procurement and construction contract including agreed upon construction and development schedule and a target pricing formula. The approach was adopted to reduce YEC risks as to contractor participation and price as well as risks of material delays. Subsequent to undertaking an RFP for early competitive selection and interviews with candidates, PKS was awarded the MOU contract. The MOU provides that if negotiations are not successful in securing a construction contract, YEC has reserved the ability to proceed with a construction tender process in early 2010. Under the MOU, PKS and the project engineer (KGS) developed an approach for early selection of a turbine/generator contractor that was included in an RFP issued September 10, 2009. The MOU Contractor also participated in assessing design options and cost estimating to date in 2009 which facilitated completion of more advanced preliminary design engineering and project costing than originally anticipated for this time period.

[10] Bids for the T/G supplier closed November 6th. An award is anticipated in early December.

[11] As defined and discussed in the Resource Plan. See pages 5-32 and 5-33 of Resource Plan for further discussion.

During Yukon Energy's 2008/2009 GRA, the cost of the Project was estimated at $120 million (including escalation, interest during construction, and contingencies of 15% to 25% depending on the Project component).[12]

Since the 2008/2009 GRA process, the Project cost estimates, including contingencies, have been subject to further and more detailed review and have been updated to reflect the following:

- The latest planning budgets as well as construction cost estimates based on initial outcomes of the past summer field season;
- Extensive cost estimate updates and option assessment carried out by KGS and PKS pursuant to the Construction Contractor MOU between YEC and PKS;
- Ongoing engineering coordination as to potential scoping of elements affecting costs;
- Short-term financing arrangements being finalized by YEC affecting interest/AFUDC during construction, resolution of ongoing ES&G treatment for this specific Project; and
- The decision to address Mayo Lake storage enhancement (licence amendment to allow 1 metre added drawdown) elements of this development through a separate YESAB application planned to be filed in fall of 2010.

As of late November 2009, the updated installed capital cost estimate for Mayo B at the planned powerhouse location, with long-term average annual net generation of 41.4 GW.h (under full long term dispatchable generation load conditions of 720 GW.h/yr with Mayo Lake enhanced storage), remains at $120 million. This $120 million cost estimate includes provision for approximately $99 million for construction contractor and detailed engineering costs, $8 million for owner construction costs (construction management and field inspection services, owner staff and administration costs, plus ES&G and AFUDC/interest costs during construction), and $13 million for pre-construction and other permitting/regulatory planning costs (including provision for Mayo Lake environmental review and licensing).

[12] The GRA responses by YEC noted, based on the estimated Project cost of $120 million (and ignoring potential government infrastructure funding) that with an assumed output of 38.4 GW.h (under full load long term conditions with Mayo Lake), it was estimated that the Project would yield a levelized cost of energy (LCOE) for the capital cost of the Project of $0.142/kWh. Further, and as noted in YECL-YEC-1-5 Revised, in the near-term under reasonably foreseeable load conditions, integration of the Project into Yukon power systems would be expected to yield a somewhat smaller net firm energy benefit, potentially as low as approximately 30 GW.h of firm energy with the LCOE estimated to approximate $0.182/kW.h. During the earlier Resource Plan hearing, Mayo B was discussed as a potential small hydro resource option (10 MW installed) with the ability to produce up to 48 GW.h on the MD system at a capital cost of $101 million in 2005$ and a LCOE of 11.2 cents/kWh.

During the 2008/2009 GRA process (and in YECL-YEC-1-5 Revised) it was noted that in order to keep levelized costs of energy (LCOE)[13] and risks to Yukon ratepayers within acceptable bounds (e.g., more in line with earlier B.C. green market power purchase costs of 8 to 10 cents/kW.h)[14] government infrastructure funding would need to be secured for a material portion of the Project costs. Yukon Energy has been able to secure the following required government funding to proceed with the Project:

- Yukon Energy secured federal funding under the Federal Green Infrastructure Fund (**GIF**) Guidelines for the Yukon Green Energy Legacy Project: Mayo B Enhancement/CSTP, which includes a Federal Government funding commitment of up to $71 million in total for the Legacy Project (CSTP Stage 2 and Mayo B) with $53.35 million in funding committed to Mayo B through a Federal Contribution Agreement (see Attachment E for a copy of the Agreement).

- Yukon Energy has also secured $30.15 million in no cost YDC funding towards Mayo B capital costs. See Attachment F which provides the letter from the Yukon Government outlining the commitment of $52.5 million no cost funds to YDC for the CSTP Stage 2 and Mayo B projects. YDC will use these funds to contribute $30.15 million (at no cost to YEC) towards the capital cost of the Mayo B Project.[15]

Based on these federal and Yukon Government no cost funding commitments, the current estimated YEC net rate base cost for Mayo B is $36.5 million.

Table 1 summarizes the overall in-service estimated capital cost estimate and financing for Mayo B. Levelized costs of energy (LCOE) for projected Mayo B "net generation" (generation forecast to displace diesel generation on the WAF/MD grids) are also provided, both with and without the Mayo Lake enhanced storage, assuming YEC's approved 2009 GRA cost of capital (average 6.56%), a 65 year economic life for the Project, a base case grid generation load forecast (as reviewed later in this Application) with the Carmacks Copper mine connected by 2012, and the other currently existing or committed grid generation and transmission assets.

[13] "Levelized" costs (levelized cost of energy or "LCOE") convert projected capital and operating costs over the project's economic life to a year 1 of operation cost per unit of output (kW.h); this assessment assumes that such unit costs are constant in "real" cost terms (ignoring inflation) over the economic life of the project. Accordingly, projected actual levelized unit costs in "nominal" terms would increase after year 1 as required to reflect inflation. Actual regulated costs in any year may differ radically from levelized costs, e.g., for a capital intensive project such as Mayo B, annual regulated unit costs after substantial completion will normally decline over time while levelized unit costs will increase over time due to inflation.

[14] These are "levelized" unit costs, and are assumed to escalate each year at inflation.

[15] YDC will use the balance of the $52.5 million to provide a no cost contribution to YEC of $22.35 million towards the cost of CSTP Stage 2; if any new mine or other industrial customer connects to the CSTP line they will still be required to pay a customer contribution for their share of the capital cost of the CSTP line following the approach used with the Minto mine and as provided for in section 5.7 of the Power Purchase Agreement between YEC and Minto Exporations Ltd., as approvded by Board Order 2007-6. As provided for in the letter from the Yukon Government (Attachment F), all such proceeds from new industrial customers connecting to the CSTP will reduce Yukon Government's funding contribution to YDC.

Table 1
Summary of Mayo B Project Costs and Finacing ($million)

	Estimated Costs	
Funding Source		
Federal (grant)	53.35	see Note 1 & Attachment E
YDC (contributions)	30.15	see Attachment F
YEC (ratebase)	36.50	see Notes 2 and 3.
Total	120.00	

Notes:

1 Based on 50% of "eligible costs" (excludes costs before Minister approval & various owners costs). Funding submission estimated 'eligible costs' at approximately $106.6 million for Mayo B.

2 YEC sought government/industry funds as needed to keep Mayo B levelized cost of energy (LCOE) within range of 8 to 10 cents per kWh of "net generation" (generation forecast to displace diesel generation).

LCOE over 65 years at YEC 2009 GRA cost of capital [ROE 8.49%, new debt 5.28%], including operating costs and net added secondary sales recoveries, and base case forecast net generation (with Carmacks Copper mine connected by 2012) is as follows with the estimated $36.5 million YEC rate base capital cost:

	LCOE	
a) Assuming 1 m added Mayo Lake storage:	6.69	c/kWh
b) Assuming no change in Mayo Lake licence:	7.59	c/kWh

3 Flexible debt financing with YDC will cap annual net generation costs at 10 to 11 cents/kW.h (2012$).

Based on the estimated YEC rate base cost of $36.5 million, Mayo B real LCOE costs to ratepayers (after government and YDC contributions) range from 6.69 c/kW.h with the enhanced Mayo Lake storage to 7.59 c/kW.h with no change to the Mayo Lake licence.

Financial contributions from Canada and YDC have materially reduced Mayo B LCOE to within, or below, the 8 to 10 c/kW.h levelized cost target range. In finalizing Project design, Yukon Energy will continue to pursue refinements and/or options (e.g., turbine/generator and/or penstock design, powerhouse location within the defined area) that can increase Mayo B energy output at an incremental levelized cost (for the added capital cost) that does not exceed the minimum target cost of 8 c /kW.h.

Generation at Mayo B (as well as other hydro facilities) is forecast on the basis of long term average flow conditions, i.e., actual year to year Mayo B generation will vary depending on actual annual flows. Hydro generation capability to displace diesel generation on the WAF/MD integrated grid varies materially depending on overall grid generation loads and on water flows (median flows versus drought or flood conditions) – long term average hydro generation estimates increase (up to certain limits for each facility) as grid loads increase, in part reflecting enhanced ability to capture summer flows and in part reflecting enhanced ability to capture flood condition flows for the purposes of serving loads (see Attachment C which reviews this for the WAF/MD system excluding Mayo B).

The forecast "net generation" impact of Mayo B to displace diesel generation on YEC's overall WAF/Mayo Dawson integrated system (assuming completion of CSTP Stage 2) recognizes that, in order to assess diesel displacement benefits due to Mayo B, the increased generation at the Mayo plant ("gross generation") must be reduced to the extent that Mayo B operation results in reduced generation at the Whitehorse and/or Aishihik hydro generation facilities (due, for example, to impacts on seasonal generation at these other hydro plants). "Net generation" impacts of Mayo B are sensitive to assumed overall loads on the WAF/MD systems, and changes to annual grid generation load are forecast to change long term average net generation from Mayo B; for example, under the base case forecast, Mayo B net generation contribution to the system (with Mayo Lake enhanced storage) approximates 26.4 GW.h in 2012, and ranges from 14.9 to 41.4 GW.h/yr over the Project's assumed 65 year economic life, reflecting the impact of changes during this period in overall forecast WAF/MD annual dispatchable generation loads. By comparison, gross generation at Mayo B during this same period would be expected to fluctuate considerably less under the same forecast load conditions.

Figure 1 below illustrates the projected Mayo B annual ratepayer costs (net of incremental secondary sales revenues from Mayo B) over the first 35 years of the 65 year assumed life of Mayo B, reflecting normal utility revenue requirements to set rates,[16] and assuming that Mayo Lake enhanced storage benefits are included. Figure 1 also reflects a base case WAF/MD integrated grid generation load forecast with non-industrial load growth rates consistent with the 2006-2025 Resource Plan and with three industrial loads (Minto, and Alexco, and Carmacks Copper mines) assumed to be connected in 2012 and shut down (at varying dates) by 2019, and specifically illustrates the following:

- **Mayo B Total Costs – No Contributions:** downward sloping line showing annual costs for a total plant cost of $120 million (with no federal or YDC contributions);

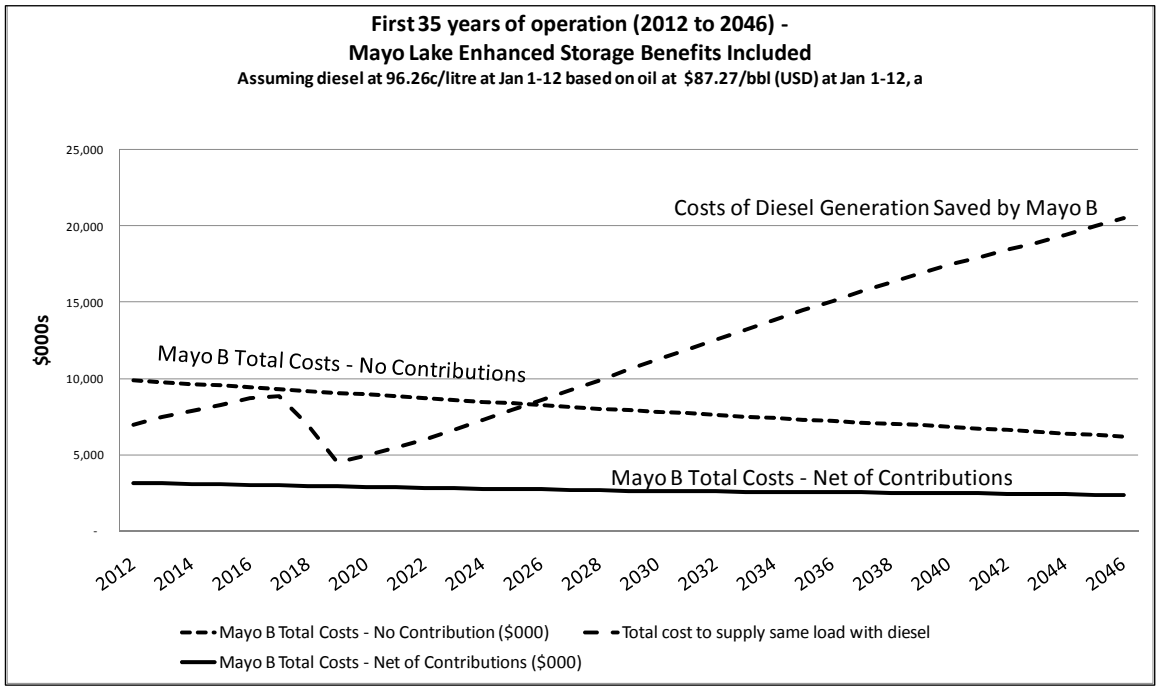
- **Mayo B Total Costs – Net of Contributions:** relatively flat (slightly downward sloping) line showing annual costs for a total plant cost of $36.5 million after $83.5 million of federal ($53.35 million) and YDC ($30.15 million) no cost contributions to offset capital costs; and

- **Cost of Diesel Generation Saved by Mayo B:** diesel generation annual costs (the upward sloping "Costs of Diesel Generation Saved by Mayo B" line) if the equivalent net generation

[16] Assumptions are consistent with LCOE in Table 1, including provision for operating costs, average 65 year depreciation of Mayo B assets, and YEC average return cost on capital in rate base as per approved 2009 GRA (6.56%).

forecast for Mayo B was to be provided from diesel plants at the assumed diesel price fuel cost (incremental diesel generation fuel and incremental O&M costs at approximately 26 c/kW.h in 2012, increasing by inflation thereafter).

Figure 1
Mayo B Annual Costs and Diesel Savings – end of 2011 ISD ($000s)



With a ratebase net cost of $36.5 million[17] and Mayo B net generation resulting from the base case grid load forecast, Figure 1 demonstrates that Mayo B will create ratepayer cost savings each year compared to diesel generation that would otherwise be required. These annual savings start at approximately $3.8 million in year 1,[18] grow to $5.7 million by year 5, fall to $1.6 million in year 8 (2019) when no industrial loads are assumed to be connected, with higher annual savings for each subsequent year (e.g., $2.6 million in year 10, and $9.3 million in year 20). By inference, Figure 1 also shows that Mayo B benefits beyond 2016 will be materially increased to the extent that industrial loads are retained and/or new such loads are added to the grid after that date.

[17] With no contributions and a ratebase cost of $120 million, the LCOE approximates 20.0 c/kW.h, and is below the cost of incremental diesel generation (26 c/kWh); however, as shown in Figure 1, annual Mayo B costs would remain above incremental diesel generation costs for close to the first 25 years of operation at the assumed base case loads (reflecting the assumed loss of all industrial loads by year 8).

[18] Without the Carmacks Copper mine connection, the overall grid load would be reduced and Mayo B cost savings compared to diesel generation that would otherwise be required in year 1 would fall to approximately $1.2 million with Mayo Lake storage enhancement benefits and $0.7 million without Mayo Lake storage enhancement benefits.

Yukon Energy and YDC are also in the process of securing a possible investment in the Project by NND through the negotiation of a Project Agreement. Any such investment would only impact related YDC funding requirements with regard to YEC rate base costs for the Project and would have no impact on ratepayer costs.

3.2 ANTICIPATED TIMELINE

Mayo B in service is currently planned to occur on, or before, December 31, 2011. In any event, under the terms of the Federal Contribution Agreement, substantial completion of the Project is required by no later than March 31, 2012. Once Mayo B is commissioned and is in operation, it is expected to continue in operation indefinitely.

Two summer construction seasons (2010 and 2011) are required to complete the Project. Start of construction on land-based activities of the Project is planned to occur in mid to late May 2010, and work on the construction camp that does not require permits will commence before then. Water-related construction activities will not commence until summer 2011.

In order to meet the target in-service date, long lead equipment (i.e., the Turbine/Generator) must be contracted in early 2010 from a supplier selected and committed before the end of 2009, well before the start of construction.

The YESAB review process and any related permitting requirements are the key critical path elements currently affecting the required start of construction for Mayo B in May 2010. Under the MOU, a construction contract is targeted with PKS by the end of 2009. If a PKS contact cannot be successfully concluded, a competitive tender process and award is to be concluded by April 2010.

A more detailed review of key timeline elements is provided below:

- **Permitting and Approvals**: The schedule anticipates completion of the YESAB review and Decision Body approvals, and securing all needed permits and approvals required to commence construction of Mayo B by early May 2010.
  - **The YESAB Executive Committee assessment process** includes at a minimum the following major steps:
    - A pre-screening adequacy review – on August 7, 2009 YESAB concluded that the revised Mayo B is adequate for YESAB to proceed with its screening.[19]
    - Screening with public comment – public comment on the proposal ended on September 28, 2009 and information requests from YESAB were provided on October 22, 2009; responses to information requests were filed with YESAB on November 13, 2009, and an update to the project description followed on November 20, 2009. On

[19] YESAB determined on July 23, 2009, that the proposal was adequate in respect of all aspects except the additional 1 metre of drawdown at Mayo Lake; on July 31, 2009 YEC notified YESAB that the Mayo Lake enhanced storage range was withdrawn from the Mayo B Project Proposal.

December 3, 2009, YESAB issued notice that supplementary information is sufficient and that drafting of the screening report has commenced.

- Release of a Draft Screening Report – YESAB has informed YEC that it is working towards issuing a Draft Screening Report for public comment by the end of January 2010.
- Public comment on the Draft Screening Report and release of the Final Report recommendations – based on experience with the CSTP review by YESAB, YEC's schedule assumes review and comment on the YESAB Draft Screening Report will be complete within 30 days of its release, with Final YESAB Recommendations provided within approximately 60 days of YESAB's release of its Draft Screening Report, i.e., by early April 2010.
- YEC's schedule assumes approval of the YESAB Recommendations by all Decision Bodies (Yukon Government, and relevant federal authorities) within 15-20 days following the release of YESAB's Recommendations.

– **YG and Federal Permits and approvals** can be issued by federal and territorial regulatory authorities only after release of the YESAB Final Report recommendations and (if undue delay is to be avoided) only after each Decision Body has issued a Decision Document accepting the YESAB recommendations. Application materials have already been filed with Transport Canada (Navigable Waters Protection Program) and the Department of Fisheries and Oceans ("DFO").

To facilitate timely completion of the overall permit and approval process, the following activities have/will be undertaken:

- Land-based Construction Permits – YEC's schedule assumes the ability to proceed with land-based construction as soon as possible in spring/summer 2010, prior to securing from pertinent regulators any authorizations required pursuant to the *Fisheries Act* or the *Navigable Waters Protection Act*, or any required amendments to the Mayo Water Licence pursuant to the *Waters Act*.
- Permits for Work in Water – Yukon Energy expects to secure required approvals to commence work in water as soon as feasible after Decision Body approval of the YESAB Recommendations, and will endeavour to secure them prior to the end of 2010. These permits and authorizations must be secured prior to the 2011 spring/summer construction season.
- NND Project Agreement – YEC and NND are in the process of completing a Project Agreement that supports the Mayo B Project and provides support for the future development of the Mayo Lake project (1 meter added drawdown). Negotiations are ongoing, and the parties are hopeful that an agreement will be finalized prior to the end of December 2009 or early in 2010.

– **Mayo Lake Licensing related to provision for an additional 1 metre drawdown** will be pursued via a separate Designated Office level YESAB Project Proposal. This item was removed from the YESAB Mayo B Project Proposal to enable Mayo B to advance from the adequacy stage to assessment expeditiously. Field studies and other related

reviews are expected to be completed to allow the YESAB Project Proposal to the Designated Office to be filed in fall 2010. Yukon Energy is working towards completion of the YESAB Designated Office review of the separate Mayo Lake Project and securing all required permits and approvals (including amendments to the Mayo Water Licence pursuant to the *Waters Act*) prior to December 31, 2011, to allow YEC to utilize the added drawdown as required as soon as possible after start of operation of the Mayo B Project. No new works are required to implement this licence change. Even if delays occur, securing this amendment at any point in time in the future would restore thereafter the full benefits of the enhanced Mayo Lake storage.

- **Construction Management Approach:** An early competitive selection of a construction contractor was pursued by YEC in spring 2009, and PKS was selected and awarded the MOU contract in June 2009. This allowed YEC via an MOU with PKS to establish procedures to arrive at an open book procurement and construction contract including agreed upon construction and development schedule and a target pricing formula. The approach was adopted to reduce YEC risks as to contractor participation and price as well as risks of material delays. YEC and PKS are currently working to secure a construction contract agreement by the end of 2009; if this agreement cannot be successfully concluded, YEC will issue a construction contract tender in January 2010.
  - The preliminary designs for key aspects of the Project have been completed to a stage sufficient to establish the general location of infrastructure, to identify the key components that will make up that infrastructure, to describe the general activities required to construct those components, and to provide updated construction cost estimates. This preliminary design will provide the basis for a construction contract with PKS and/or a construction contract tender.
  - Engineering and design are ongoing, with aspects of detailed design, including "issued for construction" drawings, being completed leading up to and in some cases during the construction process.
  - YEC is contracting KGS to provide detailed engineering for the Project, and to direct field inspection services and on-site construction contract management for the Project.
- **Long-lead equipment (Turbine/Generator):** An approach for early selection of a turbine/generator contractor was developed by YEC, PKS and the project engineer (KGS). The selected turbine/generator supplier will work with the project constructor and project engineer to finalize the relevant design.
  - Bids for the T/G contractor ended November 6, 2009, and an award is expected before the end of 2009.
  - The outcome of the tender award will allow YEC to determine a more definitive target schedule for in-service of Mayo B facilities in late 2011, and confirm expected costs and requirements for this key component. This approach will also assist the constructor and engineer in completing overall design and construction planning.
  - The schedule for this item is material to the ultimate Project in-service date. Current schedule for in-service at the end of 2011 assumes the T/G equipment will be delivered by mid September 2011.

- A limited notice to proceed for detailed engineering is expected by mid-December 2009, prior to a final purchasing commitment with YEC in February 2010.

3.3 NEW OR EXPANDED PUBLIC WORKS DESCRIPTION

Mayo B does not require any new or expanded public works, undertakings or infrastructure beyond what has been described above with regard to CSTP Stage 2. While the completion of CSTP Stage 2 is not required to physically complete the Mayo B Project, the completion of CSTP Stage 2 is required to enhance the economics of the Mayo B Project, and alleviate the effects of the required shut down of the Mayo A plant for a short period during construction.[20] Completion and commissioning of CSTP Stage 2 provides for an interconnection that enables new renewable sources (such as Mayo B) to meet new loads on both grids. This is a key element in supporting new hydro or other renewable development.

3.4 SUMMARY OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

Chapter 7 of the February 2009 YESAB Project Proposal Submission provides a detailed explanation of the expected environmental and socio-economic impacts of the project.[21] In July 2009, a Supplementary Filing was submitted to YESAB to remove the additional one metre drawdown of Mayo Lake from the Mayo B Project Proposal, thus removing the identified potential environmental and socio-economic effects on Mayo Lake and any pathway of effect on Valued Components at Mayo Lake as identified in the Project Proposal.

In summary, the Project Proposal Submission indicates that the revised Mayo B project is expected to cause no significant adverse effects on the biophysical environments (e.g., land and water environments and associated terrestrial and aquatic life) or on the socio-economic components (e.g., resource and other land use, economy (including local employment and training and local business), and social components including infrastructure and services, traffic, heritage sites, community and family life, and worker health and safety.

[20] Delay in completion of CSTP Stage 2 beyond spring/early summer of 2011 would require that costly diesel generation rather than available WAF surplus hydro be used when the existing Mayo plant is required to be shut down briefly during the summer to complete the connection of the new Mayo B powerhouse. Delay in the in-service of CSTP Stage 2 beyond 2011 would mean that Mayo B generation would not be available to be utilized to displace diesel generation on the WAF grid. CSTP Stage 2 is currently planned to be in-service by the end of 2010.

[21] Supplementary Filings provided to YESAB in June 2009, including YESAB-YEC-4.1.1 Chinook salmon, YESAB-YEC-7.1 Alcohol and Drug Policy, YESAB-YEC-7.2 Temporary Work Force, provide added information related to environmental and socio-economic effects of the Project. Additional Supplementary Information on fish and fish habitat issues was provided to YESAB on November 13, 2009.

Biophysical Effects

The conclusion that there will be no significant adverse effects on biophysical environments reflects considerable attention to mitigation measures to protect against adverse effects on Chinook salmon specifically, and fish and fish habitat more generally in the lower Mayo River between the Wareham dam and the confluence with the Yukon River. Net effects on Chinook and other fish species are deemed to be positive, as the proposed water management regime will benefit the overall productivity of the lower Mayo River.

Planned mitigation includes a water management regime of winter minimum flows in Zone 2[22] of 5 cms to protect overwintering (which are higher than presently licensed minimum flows of 2.8 cms), and minimum flows of 6 cms during the key growing season (approximately May to September); as well as minimum Zone 1[23] flows of 11 cms during the same key growing season. These new minimum flows provide an improved habitat condition on the lower Mayo River with the Mayo B project.

In addition to the above noted mitigation measures, YEC is developing a lower Mayo River monitoring plan in conjunction with NND and DFO.[24] The fish and fish habitat monitoring plan is aimed at providing additional data to confirm the conclusion of no significant adverse effects, to detect potential unanticipated project effects on the lower Mayo River and to provide data for future environmental reviews and license renewals. The monitoring plan will be finalized with appropriate regulators prior to licensing.

Socio-economic effects

Mitigation measures planned to address potential adverse socio-economic effects include community notification of construction activities and timing; a YEC designated liaison person to address any concerns that may arise during construction; a commitment to employ local contractors and individuals wherever feasible; a "no firearms policy" and a drug and alcohol policy for the camp.

Some residual adverse effects are anticipated (e.g., the physical presence of the facilities result in an altered landscape; potential short-term sediment mobilization during construction of the last stage of the powerhouse/tailrace structure; short-term seasonal habitat avoidance during construction for local wildlife populations; restricted access to the lower Mayo River), but these residual adverse effects are not expected to be significant based on criteria relevant to the YESAB assessment.

The Project Proposal Submission also indicates the positive environmental and socio-economic effects that are likely to result from the Mayo B Project:

- Provide long-term supply of renewable power at stable costs, for electrical users on today's WAF and Mayo-Dawson grids (once the CSTP is connected), and reduce the future consumption of diesel or other fossil fuels (either by Yukon Energy, or by large industrial

[22] Zone 2 is the reach of the river between the existing Mayo A plant and the proposed Mayo B powerhouse.
[23] Zone 1 is downstream of the proposed Mayo B powerhouse to the confluence with the Yukon River.
[24] A Draft Mayo River Fish and Fish Habitat Monitoring Plan for Zones 1-3 was provided as Attachment A to the Supplementary Information Response YESAB-YEC-3.0 filed November 3, 2009.

loads using off-site diesel generation). Utility net benefits resulting from sales of enhanced power supply at Mayo B and displaced high cost of diesel generation will be shared by all Yukon ratepayers (under the rate directive OIC 1995/90).

- Displacement of 700 tonnes of greenhouse gas emissions per GW.h of electricity generated.

- System-wide grid reliability and flexibility once CSTP is interconnected with the WAF and Mayo-Dawson grids with the increased power generation at Mayo B enabling dissemination of the power to where it is needed.

- Net increase in productive capacity of the lower Mayo River for Chinook and other fish species through an improved water management regime.

- Local employment and business opportunities related to the construction phase of the Project, including use of local businesses such as the grocery/hardware store, gas bar, restaurant; and construction workforce opportunities such as truck drivers and heavy equipment operators, camp caterers, carpenters, skilled trades and general labourers. Local economic spin-off includes the ability of transference of job skills acquired through employment on the Project to other local employment opportunities in the future.

4.0 PROJECT JUSTIFICATION

The Mayo B Project will reduce the use of diesel to generate electricity in Yukon, saving costs for electricity customers and reducing GHG emissions to the environment. Consistent with Yukon Energy's 20-Year Resource Plan's priority of increasing renewable energy through enhancements of existing hydro facilities, the Project will roughly double the amount of hydro electricity that can be generated on the Mayo River downstream of YEC's existing Mayo facilities without requiring any new dam or causing any new flooding.

In the near term, Mayo B is the largest single renewable energy project opportunity available to Yukon Energy with the least risky timeline for in-service by late 2011 or early 2012.

Justification for the Project is reviewed in detail below, addressing requirements as set out in OIC 2007/50:

- Need for the Project
- Risks
- Effect on Ratepayers

4.1 NEED FOR THE PROJECT

The technical, economic and financial feasibility of proceeding with the Project at this time is confirmed by review of forecast WAF/MD grid baseload diesel generation requirements that will be displaced by Mayo B, by the engineering and other studies conducted to establish the Project's components and estimated costs and expected timelines, and by the material federal and YDC no cost funding contributions now committed to the Project. Review of alternative means to carry out the Project, as well as alternatives to the Project, confirm that Mayo B, as proposed, is also the optimum development for Yukon Energy to proceed with at this time. Development of Mayo B will provide near term and long term economic development benefits for Yukon, through the near term construction, as well as the long term augmentation of cost-effective renewable hydro electric generation supplying all customers on the Yukon grid.

The Mayo B Project Proposal Submission to YESAB, along with Supplementary Responses provided to YESAB in June and November 2009, document some of the field and other studies carried out to determine the Project's technical feasibility, including identifying cost-effective technically feasible options to carry out the Project (given geotechnical and other physical constraints), the net generation expected to result from the Project (i.e., diesel generation displacement), the estimated construction costs for the Project, and the expected effects on the biophysical and socio-economic environments (including ability

to prevent any significant adverse effects on these environments through the measures incorporated in the proposed Project). Ongoing work by KGS and PKS (including preliminary engineering) through the past summer and fall, as well as other ongoing activities, continue to confirm Yukon Energy's ability to proceed with the Project with the expected capital costs and net generation as described in Section 3.1 of this Application and in accordance with the timelines as described in Section 3.2.

At its core, the "need" for the Project reflects an opportunity available today to reduce diesel generation in a cost effective and timely manner. Without the Project, existing and committed Yukon Energy generation and transmission facilities (as reviewed in Attachment C) will still be able to supply forecast WAF/MD grid generation energy load forecasts for many years to come by relying on existing diesel generation facilities. If and when needed, additional diesel plant can also be added in a timely way to augment winter peak capacity as needed to satisfy YEC's capacity planning criteria. Developing the Project as proposed will enable future reliance on diesel generation and diesel plant capacity to be reduced – and will also enable Yukon Energy to capture the full benefits currently offered for federal funding contributions towards near term renewable energy development in Yukon.

Further detail is provided below on the following:

- Need Based on Opportunity
- Economics of Project
- Alternatives to Mayo B

4.1.1 Need Based on Opportunity

As with CSTP and other "opportunity project options[25]" previously reviewed, this Project "reflects a sensible and prudent approach to maximizing the value of existing resources." Following the rationale underlying the pursuit of other opportunity projects noted in the Resource Plan [Chapter 4 (section 4.3.1)], Mayo B provides for enhanced system assets with capital cost requirements offset by new loads and/or available sources of external funding that ensure no adverse impact on ratepayers.[26]

Pursuit of supply side enhancement options that maximize the value of the existing system (before pursuing more complex and costly greenfield projects that often entail more time consuming regulatory

[25] Other "opportunity projects" considered in the Resource Plan included Aishihik 3rd Turbine and Marsh Lake Fall/Winter storage. While Aishihik 3rd Turbine and Carmacks-Stewart Transmission were pursued and are completed (or in the process of being completed) Marsh Lake was not considered a feasible option that could be pursued over the near term.

[26] Note that while Mayo B is considered economic in the long term without any government funding, the full interconnection from Carmacks to Stewart crossing was not considered in the 20-Year Resource Plan (Section 4.3.4) to be a project that would be economic for Yukon Energy to pursue as a regulated utility due to the fact that WAF and MD had surplus hydro at time and the line would not have displaced the level of diesel fuel or other high cost generation needed to justify its costs. The project was instead considered "a key Yukon territorial infrastructure initiative to meet a specific window of opportunity related to two potential new mines (Minto and Western Silver at Carmacks Copper) and current Yukon Government Infrastructure Funding."

review process and typically require larger project footprints and consequently greater environmental impacts) is considered a prudent approach towards meeting energy needs on the system at this time. While the 20-Year Resource Plan focused on Carmacks-Stewart Transmission Project (CSTP), Marsh Lake Fall/Winter Storage and Aishihik 3rd Turbine as three near term opportunity options, Mayo B subsequently emerged as a fourth opportunity project similar to the other opportunity projects described in Chapter 4 (section 4.3.1) of the 20-Year Resource Plan.[27]

Specifically, Mayo B has emerged as a fourth near term opportunity project to be licensed and built prior to 2012 based on the following relevant conditions that exist at this time in relation to this Project:

1. The current availability of material federal funding for the Legacy Project (Mayo B and CSTP Stage 2) defines, in part, the need to proceed with this particular project at this time (i.e., proceed on a timeline that ensures substantial completion by March 31, 2012 as required by the federal funding agreement). This funding is available only for the Legacy Project as defined by the federal funding agreement and cannot be applied to any other projects or for any other purposes.[28] The available federal and YDC funding reduces the estimated cost of the Project to ratepayers to $36.5 million, mitigating risks relating to loads (i.e., timing and duration of development) and enhancing Project benefits for ratepayers. The availability of sources of funding to reduce risk and enhance project benefits to ratepayers is a critical factor driving the need to pursue this enhancement opportunity at this time.

2. Available federal grant funding for completion of CSTP Stage 2 as part of the Legacy Project, combined with available no cost YDC funding contributions, also makes feasible the pursuit at this time of CSTP Stage 2. As noted in Appendix B of the Resource Plan, pursuit of enhancements of the existing Mayo B facility as a supply option was in part dependent on the successful completion of the CSTP and the ability to use the full capability of potential Mayo enhancements to supply the integrated WAF and MD grid system (as opposed to solely supplying Mayo). CSTP Stage 2 is fully licensed, has obtained necessary financing to proceed and initial stages of site clearing have commenced, with the project on track to be in service by the end of 2010.

[27] CSTP and other opportunity projects considered at that time were defined in the Resource Plan as opportunity to commit resources necessary to serve new industrial customers with low cost and available surplus power. The timing constraints on those opportunities were defined by the timing of mine loads and mine life and the opportunity to displace diesel at the mine site that would otherwise be required.

[28] See Schedule B of the Federal Contribution Agreement (Provided as Attachment E of this Application) for specific Project components and definition; the Legacy Project is broadly defined as a multi-component Green Energy Legacy Project to link the two existing power grids (the Carmacks-Stewart Transmission Line or "CSTP") and capacity enhancement to the existing Mayo hydro facility ("Mayo B").

3. Further, as noted in section 4.2.3 below, there are no other viable hydro enhancement options (i.e., greenfield hydro or other generation options) that could be licensed in time for the 2011-2012 timeframe when new generation is required. Mayo B was considered the only renewable resource option that could feasibly be licensed and built in the timeframe required.

The requirement to proceed with Mayo B at this time is not directly tied to the timing of a specific emergent industrial load (such as Minto mine in the case of CSTP Stage 1) but is defined by the opportunity available, with ongoing non-industrial load growth plus the existing Minto and emergent Alexco mine loads, to secure low risk and cost effective assets for the near term as well as long term benefit of ratepayers due to federal and other funding commitments to provide for hydro generation infrastructure enhancements (as well as for completion of major grid interconnection) with minimal risk and reduced costs to ratepayers.[29] The Project also provides the opportunity to have added material renewable hydro generation in place by 2012 for the emergent Carmacks Copper mine industrial load as assumed in the base load forecast.

Mayo B will come into service at a time when electricity loads are now forecast over the near term to require grid service and energy materially beyond available surplus hydro, driving new diesel generation requirements in Yukon over both the near term and the long term unless new renewable power resource options are developed (see Attachment D and Section 4.1.2 below). The Resource Plan addressed this next set of challenges in Chapter 5 – and Mayo B in effect provides a bridge to this next stage of power resource planning. Notwithstanding the base case load forecast's conservative assumption of no industrial loads beyond 2018, there is a stong likelihood of ongoing requirements beyond 2018 to service industrial loads connected to the WAF/MD grid that are similar to or greater than the loads projected in the near term.

Given Yukon Energy has an obligation to serve industrial loads able to connect to the integrated grid[30] (as well as non-industrial loads), Yukon Energy needs to protect its ability to proceed with feasible and desirable options to develop resource projects expeditiously in the event that these new loads develop, while not spending more than is considered prudent to protect and advance such resource projects.[31] While risks related to the uncertainty of loads (timing of developments and when they come onto the

[29] In this vein, it is important to note that the Mayo B Project is a small hydro project in the range of 5-10 MW (considered under the 25 MW industrial scenarios in the Resource Plan and is appropriate to the long term development of the existing system under conservative load forecasts).

[30] Yukon Energy is considered under the *Public Utilities Act* to have a typical utility obligation to serve new industrial customers that request electrical service where these customers locate within areas presently served by Yukon Energy grid power; however, Yukon Energy is not automatically required to serve new industrial loads that are located far away from the current Yukon grids unless the customer (or government) is prepared to fund directly the transmission costs and risks required for Yukon Energy to connect the new load to the grid. It is assumed that customers isolated from the grid would be supplied by on-site diesel generation with all costs being excluded from YUB consideration for the purpose of Yukon wide regulated rate setting (in accordance with OIC 1995/90).

[31] These planning considerations were noted and discussed in detail in the 20-Year Resource Plan (Chapter 5, Section 5.1).

system or leave the system) need to be considered, there is limited time available after a development's load uncertainties are resolved for Yukon Energy to proceed with the new generation and transmission needed to supply a new industrial load development with grid-based power since planning, design, licensing and construction related to new generation or transmission can take as long (or longer) as similar commitments required for new industrial developments.[32]

Mayo B has demonstrated the significant advance planning cost and effort needed to move forward to a decision point on a major new renewable generation resource project. As reviewed below, Mayo B provides the opportunity today, on a cost effective basis, to put in place resources that will assist in meeting future industrial load requirements beyond those forecast in the base case load forecast.

4.1.2 Economics of Project

The Mayo B Project comprises new or amended infrastructure and operating regime changes at the existing Mayo Hydro plant ("Mayo A") and, with the subsequent proposed Mayo Lake licence changes, its associated storage reservoir at Mayo Lake. In this regard, the Mayo B Project operates in conjunction with the existing Mayo A project to increase the energy available from this complex. Energy generated at the Mayo River facilities is coordinated with the other generation on the WAF/MD Interconnected System ("IS") to meet all firm generation load requirements, and supplied secondary loads.

Mayo B economics have been considered and assessed on the following basis:

1) **Integrated System:** Mayo B is assessed as part of an integrated system, assuming completion of CSTP Stage 2, taking into consideration generation load forecasts for the IS (see below) as well as the capability of existing and committed IS generation and transmission facilities (see Attachment C) to provide reliable electric power generation to meet the forecast load requirements. Although Mayo B will also contribute additional firm winter peak capacity to the IS, the economics assessment focuses on the energy contribution of Mayo B to displace IS diesel generation that would otherwise be required. In this regard, the gross or total generation from Mayo B is not the determining factor for Mayo B economics. Generation from the Mayo B plant must be considered in light of associated changes to the other WAF and MD plants once Mayo B is brought into service. For this reason, the economics of Mayo B are evaluated looking at the overall forecast capability of the IS to supply energy loads with Mayo B (on the new combined WAF and MD system) and how this differs from the forecast capability of the overall IS to supply energy loads without

[32] These planning considerations are balanced against the fact that planning phases for new generation or transmission can be costly and require many years of work prior to Yukon Energy being in any position to undertake final commitments to proceed with construction (with corresponding risks that potentially substantial spending on planning studies will indicate a project is not feasible).

Mayo B (the capability of the existing and committed system absent Mayo B is set out in Attachment C).

2) **Mayo B is second in dispatchable resource stacking order:** The nature of the Mayo B plant, and its associated storage reservoirs (Mayo Lake[33] and Wareham Lake) is a relatively typical "annual storage" type of hydro plant with moderate constraints on plant operation (e.g., licensed flow maximums and minimums, variability in flows to address other environmental conditions such as ice, etc.). The Mayo A and B plants will be more flexible than the Whitehorse plant, which is a largely run of the river plant with relatively severe constraints on dispatchable operation[34] (as well as wind and Fish Lake hydro with no dispatchable operation), but less flexible than the Aishihik plant which is typical of a multi-year storage facility with daily peaking capability. The normal approach to stacking such a complement of dispatchable plants on a weekly or monthly basis would be to maximize output from the least flexible plants (run of river) as a priority over annual storage plants, and finally multi-year storage. As a result, the typical approach that would be used to stacking these three plants on a weekly basis is to maximize the reasonable output of Whitehorse as a first priority, then dispatch Mayo B, with use of Aishihik being driven by loads in excess of the amounts that can be supplied by Whitehorse and Mayo.[35]

3) **Full range of water flow conditions:** The nature of hydro generation is that the capability of a given plant varies by year with the degree of water available for generation. In very wet years the plant's generation potential will be higher than in very dry years. In addition, the water conditions on the rest of the IS will determine the degree of contribution required from any one plant. For this reason modeling the economics of Mayo B has addressed attention to its contribution to the system under a full range of water conditions affecting this plant as well as other plants on the IS.

4) **Plant Configuration:** Present assumptions regarding Mayo B plant configuration were used for the current capital cost estimate and projected net generation levels; further refinements for such matters as enhanced effective net head for the facility, or greater efficiency in turbine units, may affect this average energy contribution value within a range of approximately 5%.[36]

[33] This characteristic is true with or without enhanced Mayo Lake storage.

[34] This plant has relatively strict license constraints on operation of Marsh Lake, as well as constraints on winter peaking operation imposed by downstream ice formation.

[35] On an hour to hour (capacity and load following) basis the stacking order may be different than this, but this reflects the overall energy stacking over weekly or monthly time periods.

[36] Depending on the turbine design selected, there appears to be a possibility of additional energy available from this plant due to selecting higher efficiency in unit performance; penstock design as well powerhouse location may also affect effective net head available for generation; however, the selection of such refinements needs to consider both cost and benefit aspects, and analysis of such final design options remains underway.

5) **Long-term IS Load Forecast:** The Mayo B economics have been considered in light of the present long-term load forecast for the IS as set out in Attachment D. This comprises existing non-industrial load, plus a reasonable assumption for growth of these loads, as well as only present and anticipated near-term industrial loads (Minto, Alexco and Carmacks Copper, for the presently anticipated mine lives). Given the net contribution (and resulting economic value) of Mayo B in any year is greater with a larger overall grid load, the assumptions used regarding industrial load forecasts (i.e., limited to only present and reasonably foreseeable industrial customer loads) are likely conservative, since these industrial load forecasts do not include load for not yet confirmed near-term industrial loads, or for any other industrial loads that may arise in the medium to long-term.

6) **Contribution to secondary energy generation:** Under forecast future load scenarios, the ability of the existing system to serve secondary energy will become considerably more constrained than at present. Mayo B increases the IS secondary energy potential which can provide value in terms of added revenues to help offset plant costs.

7) **Contribution to Firm Winter Peak Capacity**: Mayo B will add approximately 10 MW to the IS capacity, and almost all of this will augment firm winter peaking capacity. Under Yukon Energy's capacity planning criteria, this added winter peak capacity at Mayo will defer the need to provide additional winter peak capacity on the IS. This economic assessment of Mayo B impacts has not attempted to assign any specific value to this contribution to firm winter peak capacity.

Mayo B's full contribution to the system's ability to serve firm load (i.e., to avoid diesel generation) under very high IS load scenarios is as high as 41.4 GW.h. Within the range of reasonably foreseeable load scenarios within the next 30 years and assuming the current and committed IS generation and transmission capabilities, the Mayo B contribution (evaluated as an average [mean] contribution across all variety of water flows at the given load level) varies with load[37] as follows:

- At a total IS dispatchable generation load of 416.7 GW.h, the Mayo B contribution is approximately 19.2 GW.h;

- At 468.1 GW.h IS generation load, the Mayo B contribution is approximately 28.2 GW.h; and

[37] All IS generation loads referenced in this section are net of Fish Lake generation (approximately 8.73 GW.h) and YEC wind generation (approximately 1 GW.h).

- At 575.1 GW.h IS generation load, the Mayo B contribution is approximately 38.0 GW.h[38] (only small incremental benefits arise as the IS dispatchable generation load grows beyond 575 GW.h).

IS dispatchable generation loads (i.e., net of Fish Lake and wind) as forecast for the base case (see Attachment D) approximate 456 GW.h in 2012 with Carmacks Copper assumed to be connected (approximately 398 GW.h without Carmacks Copper).

- By 2019, when all industrial loads are assumed to have been removed from the IS, the base case forecast load from dispatchable generation falls to approximately 391 GW.h.

- By 2029, the forecast IS load from dispatchable generationwithout any industrial loads is 471 GW.h, growing to about 578 GW.h by 2040 (year 29) and about 721 GW.h by 2052 (year 41).

The current and committed IS generation and transmission, without Mayo B, is forecast to require material diesel generation by 2012. As reviewed in Table C-1 of Attachment C, IS diesel generation[39] under average (mean) water flow capability would approximate the following (Table C-1 also shows the variation in diesel requirements at extreme low water, median, and extreme high flow conditions):

- At an IS dispatchable generation load of 417 GW.h/yr: 31.1 GW.h/yr.

- At an IS dispatchable generation load of 468 GW.h/yr: 65.7 GW.h/yr.

- At an IS dispatchable generation load of 575 GW.h/yr: 162.3 GW.h/yr.

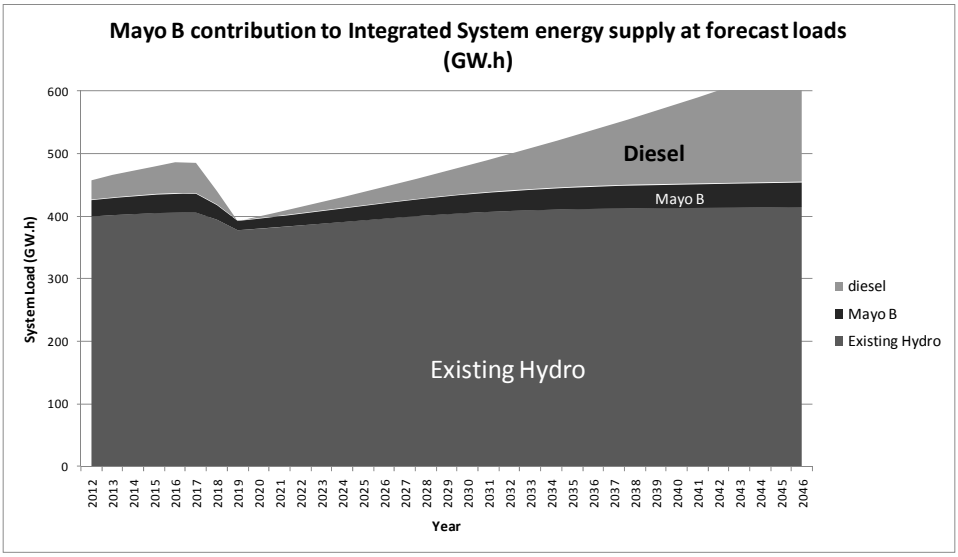
Assuming the base case IS generation load forecast, Figure 2 below sets out the forecast net average contribution of Mayo B to diesel generation reduction by year from 2012 to 2046 inclusive (the first 35 years of Mayo B operation), out of an assumed economic life of approximately 65 years) for all dispatchable generation.[40]

[38] In each case other than the very high load case there is also a net contribution of Mayo B to the ability of YEC to support secondary sales, conservatively estimated as varying from about 0.5 GW.h to 2.0 GW.h/year.

[39] This includes any new diesel generation that may be required either to meet capacity planning requirements or baseload energy needs.

[40] Figure 2 shows generation and loads net of wind and Fish Lake hydro, which are not dispatchable generation and are very small. In this analysis, Fish Lake and existing Haeckel Hill wind are directly netted off of loads before running the system simulation model for dispatchable resources. Enhanced Mayo Lake storage is assumed in Figure 2.

Figure 2
Mayo B Net Contribution to IS energy supply 2012-2036



As shown in Figure 2, the contribution of Mayo B to energy supply (the "thickness" of the very dark bar) varies by year depending on the overall level of grid load. In approximately year 2019, with the presently assumed closure of all industrial customers, the contribution reaches a low of 14.9 GW.h. The absolute maximum of 41.4 GW.h is not assumed until 2052 (when forecast grid loads without any industrial loads approximate 720 GW.h), but very substantial contributions are seen much earlier, e.g., in year 2017 over 30 GW.h of Mayo B contribution to firm load (avoided diesel - equalling approximately $8.8 million/year in diesel savings (2017$) in that year alone).

At the base case load forecast and a total Project capital cost of $120 million (i.e., before the benefits of no cost capital), the Mayo B levelized cost of energy over the 65 year economic life approximates 20.04 cents/kW.h (2012$, real)[41] compared to diesel costs of 26.38 cents/kW.h on the same basis (2012$).[42] However, with no cost capital offsetting $83.5 million of the capital cost, for a net cost of $36.5 million, the effective levelized cost of energy from Mayo B is 6.69 cents/kW.h (2012$, real), or less than one-quarter of the cost of diesel to serve the same load over the Project life.[43]

[41] At an assumed YEC cost of capital as approved by the YUB for YEC's 2009 GRA of 5.28% for new debt, 8.49% for equity, a 60% debt and 40% equity financing, and a real discount rate of 4.47% (assuming inflation of 2%).

[42] Based on NYMEX Jan 2012 quote as of Nov 27, 2009 at $87.27/bbl, US$/CDN exchange of 0.9421, standard ratios otherwise used by YEC in forecasting diesel price ($0.38/litre shipping, 3.9 kW.h/litre baseload efficiency) for a fuel price for 2012 of 96.26 cents/litre, or 24.68 cents/kW.h. (very close to 2009 GRA approved price), plus 1.7 cents/litre in 2012$ for variable O&M, for a total price/kW.h of diesel generation 26.38 cents/litre. This does not include any capital cost component.

[43] This analysis ignores any reliable capacity contribution provided by Mayo B.

Looking at specific annual effects of the Project on ratepayer costs (prior to application of any flexible debt financing), as compared to the same quantity of diesel generation, Figure 3 below sets out the annual cost of supply for Mayo B (including O&M,[44] depreciation[45] and return, net of secondary sales benefit)[46] at a $36.5 million net Project capital cost, as compared to diesel generation (fuel and variable O&M). As set out in that figure, the net costs of Mayo B, are lower than diesel generation cost in each year of the Project, and of increasing benefit through the remaining life of the Project beyond the horizon provided in this figure (i.e., in years 36-65).

Figure 3
Mayo B Annual Costs and Diesel Savings ($000s)

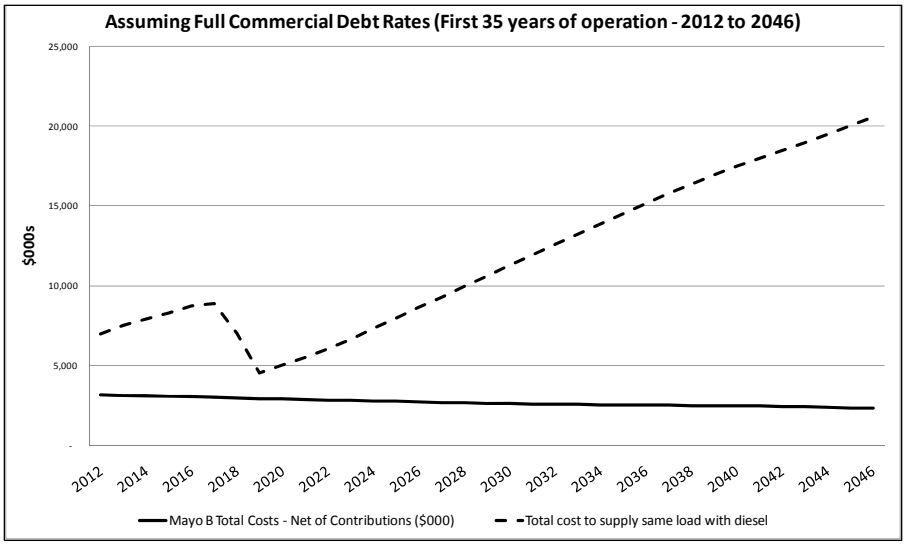


Figure 3 indicates the cost of supplying the same load with diesel as it varies during the period with anticipated mine loads (2012 to 2018) versus the sharp reduction that may occur if indeed these mine loads drop as presently forecast and no further industrial loads arise at that time. Notwithstanding any

[44] Assumed O&M at $0.36 million/year (2012$), including provision for insurance, regular maintenance (non-labour) and any added regular labour, and $0.1 million/yr allowance for periodic maintenance/overhauls (approximately $1 million every 10 years).

[45] Average life of 65 years. This is slightly longer than presently included in YEC's depreciation rates, but reflects the increasing lives used for depreciation purposes in recent depreciation rate adjustments sought or approved for other hydro-based Crown utilities.

[46] Assumed year 1 revenue for secondary sales of $0.072/kW.h (2012$), which is equal to the approved rate for 2009 for YEC (i.e., assumes no escalation in price from 2009 to 2012, consistent with current diesel price forecasts). Secondary sales volume benefits from Mayo B are determined conservatively at 2.0 GW.h/year benefit for all load levels up to 468 GW.h total firm grid load, linearly reducing to 0.5 GW.h/year as grid firm loads approach 575 GW.h and remaining at 0.5 GW.h/year until such time as all Mayo B supply is available to serve firm loads (2052 under base case assumptions). This is solely the benefit of enhanced summer generation from otherwise spilled water, where there is a market potential to serve the respective power loads. There is also likely a benefit arising from Mayo B in terms of serving secondary loads from some use of stored water in winter under certain load conditions, but no such benefit was included in the above calculations.

such drop, the benefits of Mayo B in avoided diesel in the lowest year still exceed the annual costs of the Project in that year. In short, even absent any flexible debt financing, the annual costs in each year of Mayo B under the above load forecast will be lower than they would have been absent the Project to supply the same load with diesel generation.

4.1.3 Alternatives to Mayo B

A number of alternatives for providing new or enhanced renewable energy supply were evaluated by Yukon Energy before the Mayo B Project was advanced for further evaluation.[47]

In 2005, Yukon Energy engaged in planning and regulatory review focused, in part, on capacity and energy-related issues to be addressed over the period from 2006 until 2025 – these issues were reviewed in the 20-Year Resource Plan. This review focused on major electrical generation and transmission requirements during the 2006-2025 period, with an emphasis on near term projects, with costs of $3 million or more, that required YEC's commitment prior to 2009;[48] and planning activities as required by YEC to commence construction on other projects prior to 2016 in order to meet the needs of potential major industrial customers or other major potential developments in Yukon.[49]

Following resolution of the capacity-related issues to be addressed prior to 2009, Yukon Energy embarked upon a new stage of planning and regulatory review focused on addressing energy-related issues raised in Chapter 5 of Yukon Energy's 20-Year Resource Plan.[50] Mayo B was identified, as part of this resource planning process, as one option among the suite of small hydro projects being considered and investigated (within the 5 to 10 MW range) to meet 25 MW (or larger) industrial load scenarios (see Chapter 5 and Appendix B of the Resource Plan). Mayo hydro system enhancements were included

[47] For an in-depth discussion refer to materials included in, or appended to, the YESAB Project Proposal Submission and relevant excerpted materials from the YESAB submission are provided in Attachment A to this Application (see Attachment A2 for discussion of alternatives to the Mayo B Project provided in YESAB Project Proposal Submission, and for a discussion of alternative configurations considered); See also Yukon Energy's 20 Year Resource Plan 2006-2025 overview document, and the Assessment of Potential Hydroelectric Sites – Concept Phase Study Executive Summary appended to the YESAB Project Proposal Submission as Appendix 1-A and 1-B respectively.

[48] For example, Aishihik 3rd Turbine, Carmacks-Stewart Transmission Project, Mirrlees Life Extension Project and Marsh Lake Fall/Winter Storage.

[49] A potential list of initial options was examined for each of four WAF industrial development scenarios noting non-diesel energy resource development opportunities are shaped by the magnitude and duration of the incremental baseload energy that would otherwise need to be supplied by available diesel generation.

[50] While the focus of the Resource Plan review in 2006 was Chapter 4 (near term resource options to be developed prior to 2009 in order to address capacity planning related concerns, or take advantage of short term opportunities to advance system enhancements), Chapter 5 (and Appendix B) of the 20-Year Resource Plan established the framework for addressing resource planning over the second stage of this orderly process for additional projects that might be committed between 2009 and 2016 to address additional new industrial energy requirements that may commence before 2016.

among planning activities recommended in the event that 10 MW to 25 MW industrial scenarios were seriously considered prior to 2016.[51]

Yukon Energy over 2007-2008 initiated an update to the studies of hydro sites and enhancements previously identified as relatively promising that could provide up to 50 to 100 GWH/yr[52] of new renewable energy within the 2010 to 2015[53] time period when YEC saw a potential need to serve up to at least three mine projects (Minto, Carmacks Copper, and Alexco). Mayo B was identified in this study as the largest available enhancement opportunity to Yukon Energy's existing hydro generating facilities (in terms of energy benefits) among the eligible options potentially available to begin operation in this time period; it was also considered the only enhancement opportunity that can feasibly be licensed and built to be in service within the 2011 and 2012 time period.[54]

While Mayo B is the first generation enhancement opportunity to proceed (among the suite of potential projects considered), Yukon Energy is also proceeding with planning activities on a series of other enhancements to existing hydro facilities. The most recent description of current planning and study activities being undertaken by Yukon Energy is provided in Yukon Energy's 2008/2009 GRA, Tab 5, pages 5-19 to 5-21.[55] As noted during the recent 2008/2009 GRA process (see for example responses to YECL-YEC-1-5 Revised and CW-YEC-1-31), Mayo B is required in addition to other generation options also being pursued such as Gladstone and Atlin in order to meet system requirements using renewable generation instead of diesel. These projects are not alternatives to Mayo B, and all are necessarily being studied and pursued to address the energy requirements that are expected to outstrip available surplus hydro due to projected load growth over both the near and longer term. Potential other hydro enhancement projects

[51] For both the 10 MW and 25 MW scenarios it was noted that assessment and development of appropriate Mayo system enhancements were contingent on the development of a Carmacks to Stewart transmission line interconnecting the WAF and MD grids.

[52] This study initially focused on relatively promising sites that could potentially provide up to 20-50 GW.h/year of energy, but was subsequently expanded to include sites that could potentially provide up to 50 to 100 GW.h/year.

[53] The study indicated estimated capabilities and costs for the various options, excluding costs of transmission (which can be material for greenfield sites).

[54] See Potential Hydroelectric Sites – Concept Phase Study Executive Summary provided as Appendix 1-B to the YESAB Project Proposal Submission.

[55] The YEC 2008/2009 GRA and the response to CW-YEC-1-32 filed during that process provides a review of projects currently in feasibility or prefeasibility planning during the test years (to protect earliest feasibility near term in-service dates). These projects include the Gladstone Diversion project (up to 18 GW.h/year), small scale Atlin winter storage project (up to 18 GW.h/year), Marsh lake fall/winter storage project (up to 7.7 GW.h/year), as well as longer term/ larger scale options such as geothermal generation options and larger scale Hydro (such as Hoole, at 100-300 GW.h/year). Each of the smaller scale developments require relatively. short construction periods (typically on the order of one year) but it is not possible at this time to forecast the potential licensing periods required. Larger scale greenfield hydro generation cannot likely be developed in less than 5-6 years even on an expedited schedule. In addition, Yukon Energy continues to consider various supply-side enhancements (SSEs) related to such matters as re-runnering existing units. Budgets and schedules for projects in feasibility or pre-feasibility stages of development are subject to ongoing review after completion of field studies and initial desk studies, as well as ongoing review of project mine loads and timing of new renewable generation requirements.

currently assessed (i.e., Atlin and Gladstone) are cost effective and simple to construct, but present challenges related to the ability to complete timely regulatory reviews.

A number of utility greenfield hydro sites and alternative existing hydro project enhancements have been reviewed by Yukon Energy since 1987, and by NCPC or others prior to 1987, and continue to be investigated;[56] however, no greenfield hydro options are currently competitive with available hydro enhancement projects such as Mayo B in terms of cost and timing. Smaller enhancements to current assets also provide a better fit in terms of resource options to meet projected near term load requirements (in terms of risk tolerance and scale)[57]. Enhancement projects that maximize existing hydro facilities remain the preferred approach to developing renewable hydro resources at this time.[58]

Other non-hydro, but renewable power generation resources for northern climates (i.e. has a wintertime electrical peak) can be pursued from only a limited number of sources. Generation technologies of notable promise (with respect to ability to effectively serve loads typical of Yukon) are under active investigation by Yukon Energy.[59] This includes consideration of geothermal, as well as further wind generation. These technologies are not alternatives to Mayo B, and can be pursued and developed in future to complement the Project. Specifically, geothermal generation is currently not considered an alternative to Mayo B as it remains in exploratory stages and cannot be developed in time to meet current system requirements. Wind generation does not offer the same power characteristics as hydro enhancements (e.g., the type and degree of firmness provided by the Mayo B Project) and likewise cannot be considered an alternative to developing Mayo B at this time.[60]

Absent Mayo B or some other renewable resource option, baseload diesel would be required to meet growing system load requirements. As noted in Appendix A of the Resource Plan, diesel units are typically well-suited to meeting reserve capacity requirements and short-term capacity needs during system

[56] As noted in Appendix A of the Resource Plan – Hydro options were studied extensively as part of the 1992 Resource Plan Submission with a detailed information on hydro options evaluated by the utilities at that time included in a separate binder (Supply Side: Binder A) included with that filing.

[57] As reviewed in the Resource Plan, Yukon does not have grid connections with external markets, and the economic value of generation projects therefore depends entirely on sales to Yukon customers. This increases the risk related to developing large, capital intensive bulk power projects where loads do not develop as forecast (both as to scale and duration). Resource projects must also be of a scale that is within the current capability of Yukon Energy or Yukon entities to finance and construct.

[58] As noted in the Resource Plan filing, at page 4-17 "The implementation of supply side enhancement or Resource Smart projects reflects a sensible and prudent approach to maximizing the value of existing resources. Such projects are routine in other jurisdictions in Canada, and often offer the lowest cost sources of supply available (although the scale can be modest in some cases)".

[59] A thorough review of Power Resource Technology Options is provided in Appendix A to Yukon Energy's 20 Year Resource Plan 2006-2025 ("20 Year Resource Plan").

[60] Key issues related to the pursuit of wind generation were noted in the Resource Plan (Appendix A) and include capital costs, capacity limitations and wind availability. While capital costs have been declining, it was noted that costs remain high in Yukon where major new support systems can be required (i.e., transmission and roads) to install generation in new sites at typically high elevations.

peaks. However, diesel is expensive for utility operations running to provide sustained energy on a regular basis throughout the year. Even at the recent 25 cents/kWh incremental cost, 30 GW.h of diesel generation (equivalent to Mayo B near term added net grid generation) would incur added annual fuel and operating costs of approximately $7.5 million and increase CO2 emissions by approximately 21,000 tonnes per year. By comparison, the levelized cost of near term energy related to Mayo B is approximately 20 cents/kW.h even without any federal or other government infrastructure funding (and less than 8 cents/kW.h with committed federal and YDC no cost funding contributions).

4.2 RISKS

The Mayo B Project as proposed by Yukon Energy at this time has involved a range of complexities and risks related to adequate no cost capital funding, regulatory schedule delays due to the YESAB environmental and socio-economic review process and subsequent federal and territorial permitting and licensing that would follow from that review, capital cost increases and construction risks, and project feasibility risks related to grid load and debt borrowing costs. Prior to YEC's Board of Directors approving each major stage of Mayo B development, all material risks are reviewed to confirm that it is prudent to proceed. In assessing Mayo B risks, Yukon Energy also considers seriously the material additional diesel generation costs that would likely arise should the Project not proceed at this time.

The largest single factor considered likely to affect the risk of Yukon Energy not proceeding with Mayo B expansion (i.e., securing adequate federal infrastructure and other no cost funding on a timely basis) has been addressed via the Federal Contribution Agreement and a separate Yukon Government commitment that enables no cost contribution funding from YDC. Securing $83.5 million of no cost funding for the Project has largely mitigated concerns as to grid load risks and near term rate cost impacts that might otherwise have compromised Yukon Energy's ability to proceed with the Project at this time. The Federal Contribution Agreement, however, has introduced its own specific risk requiring substantial completion of the Project on or before March 31, 2012.

YEC proposes to manage and address remaining noted risks related to regulatory or other delay, capital cost increases and construction risks and other project feasibility risks as outlined below:

- **Regulatory risks** exist to the extent that land based construction activities could not commence by summer 2010[61] and Yukon Energy would be unable to meet timelines established and required pursuant to the Federal Contribution Agreement (for substantial

[61] As noted, in Section 3.2, the Project will take two summer construction seasons to complete. With substantial completion required by March 31, 2012, site preparation and construction activities are planned to commence by May/June 2010. At the very least, delay beyond June 2010 in this start will exert material upward pressure on Project construction costs (in order to maintain the substantial completion target date of on or before end of 2011). At some point during summer 2010, delay of construction start will compromise the ability to complete the Project by March 31, 2012.

completion by March 31, 2012). Delay to Project in service is also likely to increase the risk of YEC incurring added diesel generation costs for the period of any in-service delays.

Most regulatory requirements are reasonably apparent, despite limited Yukon YESAB Executive Committee assessment process experience with related YG, federal and Water Board permitting and/or licensing. Due to the absence of any new dam or new flooding for the Project (as well as other factors addressed in the YESAB Project Proposal Submission), the Project is expected to receive all necessary regulatory approvals without material additions to cost (or reductions in output) for mitigation measures. Throughout this review process Yukon Energy has been working in consultation with stakeholders, such as NND, as well as regulators (e.g. DFO) to ensure any issues or concerns with the Project are addressed expeditiously. However, notwithstanding YEC's experience of timely progress with the CSTP YESAB review after release of the Draft Screening Report, risks remain that the YESAB and related Decision Body approval process may be delayed beyond April 2009 and result in delays to the start of Project construction. YEC will be undertaking all measures within its control to prevent and/or minimize any such delays.

YEC anticipates minimal environmental/regulatory cost risks arising from the YESAB and other permitting processes given, as noted, that the Project enhances existing assets without the requirement for a new dam or any further flooding. There is a possibility that DFO would require some further habitat compensation in relation to any requirement for a Fisheries Act Authorization; however, the Project provides for alterations to the current flow regime which overall enhance salmon habitat in the lower Mayo River, and any habitat compensation required is not expected to be material in terms of cost or delay in proceeding with the Project.

- **Capital cost increase risks and other construction risks** may be expected for any project of this nature, location, scale and stage of development. Added risks (and costs) may also arise related to tight timing (e.g., Project costs that are required to be incurred will tend to increase the later into summer 2010 that Project construction commences). As reviewed below, Yukon Energy has taken steps to mitigate these risks.

  Additional planned geotechnical field studies were undertaken in summer 2009 and the results of this work have further reduced the uncertainties affecting the penstock and powerhouse geotechnical conditions. A construction management approach was adopted to mitigate construction contractor risks related to contractor selection, price and delay;[62] this approach included early competitive selection of a construction contractor through an MOU

[62] These risks include lack of adequate contractor bid interest, inflated tender prices to cover potential Project risks and final design uncertainties, adequate supervision and management during construction, and delays.

establishing procedures to arrive at an open book procurement and construction contract. While negotiations for a final construction contract are ongoing, positive outcomes of this approach to date include the development of an approach for early selection of a turbine/generator contractor, as well as considerable testing and further refinement of the Project cost estimate and completion of more advanced preliminary design engineering. Ongoing planning, quality assurance and safety construction contract procedures, and owner-retained construction administration and field inspection services during construction will all contribute to the management of all construction-related risks.

- **Other Project feasibility risks**, beyond regulatory and construction risks, include delay in completion of CSTP Stage 2 beyond spring/early summer of 2011[63], loss of Mayo Lake enhanced storage provisions, and risks that Mayo B costs will exceed diesel generation costs (due to sustained diesel fuel price decline or inadequate near term system loads [load risks] to utilize Mayo B generation as planned, i.e., impact on net generation available and LCOE for project[64], or due to other risks related to general market conditions).
  - **CSTP Stage 2** - With regard to risks related to delay in completion and commissioning of CSTP Stage 2, it is noted that all required permits and authorizations have been obtained (or are being secured as provided for by agreements and/or Decision Documents), project survey and clearing work has commenced, and the long lead equipment (Stewart Crossing transformer) contract has been awarded. Government funding (federal and YDC) of $40 million of the project capital cost that is required to proceed with the project has been secured. Outstanding risks relate to award of the line construction contract (currently out for tender for work to start in February 2010) and of the substation contracts (tenders planned for spring so that work can commence in May 2010). Based on current information, in-service for CSTP Stage 2 is planned by the end of 2010, i.e., in ample time to meet the timing requirements for Mayo B construction and operation.

[63] This would require more costly diesel generation [rather than surplus WAF hydro generation] when the existing Mayo A plant is shut down briefly in that summer to complete connection of the new Mayo B powerhouse; if CSTP Stage 2 continues to be delayed, Mayo B generation would also be unable to be utilized as planned to displace diesel generation on the WAF as well as MD grids.

[64] Including material delays in connection of new mine loads such as Carmacks Copper and Alexco; due to the small scale of the Project relative to the combined WAF/MD system, long-term loads adequate for effective use of the Project are not likely to be a material risk.

- **Mayo Lake Enhanced Storage** - It became apparent during the YESAB adequacy review process that provision for an additional metre of bottom storage at Mayo Lake in the Mayo B Project proposal presented a significant risk to project timelines and available federal funding.[65] To facilitate timely review of the Mayo B Project and ensure completion of regulatory reviews prior to June 2010 remained feasible, YEC, in consultation with YESAB, removed the provision for an additional metre of drawdown at Mayo Lake from the YESAB Project proposal, on the understanding that Yukon Energy would likely file a separate YESAB application by fall 2010[66]. The separate Mayo Lake enhancement requires an amendment to the Mayo Water Licence and would not require construction of any additional infrastructure – the critical path item for this project will be the required regulatory review processes (YESAB, DFO permits, and Yukon Water Board approval of the amended Water Licence).

  The removal or delay of Mayo Lake storage enhancement as at 2012 would limit the amount of available diesel that could be displaced by the Mayo B Project once it is in service (until the required amendment to the Mayo Water Licence to provide for the additional metre of bottom storage is approved by the Yukon Water Board). Based on long term average flows, Yukon Energy would be required to provide 4 GW.h/year more diesel generation so long as Mayo Lake enhanced storage was not available (the actual year-to-year impacts will vary depending on annual water flows, i.e., the added bottom storage would allow for added Mayo generation primarily in high flow years, when the water would otherwise be spilled) [67]. At 26 c/kW.h incremental cost for diesel generation (2012$), the 4 GW.h would result in an increase in annual average ratepayer costs of $1.0 million (2012$) – costs that would be fully avoided with the Mayo Lake storage enhancement. Over 65 years, the present value of such extra diesel generation costs

[65] YESAB concluded in correspondence provided to YEC on July 23, 2009 that "with the exceptions of those issues related to the additional one meter drawdown of Mayo Lake, that all information supplied with respect to the Project is sufficient." The additional information related to Mayo Lake additional one metre drawdown, required by YESAB to complete adequacy, would not have been available until November 2009 at the earliest and would have consequently adversely impacted the ability to complete regulatory reviews prior to June 2010.

[66] As far as possible, Yukon Energy intends to obtain the required license amendments related to the additional metre of bottom storage at Mayo Lake such that this enhancement would be available prior to, or as soon as possible after, Mayo B Project in-service.

[67] The energy value of a metre of Mayo Lake storage (when used to generate at Mayo B) is approximately 14 GW.h; however, this added storage range, which would be accessed in higher water years, would not be used every year The reduction in Mayo B long term average net generation without Mayo Lake enhanced storage (i.e., no licence change at Mayo Lake compared to 1 metre added drawdown allowed) is expected to vary depending on the IS dispatchable generation load, e.g., this reduction ranges from about 1 to 4 GW.h for very low IS dispatchable loads (400 to 450 GW.h/yr), rising thereafter to a 4.6 GW.h/yr reduction for IS dispatchable loads at about 510 GW.h/yr, falling thereafter to a reduction of about 4.0 GW.h/yr at IS load of 570 GW.h/yr, about 3.0 GW.h/yr reduction at IS load of 640 GWh/yr, and slightly less (about 2.8 GW.h recution) at maximum long-term capability IS load levels (around 720 GW.h/yr). On a present value basis under the base case load forecast, the levelized reduction equals 4 GW.h/yr (implies use of the full 14 GW.h yr of added storage on average one in every 3.5 years).

would approximate $20 million (this would be higher if diesel fuel prices increase faster than inflation over the next 65 years). The annual GHG emissions would equal 2,800 tonnes.

Delay of Mayo Lake storage enhancement will not change the direct Mayo B annual costs incurred by Yukon Energy; in addition, flexible debt financing will mitigate Mayo B unit costs to ratepayers to not exceed 10-11 c/kWh (2012$). Table 1 (in Section 3.1.2) summarizes the LCOE impacts if Mayo B proceeds over its 65 year economic life without Mayo Lake enhanced storage, i.e., Mayo B LCOE costs increase by approximately 13.6% (from 6.60 c/kW.h to 7.60 c/kW.h, assuming Project net ratebase costs of $36.5 million).

When required licensing for Mayo Lake enhanced storage is complete, it will provide additional benefits to ratepayers through reducing ratepayer costs for diesel generation.

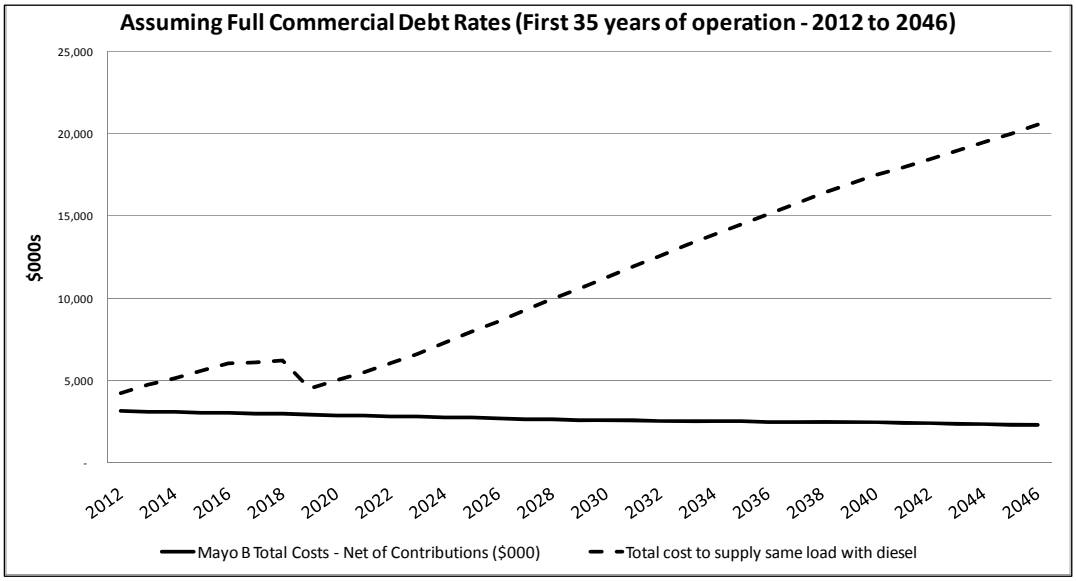
Yukon Energy is working in consultation with regulators (such as DFO) and stakeholders (such as NND) to ensure any environmental or other issues and concerns related to the additional metre of bottom storage at Mayo Lake are addressed in order to ensure this operational enhancement is available as soon as possible, preferably before Mayo B is in service.

- **Mayo B costs higher than displaced diesel costs -** Project funding risks (for both Mayo B and CSTP Stage 2) previously discussed during the 2008/2009 GRA (YECL-YEC-1-5 revised and YECL-YEC-1-8 revised) have been satisfied through the Federal Contribution Agreement for the Legacy Project and through an additional funding arrangement with YG and YDC for no cost contribution funding to YEC. These no cost funding contributions reduce Project feasibility risks and mitigate any adverse impact on ratepayers (through reducing impacts on YEC ratebase to acceptable levels).

  Load risks would reduce the Project's expected diesel generation costs savings if IS generation loads fall below the base case forecast, particularly in the near term. However, even if the Carmacks Copper mine load does not materialize, the Project will continue to provide cost savings relative to diesel generation each year as demonstrated in Figure 4 below.[68] Material reductions in other near term loads (including Minto and Alexco) are not considered as a major risk to the Project. Similarly, long term variances from the base case forecast are also not considered as a major risk to the Project's ability to secure diesel cost savings.

[68] LCOE for the Project (net rate base of $36.5 million) without Carmacks Copper load is 7.30 c/kW.h with enhanced storage at Mayo Lake and 8.19 c/kW.h without any change to the Mayo Lake licence.

Figure 4
Mayo B Annual Costs and Diesel Savings – No Carmacks Copper (000s)



Changes to general market conditions, including sustained reductions in diesel fuel prices and/or material increases in YEC long-term borrowing costs for the Project, are not considered likely to affect the overall ability to secure costs savings relative to diesel generation. YDC is likely to secure the necessary long term borrowings for the Project within the next year, thereby mitigating risks regarding potential major increases in future long term interest rates.

As discussed in further detail in Section 4.3, provision for flexible debt financing will also serve to ensure there will be no adverse impact on rates during the initial years of Mayo B operation[69] including no adverse rate impacts due to the impact of reduced grid loads affecting diesel savings in any given year.[70]

As noted in Attachment D of this Application, new industrial loads are expected to materialize over the near term (with Alexco expected to commence operation in June 2011 and Carmacks Copper anticipated

[69] Under normal regulatory costing for a capital intensive project such as Mayo B, higher annual costs typically incurred in initial operating years when the project ratebase is at its highest level. These costs typically decline each year thereafter due to depreciation of the ratebase.

[70] The quantum of available diesel cost savings available due to Mayo B relates directly to the assumed grid loads and net diesel generation being displaced by the Project. When grid loads are lower, less diesel is being displaced and the Project's "value" is accordingly reduced. Conversely, with higher grid loads Mayo B is available to displace more diesel generation. Variance in the cost per unit of "net" generation used to displace diesel is consequently tied to the degree to which grid load varies from forecast load levels. If loads do not materialize as expected (i.e., materialize later than expected or fall off sooner than expected) the cost per unit of net generation will be higher. Diesel cost savings could also be reduced by lower-than-expected diesel fuel prices; conversely, higher-than-expected diesel fuel prices can offset (at least partially) lower-than-expected grid loads.

to require service in 2012). The obligation to serve these developing industrial loads in the near term continues to be a material factor underlying Yukon Energy's resource planning activities and the connection of these and other industrial loads could lead to the requirement for 50 to 100 GW.h of annual baseload diesel generation within the 2010-2015 time period.

By reducing the surplus hydro generation, new industrial loads advance the timing for potential renewed diesel generation. Absent Mayo B there is today no apparent renewable resource option that could be developed to be available over the near term (2012-2015) to replace the average annual 28 GW.h of additional renewable net generation (diesel generation displacement) that Mayo B is forecast to provide over this 4 year period. At 26 cents/kWh incremental cost, 28 GW.h of diesel generation would incur added annual fuel and operating costs of approximately $7.3 million and increase CO2 emissions by approximately 19,600 tonnes per year. Not proceeding with the Mayo B expansion means that YEC and Yukon ratepayers would be at risk during the near term (2012-2015) for the additional forecast 28 GW.h or more per year of diesel generation (i.e., the diesel generation that Mayo B would otherwise displace) with related costs and GHG emissions.

4.3 EFFECT ON RATEPAYERS

4.3.1 Context for Project Effects on Ratepayers

Yukon's power system includes material assets with embedded costs well below the costs that would presently be incurred to advance new generation, and these embedded costs provide the basis for today's low cost power in Yukon relative to other northern jurisdictions. Ratepayers presently enjoy the benefits of historic investments in the current compliment of bulk transmission and generation facilities made in the past to serve major industrial mine customers at Faro and Keno.

The Resource Plan documented the surplus hydro resources on both the WAF and MD grids for many years due to closures of the Faro and Keno mines, and projected that, absent new industrial loads, these surpluses would likely continue for at least the next 15 years. The Resource Plan also set out potential opportunities for industrial development prior to 2012, including the Minto and Carmacks Copper mine developments, that would fully utilize the WAF surplus and accelerate the timing for Yukon Energy to develop new renewable generation to displace the need otherwise to rely on diesel generation to supply all of the incremental energy requirements beyond the existing system capability.

Since the Resource Plan review by the YUB, non-industrial grid loads have continued to grow and the Minto mine has been connected to the grid with ongoing expansion of its reserves and expected power requirements. The Alexco mine is also planned to be connected with commercial production by mid 2010, and the Carmacks Copper mine is moving toward development with potential commercial production by as early as late 2011.

In summary, anticipated load increases (reviewed in Attachment D) confirm that there are strong cost-based and environmental incentives today for expanding the available complement of renewable generation, as well as transmission interconnections that support enhanced use of renewable generation in Yukon. All utility ratepayers will realize benefits from the enhanced ability to serve both new industrial loads[71] and on-going domestic load growth through additional renewable generation capacity available on the interconnected WAF/MD system.[72] In addition to near term cost savings, over the long term ratepayers will once again enjoy the benefits available due to lower cost (relative to diesel generation) renewable energy plus the increased installed firm system capacity.

Notwithstanding the cost savings secured from displacing incremental diesel generation, the reality remains that new renewable generation facilities will typically require unit costs per kW.h well in excess of Yukon Energy's embedded generation costs per kW.h. Capital intensive new generation will also typically have its higher unit costs in the initial years of operation. These cost features may give rise to near term concerns as to potential adverse rate impacts relative to what ratepayers are currently accustomed to being charged (regardless of the extent to which even higher near term adverse rate impacts would occur without the Project if diesel generation had to be utilized).

4.3.2 Ratepayer Diesel Cost Saving Effects

The Mayo B Project will materially reduce overall ratepayer costs through displacing diesel generation that would otherwise be required as available surplus hydro by 2012 will have been reduced to the level where the system (WAF and MD) returns to a condition of diesel being on the margin. The Project will also increase system firm peak winter capacity.

Under reasonably foreseeable near term load conditions (2012-2015), integration of the Project with the Mayo Lake storage enhancement into Yukon power systems would be expected to yield a net firm energy benefit (diesel generation displacement) averaging approximately 28 GW.h/year of firm energy over the four years (plus enhanced potential secondary energy). At 26 cents/kWh incremental cost, 28 GW.h of diesel generation would have added annual fuel and operating costs of approximately $7.3 million. In contrast, the projected near term average annual Mayo B cost to ratepayers for these same loads approximate $3.1 million/year, net of federal and YDC contributions and with a full 6.56% average return on rate base. In summary, Mayo B provides an average annual near term cost savings for ratepayers of

[71] As noted and discussed in detail in the Resource Plan – new industrial loads are considered economically attractive to the existing grid system where such loads allow for the utilization of existing surplus hydro generation or the development of new capital intensive low-cost generation (e.g. past opportunities to develop Mayo, Aishihik, Whitehorse #4, or more recently the opportunity to serve the Minto mine through CSTP Stage 1 infrastructure which provided for increased revenues pursuant to rate schedule 39 as well as for the cost-effective development of long term transmission infrastructure through contributions secured from the Yukon Government and from the Minto mine through a Power Purchase Agreement.

[72] OIC 1995/90 directs that the consolidated costs of Yukon Energy and YECL be used to set the same rates throughout Yukon for non-government retail customers as well as Major Industrial customers, i.e., the benefits of Mayo B will accrue to all of these YEC and YECL customers in Yukon and not only those in the vicinity of the Mayo B Project.

approximately $4.2 million/year for the 2012 to 2015 period.[73] Added near term secondary energy sales due to Mayo B would constitute added savings for ratepayers (averaging approximately $0.145 million during the 2012-2015 period); total average savings of about $4.3 million/year would be equivalent to about 8.5% of the YEC/YECL consolidated rate revenue requirement for 2009 (see Attachment D).

Looking beyond the near term, Mayo B will provide ongoing cost savings for ratepayers as demonstrated earlier in Figure 3 (with Carmacks Copper load) and Figure 4 (without Carmacks Copper load) even without any industrial loads after 2018. Connection of any new industrial loads to the IS (and/or extension of the life of existing mine loads) will increase the ratepayer savings from Mayo B above the levels shown in Figures 3 and 4.

4.3.3 Short Term Annual Rate Impacts – Rate Neutral Mitigation

Notwithstanding the significant diesel cost savings from Mayo B to benefit ratepayers in the short-term term, Yukon Energy has taken additional steps so that Mayo B's short term annual rate impacts will be "rate neutral", i.e., so that, without considering diesel cost savings, Mayo B will on balance have no material effects on short-term retail firm rates by ensuring that annual Mayo B costs recovered from ratepayers do not exceed the 10 to 11 cents per kW.h in 2012$ applicable to incremental industrial rate revenues.

The potential short term impacts that could give rise to concerns in this regard are reviewed below, followed by an outline of the flexible debt mitigation that YDC and YEC have committed to establish.

Potential Concerns Absent Proposed Mitigation

Assessment of the preliminary generation capital, operation and maintenance, and fuel-related levelized cost/kWh (LCOE)[74] of a project does not consider the annual rate impact in a given year. Capital intensive projects with relatively attractive LCOE's may still result in substantial rate impacts in a given year (especially in initial years of operation)[75] that may need to be considered and addressed, since utility

[73] Without Carmacks Copper load, the 2012-2015 projected average annual diesel displacement is approximately 18 GW.h, and annual average ratepayer net savings (diesel costs avoided) from Mayo B are $1.6 million/yr. Without Carmacks Copper load and any Mayo Lake enhancement, the 2012-2015 projected average annual diesel displacement is approximately 15.8 GW.h, and annual average ratepayer net savings (diesel costs avoided) from Mayo B are $1.0 million/yr.

[74] Levelized costs indicate a cost per kWh in 2012 (year 1 of operation) and this cost is assumed to increase at inflation for subsequent years of operation.

[75] For capital intensive hydro projects, the annual costs that drive rates are highest in the initial years of operation when the impacts on rate base are highest (as the project depreciates over time these impacts on rates decrease accordingly). Conversely, the benefits of hydro intensive project increase over time due to the increased value of diesel being displaced (due to inflation or other upward price drivers) by the project. For example, the Mayo Dawson Transmission Project will achieve material cost savings for ratepayers over its life; however, despite these expected material savings over the project life, it was recognized that the project could result in adverse rate impacts in the initial years of service that would require mitigation through a form of flexible debt financing.

rates in any test year are based on annual costs in that test year (including depreciation, interest and return on equity) rather than "levelized' costs incurred over the life of the project.[76]

Absent any other measures to constrain near term impacts on rates, upward pressure on rates may be expected over the initial 10-15 years of the Project's life to the extent that its costs per unit of net generation in the first years of operation are higher than the revenues recovered per kW.h of related generation from additional loads served through the Project. Such initial higher costs are due in part to added depreciation and allowed return on rate base costs (blend of interest and equity) that are reduced over time as rate base is depreciated.[77] Additional adverse short term rate impacts can arise to the extent that overall grid load risks affect the Project's ability to displace diesel generation[78] due to loads not materializing as expected (i.e., timing or quantum) or alternatively leaving the system sooner than expected, and/or net generation benefits are reduced due to Mayo Lake enhanced storage not being licensed.

To demonstrate the potential impact of these short term rate impact considerations absent Yukon Energy's proposed flexible debt mitigation measures, the following are noted with regard to the Project (all examples assume Project rate base costs at $36.5 million):

- With Mayo Lake enhanced storage benefits:
  - With Carmacks Copper load:
    - LCOE over life equals 6.69 c/kW.h for year 1
    - Year 1 (2012) average revenue requirement cost per net generation unit equals 11.93 c/kW.h[79]
  - Without Carmacks Copper load:
    - LCOE over life equals 7.30 c/kW.h for year 1
    - Year 1 (2012) average revenue requirement cost per net generation unit equals 19.74 c/kW.h[80]

[76] In year one of operation, using normal utility financing, capital related rate base costs (depreciation and return) account for 89% of overall annual costs from Mayo B before consideration of incremental secondary sales recoveries (rate base of $36.5 million) , but decline over time as rate base for the Project is depreciated.

[77] Once the Project is complete and in service, YEC will apply to the YUB to recover through rates the balance of Project costs not otherwise funded by federal or YDC no cost funding contributions.

[78] Reduced grid loads reduce the diesel cost savings from the Project. The quantum of available diesel cost savings available due to Mayo B relates directly to the assumed grid loads and net diesel generation being displaced by the Project. Where grid loads are lower, less diesel is being displaced and the Project's value is accordingly reduced. Conversely, with higher grid loads Mayo B is available to displace more diesel generation. Variance in the cost per unit of "net" generation used to displace diesel is consequently tied to the degree to which grid load varies from forecast load levels. If loads do not materialize as expected (i.e., materialize later than expected or fall off sooner than expected) the cost per unit of net generation will be higher.

[79] Year 1 cost includes 1.36 c/kW.h of net generation for O&M costs that are assumed to escalate at inflation. Further refinement in future may indicate lower O&M costs in the first 5 to 10 years prior to the first major periodic maintenance/overhaul.

[80] Ibid., Year 1 cost includes 2.25 c/kW.h of net generation for O&M costs.

- Without Mayo Lake enhanced storage benefits:
  - With Carmacks Copper load:
    - LCOE over life equals 7.60 c/kW.h for year 1
    - Year 1 (2012) average revenue requirement cost per net generation unit equals 14.16 c/kW.h[81]
  - Without Carmacks Copper load:
    - LCOE over life equals 8.19 c/kW.h for year 1 equals
    - Year 1 (2012) average revenue requirement cost per net generation unit equals 21.6 c/kW.h[82]

Annual Unit Cost Ceiling Target for Rate Neutral Annual Impacts

To address potential short term annual rate impact concerns flowing from the Project, YEC has defined an annual "unit cost ceiling target" for Mayo B at the cost level per kWh for Project net generation in year 1 (escalating at inflation for subsequent years) that would mitigate upward pressure on near term rates (absent consideration of the benefits secured from diesel generation cost savings). This unit cost ceiling target has been set at 10-11 cents/kWh in 2012 (rising with inflation) based on assumed average Major Industrial rates to be applied in 2012.[83] In effect, Mayo B net generation revenue requirement costs capped at 10 to 11 c/kW.h will not materially exceed new industrial or other rate revenue growth per kW.h, and that Mayo B costs would therefore not be expected to create upward pressure on overall near term retail rates. At 10.5 c/kW.h, the following would apply:

- With Mayo Lake enhanced storage benefits, net generation costs in excess of 10.5c/kW.h (2012$) equal approximately:
  - In year 1
    - $0.4 million with Carmacks Copper
    - $1.5 million without Carmacks Copper
  - Decline to
    - Zero by year 3 with Carmacks Copper
    - $0.5 million by year 7 without Carmacks Copper
  - In year 8 (after all mines closed)
    - with Carmacks Copper: $1.1 million and decline to zero by year 13
    - without Carmacks Copper: $1.1 million and decline to zero by year 13

- Without Mayo Lake enhanced storage benefits, net generation costs in excess of 10.5 c/kW.h (2012$) equal approximately:

[81] Ibid., Year 1 cost includes 1.62 c/kW.h of net generation for O&M costs.
[82] Ibid., Year 1 cost includes 2.46 c/kW.h of net generation for O&M costs.
[83] This is considered a conservative assumption to the extent that rates charged for incremental sales in 2012 are higher than about 10.5 c/kWh (which is likely to be the case for new Major Industrial sales, let alone new incremental retail customers sales).

- In year 1
  - o $0.8 million with Carmacks Copper
  - o $1.6 million without Carmacks Copper
- Decline to
  - o Basically zero by year 6 with Carmacks Copper
  - o $0.9 million by year 7 without Carmacks Copper
- In year 8 (after all mines closed)
  - o with Carmacks Copper: $1.2 million and decline to zero by year 16
  - o without Carmacks Copper: $1.2 million and decline to zero by year 16

Proposed Flexible Debt Mitigation for Short Term Rate Neutral Impacts

To mitigate potential annual rate impacts in the initial years of Mayo B operation, and to ensure annual per kW.h costs are held within the defined unit cost ceiling during this period, YEC will arrange flexible debt financing with YDC for Mayo B similar to the current YEC flexible term debt long term loan arrangements related to Whitehorse #4 generating unit.

The Mayo B flexible debt will allow the interest rate on the debt to change, based on the IS grid generation load, as required to prevent, in any fiscal year during the short term, the cost of Mayo B net generation used to displace diesel generation from exceeding a 10 to 11 c/kWh range (2012$). The YDC/YEC flexible debt arrangements will also include YDC funding at no cost to YEC for the additional interest rate reductions (including cash injections through "negative" interest rate payments) required in this regard (i.e., to prevent net generation cost from exceeding the stipulated unit cost range) to mitigate any delays in connecting the Carmacks Copper mine load to the grid.[84] The face interest for this flexible debt (i.e., the rate charged when no interest rate reductions apply) will be set above YEC's then applicable long-term borrowing costs in order to enable YDC an opportunity to earn an overall return on the loan over its life equal to YDC's long-term borrowing costs when the flexible debt is established.

[84] These no cost arrangements for YEC would apply in the short term for years before the Carmacks Copper assumed operating load of approximately 50 GW.h/year is being supplied from the grid.

5.0 CONSULTATION

The Mayo B Project has undergone extensive consultation under both YEC's 20 Year Resource Plan hearing and the YESAB Screening of the Project Proposal Submission. The majority of public consultation has been conducted through the YESAB framework, as discussed below.

The Mayo B enhancement project was identified as one of the key near-term enhancement projects to be undertaken by YEC in its Resource Plan. The Resource Plan was filed on June 13, 2006 and became the focus of a public consultation process during the summer of 2006. Leading up to the YUB's oral hearing Resource Plan review in mid-November 2006 in Whitehorse, the public was kept informed through media briefings, public consultations and the option to obtain a copy of the Resource Plan and accompanying documents.[85]

YESAB Process

Public Consultation prior to YESAB Submission Filing

Consultation with Yukoners, especially those living in proximity to the proposed Project, played an integral role in the assessment of Project effects and mitigation measures outlined in the YESAB Project Proposal Submission. Yukon Energy developed a public involvement approach in order to incorporate community input in the Project design and environmental assessment, and to meet the regulatory requirements for public consultation in an effective and credible manner, and as a standing corporate principle for good planning. The approach enabled multiple opportunities and forums for public involvement, including community meetings, targeted group meetings, on-going face to face interaction, personal communication and written commentary for potentially affected stakeholders to voice their concerns and perspectives. Considerable consultation occurred with the First Nation of Nacho Nyak Dun (FNNND) and the community of Mayo. Yukon Energy also distributed a newsletter (November 2008) during the initial rounds of consultation; and a second and third newsletter (February and September 2009 respectively) to update those individuals/organizations involved in consultation on the Project Proposal.

In addition to the three Project newsletters, YEC posted Activity Bulletins in the Mayo area to inform local residents on Project-related activities. Project-related posters and fact sheets were developed based on on-going results from technical studies, engineering and environmental field work, and socio-economic and public consultation activities for use at the January 2009 community meeting. Also in January 200909, Yukon Energy released a *Technical Status Update for the Proposed Mayo Hydro Enhancement*

[85] For more information on the role of public involvement in the Resource Plan hearing see Resource Plan IR YUB-YEC-1-17 and Attachment B to Exhibit B-8, (a supplement to YUB-YEC-1-17).

(Mayo B). This document was circulated to key stakeholders who had participated in on-going discussions on the Project including NND, the Village of Mayo, Mayo District Renewable Resources Council (MDRRC) and territorial and federal departments. Yukon Energy also used their website to update Yukoners on the Project.

There were three stages of consultation activities for the Mayo B Project. During the Feasibility Stage, public involvement activities included discussions with FNNND, the Village of Mayo, and MDRRC to ensure local stakeholders were aware of the activities taking place in the Project Construction Footprint (e.g., heritage and geotechnical work), as well as aquatic and terrestrial studies occurring within the Project Study Region. Yukon Energy was open to the identification of any key interests that might arise should they decide to move ahead with completing studies and further consultation required for a submission to YESAB.

The Project Introduction and Issues Identification stage officially launched the public consultation activity in November 2008. Upon entering into a cooperative engagement process with NND, Yukon Energy proceeded with meetings with the NND Lands and Resource Department, the NND Project Agreement Working Team, and with the broader community to inform them of the Project. This provided the first opportunity for residents of Mayo and the surrounding area to learn about the Project as well as express any concerns or perspectives they had about the Project. Meetings were also held with representatives from territorial and federal departments to introduce them to the Project. Non-governmental organizations (NGOs) were also invited to learn about the Project through newsletters and participation in an open house in Whitehorse and Mayo.

The third stage of consultation focused on Project Effects and Mitigation. Consultation activities were conducted with FNNND, the Village of Mayo, MDRRC, community members from Mayo including private landowners and resource users, NGOs and various government departments. In January 2009, Yukon Energy also entered into a Contribution Letter of Agreement with NND that included funding towards their participation in the Planning Phase of the Mayo B Project (including activities that occurred in December of 2008).

Attachment B of this Application provides additional details on consultation up to the filing of the Project Proposal Submission.

YESAB Consultation Process

After completing the above noted stages of consultation, Yukon Energy submitted a Project Proposal to the Executive Committee of YESAB on February 27, 2009, whereby YESAB initiated its Pre-Screening process which reviewed the adequacy of the Project Proposal and included requests for supplementary information. During the adequacy review YESAB received comments from NND as well as Yukon

Government and federal regulatory authorities. A workshop of these parties was held by YESAB in July on Mayo Lake enhanced storage related issues.

Two major milestones were achieved in August of 2009:

- August 5th, YESAB Executive Committee informed Yukon Energy that public consultation with FNNND had been completed in accordance with subsection 50(3) of *YESAA*.

- August 7th, YESAB Executive Committee announced that the revised Mayo B Project Proposal had successfully completed their Adequacy Review and could commence the Screening and Public Review phase.

A public notice was posted on the YESAB On-Line Registry to inform the general public of a 30 day public review period from August 15 - September 14, 2009. This public review period was subsequently extended an additional 14 days to September 28th, 2009. A third major milestone was achieved on September 29th when YESAB switched to Considering Public Comments as part of their assessment phase. Additional supplementary information was subsequently requested by YESAB on October 22nd related to questions submitted by Fisheries and Oceans Canada. Yukon Energy, working with FNNND and DFO filed this supplementary information on November 13th, as well as an update to the Project Description on November 20th.

The Project Proposal, supplementary filings, Project-related announcements from YESAB, along with any public comments received, are all available on the YESAB On-Line Registry (YOR) at: http://www.yesab.tzo.com/wfm/launch/YESAB. The Project Proposal is also available on the Yukon Energy website (www.yukonenergy.ca).

Yukon Energy is continuing consultation with FNNND and regulators during the YESAB assessment phase. A second Contribution Letter of Agreement with FNNND was agreed to in August 2009 to enable their participation in the YESAB reviews and project-related consultation on the Mayo B Project. Yukon Energy has established a Technical Working Group (TWG) with representatives from FNNND to work through various technical matters of interest to both parties (e.g., on-going development of a lower Mayo River monitoring plan, issues related to the future Mayo Lake Enhanced Storage Project); and a Project Agreement main table to conclude discussions on a Project Agreement. Meetings have occurred with both FNNND and DFO in November 2009 to discuss the supplementary October information requests from YESAB, including a draft lower Mayo River monitoring plan, and updated project description related items. Discussions at the TWG level will continue over the course of the YESAB assessment and throughout construction of the Project, assuming the Project proceeds.

6.0 OTHER APPLICATIONS AND APPROVALS

6.1 LIST OF APPROVALS, PERMITS, AND LICENCES

Regulatory permits and approvals are required for land use, water use, potential impacts on fish and fish habitat, potential impacts on navigable of waters and other activities related to the Project's development.

Yukon Energy has submitted a formal Request for Review to DFO and has been working with DFO to determine whether the Project will cause a harmful alteration, disruption or destruction of fish habitat and consequently require a Fisheries Act Authorization pursuant to the *Fisheries Act*. An application has also been filed pursuant to the *Navigable Waters Protection Act* and the Project is currently under review by Transport Canada, Navigable Waters Protection Program. Once the YESAB Process is complete, Yukon Energy will also need to apply to the Water Board for an amendment to the Mayo Water Use Licence pursuant to the *Waters Act*. Since the initial stages of construction do not require any in-stream work, Yukon Energy intends to secure all required permits, licences and authorizations required to proceed with work on land by early May 2010, and will endeavour to secure required licences and permits for water based work as soon as possible thereafter (and in any event by the end of 2010).

Table 2 lists the potential regulatory permits and approvals that have been identified during the YESAB process. In addition, YEC requires the Certificates referred to in OIC 2009/220 and approvals required by YDC under OIC 1993/108.

Table 2
Regulatory Permits and Approvals Required for Mayo B

Activity	Authorization Required	Act or Regulation
Water use or deposit of waste in water	Water Use License	*Waters Act, Water Use Regulations*
Harmful alteration, disruption or destruction of fish habitat; destruction of fish	Fisheries Act Authorization	*Fisheries Act (Sections 32 and 35(2)); Fishery (General) Regulation*
Work, build or place in, on, over, under, through or across any navigable water	Review for possible exemption, if not exempted then file Application for an Approval of Proposed Works	*Navigable Water Protection Act Territorial Lands (Yukon) Act, Lands Act, Land Use Regulation*
Use of more than 50 kg of explosives on Commissioner's land in any 30-day period	Land Use Permit	*Territorial Lands (Yukon) Act, Lands Act, Land Use Regulation*
Temporarily using or occupying Commissioner's Land		
Construction of a trail or road		
Clearing or installing a utility right-of-way		
Permission to obtain gravel/sand from a quarry	Quarry Permit	*Territorial Lands (Yukon) Act, Quarry Regulations, Lands Act*
Burn refuse (wood)	Burning Permit	*Forest Protection Act, Forest Protection Regulation; Territorial Lands (Yukon) Act*
Tenure for land lease or agreement of sale, or other disposition	Application for Land	*Territorial Lands (Yukon) Act, Territorial Lands Regulation, Lands Act, Lands Regulations*
Construction of buildings outside a municipality	Building Permit	*Building Standards Act, Building Standards Regulation*
Gas Piping	Gas Installation Permit	*Gas Burning Devices Act*
Use of propane gas in a gas burning device		
Electrical work	Electrical Permit	*Electrical Protection Act; Canadian Electrical Code*
Plumbing	Plumbing Permit	*Building Standards Act, Building Standards Regulation*

Activity	Authorization Required	Act or Regulation
On-site sewage disposal system	Permit to install a sewage disposal system	*Public Health and Safety Act, Sewage Disposal Systems Regulation*
Operating a food premise	Permit to Operate a Food Premise	*Public Health and Safety Act, Eating or Drinking Places Regulation*
Supply of Potable water	Must meet the Health Criteria under the Guidelines for Canadian Drinking Water Quality	*Public Health and Safety Act, Drinking Water Regulation*
Operation of a solid waste incinerator	Air Emissions Permit	*Environment Act, Air Emissions Regulations*
Handling, disposal, generation or storage of special (hazardous) wastes	Special Waste Permit	*Environment Act, Special Waste Regulations*
Explosives Storage and Use	Permit of Use of Explosives; Explosives Magazine Permit; Blaster's Permit	*Explosives Act*
Oversize trucking	Over-dimensional or Over-weight Vehicle Permits (single trip or multiple trip)	*Highways Act, Highways Regulation*
Transport of dangerous goods/waste	Permit for transport of dangerous goods	*Dangerous Goods Transportation Act, Dangerous Goods Transportation Regulations*
Erect a sign within highway right of way	Sign Permit	*Highways Regulation*
Fish Research and Surveys	Fisheries Permit	*Fisheries Act, Fisheries (General) Regulations*
Collection of fish	Licence to Collect Fish for Scientific Purposes	
Search for and research at archaeological and palaeontological sites	Archaeological Sites Regulations Permit	*Historic Resources Act, Archaeological Sites Regulation*
Scientific and social scientific research in the Yukon, including studies connected with environmental assessments	Scientists and Explorers Permit required for non-resident researchers in the Yukon and optional for residents	*Scientists and Explorers Act*
Work within 4 km of aerodrome property	Transport Canada Obstacle Clearance Form	*Canadian Aviation Regulation TP 312 Standards and Recommended Practice*

The Project is subject to a screening level assessment by the Executive Committee of YESAB, in accordance with sections 25(a) and 26 of Schedule 3 of the Assessable Activities, Exceptions and Executive Committee Projects Regulations[86] as the Project will involve construction and expansion of a hydroelectric generating station with a production capacity of 5 MW or more. Subsequent to the YESAB Executive Committee screening, review of the Project will be required by the Yukon Water Board under section 6(1) of the Yukon Waters Act due to the need for an amended Class A Water Licence for the Project.

Before any Yukon or federal permit or approval can be issued, YESAB must complete its screening report and make recommendations to the relevant Decision Bodies under YESAA. Further, unless delays are to occur, all of these Decision Bodies must also issue Decision Documents agreeing with the YESAB recommendations before any permits or approvals can proceed.

YESAB's Final Recommendations Report on the Mayo B will be submitted to the following Decision Bodies:

- Yukon Government Development Assessment Branch of Executive Council for issuance of a Decision Document for Ministerial approval;
- Department of Fisheries and Oceans (There is a likely requirement for an authorization to kill fish pursuant to section 32 of the Fisheries Act, and potential requirement for a HADD pursuant to section 35(2) of that Act);
- Navigable Waters (Transport Canada, Navigable Waters Protection Program is responsible for completing a Navigable Waters Impact assessment to determine whether an approval pursuant to the Navigable Waters Protection Act is required); and
- Infrastructure Canada (the Federal Contribution Agreement funding under Infrastructure Canada's GIF makes Infrastructure Canada a Decision Body for Mayo B).

The Yukon Water Board is not a decision body pursuant to YESAA, and Yukon Energy will need to apply to this regulator as part of a separate process to take place subsequent to the YESAB review and the receipt of Decision Documents related to the Mayo B project.[87]

[86] The *Assessable Activities, Exceptions and Executive Committee Projects Regulations* (SOR/2005-379) ("*Assessable Activities Regulations*"), established under Section 47 of YESAA.

[87] The YESAA Act specifically states at section 86 of the Act that (a) the Yukon Territory Water Board may not, under the Yukon Waters Act, issue a licence if the issuance of a licence is contrary to a decision document issued by another federal agency or a decision document that a territorial agency, municipal government or first nation is required by subsection 83(2) or 84(2) or (3) to implement; or (b) set terms of a licence that conflict with such a decision document, to the extent that another federal agency or a territorial agency, municipal government or first nation is required to implement that decision document.

To facilitate moving quickly though the final decision and permitting phases, steps are being taken well in advance of the YESAB's Final Recommendations Report being issued to initiate actions by relevant decision and permitting bodies well in advance of even a draft YESAB screening report. Timely completion of the draft YESAB screening report is also critical to the overall planning approach since it will provide the Decision bodies as well as YEC with an opportunity for early review of YESAB's assessment and draft recommendations. This initial review will provide the opportunity for any significant issues or differences between various decision and assessment parties to be resolved prior to the issuance of the final YESAB recommendations report.[88]

Federal and Yukon government bodies have provided comments on the Project Proposal. Yukon Energy has consulted with DFO and Navigable Waters regarding comments provided to YESAB and is endeavouring to work with both regulators to ensure any issues and concerns are understood and addressed. Yukon Energy continues to consult with the Yukon Government on the Project.

6.2 CONDITIONS AFFECTING APPROVALS

Yukon Energy does not anticipate material risks of major design modifications resulting from regulatory approvals and review process for this specific project. Accordingly, no special added costs are anticipated at this time to be required for Mayo B to comply with anticipated material conditions in approvals or permits.

The major regulatory risk for the Project remains material delays in schedule which could adversely affect Project costs and benefits and jeopardize available federal funding.

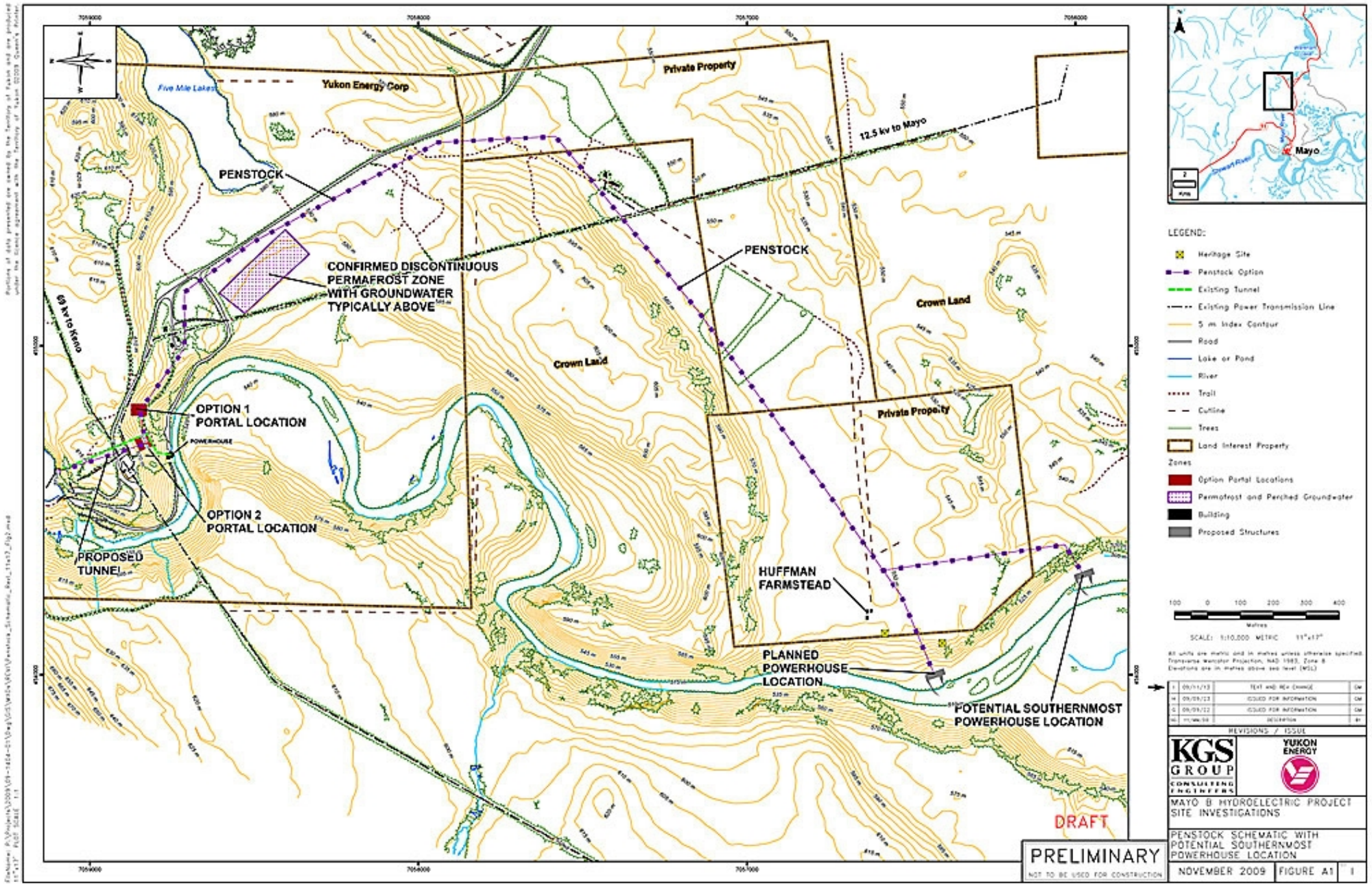
[88] Section 75(1) of YESAA provides that a decision body must issue a decision document within the period prescribed by the regulations after the executive committee makes a recommendation. The decision document may accept, reject or vary the recommendation. However, under section 76(1) of YESAA, where an executive committee makes a recommendation, the decision body must within the prescribed time periods (a) issue a decision document accepting the recommendation or (b) refer the recommendation back to the executive committee or panel for reconsideration unless that recommendation was made in response to a previous referral under this section.

ATTACHMENT A

ATTACHMENT A1

Figure A-1 - Project Area Map from YESAB

Update filed November 20, 2009


Private Property
Yukon Energy Corp
Five Mile Lakes
12.5 kv to Mayo
PENSTOCK
CONFIRMED DISCONTINUOUS PERMAFROST ZONE WITH GROUNDWATER TYPICALLY ABOVE
69 kv to Keno
Crown Land
OPTION 1 PORTAL LOCATION
POWERHOUSE
OPTION 2 PORTAL LOCATION
PROPOSED TUNNEL
HUFFMAN FARMSTEAD
PLANNED POWERHOUSE LOCATION
POTENTIAL SOUTHERNMOST POWERHOUSE LOCATION
DRAFT
PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION
Mayo
LEGEND:
Heritage Site
Penstock Option
Existing Tunnel
Existing Power Transmission Line
5 m Index Contour
Road
Lake or Pond
River
Trail
Cutline
Trees
Land Interest Property
Zones
Option Portal Locations
Permafrost and Perched Groundwater
Building
Proposed Structures
SCALE: 1:10,000 METRIC
REVISIONS / ISSUE
KGS GROUP CONSULTING ENGINEERS
YUKON ENERGY
MAYO B HYDROELECTRIC PROJECT
SITE INVESTIGATIONS
PENSTOCK SCHEMATIC WITH POTENTIAL SOUTHERNMOST POWERHOUSE LOCATION
NOVEMBER 2009
FIGURE A1

ATTACHMENT A2

Alternatives and Alternative Configurations:
Excerpts from YESAB Project Proposal Submission

EXCERPTS FROM MAYO HYDRO ENHANCMENT PROJECT (MAYO B) YESAB PROJECT PROPOSAL FILED FEBRUARY 27, 2009

The following excerpts from the Mayo B Project Proposal Submission to YESAB in Februaury 2009 review the alternatives to the Project considered in YESAB Project Proposal Submission:

- YESAB Project Proposal Submission Chapter 1, Section 1.6 "Alternatives to the Project" (provides basic background re: Resource Plan information on resource options and more recent 2007 update of potential near term hydro sites and enhancements in range of 20-50 GW.h/yr and 50-100 GW.h/yr (see Appendix 1B to this Application);

- Section 6.2.1 "Alternatives to the Project" (provides high level overview of alternatives to Mayo B); and

- Section 6.2.2 "Do Not Proceed with the Project or any other Option" (provides review of expected impacts if a decision made not to proceed with the Project).

The following excerpts from the Mayo B Project Proposal Submission review the alternative configurations for the Mayo B Project:

- Section 6.2.3 "Project Development Concepts" (provides a review of past development concepts considered for Mayo B, and studies leading to the current Project Proposal as at February 2009 when the YESAB submission completed); and

- Section 6.2.4 "Lower Mayo River Flow Regime" (provides a review of various potential configurations and flow regimes for the lower Mayo River to maximize the generation potential of Mayo B while ensuring good environmental conditions are maintained in the Mayo River).

Appendix 1B from the Mayo B Project Proposal Submission provides "An Assessment of Potential Hydroelectric Sites Concept Phase Study – Executive Summary" (provides summary of the update in 2007-08 to the studies of hydro sites and enhancement opportunities previuously identified as relatively promising for near term development [2010-2015] in the range of 20-50 GW.h/yr and 50-100 GW.h/yr).

1.6 ALTERNATIVES TO THE PROJECT

The proposed Project comprises a unique opportunity to enhance existing renewable generation by increasing the output available from assets already in service. In this regard, the project is consistent with other major Yukon Energy projects undertaken or underway as part of its long-term resource planning, such as the installation of a third turbine at the Aishihik facility (now underway, and targeted for in-service in 2010) and the Carmacks-Stewart Transmission Project (with Stage 1 now in-service, and Stage 2 under active planning). The Mayo B project is the largest single enhancement available (in terms of energy benefits) to Yukon Energy's existing hydro generating facilities.

Outside of enhancements to existing hydro facilities, renewable power generation for northern (i.e. has a wintertime electrical peak) climates can be pursued from only a limited number of sources. A thorough review of Power Resource Technology Options is provided in Appendix A to **Yukon Energy's 20 Year Resource Plan 2006-2025** ("20 Year Resource Plan"). A copy of the summary overview of the 20 Year Resource Plan is provided in Appendix 1A. Each of the generation technologies of notable promise (with respect to ability to effectively serve loads typical of Yukon) are under active investigation by Yukon Energy, notably geothermal, as well as further wind generation. Neither of these technologies, however, is an alternative to the Mayo B project at this time, and each can be developed in future to complement the Project. Specifically, geothermal generation is not an alternative as it remains in exploratory stages, and wind does not offer the same power characteristics as hydro enhancements (e.g., the type and degree of firmness provided by the Mayo B Project).

Outside of enhancements to existing facilities, a number of utility "greenfield" hydro sites and alternative existing hydro project enhancements have been reviewed by Yukon Energy since 1987, and by NCPC or others prior to 1987. In 2007, following the Yukon Utilities Board review of the 20 Year Resource Plan, Yukon Energy initiated an update to the studies of hydro sites and enhancements previously identified as relatively promising, in the range of 20-50 GW.h per year (subsequently expanded to 50-100 GW.h per year). The Executive Summary from this Concept Phase Study is provided in Appendix 1B, indicating estimated capabilities and costs for the various options, excluding costs of transmission (which can be material for greenfield sites). Coming out of the study, Yukon Energy proceeded with planning activities on a series of enhancements to existing hydro facilities, of which Mayo B is the largest and first to proceed. No greenfield sites were considered to be competitive on cost and timing factors to Mayo B.

1.7 SUBMISSION ORGANIZATION AND CONTENT

The project Proposal has been prepared so as to follow the *Proponent's Guide to Information Requirements for Executive Committee Project Proposal Submissions (v. 2005.11)* (Proponent's Guide) in structure and content in all materials respects. As the Proponent's Guide describes in general terms the form of Project Proposal submissions, it has been applied in this document so as to reflect the specific characteristics of the Project.

6.1.2 Key System Planning and Load Assumptions

The construction of the proposed Project is contemplated to occur concurrently with Stage Two of the Carmacks-Stewart Transmission Project (CSTP), a project previously reviewed by the Executive Committee of YESAB. CSTP will complete the 138 kV connection of the Mayo Dawson and WAF grids. Stage One of that project was completed in November 2008 and connected the Minto copper mine and Pelly Crossing to the WAF grid immediately displacing over 30 GWh per year of diesel generation with surplus hydro generation.

The planned Alexco silver mine development may potentially connect new industrial load to the Mayo Dawson grid as early as 2010. This new load will use surplus hydro and during certain times of the year it will also lead to a requirement for diesel generation if no new renewable power resource developments occur. Forecast further increases in the Alexco load expected for 2012 would increase such diesel requirements throughout most (if not all) of the year.

Potential new loads on the WAF system by 2012, including increased load at the Minto mine, the Carmacks Copper Mine development and new Faro site reclamation loads would also result in baseload diesel requirements on the WAF system if no new renewable power resource developments occur.

Overall, absent new renewable power resource developments, the above developments plus normal load growth could result in 50 to 100 GWh of annual baseload diesel generation requirements by 2015.

YEC is pursuing other potential renewable resource developments, including enhancements to the existing WAF hydro generation. All of these potential developments, as well as Mayo B, would be fully required to displace diesel if the above load developments materialize. Mayo B is the largest of the hydro enhancement projects potentially available to YEC for in-service by late 2011/early 2012.

6.2 ALTERNATIVES & CHOSEN APPROACH

As stated previously, the Project will provide long-term supplies of renewable power at stable costs, for electrical users on the Yukon's WAF and Mayo Dawson power grids, and help to offset pressures that would otherwise drive consumption of diesel fuel (either by Yukon Energy, or by large industrial loads that may otherwise not connect to the utility system and instead utilize on-site generation), which is costly and has associated environmental concerns.

6.2.1 Alternatives to the Project

A number of alternatives to the Mayo B project for providing new or enhanced renewable energy supply were evaluated by Yukon Energy before the Mayo B Project was advanced for further evaluation. For an in-depth discussion of these projects refer to the discussion in Section 1.4, Yukon Energy's 20 Year Resource Plan 2006-2025 overview document in Appendix 1A, and the Assessment of Potential Hydroelectric Sites – Concept Phase Study Executive Summary in Appendix 1B.

The priority near term (2010-2015) renewable generation options available to supply the potential loads reviewed under section 6.1.2 included Mayo B as well as three other smaller WAF hydro enhancements, all of which are forecast to be required. Mayo B is the largest of the priority near term enhancements.

Overall, the priority "alternatives to" Mayo B outside the Mayo area, if all developed on the same schedule as Mayo B, would still require diesel generation in the near term as well as long term that the Mayo B Project would otherwise displace.

As regards options on the Mayo Dawson grid and in the area of the Existing Facility, see Section 6.2.3.

6.2.2 Do not proceed with the Project or any other option

A decision to not proceed with the Project or any other renewable generation enhancement project in Yukon, would be expected to result in the following:

- The Yukon power systems will experience ongoing growth that cannot be served from existing renewable power sources. Consequently, given Yukon Energy's general obligation to serve customers who request service within its franchise area, the utility will be required to utilize non-renewable generation to service the loads, almost certainly diesel generation.
- Long-term power costs in Yukon will not benefit from the enhanced stability associated with capital intensive renewable power generation such as increased hydro (and that accordingly would occur with Mayo B). This would likely lead to materially higher power rates over time than would be the case with the Project, and separately may lead to more industrial customers electing to generate their own on-site power with fossil fuel generation rather than connect to the grid.
- Ongoing diesel generation in Yukon that arises, which could otherwise have been displaced by the Project, will generate approximately 700 tonnes of GHG emissions per GW.h of electricity generated.
- Economic development opportunities that could be realized from the project will not occur.

6.2.3 Project Development Concepts

Investigations of the Mayo B development concept date back to 1968 when the potential for a Mayo B project as an incremental addition to the existing Mayo generating station was reported on as part of a general survey of hydroelectric resources in the central Yukon. At the time the existing Mayo plant was owned and operated by the Northern Canada Power Commission (NCPC). Additional investigations of the potential to develop new hydro in Yukon noted the potential of a Mayo B project, including a 1989 review by the Yukon Electrical Company Limited (YECL) as manager for Yukon Energy.

The most recent investigation of the site prior to the current development planning was completed by BC Hydro in 2003 as part of a Small Hydro Assessment process for the Mayo-Dawson system, to consider potential future projects on or near the Mayo-Dawson transmission system. Six sites were investigated; Mayo B, Ethel Lake, a Reid Lakes and Lake Creek concept, the North Fork of the Klondike River, Rock Creek and the Chandindu River. The study concluded that Mayo B and the North Fork of the Klondike

River were by far the most attractive identified small hydro projects in the region, and that of the two the North Fork was not able to provide sufficient firm winter energy (which is critical to Yukon power generation). At the time, BC Hydro did not do any cost estimate updating, but only inflated earlier (1989) YECL values[1].

BC Hydro's study summarized the earlier work in respect of four significantly different project concepts:

- Scheme 1 Alternative 1 was a new 20 metre high dam 3.0 km downstream of the existing plant which would back up water to the existing plant, and a 1200m long tunnel to a 5 MW powerhouse.
- Scheme 1 Alternative 2 was a 30 metre high dam 4.2 km downstream of the existing plant to back up water to the existing plant, and a penstock to a 5 MW powerhouse.
- Scheme 2 was a new inlet on Wareham Lake with a tunnel, canal and penstock combination bypassing the existing plant to a new 10 MW powerhouse.
- Scheme 3 consisted of a 55 metre high dam 3.0 km downstream of the existing plant, flooding the existing plant location and feeding a 1200 metre long tunnel to a 15 MW powerhouse.

Only scheme 2 of the earlier studies did not involve a new dam, and each scheme effectively rendered the Mayo River downstream of the existing powerhouse to the approximate location of the proposed powerhouse inaccessible to fish as a river environment for most or all of the year, either due to de-watering or to inundation. The Scheme 2 concept was subjected to limited cost updating at the time Yukon Energy's 20 Year Resource Plan was prepared, resulting in a revised capital cost update of $101 million in 2005$, excluding transmission.

Upon initiation of the Concept Study Review by Yukon Energy in 2007, Mayo B project concepts of the type noted as Scheme 1 and Scheme 3 above (i.e., involving various scales of new dams and impoundments) were assessed and quickly discarded in the initial study screening as being unacceptable from both a cost and environmental impact perspective.

Compared to the earlier Scheme 2 concept, the current Project Proposal simplifies the Project development considerably by maintaining and reusing the existing intake at Wareham Lake. Not only does this aspect of the Project development reduce the number of components that are required to be constructed for the purposes of the Project, it also eliminates any need to undertake construction activities in Wareham Lake.

The approach adopted for each major component of the Project is reviewed below.

[1] Specifically, the study inflated earlier 1989$ values to 2004$ using the historical Non-Residential Building Construction Price Index from Stats Can (V7717859) for industrial buildings and the inflation rate calculated from the Consumer Price Index.

6.2.3.1 Location of the Powerhouse

Earlier stages in the Mayo B investigations considered alternative locations for the location of the powerhouse. The main notable alternative under consideration at the time was a concept noted as "Option C", which would locate the powerhouse approximately 1.0 to 1.5 km upstream of the area now proposed for the Mayo B Powerhouse. This concept was investigated notwithstanding that it provides less power generation benefits (due to developing less head than the Proposed Mayo B Project), as it held the potential to permit a shorter conveyance potentially offering a lower overall project cost than Mayo B. Following review of geotechnical investigations and costing, the option was determined to be less economic than Mayo B.

In addition, the proposed powerhouse location (within an approximate range of 100 metres along the shoreline) may provide an opportunity to implement a salmon rearing channel directly adjacent to the powerhouse, focused on re-establishing and managing flows and conditions in an old (presently de-watered) side channel of the lower river. This same opportunity does not appear to exist at the Option C location.

6.2.3.2 Conveyance Options

During the Project development process, three conveyance options were extensively studied. Significant effort was expended on geotechnical investigations during the course of summer of 2008 (overburden auger drilling and bedrock core sampling) and fall of 2008 (**seismic refraction** surveys) in part to determine if there was sufficient quantity and quality of bedrock at depth to permit a tunnel to be used as the conveyance for most or all of the project route.

The geotechnical studies to date indicate that a tunnel from the existing Wareham Lake intake to the new powerhouse location would be very challenging due to the unexpectedly low depth of bedrock immediately downstream of the existing plant. At the same time, auger drilling confirmed appropriate overburden materials for surface conveyance construction and identified no permafrost in the vicinity of the surface conveyance. Given the technological challenges associated with tunnel projects, as well as the cost risk they entail, using a tunnel for the entire route was deemed to be eliminated from further consideration.

A second alternative to the Proposed Project was also considered that would see the flows from Wareham Lake conveyed to the new powerhouse through buried penstocks(s) with- no canal. Based on current estimated prices, this option proved significantly more costly than the canal scheme proposed.

6.2.3.3 Mayo Lake Operating Regime

The Mayo B concept studies reviewed the potential benefits from enhancements to the operating range of Mayo Lake of up to 2 metres of additional water level fluctuation to increase the amount of water retained in storage, including up to 1 metre of added top storage (raising the controlled maximum licensed lake level) combined with up to 1 metre of added bottom storage (lowering the minimum licenced elevation).

Flow releases from Mayo Lake Dam occur primarily through three low level gated 1.5 m diameter **sluices** that are opened or closed as downstream flows are required. When Mayo Lake water levels are above El. 665.73 m, then flow is also released from the dam by passing over a timber overflow spillway.

Early hydrological studies indicated insufficient inflows to Mayo Lake in most years to allow the 2 additional metres of extra storage to be fully utilized for energy generation. The long-term average energy enhancement benefits of this full added range were not significantly higher in comparison to the addition of only 1 metre of extra storage range.

Environmental and engineering investigations and scoping to date indicate potential complexities with respect to raising the upper lake levels that would not arise if the same storage enhancement was obtained by lowering the minimum licenced level by an equivalent amount (for example, see Appendix 6C regarding erosion). Concerns with increased upper storage (and water levels) included "toe of bluff" erosion, infrastructure concerns with respect to existing cabins and heritage structures close to the shoreline at current maximum elevation, as well as required modifications to the Mayo Lake dam structure.

This Project Proposal reflects a "modified" increased storage regime consisting of the following (as set out in section 6.8.1):

- Maintenance of the existing maximum controlled elevation for Mayo Lake;
- Reducing the controlled minimum elevation of Mayo Lake by 1 metre; and,
- Implement a water management regime to ensure that minimum spring elevations are not in excess of 2.59 metres below the lake elevation on the previous September 15 more than 2 years in a row (i.e., at least one year in three the drawdown from September 15 elevation, to the minimum elevation the following spring, shall be less than 2.59 metres).

6.2.4 Lower Mayo River Flow Regime

As part of the concept study reviews, Yukon Energy investigated various potential configurations and flow regimes to maximize the generation potential of the proposed project while ensuring good environmental conditions were maintained in the Mayo River. Ongoing environmental investigations indicated the potential for concerns regarding flows through Zone 2 (the stretch of the lower Mayo River between the existing powerhouse and the proposed new powerhouse) primarily in relation to salmon spawning and rearing habitat.

Three main options were considered with respect to flow regimes particularly in Zone 2:

- ***Option A – Maintain and fulfill existing licence conditions on a continuing basis:*** This concept recognizes and acknowledges the importance of the existing licence conditions as they relate to this portion of the river. Specifically, given that the requirements imposed on Yukon Energy by the existing Mayo Generating Station Water Licence require 2.8 cms minimum flow downstream of the existing plant at all times, establish a flow regime that is able to continue to meet this minimum flow year-round. This option was identified based on

particular attention to the fact that the current 2.8 cms minimum flow arises from conditions recommended by the Environment Canada Fisheries and Marine Service (the predecessor to the current Department of Fisheries and Oceans Canada) during the 1975 licencing of the facility, under the specific reference that observations on the river at that time indicated this flow rate was sufficient to ensure that most of the stream bed would remain wetted.

- ***Option B – Seek to vary existing licence conditions and incorporate habitat compensation into the project proposal:*** This concept involves maximizing flows through the new powerhouse at all times, such that the existing powerhouse and Zone 2 could be largely "de-watered" at times when there is no flow surplus to the needs of the new generating station. Habitat compensation for lost productive area in Zone 2 would be sought elsewhere on the river system or off-system.
- ***Option C – In-situ mitigation:*** Notwithstanding a licenced minimum flow of 2.8 cms, provide enhanced flow of 5 to 6 cms through the existing powerhouse and through the entire Zone 2 of the river to the extent possible throughout the year.

The studies completed to date reflect the obvious environmental benefits of pursuing development Option C (which reduces the extent of river that experiences reduced flows) notwithstanding the significant reduction to power production potential for the Mayo B plant. As noted in Chapter 7, the proposed minimum flows for Zone 2 serve to ensure maximum in-situ preservation and enhancement of spawning (and to some degree rearing) conditions. Consequently, the Project Proposal sets out Yukon Energy's intention to adopt a water management regime that sustains flows through Zone 2 (either through the existing powerhouse, the Wareham spillway, or the two combined) at a sustained level of not less than 5 to 6 cms year-round.

6.3 TECHNOLOGIES

The proposed Project will be built using conventional construction technologies following all applicable construction and design practices for works of this nature, including building and electrical codes and adhering to the best practices laid out in the relevant excerpts of Yukon Energy's Environmental Management System Manual (presented in Appendix 6-A). The technologies employed in the Project are industry standard in all material respects, and reflect consistency with a significant number of small hydro projects of similar configuration being constructed throughout Canada.

The Project will also adhere to all applicable national and territorial standards used in the design of all project components. The following list provides typical standards and associations with design manuals/guideline for the elements included in the Project:

- Canadian Dam Association (CDA) - Dam Safety Guidelines (2007).
  Relevant for the powerhouse, canal inlet & outlet structures, and canal
- National Building Code of Canada (NBC)
  Relevant for the powerhouse only
- Canada Standards Association (CSA) A23.3
  Design of Concrete Structures

CHAPTER 1
APPENDIX 1B

Assessment Of
Potential Hydroelectric Sites
Concept Phase Study – Executive Summary

EXECUTIVE SUMMARY

In August of 2007, Yukon Energy Corporation (YEC) retained KGS Group to perform a concept study on several potential hydroelectric generation projects located in Yukon and B.C. Wilson Hydrotechnical was also retained by YEC to examine storage potential in the Southern Lakes region as well as to act as an advisor to YEC on hydro development.

The intent of the study is to identify hydroelectric development schemes that offer the potential to develop 20 to 50 GWh of new generation in time to meet anticipated upcoming energy load demands on the YEC system.

Working closely with YEC, Intergroup, and Wilson Hydrotechnical, KGS Group investigated the various potential sites and affirmed the feasibility of the developments The results and conclusions presented in this report remain, however, those of KGS Group.

There have been many previous studies of the various potential sites. The scope and extent of these previous studies varies, but most were desktop studies with limited site reconnaissance. As was typical for the time (generally late 1980's to early 1990's) the hydroelectric developments envisioned in the previous studies in most cases would be very challenging to license in the regulatory environment of today. The approach used for this study was to try and develop projects with a high potential to be licensed in a timely manner, with potential environmental issues identified and wherever possible mitigated or minimized.

The initial sites to be examined included:

- Mayo and Mayo B
- Mayo Lake
- Tutshi
- Moon
- Atlin storage
- Primrose
- Drury

Review of the Gladstone Creek diversion to Aishik G.S. was subsequently added as the study proceeded, along with a site reconnaissance of the Morley River site. Review of the McNaugton Creek was added in November of 2007 and remains underway. The results of that study will be provided shortly for review, and would be added to the final draft of this report.

KGS performed two phases of site investigations of the various development schemes, the initial site reconnaissance was performed in August of 2007 while a follow up geotechnical reconnaissance was performed in October of 2007.

The study reviewed the potential developments based on their flows, costs, storage and generation at the site or the enhanced generation provided at one of the existing YEC hydro facilities. The assessment of each site is presented in the main report, while detailed information on the geotechnical aspects, costs, and energy production is presented in several appendices.

The study concluded there are feasible options that could provide additional power. The projects that had the shortest anticipated implementation time and appeared the most technically feasible were those related to existing facilities, such as Gladstone Diversion, Atlin Storage, and the enhancements to the Mayo Lake and River system.

The most feasible project options for each site are summarized below, along with the capacity cost and the equivalent capital cost divided by the annual and winter energy. As is noted in the report, only the Drury site was deemed to not be technically feasible to develop, due to the many concerns regarding the slope stability and permafrost related concerns.

Summary of Development Schemes Reviewed in 2007

Project	Option on Drawings	Plant Capacity in kW	Total Annual Incremental Energy in GWHr	Total Incremental Winter Energy in GWHr	2007 Capital Cost in $/kw	2007 Capital Cost in Annual Energy $/GWHr	2007 Capital Cost in Incremental Winter Energy in $/GWH
Tutshi A (Existing Outlet)	B	4248	30.3	22.2	19,890	3.50	3.80
Tutshi B (Windy Arm)	C	5856	39.4	28.3	18,462	3.25	3.82
Atlin	A	0	18.0	18.0	3,438	0.76	0.76
Moon Lake	A1	5758	32.9	20.3	13,000	2.28	3.70
	C1	4922	28.1	17.3	11,300	1.98	3.21
Primrose Upper G.S.	1A	12359	70.1	26.0	16,500	2.90	7.83
Primerose Lower	D	3708	21.0	7.8	21,300	3.75	10.11
Mayo Lake	A						
	B	845	6.7	3.0	15,400	1.94	4.34
	B	845	6.7	4.0	15,400	1.94	3.26
Upgrade Existing Mayo	A1	5536	0.0	0.0		0.00	
	A2	5536	3.5	7.8	0	0.00	0.00
	A3	7689	11.5	10.3	2,000	0.29	1.47
	A3	7689	13.9	14.5	6,700	0.33	1.23
	A3	7689	15.0	17.8	7,100	0.35	1.07
Mayo B	B1	9374	22.2	10.2	12,100	1.83	11.13
	B2	13019	41.9	16.1	9,200	1.46	7.45
	B3	13019	41.9	16.1	10,100	1.60	8.16
	C1	9944	7.7	4.2	10,800	2.26	25.50
Drury B	2	2436	19.8	9.8	24,700	3.04	6.16
Gladstone	A		18.0	18.0		1.53	1.53

ATTACHMENT B

ATTACHMENT B: OVERVIEW OF CONSULTATION ACTIVITIES

As discussed in Section 6 on Consultation, Chapter 4 of the Mayo B Project Proposal Submission to YESAB provides the primary source of information on consultation activities. Table B-1 below provides a summary of the contents of Chapter 4, including a description of how consultation activities were approached, guiding principles, methods used, key meeting dates, and the public's influence on the Project.

Table B-1
Overview of the Contents of Chapter 4

Section	Contents	Page
4.0 First Nations and Other Publics Consultation	4.0 Brief overview of the public and community involvement activities	4-1
4.1 Overview	4.1 Brief description of the regulatory requirements and involved publics.	4-1
4.2 Principles and Approach to Consultation	4.2.1 Guiding Principles – Describes the principles used throughout the public and community involvement process.	4-2
	4.2.1.1 Opportunities before a Filing with YESAB – describes the three stages of opportunity for involvement: Feasibility Stage; Project Introduction and Issues Identification; and Potential Project Effects and Mitigation.	4-4
	4.2.1.2 Public Communication of the Filing with YESAB – YEC committed to informing the public on its filing, and to continue with open dialogue with FNNND, the Village of Mayo and local residents.	4-5
4.3 Methods	4.3.1 Face to face Interaction – with FNNND, Local Stakeholders and Municipal Government, Other Government, Other Publics.	4-5
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4.4 Review of Public Involvement Activities to Date	4.4.1 Activities involving NND - focused on four groups: 1) Chief and Council, 2) the Lands and Resources Department[89], 3) the Project Agreement Working Team, and 4) NND membership. Focused on the three stages of involvement.	4-9
	4.4.2 Local Stakeholders and Municipal Government – focused on the Village of Mayo Council, MDRRC, community residents including land and business owners, resource users.	4-12
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	4.4.4 Other Publics – including non-government organizations.	4-16

[89] Other departments and community members were involved in these meetings at the discretion of the NND Lands and Resources Department.

Appendices
The Appendices to Chapter 4 provide supporting documentation to the main text in Chapter 4, including a list of potentially affected or interested parties, electronic, paper and other media communication, materials used throughout the consultation process, and records of personal communications.

Stages of Consultation
There were three stages of consultation activities for the Mayo B Project. The **Feasibility Stage** was to:

- Keep local stakeholders apprised of the activities that were taking place in the area such as environmental and geotechnical fieldwork; and

- To learn about key interests and issues from local stakeholders that might arise should Yukon Energy decide to proceed with the Project.

Yukon Energy also sought engineering and cost advice, as well as initial input from FNNND, the Village of Mayo and the Mayo District Renewable Resources Council.

The **Project Introduction and Issues Identification Stage** provided an opportunity for the public (with particular emphasis on FNNND and the local community) to express key perspectives and issues it may have about the proposed Project. The **Potential Project Effects and Mitigation Stage** provided an opportunity to identify and discuss potential Project-related effects and possible mitigation strategies. Information received during this stage ultimately influenced several factors related to the Project (i.e., location and operating policies related to the camp).

Yukon Energy has continued with on-going consultation with FNNND on such topics as changes to the water management regime, pre- and post-project monitoring of the lower Mayo River and access concerns. Yukon Energy has entered into discussions with FNNND on a Project Agreement during the fall of 2009, with the intent of finalizing an agreement if possible prior to the end of 2009.

The November 2008 Proposed Mayo Hydro Enhancement (Mayo B) Newsletter and the September 2009 Mayo B/ Carmacks-Stewart Transmission Project Stage 2 Newsletter are provided as Attachment B1 and Attachment B2 respectively.

ATTACHMENT B1

November 2008 Newsletter

Nov. 2008

PROPOSED MAYO HYDRO ENHANCEMENT PROJECT (MAYO B)

What is involved?

Electrical loads in Yukon are increasing. By 2011, Yukon Energy expects to need additional renewable power to help minimize the use of diesel to generate electricity. As outlined in Yukon Energy's 20-Year Resource Plan (found at www.yukonenergy.ca), the first priority for increasing renewable energy is through enhancements to existing hydro facilities. As such, Yukon Energy is looking at enhancing the existing Mayo hydro plant, a potential project referred to as Mayo B.

Mayo control structure

What are the benefits?

Yukon Energy is the primary generator of power in Yukon. As electrical load grows in Yukon, the opportunity exists to develop additional renewable energy rather than serve those loads with diesel. The Mayo B project, if developed, will help reduce the future need for running diesel, and enable Yukoners to offset greenhouse gas emissions of up to 28,000 tonnes a year.

Regulatory Approvals/Reviews

No decisions have been made at this time to proceed with this proposed project. Yukon Energy first plans to consult with local governments, stakeholders and the public. Before any project regarding Mayo B moves ahead, government permits and approvals would be required for land use, activities affecting water bodies, and other activities.

Environmental and socio-economic assessment would be needed under the *Yukon Environmental and Socio-Economic Assessment Act (YESAA*). An Executive Committee Screening of the project would be done by the Yukon Environmental and Socio-Economic Assessment Board (YESAB). In addition, the project would need a new or revised water licence from the Yukon Water Board.

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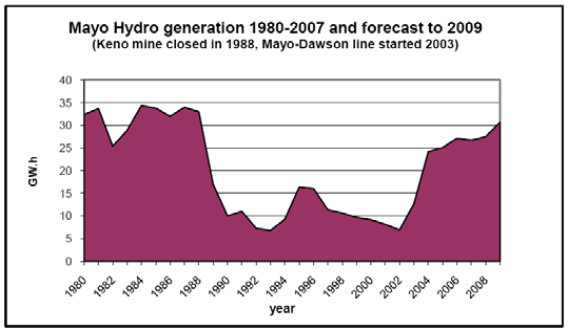
The Existing Facility

Operation of the Mayo facility



The Mayo hydro facility supplied the loads of both the Keno mine and the community of Mayo from 1951 until the mine closed in 1988/89. During this period, the plant typically operated at full capacity, and the storage range at Mayo Lake was largely used each year. After the closure of the mine and up until the Mayo-Dawson line was energized in 2003, the plant generated power only for local loads in Mayo and Keno. Since the Mayo-Dawson line went into service, the plant has also provided power to Dawson and Stewart Crossing. The Mayo hydro facility continues to operate below its full capability. The existing plant has an annual generation capability of just over 40 gigawatt hours (GWh) each year. Regardless of whether the Mayo B project is developed, the Mayo facility will return to operating at its full potential as loads grow and new mines go into production, including using the full range of Mayo Lake storage.

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Components of the existing Mayo hydro facility

Wareham Lake: the original project involved construction of a 32 metre high earthen dam that created Wareham Lake. The dam controls the lake levels within a licensed range. From the lake, water passes through an intake structure and a tunnel (approximately half a kilometre) to the generating station.

Wareham Lake spillway

Existing Mayo plant

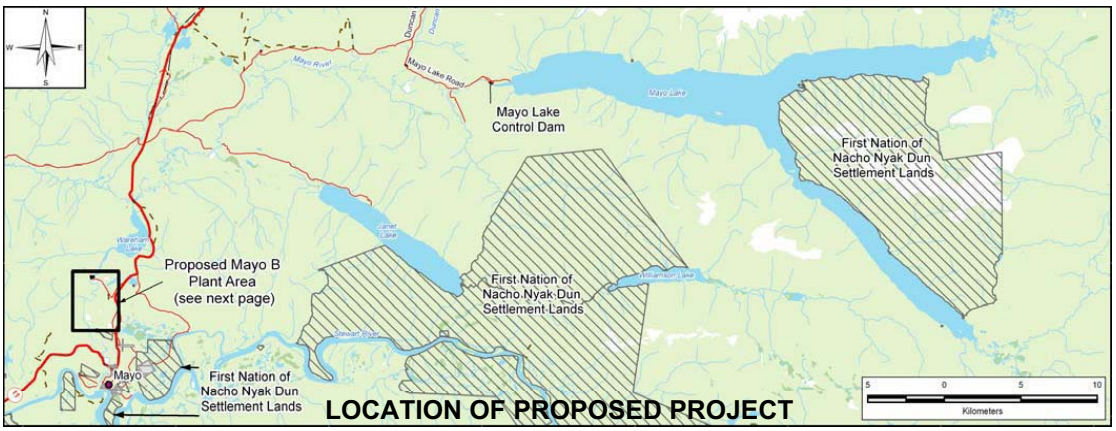
Generating Station: located on the Mayo River, the plant has two generating units of approximately 2.7 megawatts each, which operate with 36 metres of 'head' or vertical drop between Wareham Lake and the existing generating station.

Mayo Lake

Mayo Lake Water Storage: approximately 40 to 50 kilometres upstream of Wareham Lake, the Mayo Lake dam provides the ability to control the level of Mayo Lake. Yukon Energy's water license sets a fixed maximum controlled lake level. Yukon Energy is permitted to release water to lower the lake from this level (draw it down) by 2.5 metres, which it typically does in the winter. The released water flows to Wareham Lake where it is used to generate power. The Mayo Lake dam is a six metre high rock-filled wood structure that was rebuilt in 1988/89.

The Proposed Mayo B Project

No decisions have been made at this time to proceed with the project. Any decision to proceed will only occur after meaningful consultation with all stakeholders in the Yukon and all permits and approvals are obtained.



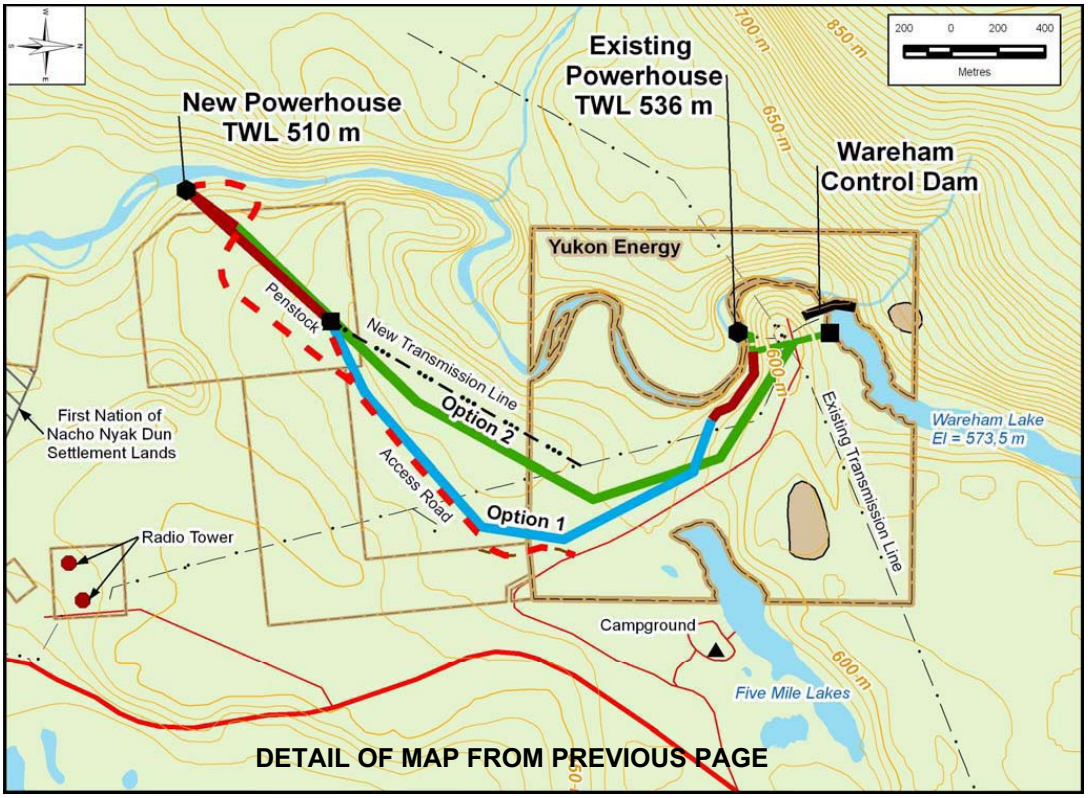
The proposed Mayo B project involves construction of a new powerhouse about three kilometres downstream from the existing powerhouse. The project will approximately double the amount of energy that can be generated from the Mayo River. No changes would be required at Wareham Lake or to the Wareham dam. The current plan is to maintain the existing power house for use as required in the future.

Yukon Energy is proposing to enhance the storage at the Mayo dam by lowering the current licensed minimum level for Mayo Lake. This would allow up to one metre of additional winter drawdown range, leading to a lower spring level than is currently permitted in the water licence. With the large natural spring inflows to the lake, this lower lake level would be temporary each spring.

Mayo B would be developed to help supply Yukon-wide power loads, which is conditional upon the completion of Stage 2 of the Carmacks-Stewart Transmission Project to interconnect the Mayo-Dawson and WAF (Whitehorse-Aishihik-Faro) systems.

Dam safety

The existing Mayo hydroelectric facilities are inspected to ensure the safety of the operation. This includes routine inspections (day to day observations, monthly checklist-driven inspections, and 24 hour equipment monitoring), annual formal inspections by Yukon Energy engineering staff, and an independent dam safety review every five years as per Canadian Dam Association guidelines and current licence requirements. The most recent five-year review was completed in November 2005.



Studies to date

Field studies on the local environment (water, land, wildlife, heritage resources) have been done and preliminary information collected on how people use the area or may be affected by the project.

The following studies have been completed:
-Geotechnical studies (test holes) to assist in determining which project options are feasible;
-Specific aquatic information on the use of the Mayo River by Chinook salmon and the use of Mayo Lake by lake trout, to enable Yukon Energy to address potential effects on the aquatic environment; and
-A heritage resources assessment has been completed.

The collection and analysis of data is on-going and will be used to help predict the potential effects of Mayo B on the existing environment and assist in shaping the project details.

The project concept is still being developed. Results of the public consultation process will help shape the project.

Project Components and Options

There are four parts to the Mayo B proposed project:

New Powerhouse

The new powerhouse will result in a total head or drop in elevation (between Wareham Lake and the new powerhouse) of 65 metres. By developing more head, the same water can be used to generate more power. It would include two to three turbines with a plant capacity of approximately 13 mega-watts. The plant would be large enough to allow most of the river flow to be used to generate power, compared to the existing plant that results in some of the water being spilled or wasted.

The powerhouse would be set back from the river and would be built on a bedrock foundation. Its tail-race (a component of the powerhouse that directs the flow of water once it has passed through the turbines) would extend to the Mayo River.

Water Diversion Options

A major part of the Mayo B project would be the construction of a mechanism to divert water from the existing intake to a new powerhouse.

Option 1 *- canal and/or penstock (see map page 4)*

Moving water at or near the land surface using a canal and/or a penstock (a pipe likely buried about one to two metres beneath the surface). This conveyance would begin at the existing intake tunnel and be approximately three kilometres long. It would follow the land contours before heading off the ridge into the new powerhouse.

Option 2 *- tunnel (see map page 4)*

Moving water using an underground tunnel approximately 3.5 metres in diameter and 3,200 metres long. It would be buried 65 to 100 metres below the ground surface tapping into the existing tunnel near the intake at Wareham Lake. Located near the new powerhouse, the tunnel would convert to a penstock that would run about 200 metres into the powerhouse.

Water Storage Improvements

Revising the licensed drawdown range at Mayo Lake (from 2.5 metres today to 3.5 metres) requires very little change to the Mayo Lake dam. Some of the pipes that release water would need to be re-placed with larger pipe, to allow the lower storage range to be used.

Additional Infrastructure

-New all-weather access road along the Option 1 alignment to the new powerhouse.
-Possible changes to the sub-station at the existing Mayo generating station
-Distribution line to new plant
-Pits for sand and gravel if Option 1 is chosen
-Site for stockpiling tunnel rock if Option 2 is chosen
-Temporary work camp for 50-75 people for up to two years

Construction activities would include clearing, tunnelling and/or penstock excavation, and heavy equipment operations associated with building an access road and power house.

Opportunities for Public Engagement

Public involvement is important to help Yukon Energy plan and shape the Mayo B Project, and to help YESAB carry out its environmental and socio-economic assessment of potential project effects. Yukon Energy's consultations to date with key stakeholders in the vicinity of Mayo (First Nation of Nacho Nyak Dun, Village of Mayo and the Mayo Renewable Resources Council) focused on summer and fall field study issues. More consultation opportunities are now planned with the First Nation of Nacho Nyak Dun, key stakeholders in the Mayo and Whitehorse areas, and the broader Yukon public. Future consultation will occur in the New Year after Yukon Energy's filing with YESAB.

Public Involvement Opportunities Before a Filing with YESAB

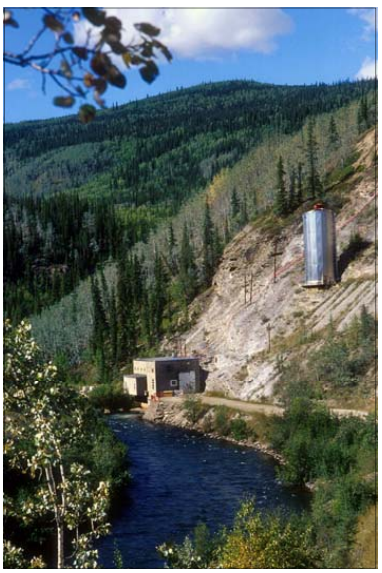
Project Introduction and Issues Identification

Potential Project Effects and Mitigation

Fall 2008
Yukon Energy is currently introducing the project and seeking feedback on issues of concern, planning options, potential project effects and mitigations.

Public Communication After a Filing with YESAB

First Quarter 2009



Existing Mayo generating plant

Mayo control structure

Comments? Questions?

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ATTACHMENT B2

Post Adequacy Review – September 2009 Newsletter

September 2009

MAYO B / CARMACKS-STEWART TRANSMISSION PROJECT STAGE 2

YUKON ENERGY

Planning for Yukon's Future

Yukoners are using more electricity than ever before. That, coupled with the fact that at least two new mines are expected to open in the next few years, means that Yukon Energy must find new sources of renewable, clean energy. Without new renewable power, we will be forced to burn diesel, which is not good for your pocketbook or the environment.

This need for clean electricity is why Yukon Energy is moving forward with work on the Mayo Hydro Enhancement Project (Mayo B) and the second stage of the Carmacks-Stewart Transmission Project (CSTP). While we must still obtain various permits and approvals before proceeding too far with these projects, we do have permissions in place to do some of the necessary preparatory work.

The Mayo B project, if approved, will provide more than five megawatts of additional hydro power and will offset greenhouse gas emissions of up to 25,000 tonnes a year.

Proposed location for the new powerhouse. Photo: Yukon Energy

Aerial view of existing plant downstream from the Wareham Dam Spillway. Photo: Karl Scheifer

The CSTP Stage 2 project will connect Yukon's two established hydro-based transmission systems, the Whitehorse-Aishihik-Faro grid and the Mayo-Dawson system. CSTP Stage 1 was completed in November 2008. With CSTP Stage 2 in place, renewable power generated anywhere on these two systems will be able to serve loads throughout the integrated Yukon grid.

The Government of Canada has committed up to $71 million to Mayo B and CSTP Stage 2 as part of its Green Infrastructure Fund (GIF). The total estimated cost of Mayo B and CSTP Stage 2 is $160 million. We are currently working to secure the rest of the funding needed to complete these projects. In keeping with the funding agreement with the Federal government, construction of the projects must be complete by March 31, 2012.

Both initiatives have achieved significant steps forward in recent months.

Mayo B Update

The Mayo B project involves enhancements to Yukon Energy's existing Mayo hydroelectric facilities to increase renewable power production, without the need for a new dam.

Mayo B project planning continues to move forward to target an in-service date of late 2011. To meet this schedule, the environmental review must be completed in time to allow construction of Mayo B to begin by next summer.

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Environmental Review

The Mayo B project proposal was submitted to the Yukon Environmental and Socio-Economic Assessment Board (YESAB) in late February of this year. YESAB's initial review (known as an adequacy review) indicated that one aspect of the proposed project needed more field study before it could be assessed (a proposal to change the water license to permit the use of Mayo Lake for added water storage).

To accommodate YESAB's requirements while still keeping within the construction time period required, Yukon Energy has revised the Mayo B project proposal to remove the Mayo Lake enhanced storage component. This change does not modify the proposed Mayo B construction, and allows the YESAB review of all Mayo B construction components to proceed on the basis that Mayo Lake will continue to be operated as currently licensed.

As a result of this revision, YESAB on August 7 concluded that the information provided for the amended Mayo B project is adequate for YESAB now to proceed with its screening, including the opportunity for public comment. YESAB's review of the project is anticipated to continue into early 2010, with project permits to be in place by the late spring as needed to allow the start of construction. License changes will need to be approved by the Yukon Water Board before any construction work begins that affects any waters or the current plant.

After the YESAB review of Mayo B is concluded, and the required Mayo Lake field work information is available, Yukon Energy will consider filing a new project proposal relating specifically to enhanced storage at Mayo Lake.

Wareham Dam. Photo: EDI Environmental Dynamics Inc.

Installing nets for collection of invertebrates on the Lower Mayo River.
Photo: EDI Environmental Dynamics Inc.

Working with NND to capture Whitefish in Mayo Lake for research purposes. Photo: EDI Environmental Dynamics Inc.

Lithic flake found in the test area. Photo: Ecofor

First Nation of Na-cho Nyak Dun

Yukon Energy and the First Nation of Na-cho Nyak Dun (NND) have agreed to negotiate a project agreement in regard to the amended Mayo B project and the subsequent Mayo Lake enhanced storage project. This agreement will include an opportunity for NND to invest in the projects. Yukon Energy and NND have also agreed to specific studies to be led by the First Nation in areas of concern related to the future Mayo Lake project.

As a result of these ongoing discussions, NND has indicated its general support for Mayo B, and for Yukon Energy bringing forward a separate future application to YESAB in regards to Mayo Lake.

Construction Planning

Ongoing geotechnical field work continues this summer, including drilling, to help determine engineering design and a more accurate overall cost of the Mayo B project.

In order to involve a construction contractor in the project planning and design stage, and to minimize risks related to project cost and schedule, Yukon Energy entered into a Memorandum of Understanding in June with Peter Kiewit Sons Inc. (Kiewit). Kiewit was hired after Yukon Energy carried out an open, public Request for Proposal process. The company has a strong background building similarly sized hydro facilities, particularly for Independent Power Producers in British Columbia.

During the MOU stage, Kiewit is helping to finalize the most cost-effective and efficient project design. It is also assisting in an early tender process for the turbine/generator package and is working with Yukon Energy to determine firm costs for the Mayo B project. If negotiations with Kiewit are successful, it is anticipated that Yukon Energy and Kiewit will enter into a construction contract before the end of this year. However if negotiations are not successful Yukon Energy has reserved the ability to proceed with a construction tender process in early 2010.

Bedrock drilling is necessary to help determine engineering design for Mayo B.

Yukon Energy and Kiewit will be working with NND, the local Mayo community and others to plan for employment and business opportunities during the construction of Mayo B. Land-based construction of the canal, tunnel and/or penstock components as well as the powerhouse is expected to begin next summer. The water-based work will start during the summer of 2011.

CSTP-Stage 2

CSTP Stage 2 is the final component of the Carmacks-Stewart transmission project. It will connect the two Yukon power systems (Whitehorse-Aishihik-Faro and Mayo-Dawson). Stage 1 of the CSTP Project connected Carmacks with Pelly Crossing in November 2008, along with a spur line to provide power to the Minto mine.

YESAB review of the CSTP Stage 2 project and a Project Agreement with the Northern Tutchone First Nations were completed in 2007. Yukon Energy is now securing final permits and certificates to allow clearing to start this fall. Survey of the line is expected to begin in late September.

A section of the first phase of the Carmacks-Stewart transmission line. Photo: Ron Threkeld

Assembling power poles for stage 1 of the Carmacks-Stewart line. Photo: www.archbould.com

This project involves three main components:

- A new 138 kV transmission line of approximately 74 km in length within a 60 m right-of-way between Pelly Crossing and Stewart Crossing;
- Expansion of the existing Stewart Crossing substation north of the Stewart River to allow the connection of the two grids; and
- Modifications to the existing Carmacks switching station and the Minto Landing substation, and provision of new facilities to serve Pelly Crossing.

A tender has been issued for the Stewart Crossing transformer, for closing this month. It will be awarded by the end of the month. CSTP Stage 2 is expected to be in service in late 2010 or early 2011, depending on when the transformer can be delivered.

Clearing is expected to begin between Pelly Crossing and Stewart Crossing in October and continue through the end of this year. Line construction tendering is scheduled for this fall, with line construction to begin in February 2010. Substation tenders are planned to be issued in March 2010, with contract awards by late April to enable construction to start in May.

Comments? Questions?

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YUKON ENERGY

ATTACHMENT C

ATTACHMENT C: CAPABILITY OF THE EXISTING SYSTEM

The capability of the existing WAF/MD grid system and currently committed new transmission and generation facilities comprises the following components:

1) **Existing WAF:** The 138 kV existing Whitehorse Aishihik Faro ("WAF") system, including the Carmacks-Stewart Transmission Project Stage 1 ("CSTP Stage 1") including all related YEC hydro generation (the 40 MW Whitehorse GS, the existing 30 MW Aishihik GS), YEC diesel generation (the 25 MW Whitehorse diesel plant[90], and the 10 MW Faro diesel plant[91])[92], and YEC wind generation (1 MW at Haeckel Hill) as well as YECL hydro generation at Fish Lake and diesel generation at Haines Junction, Ross River, Carmacks, Pelly Crossing, and Teslin.

2) **Existing MD:** The 69 kV existing Mayo Dawson ("MD") system, including existing YEC hydro generation at Mayo (the Mayo A plant at 5 MW), YEC diesel generation at Mayo and Dawson, and YECL diesel generation at Stewart Crossing.

3) **Currently Committed:** In addition to the existing system, two relevant currently committed transmission and generation facilities are noted:
   a) **Aishihik 3rd turbine:** Consisting of a 7 MW third turbine unit at the Aishihik Generating Station, scheduled to be in-service by year-end 2010.
   b) **Carmacks-Stewart Transmission Projects Stage 2 ("CSTP Stage 2"):** The completion of the interconnection of the WAF and MD systems, comprising a 138 kV transmission line between Pelly Crossing and Stewart Crossing and related substation facilities to permit the two present hydro systems (WAF and MD) to operate as a new single Integrated System ("IS").

The new IS, including committed projects noted above, will comprise approximately 132 MW of installed generation prior to the addition of Mayo B (approximately 82 MW YEC hydro, 1 MW YEC wind, 42 MW YEC diesel, 1 MW YECL hydro, and 6 MW of YECL diesel).

The system capability to meet energy loads comprises two main generating sources – renewable and diesel. Renewable generation, primarily hydro, is dispatched on the WAF and MD systems as the first and main source of supply, and this mode of operation will not change with the initiation of IS. Yukon Energy generation dispatch in effect first meets integrated loads requirements with non-dispatchable generation (wind and YECL Fish Lake hydro) and then with YEC hydro generation, with diesel only being used as required. This can comprise two forms of diesel generation:

[90] Including the full consideration of the 3 rebuilt Mirrlees units (WD1, WD2 and WD3) scheduled for completion over the period to 2012.
[91] Including full consideration of the recommissioning of FD1 at 5 MW.
[92] This excludes the 6.4 MW of installed diesel at the Minto mine site, which YEC has agreements to acquire but, pursuant to YUB Order 2009-8 has not been permitted to be included in YEC's rates for 2008 and 2009.

- **Peaking diesel generation** typically refers to operation where the sum total MW of all dispatched renewable generation cannot supply the full moment-to-moment peak loads being experienced on the system. As a result, diesel generation is dispatched on an hour-to-hour basis to aid in meeting peak loads. In effect, peaking diesel generation is a short-term capacity-related issue (MW) due to a shortage of installed renewable generation capacity (MW). At the present time, under normal water flow conditions, the only use of diesel generation on WAF or MD is for peaking, and this requirement (at any given grid load level) will diminish with the initiation of the Aishihik 3rd turbine.

- **Baseload diesel generation** refers to energy (kW.h) constraints that arise due to insufficient water for hydro generation over an extended period of time (e.g., a material portion of a year) to meet all energy loads demanded, regardless as to the ability of the system to meet peak loads from time to time. The use of baseload diesel generation was common on WAF during periods when the Faro mine was operating, as well as during periods in the late 1990s when severe drought conditions existed even without the Faro mine operating (e.g., the first half of 1999). Baseload diesel generation has not been experienced in Yukon on the WAF system since 2000. On the MD system, baseload diesel generation has not been required throughout Yukon Energy's commencement in 1987, and, with the extension of this grid to Dawson in 2003, baseload diesel generation has also not been experienced in Dawson.

The existing system, absent Mayo B, can meet most energy loads with renewable generation at present and under most reasonable near-term forecasts. For example, focusing on the case with approximately 468 GW.h of firm total load to be supplied by YEC hydro and diesel generation[93] the existing and committed system's ability to supply this energy load is set out as follows (ignoring secondary energy loads or potential):

- Average water flow conditions: Generation from existing and committed resources totals 402.3 GW.h from hydro generation, and 65.7 GW.h from diesel generation (primarily baseload).[94] Using 2012 fuel prices, this totals $17.3 million/year of diesel cost.[95]
- Range of conditions: The average noted above is a mean result of analyzing 273 separate cases, representing 21 individual actual hydrological water years (1987 to 2007 inclusive) and sampling a 13 years period of load.[96]
  - **High water years:** Under the best case scenarios modeled (which tend to correspond to the hydrological results arising from 1992) the quantity of hydro generation reaches 452.8 GW.h and diesel generation drops to 15.3 GW.h/year ($4.0 million/year of diesel

[93] Net of approximately 8.7 GW.h of Fish Lake generation, and approximately 1 GW.h of wind generation.
[94] This value is determined using an assumed set of Fisheries Act Authorization conditions at Aishihik Lake that are presently under discussion. This value could vary approximately +/- 3 GW.h should other variations on conditions be imposed by regulators.
[95] At 26.38 cents/litre for fuel and variable O&M.
[96] The model runs a 21 year period, but only selects the results for years 7-19 inclusive, to avoid inaccuracies arising from the model starting with all reservoirs full, or ending with all reservoirs empty. The 13 years selected are the running stream results representative of an "ongoing operation" mode.

cost in 2012$) with more than half of this diesel generation occurring in the latter half of March and early April.

- **Low water years:** In the very low water cases (typically 1996 or 1999) the hydro generation from existing or committed plants drops to approximately 344.7 GW.h, with a requirement to run 123.4 GW.h of baseload diesel generation ($32.6 million of diesel costs in 2012$) which represents approximately 20-40 MW of diesel generation required continuously from approximately mid-December through mid-May.

The capability of a non-interconnected hydro system to supply energy is also driven by the degree of load imposed on the system. At very high loads, a hydro system can make use of surplus water in any season to supply loads. However at only medium loads or at low loads, there are occurrences when the hydro system is required to spill water that it cannot store, if there are no further loads to supply with additional generation. For this reason the capability of a hydro system to supply energy is in part driven by the level of loads imposed on it, as noted in Table C-1:

Table C1: Yukon Energy Integrated System Capability (GW.h) from YEC hydro absent Mayo B, and resulting diesel generation required/year

	Firm Load Level (GW.h/year)[1]		
	417 GW.h	468 GW.h	575 GW.h
Mean Capability			
YEC Hydro Generation (GW.h)	**385.6**	**402.3**	**412.8**
Diesel Generation (GW.h)	**31.1**	**65.7**	**162.3**
Cost of diesel generation $M/year (2012$)	**$ 8.2**	**$ 17.3**	**$ 42.8**
Extreme Low Water			
YEC Hydro Generation (GW.h)	322.4	344.7	339.1
Diesel Generation (GW.h)	94.3	123.4	236
Cost of diesel generation $M/year (2012$)	$ 24.9	$ 32.5	$ 62.2
Median Water Conditions			
YEC Hydro Generation (GW.h)	391.5	398.0	412.6
Diesel Generation (GW.h)	25.2	70.1	162.5
Cost of diesel generation $M/year (2012$)	$ 6.6	$ 18.5	$ 42.9
Extreme High Water			
YEC Hydro Generation (GW.h)	415.8	452.8	493.6
Diesel Generation (GW.h)	0.9	15.3	81.5
Cost of diesel generation $M/year (2012$)	$ 0.2	$ 4.0	$ 21.5

Note 1 - Represents load level net of Fish Lake generation (approximately 8.73 GW.h) and YEC wind (approximately 1 GW.h)

Table C1 above sets out the capability of the Yukon IS (including existing and committed resources on the combined WAF/MD system, but without Mayo B) to meet varying firm load levels. It demonstrates how the mean hydro generation capability varies with the degree of load on the system (from 417 GW.h to 575 GW.h). Table C-1 also indicates the material diesel generation quantities and costs that can arise even under relatively low load situations in very low flow years ($24.9 million/year for a single year of extreme drought conditions at a 417 GW.h/year load level).

ATTACHMENT D

ATTACHMENT D: WAF/MD (IS) LOAD AND GENERATION FORECASTS

The Mayo B Project is planned to be developed to supply system-wide Yukon loads following interconnection of the WAF and MD systems. Loads on the new Integrated System (IS) comprise both retail non-industrial and industrial loads, varying through the forecast life of the Mayo B project.

IS generation load forecasts for the purposes of analyzing long-term economics of Mayo B are based on the following:[97]

- Yukon Energy retail non-industrial loads per Yukon Energy's approved 2009 load levels (Order 2009-10).

- Yukon Electrical non-industrial loads and Fish Lake generation forecasts per approved 2009 load levels (Order 2009-5).

- Non-industrial loads beyond 2009 based on the following:
  - Increase of 0.6 GW.h in 2010 for Faro reclamation loads from 2009 levels[98]
  - Increase of 1.85% per year after 2009 for all retail loads (Yukon Energy and YECL), consistent with the long-term load forecast growth rate used in the 2006-2025 Resource Plan.

- Industrial loads limited to those based on known or announced developments in Yukon, only for project lives based on current reasonable expectations, comprising the following:
  - WAF – Minto Mine; Capstone Mining Corporation - This load is expected to approximate 32 GW.h in 2010 with annual increases of 2 GW.h until reaching a peak of 36 GW.h from 2012 through 2018, and forecast at 0 GW.h thereafter (there will be some load for at least three years during decommissioning and shut down, but this load has not been included).
  - MD – Alexco Resource Corporation - load is expected to be 5 GW.h in 2009, 10 GW.h in 2010, 12 GW.h in 2011, and 14 GW.h in 2012, and continuing at 14 GW.h until Q2 2017.
  - WAF – Carmacks Copper Mines; Western Copper Corporation - Operations are assumed to commence in Q4 2011, with annual consumption of 52 GW.h for 6.5 years, ending in Q1 2018 (there will be some load for several years during decommissioning and shut down, but this load has not been included).
  - Industrial load losses estimated at 12.7% for Minto and Carmacks Copper (WAF) and 15.2% for MD (Alexco).

[97] In addition, where they can be serviced from surplus hydro, secondary loads based on the "market potential" used to develop the 2009 Yukon Energy secondary sales forecast (where 2009 sales forecast is the market potential value less forecast interruptions for customer or utility supply reasons)

[98] This represents an increase from the 2.7 GW.h level forecast in 2009 to the 3.3 GW.h level in 2010 and beyond, based on information received from the Faro reclamation team (variations as high as 5.5 GW.h/year were also noted as possibilities). This is well below the 13.5 GW.h/year level (including losses) set out in Yukon Energy's 2008/09 GRA Undertaking 28, due to the confirmed selection of a reclamation plan with a lower electrical requirement than other alternatives considered.

Non-industrial Load Forecast Growth Rates

In its 2006-2025 Resource Plan, Yukon Energy adopted a 1.85% long-term average annual growth rate for non-industrial loads over 2004 actual levels. At this time, 2009 approved non-industrial loads on WAF are higher than 2004 actual levels by an average of 2.8%/year, more than 50% higher than forecast at the time of the Resource Plan. The Resource Plan load forecast was based on the mid-point of a series of long-term load forecasting approaches. Each of these load forecast approaches has been updated to 2009 data[99], as shown in Table D-1 below:

Table D-1: Load Forecasts per 2006-205 Resource Plan as compared to updated data

Load Forecasts - 2005 data (per 2006-2025 Resource Plan) compared to 2009

Population Increase		Source	Increase in Use/ Customer	Combined Percentage Increase		Sensitivity Case
2005 data	**2009 data**			2005 data	**2009 data**	
0.40%	**0.53%**	Yukon Bureau of Statistics - Medium Growth Projection	0.50%	0.90%	**1.03%**	Low
1.00%	**2.61%**	City of Whitehorse Population Increase (4 year average)	0.50%	1.50%	**3.13%**	Medium-Low
		Mid-point		1.85%		Medium
		Yukon Energy's Average Recorded Increase in Consumption since 2001		2.20%	**2.68%**	Medium-High
		Yukon Energy's Highest Annual Recorded Increase in Consumption		3.00%	**5.48%**	High

As noted in Table D-1, each of the metrics used to forecast long-term load growth in the 2006-2025 Resource Plan are now higher than was the case at that time. Growth in the Whitehorse market in particular continues strong with the planned introduction of the Whistle Bend subdivision as well as other housing and related developments such as Ingram.

YEC has further assessed very long-term load growth changes in the Yukon market as well, in response to YECL-YEC-1-19 from the 2008/09 YEC GRA. In that response, Yukon Energy noted that over the period 1986 to 2008 (22 years) the average annual growth in YEC wholesale loads is 2.71% per year.

Industrial Loads

The industrial load forecast used in this Application, excluding losses, is set out in Table D-2:

[99] The updated information also includes MD loads, as these become part of the overall IS once CSTP Stage II is completed.

Table D-2: Industrial Sales Load Forecast (GW.h) by year

SALES (GWh)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
MINTO	29.0	32.0	34.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	0.0
Carmacks Copper	0.0	0.0	13.0	52.0	52.0	52.0	52.0	52.0	52.0	13.0	0.0
Alexco	0.0	5.0	10.0	12.0	14.0	14.0	14.0	14.0	7.0	0.0	0.0

The loads set out in Table D-2 reflect operating mines (Minto) or those undergoing advanced permitting or development activities (Alexco and Carmacks Copper):

- Minto mine (Capstone Mining Corporation) is an operating mine with a final Power Purchase Agreement with YEC. The Table D-2 forecast includes present load forecast expectations of Minto assuming that planned mill and reserve expansion occurs in the next two years. Ongoing development of reserves is occcuring at this mine.

- Alexco (Alexco Resource corporation) is presently in advanced discussions with Yukon Energy towards a Power Purchase Agreement targeted for completion by January 2010. Alexco has all required major permits to begin mining and processing operations and has announced the decision to proceed with mill development. Infrastructure required to supply power to the Bellekeno mine development is largely in place, and Yukon Energy and Alexco are addressing in the PPA the facilities needed to supply power to the new mill that is currently planned to begin operation by mid-2010 at a location separate from the Bellekeno mine. Ongoing development of additional mines is occurring to utilize this mill.

- Carmacks Copper mine (being developed by Western Copper Corporation) is presently being reviewed by the Yukon Water Board, having completed the YESAB process at the Executive Committee level and having secured a mining permit. Yukon Energy supply to this mine will require a new 138 kV spur line (or alternative configuration). Present forecasts from the mine owner indicate possible construction start in summer 2010 for service (including grid power) by fall 2011. Mine life has been estimated by the mine owner at 6.5 years, with a potential extension of at least two years (the YESAB Report described the development as involving 8 years of mine operation). Although YEC has had ongoing periodic discussions with Western Copper regarding this mine, active work on a PPA is awaiting completion of the current Yukon Water Board review.

No other industrial loads are forecast in this Application.

There remain a series of other potential large industrial loads in Yukon that may materially increase load forecasts within the next decade from the levels set out in this Application, including Dublin Gulch and the Alaska Highway Pipeline, as set out in the 2006-2025 Resource Plan, plus Casino mine (Western Copper) which was not under consideration at that time. None of these loads has sufficient definition as to likelihood, timing or magnitude to properly plan for service today.

Consolidated Forecast

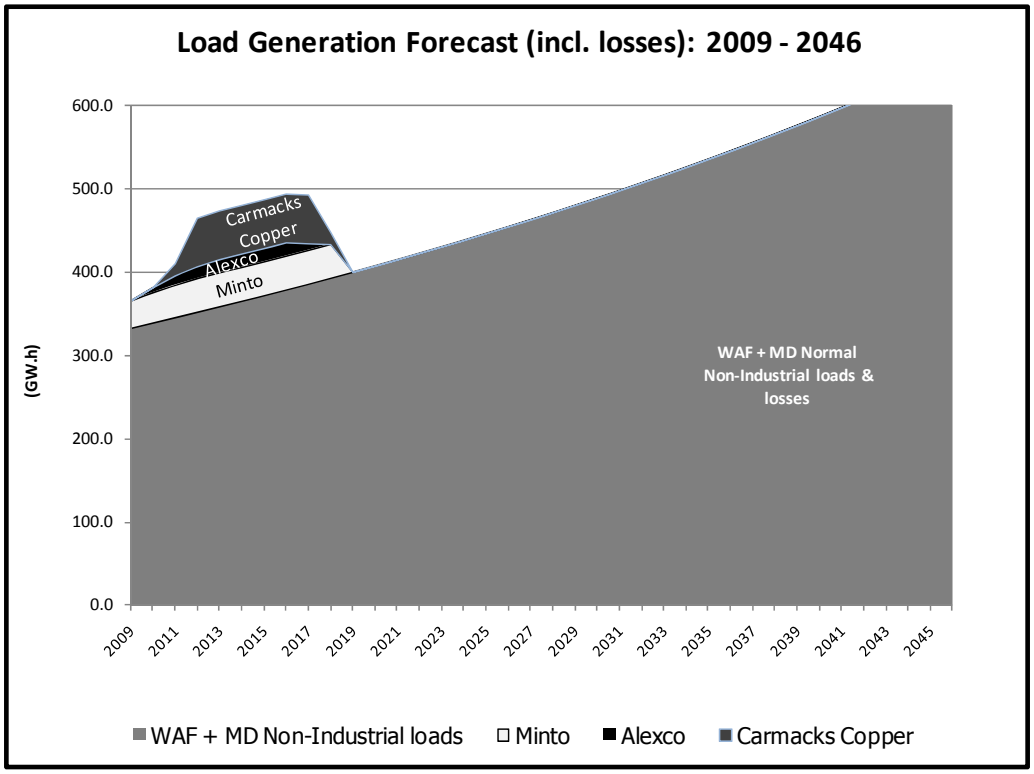
Yukon electrical loads on the WAF and MD are expected to increase from approximately 368 GW.h in 2009 (the sum of WAF and MD) to more than 600 GW.h by 2042. In 2009 and 2010, the WAF grid will remain isolated from the MD grid. New industrial load on the order of 2 GW.h will come online each year on the WAF grid from the Minto Mine. On MD, approximately 5.8 GW.h of new industrial load will be introduced in 2010 from Alexco. Projected non-industrial increases of 1.85% will be experienced across both grids. The WAF and MD grids will be connected for 2011 via the CSTP Stage 2.

After 2011, the Minto and Alexco mines will continue to add new loads until 2012-2013, when both mines are expected to reach full capacity at a combined load of 50 GW.h excluding losses. Carmacks Copper Mine and related losses will add a further 52 GW.h excluding losses in 2012.

Loads will grow through 2016 to 495 GW.h. All presently forecast mines are assumed to be closed by 2019, reducing total Yukon loads to approximately 401 GW.h.

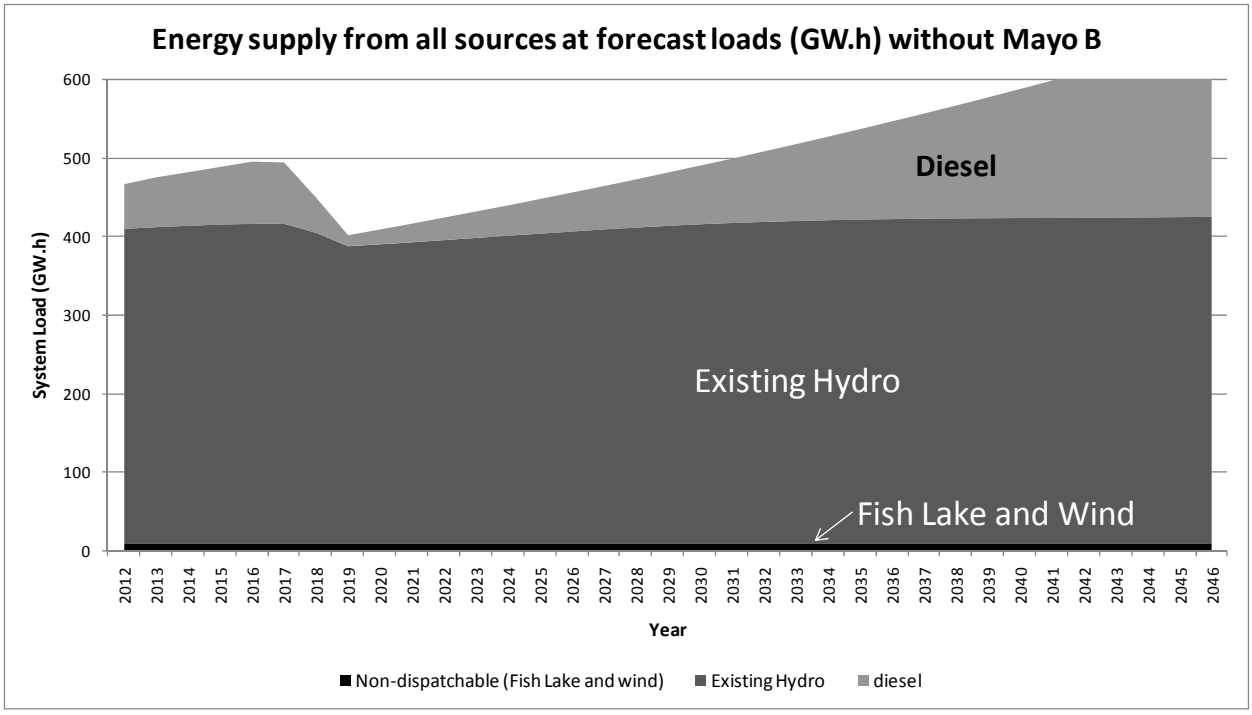
If no new mines are brought online after 2019, it is expected to take until approximately 2030 for ongoing non-industrial load increases to replace these industrial loads. Figure D-1 shows the loads under this scenario.

Figure D-1: Load Forecast (GW.h)



The existing IS including committed developments, as set out in Attachment C, has the capability to serve a large part of the forecast generation loads with renewable generation. Assuming long term average water availability, this is shown without Mayo B in Figure D-2:

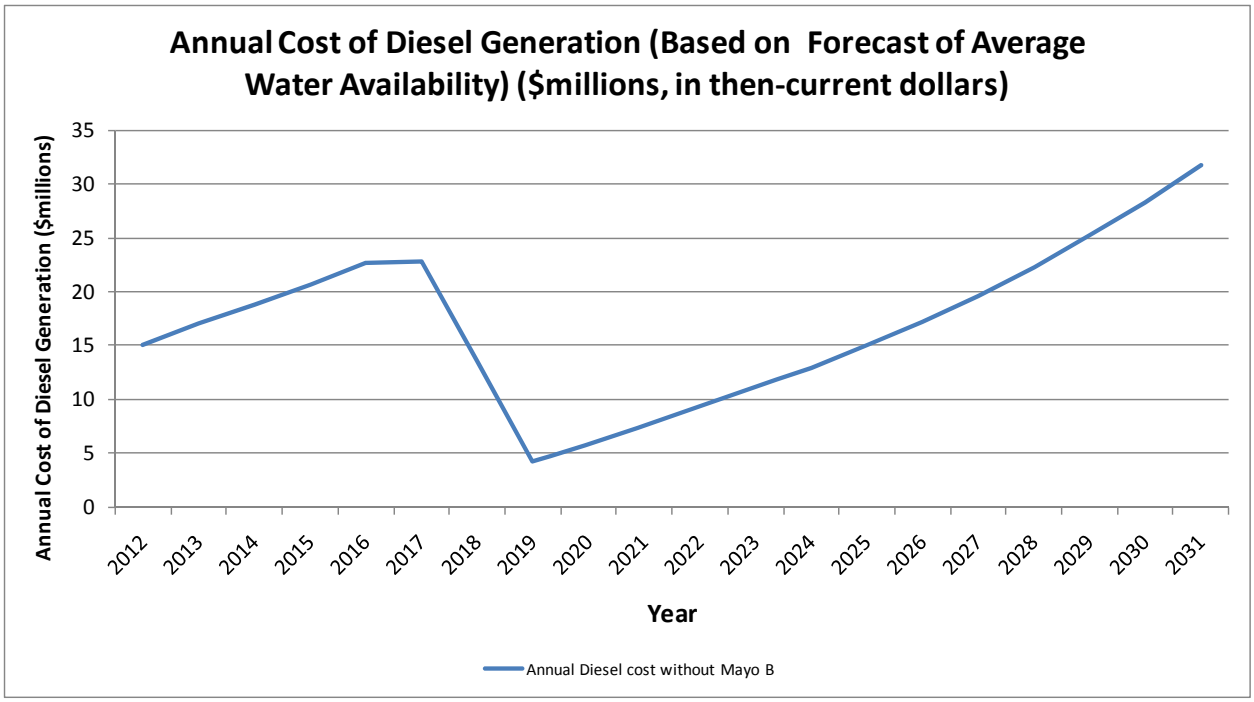
Figure D-2: Energy supply on Yukon Integrated System without Mayo B



Although energy supply in Figure D-2 above is largely from renewable sources, requirements to supply baseloads from diesel generation remain material; varying from 57-79 GW.h in the years from 2012 to 2017. Thereafter, assuming all mine loads close as per the schedule above and do not have their lives extended for further reserves, baseload diesel requirements drop to 14 GW.h/year in 2019, growing thereafter by approximately 5 GW.h/year. This diesel requirement in 2019 without Mayo B represents less than 20% of IS energy supply, but still drives material fuel-related costs on the system, as noted in Figure D-3 below (in then-current dollars[100]):

[100] Based on NYMEX Jan 2012 quote as of Nov 27, 2009 at $87.27/bbl, US$/CDN exchange of 0.9421, standard ratios otherwise used by YEC in forecasting diesel price ($0.38/litre shipping, 3.9 kW.h/litre baseload efficiency) for a fuel price for 2012 of 96.26 cents/litre, or 24.68 cents/kW.h. (very close to 2009 GRA approved price), plus 1.7 cents/litre in 2012$ for variable O&M, for a total price/kW.h of diesel generation 26.38 cents/litre. This does not include any capital cost component. Diesel costs after 2012 assumed to escalate at inflation (assumed at 2.0%/year).

Figure D-3 Diesel Generation Cost without Mayo B



For reference, at the present time the full consolidated firm rate revenue requirement for Yukon (Yukon Energy and YECL combined, excluding intercompany transfers) totals approximately $50.8 million in 2009, comprised of electrical revenues from retail ($47.6 million) and industrial customers ($3.2 million). In this context, the forecast transition to material diesel generation from 2012 to 2017 serves to drive costs (absent Mayo B) on the order of 30-40% of present Yukon-wide revenue requirements.

ATTACHMENT E

CANADA – YUKON ENERGY CORPORATION
GREEN INFRASTRUCTURE FUND

AGREEMENT FOR THE YUKON GREEN ENERGY LEGACY PROJECT
2009-2010 / 2011-2012

BETWEEN: **HER MAJESTY THE QUEEN IN RIGHT OF CANADA** ("Canada"), represented by the Minister of Transport, Infrastructure and Communities (the "Federal Minister")

AND

Yukon Energy Corporation (The "Recipient") represented by
(Collectively referred to as the "Parties"),

in accordance with the mutual covenants and agreements herein, Canada and the Recipient hereby agree as follows:

1. INTERPRETATION

1.1 *DEFINITIONS*

In addition to the terms defined in this Agreement, a capitalized term has the meaning given to it in this Section.

"**Agreement**" means this contribution agreement and Schedules A, B, C, D and E, as may be amended from time to time.

"**Contract**" means an agreement between the Recipient and a Third Party whereby the latter agrees to supply a product or service to the Project in return for financial consideration.

"**Eligible Costs**" means costs of the Project eligible for funding by Canada under the terms of Schedule A to this Agreement.

"**Fiscal Year**" means the period beginning April 1 of a year and ending March 31 of the following year.

"**Fixed Asset**" means any non-movable asset, purchased, constructed, rehabilitated, or improved, in whole or in part, with funds contributed by Canada under the terms of this Agreement.

"**Green Infrastructure Fund**" or "**GIF**" means the Green Infrastructure Fund pursuant to which this Agreement is entered into.

"**Non-Fixed Asset**" means any movable asset, constructed, rehabilitated, or improved, in whole or in part, with funds contributed by Canada under the terms of this Agreement.

"**Project**" means the infrastructure project described in Schedule B, which is the subject of this Agreement.

"**Project Implementation**" means stages of the Project directly related to the completion of the Project and includes, but is not limited to, environmental assessment, aboriginal consultation and monitoring, design, planning, engineering, construction, testing and evaluation. Project implementation does not include, among other things, the subsequent operation, maintenance, repair, rehabilitation, demolition, or reconstruction of the Project.

"**Registered Professional**" means a member of a firm of professionals its successors and assigns, duly licensed in the Yukon Territory retained and paid for by the Recipient for the purposes of certifying claims for payment, if required, as well as certifying the project Substantial Completion.

"**Substantial Completion**" occurs when the Project can be used for the purpose for which it was intended.

"**Third Party**" means any person or legal entity, other than a Party, who participates in the Project Implementation.

1.2 ***ENTIRE AGREEMENT***

This Agreement comprises the entire agreement between the Parties. No prior document, negotiation, provision, undertaking or agreement in relation to the subject of the Agreement has legal effect. No representation or warranty express, implied or otherwise, is made by Canada to the Recipient except as expressly set out in this Agreement.

1.3 ***DURATION OF AGREEMENT***

This Agreement will be effective as of the date this Agreement is signed by all Parties ("Effective Date") and shall terminate on the earlier of:

a) eighteen (18) months after the date of Substantial Completion of the Project contained in Schedule D - Solemn Declaration/Certification of Substantial Completion delivered to Canada; and

b) March 31, 2014

unless subject to early termination in accordance with this Agreement.

1.4 ***SURVIVAL***

Despite Section 1.3, the Parties' rights and obligations under Section 7 (Dispute Resolution); Section 3.3 (Disclosure of Other Funding and Adjustments); Section 6.5 (Final Adjustments); Section 8 (Reporting, Auditing and Evaluation); Section 10 (Indemnification); Section 11 (General); Section 12.3 (Additional Representation, Covenants and Events of Default), and the Intervention and any other Section which is required to give effect to the termination or to its consequences will survive the expiry or early termination of this Agreement.

1.5 ***ACCOUNTING PRINCIPLES***

All accounting terms will have the meanings assigned to them, all calculations will be made and all financial data to be submitted will be prepared, in accordance with the Generally Accepted Accounting Principles (GAAP) in effect in Canada.

2. PURPOSE OF CONTRIBUTION

The purpose of Canada's contribution is to reimburse, in accordance with the Terms and Conditions set forth in this Agreement, Canada's share of the Eligible Costs of the Project.

3. OBLIGATION OF THE PARTIES

3.1 ***CONTRIBUTION BY CANADA***

a) Canada agrees, subject to the Terms and Conditions of this Agreement, including Schedule B, to pay a contribution to the Recipient of not more than 50 percent of the total Eligible Costs of the Project, during the three Fiscal Years starting in 2009-2010 and ending in 2011-2012, but only up to a maximum of $71,000,000 and only in accordance with the Fiscal Year breakdown in Schedule B 2.

b) The Parties acknowledge that Canada's role in the Project is limited to making a financial contribution to the Project and that Canada will have no involvement in the subsequent operation of the Project. Canada is neither a decision maker nor an advisor to the Project.

3.2 *COMMITMENTS BY THE RECIPIENT*

a) The Recipient agrees to be responsible for the complete, diligent and timely Project Implementation, within the costs and deadlines specified in this Agreement and in accordance with all other terms of this Agreement, and for all the costs thereof including overruns, if any.

b) The Recipient shall assume full responsibility for the operation, maintenance and repair of the infrastructure investment that is the subject of this agreement, as per appropriate standards, for the full lifecycle of the infrastructure.

3.3 *DISCLOSURE OF OTHER FUNDING AND ADJUSTMENTS*

The Recipient agrees to inform Canada promptly of all financial assistance received for the Project. If the federal government's total financial assistance toward the Project exceeds 50 percent of total Eligible Costs, or if the total financial assistance received or due in respect of the Project's Eligible Costs exceeds 100 percent thereof, Canada may recover the excess from the Recipient or reduce its contribution by an amount equal to the excess.

3.4 *APPROPRIATIONS*

A payment due by Canada under this Agreement is conditional on a legislated appropriation for the Fiscal Year in which the payment is due. Canada shall exercise and make reasonable efforts to cause its legislature to enact the appropriation legislation required to carry out this Agreement.

3.5 *FISCAL YEAR BUDGETING*

Subject to the conditions in this Agreement, Canada agrees to commit funds for the Project for a Fiscal Year in accordance with the table of estimated contributions in Schedule B 2. If, in a Fiscal Year, an amount lesser than the estimated contribution is paid or payable by Canada, Canada will, subject to Section 3.4, make reasonable efforts to re-allocate the difference to a subsequent Fiscal Year.

3.6 *INCREASE IN PROJECT COSTS*

If, at any time during the life of this Agreement, the Recipient determines that it will not be possible to complete construction of the Project unless it expends amounts in excess of the funding available to it, the Recipient will immediately notify Canada of that determination. If the Recipient so notifies, it will, within thirty (30) days of a request from Canada, provide a summary of the measures that it proposes to remedy the shortfall. If Canada is not satisfied that the measures proposed will be adequate to remedy the shortfall, then Canada may terminate or suspend its funding obligations until such time as measures are proposed that, in Canada's opinion, will be adequate to remedy the shortfall, whereupon its funding obligation will be reinstated.

3.7 *PROJECT START DATE*

The Recipient agrees to begin the Project Implementation within sixty (60) days of the coming into force of this Agreement, failing which Canada may terminate this Agreement by a 30 day written notice to the Recipient.

4. AGREEMENT MANAGEMENT COMMITTEE

4.1 *ESTABLISHMENT*

Within sixty (60) days, the Parties agree to establish a four member management committee headed by a Federal Co-chair and a Recipient Co-chair to administer and manage this Agreement. It will adopt written rules and procedures with respect to its meetings and those of its sub-committees, the roles of the members, and any other relevant matters. Decisions and recommendations of the Committee must be unanimous and recorded in writing.

4.2 *MANDATE*

The Committee will:

a) review the procedures described in Section 5, and ensure that the principles stated therein are respected;

b) monitor the progress of the Project;

c) review claims, reports and cash flows, and adjust the information in Schedule B as required, subject to Sections 3 and 4.3;

d) obtain approval from Canada for any adjustments required to Schedule B 2;

e) establish sub-committees, as needed, for carrying out this Agreement;

f) when the Project is complete, recommend to the Federal Minister the date to be used as the proposed substantial completion date;

g) ensure that all provisions and Schedules of this Agreement are implemented in accordance with this Agreement; and

h) attend to any other function required by this Agreement or as mutually directed by the Parties.

4.3 *CHANGES DURING THE LIFE OF THE PROJECT*

a) In this Section, "significant change" includes, in respect of the Project:

(i) Any material change to its location, scope or timing. A material change is a change which:

- changes quantifiable elements of a project component, as determined by Canada; or
- significantly changes the location or timing of a project component, as determined by Canada; or
- adds or removes a project component.

(ii) any change that may require a further environmental assessment decision;

(iii) an increase to the total Eligible Costs of a Project component, which, when added to any previous increase, would be greater than 20 percent of the total cost of that Project component, as set out in Schedule B to this Agreement;

(iv) one or more increases in the Eligible Costs of the Project which, when considered cumulatively, are greater than 20 percent of the original Eligible Cost estimate, as given in Schedule B to this Agreement or;

(v) anything else that in the unanimous opinion of the Committee is significant.

b) A request for a change to the Project will be reviewed by the Committee; and

(i) in the case of a request for a significant change, the Committee will recommend to the Federal Minister whether to approve it or not;

(ii) if the change is not significant, the Committee may approve or reject it; and

(iii) if the change results in adjustments to the cash flows in Schedule B 2, the Committee will obtain approval from Canada to make these adjustments.

5. CONTRACT PROCEDURES

5.1 *AWARDING OF CONTRACTS*

The Recipient will ensure that all Contracts are awarded and managed in accordance with its policies and procedures; copies of same policies and procedures will be provided to the Committee within thirty (30) days of the first Committee meeting. Notwithstanding the foregoing, the Recipient agrees that Contracts will be awarded in a way that is transparent, competitive and consistent with value for money principles; and in accordance with the Agreement on Internal Trade. Canada may require that a Contract be re-tendered if, in Canada's opinion, it was not awarded in compliance with the foregoing.

5.2 *CONTRACT PROVISIONS*

The Recipient will ensure that all Contracts are consistent with, and incorporate, the relevant provisions of this Agreement. More specifically but without limiting the generality of the foregoing, the Recipient agrees to include in the Contracts provisions to ensure that:

a) proper and accurate accounts and records are maintained and that the Recipient has the contractual right to audit them;

b) all applicable labour, environmental and human rights legislation is respected; and

c) Canada and the Auditor General of Canada, to the extent permitted by law, will, at all times, be permitted to inspect the terms of the Contract and any records and accounts respecting the Project and will have free access to the Project sites and to any documentation relevant for the purpose of audit and that a representative of Canada may, if necessary, actually conduct such audit.

6. CLAIMS AND PAYMENTS

6.1 *PAYMENT CONDITIONS*

Canada will not be required to make any payment until after June 30 of a Fiscal Year, other than the first Fiscal Year in which claims are submitted, and only if it has received and approved the annual report and audits required under this Agreement for the prior Fiscal Year. Canada will, within thirty (30) days of receipt, approve the report or audits, or notify the Recipient of any deficiency.

6.2 *CLAIM PROCEDURES*

Claims will be submitted to Canada, following review by the Committee, every three (3) months in a form acceptable to Canada, and must include the following:

a) Signature of Recipient Co-chair and Registered Professional as to accuracy of the information submitted in support of the claim;

b) Breakdown of expenses claimed, by Project component listed in Schedule B;

c) For each expense, the Invoice/ Contract vendor name and number, the period the expense was incurred, the date paid, and the category of Eligible Costs in Schedule A to which each expense corresponds; and

d) Identification of any deferred payment amounts.

6.3 ***TIME LIMITS FOR CLAIMS***

The Recipient agrees to submit all claims for payment no later than the earlier of:

a) Twelve (12) months after the Project has been substantially completed; and

b) January 31, 2014

Canada will have no obligation to pay a claim submitted after this date.

6.4 ***FINAL PAYMENT***

The request for final payment must be accompanied by a certificate from the Recipient Co-chair confirming compliance with all Terms and Conditions of the Agreement, including evidence satisfactory to Canada that the Project has been substantially completed.

6.5 ***FINAL ADJUSTMENTS***

After the Recipient has submitted the final report and final audit as well as the Declaration/Certification of Substantial Completion of the Project by a Registered Professional and before March 31, 2014, the Parties will jointly carry out a final reconciliation of all claims and payments in respect of the Project and make any adjustments required in the circumstances.

6.6 ***HOLDBACK***

Canada may release to the Recipient up to 90 percent of its contribution, under this Agreement. The remaining 10 percent of Canada's contribution (the "Holdback") will be released when the Recipient fulfils its obligations under subsection 6.5.

7. DISPUTE RESOLUTION

7.1 ***DISPUTE RESOLUTION***

The Parties agree to use best efforts to resolve potential disputes within the Committee, in good faith and reasonably. If an issue arises, the Co-chairs shall examine it together as soon as possible and in any event within twenty (20) business days within receipt of notice of such contentious matter. Where the Co-chairs cannot agree on a resolution, the matter will be referred to the Federal Minister for resolution. A decision will be provided within ninety (90) days. Any payments related to the issue in dispute will be suspended, together with the obligations related to such issue, pending resolution.

7.2 ***WAIVER***

A Party may waive any of its rights under this Agreement only in writing, and any tolerance or indulgence demonstrated by the Party will not constitute a waiver. Unless a waiver is executed in writing, the Party will be entitled to seek any remedy available under this Agreement or otherwise at law.

7.3 *EVENTS OF DEFAULT*

A declaration of default may be made by Canada if the Recipient:

a) has not completed the Project on the Terms and Conditions herein;

b) has submitted false or misleading information to Canada or made a false or misleading representation, except for an error in good faith, demonstration of which is incumbent on the Recipient, to Canada's satisfaction;

c) has not complied with any condition, undertaking or material term of this Agreement;

d) has neglected or failed to pay Canada any amount due in accordance with this Agreement;

e) becomes insolvent, commits an act of bankruptcy, takes the benefit of any statute relating to bankrupt and insolvent debtors, or goes into receivership or bankruptcy; or

f) Is wound up or dissolved.

Canada will not declare that an Event of Default has occurred unless Canada has given notice to the Recipient of the condition or event which in Canada's opinion constitutes an Event of Default and the Recipient has failed, within thirty (30) days of receipt of the notice, either to correct the condition or event complained of or to demonstrate, to the satisfaction of Canada, that it has taken such steps as are necessary to correct the condition, and has notified Canada of the rectification.

7.4 *REMEDIES ON DEFAULT*

If Canada declares that an Event of Default has occurred, Canada may exercise one or more of the following remedies:

a) suspend any obligation by Canada to contribute or continue to contribute to the Eligible Costs including any obligation to pay an amount owing prior to the date of such suspension to the extent that it relates to the event of default;

b) terminate any obligation of Canada to contribute or continue to contribute to the Eligible Costs, including any obligation to pay any amount owing prior to the date of such termination to the extent that it relates to the event of default; and

c) require the Recipient to reimburse Canada all or part of the contribution paid by Canada to the Recipient.

8. REPORTING, AUDIT AND EVALUATION

The Parties agree that auditing and reporting activities will be undertaken in accordance with Schedule C - Reporting, Audit and Evaluation of this Agreement.

The Recipient agrees that the Auditor General of Canada may, at Canada's cost, after consultation with the Recipient conduct an inquiry under the authority of subsection 7.1(1) of the *Auditor General Act* in relation to the use of funds. For the purposes of any such inquiry undertaken by the Auditor General, the Recipient shall provide, upon request and in a timely manner, to the Auditor General or anyone acting on behalf of the Auditor General,

i. all records held by the Recipient, or by its agents or contractors relating to this Agreement and the use of the funds; and,

ii. such further information and explanations as the Auditor General, or anyone acting on behalf of the Auditor General, may request relating to any of this Agreement or the use of the funds.

9. COMMUNICATIONS

The Parties hereby agree to follow the Communications Protocol set out in Schedule E.

10. REPRESENTATIONS AND INDEMNITY

10.1 *INDEMNIFICATION*

The Recipient agrees at all times to indemnify and save harmless Canada, its officers, servants, employees or agents, from and against all claims and demands, losses, costs, damages, actions, suits or other proceedings by whomsoever brought or prosecuted in any manner based upon, or occasioned by any injury to persons, damage to or loss or destruction of property, economic loss or infringement of rights caused by or arising directly or indirectly from:

a) the Project;

b) the performance of this Agreement or the breach of any term or condition of this Agreement by the Recipient, its officers, employees and agents, or by a third party, its officers, employees, or agents;

c) the design, construction, operation, maintenance and repair of any part of the Project;

d) any omission or other wilful or negligent act of the Recipient or third party and their respective employees, officers, or agents, except to the extent to which such claims and demands, losses, costs, damages, actions, suits, or other proceedings relate to the act or negligence of an officer, employee, or agent of Canada in the performance of his or her duties;

e) the entering into by the Recipient or its servants, employees and agents of a loan, capital lease or other long term obligation in relation to the Project; and

f) any actions taken by Canada as co-chair of the Committee pursuant to this Agreement.

10.2 *RECIPIENT REPRESENTATIONS AND WARRANTIES*

The Recipient represents and warrants to the Federal Minister that:

a) the Recipient is in good standing under the laws of the jurisdiction in which it is required to be registered;

b) the Recipient has the requisite power (corporate and other) to own its assets and to carry on the activities as contemplated by the Agreement;

c) the execution and delivery of this Agreement by the Recipient, and the carrying out by it of all of the activities as contemplated hereby by the Recipient, have been duly authorized by all requisite corporate action;

d) the Recipient has full power to execute and deliver this Agreement and to perform its obligations hereunder;

e) this Agreement constitutes a legally binding obligation of the Recipient, enforceable against it in accordance with its terms, subject as to enforcement of remedies to

applicable bankruptcy, insolvency, reorganization and other laws affecting generally the enforcement of the rights of creditors and subject to a court's discretionary authority with respect to the granting of a decree ordering specific performance or other equitable remedies;

f) the execution and delivery of this Agreement and the performance by the Recipient of its obligations hereunder will not, with or without the giving of notice or the passage of time or both:

   i. violate the provisions of the Recipient's by-laws, any other corporate governance document subscribed to by the Recipient or any resolution of the Recipient;

   ii. violate any judgment, decree, order or award of any court, government agency, regulatory authority or arbitrator; or

   iii. conflict with or result in the breach or termination of any material term or provision of, or constitute a default under, or cause any acceleration under, any license, permit, concession, franchise, indenture, mortgage, lease, equipment lease, contract, permit, deed of trust or any other instrument or agreement by which it is bound.

g) there are no actions, suits, investigations or other proceedings pending or, to the knowledge of the Recipient, threatened and there is no order, judgment or decree of any court or governmental agency which could materially and adversely affect the Recipient's ability to carry out the activities contemplated by this Agreement.

h) that all information submitted to Canada as set out in this Agreement is true, accurate and was prepared in good faith and to the best of its ability, skill and judgment.

11. GENERAL

11.1 *DISPOSAL OF ASSETS*

The Recipient undertakes to notify Canada in writing, one hundred eighty (180) days in advance if, at any time during a period of twenty- five (25) years for fixed assets, or ten (10) years for non-fixed assets, from the date of completion of the Project, the Recipient proposes to sell, lease, encumber, use in a manner other than as described in their request for funding under GIF, or otherwise dispose of, directly or indirectly, any assets, whether Fixed Assets or Non-Fixed Assets, constructed, rehabilitated or improved, in whole or in part, with funds contributed by Canada under the terms of this Agreement, other than to Canada, the Recipient or a Crown corporation of the Recipient that is the latter's agent for the purpose of implementing the Agreement and, upon disposition, undertakes to reimburse Canada, on demand, a proportionate amount of the funds so contributed by Canada, in the proportion set forth below:

a) Fixed Assets:

Where asset is sold, leased, encumbered or disposed of within:	**Return of contribution (in current dollars)**
2 Years after Project completion	100%
5 Years after Project completion	90%
10 Years after Project completion	75%
15 Years after Project completion	45%
20 Years after Project completion	15%
25 Years after Project completion	5%

b) Non-Fixed Assets:

Where asset is sold, leased, encumbered or disposed of within:	Return of contribution (in current dollars)
1 Years after Project completion	90%
3 Years after Project completion	70%
5 Years after Project completion	50%
7 Years after Project completion	30%
9 Years after Project completion	10%
10 Years after Project completion	0%

11.2 ***REVENUES FROM ASSETS***

The Parties acknowledge that their contributions to the Project are meant to accrue to the public benefit. The Recipient will notify Canada in writing within ninety (90) days of the end of a Fiscal Year, if any asset, whether Fixed Assets or Non-Fixed Assets, to which Canada has contributed under this Agreement is used in such a way that, in the Fiscal Year, revenues are generated from it which exceed its operating and maintenance expenses, any reserve fund contributions deemed appropriate for long term repairs, and any rate base depreciation and return allowed in rates approved by the Yukon Utilities Board with regard to the net contributions of the Recipient to the Project. Canada may require the Recipient to pay to Canada immediately a portion of the excess, in the same proportion as Canada's contribution is to the total cost of the asset. This obligation will apply only to the first ten (10) complete Fiscal Years following the completion date of the Project.

11.3 ***DEBTS DUE TO CANADA***

The Recipient shall repay to Canada any and all disallowed costs, surpluses and overpayments made under and according to the terms of this Agreement. Any amount owed to Canada under this Agreement will constitute a debt due to Canada, which the Recipient agrees to reimburse Canada forthwith on demand.

11.4 ***INTEREST ON DEBTS DUE TO CANADA***

Debts due to Canada will accrue interest in accordance with the *Interest and Administrative Charges Regulations*.

11.5 ***SET-OFF BY CANADA***

Any debt due to Canada by the Recipient may be offset against any amounts payable by Canada to the Recipient.

11.6 ***NO BENEFIT***

No member of the House of Commons or the Senate of Canada will be admitted to any share or part of any Contract made pursuant to this Agreement, or to any benefit arising from it.

11.7 ***NO AGENCY***

No provision of this Agreement and no action by the Parties will establish or be deemed to establish a partnership, joint venture, principal-agent relationship, or employer-employee relationship in any way or for any purpose whatsoever between Canada and the Recipient or between Canada and a Third Party.

11.8 ***NO AUTHORITY TO REPRESENT***

Nothing in this Agreement is to be construed as authorizing a Third Party to contract for, or to incur any obligation on behalf of, a Party or to act as agent for a Party.

11.9 ***ASSIGNMENT***

The Recipient will not transfer or assign its rights or obligations under this Agreement without the prior written consent of Canada. Any attempt by the Recipient to assign any of the rights, duties or obligations of this Agreement without Canada's express written consent is void.

11.10 ***COUNTERPART SIGNATURE***

This Agreement may be signed in counterpart, and the signed copies will, when attached, constitute an original agreement.

11.11 ***VALUES AND ETHICS CODE***

No person governed by any post-employment, ethics and conflict of interest guidelines or policies of Canada or the Recipient shall derive a direct benefit from this Agreement unless that person complies with the applicable provisions of the guidelines or policy.

11.12 ***SEVERABILITY***

If for any reason a provision of this Agreement that is not a fundamental term of this Agreement between the Parties is found to be or becomes invalid or unenforceable, in whole or in part, and if both Co-chairs agree, it will be deemed to be severable and will be deleted from this Agreement, but all the other Terms and Conditions of this Agreement will continue to be valid and enforceable.

11.13 ***LOBBYISTS AND AGENT FEES***

The Recipient:

a) warrants that any person it has hired, for payment, to speak to or correspond with any employee or other person representing Canada on the Recipient's behalf, concerning any matter relating to the contribution under this Agreement or any benefit hereunder and who is required to be registered pursuant to the *Lobbying Act*, as amended, is registered pursuant to that Act; and

b) warrants it has not and will not make a payment or other compensation to any legal entity that is contingent upon or is calculated upon the contribution hereunder or negotiating the whole or any part of the terms of this Agreement. In the event of a breach of a) or b), Canada may either terminate this Agreement or recover from the Recipient the full amount of the compensation paid by the Recipient.

11.14 ***AMENDMENTS***

Subject to Sections 4.2 (c) and 4.3, this Agreement can only be amended in writing by the Parties.

11.15 ***NOTICE DEEMED GIVEN***

Any notice, information or document provided for under this Agreement may be delivered or sent by letter, postage or other charges prepaid and will be deemed to have been delivered on receipt. A Party may change the address below by notifying the other Party in writing.

Any notice to Canada must be sent to:

Assistant Deputy Minister
Program Operations Branch
Infrastructure Canada
605-90 Sparks Street
Ottawa (Ontario)
K1P 5B4

Any notice to the Recipient will be addressed to:

President and CEO
Yukon Energy Corporation
#2 Miles Canyon Road.
Whitehorse, Yukon
Y1A 6S7

Each Party may change the address that it has stipulated by notifying the other Party of the new address in writing.

11.16 ***COMPLIANCE WITH LAWS***

The Recipient agrees to apply, in relation to the Project, in all material respects, the requirements of all applicable laws, regulations, orders and orders in council, including environmental laws and regulations, and shall comply with the requirements of all regulatory bodies.

11.17 ***ACCESS***

The Recipient will provide Canada with reasonable access to the Project for the purposes of audit, inspection, monitoring and of ensuring that the Terms and Conditions of any environmental Approval are met, and that any mitigation, monitoring or follow-up measure required has been carried out.

11.18 ***INTELLECTUAL PROPERTY***

Any intellectual property arising from the Project will vest in the Recipient. Notwithstanding the forgoing, the Recipient agrees that:

a) it will provide Canada, upon request, royalty-free and non-exclusive licence to use the intellectual property for non-commercial purposes; and

b) Canada may disclose and sub-licence the intellectual property to third parties for non-commercial purposes.

11.19 ***GOVERNING LAW***

This Agreement is governed by the laws applicable in the Yukon Territory.

11.20 ***SUCCESSOR***

This Agreement is binding upon the Parties and their respective administrators and successors.

12. SPECIAL CONDITIONS

12.1 *PROJECT RESULTS*

The Yukon Green Energy Legacy Project falls under the Green Energy Generation and Green Energy Transmission categories of the Green Infrastructure Fund. As such, the Recipient covenants that the Project will result in one or more of the following outcomes. These outcomes shall be integrated in the reporting as outlined in Schedule C.1.1. g).

- increase the availability and/or reliability of Canada's clean energy supply;
- increase the availability of renewable and other clean energy;
- improve air quality; and
- reduce greenhouse gas emissions.

12.2 *CONDITIONS PRECEDENT*

An agreement between the Parties to provide the funding contemplated herein is subject to the delivery by the Recipient of the following conditions precedent:

a) Delivery by the Recipient of a certified copy of its by-laws and resolution authorizing the transaction and the execution of this Agreement.

b) Receipt of all the necessary approvals related to the environmental assessment of each component of the Project under the *Yukon Environmental and Socio-Economic Assessment Act* prior to the commencement of any construction activity on that respective Project component. Receipt of funding for Component I is not dependant on the fulfilment of this condition relating to Component II.

12.3 *ADDITIONAL REPRESENTATIONS, COVENANTS AND EVENTS OF DEFAULT*

a) Prior to the Committee meetings, the Recipient agrees to provide the Committee with a draft update to Schedule B.2 (Project Components, Timeline and Cost Breakdown) ensuring that Canada will only fund up to fifty percent of the Eligible Costs up to a maximum of $71,000,000. This information will then be discussed by the Committee at the Committee meeting.

b) Prior to the Committee meetings, the Recipient agrees to provide the Committee with draft copies of reports due as noted in Schedule C (Reporting, Audit and Evaluation). This information will then be discussed by the Committee at the Committee meeting.

c) The Recipient covenants that construction work will comply with all environmental approvals.

d) The Recipient agrees that any breach by the Yukon Development Corporation of its covenant contained in the paragraph 3 of the Intervention below, shall constitute an Event of Default under this Agreement.

e) The Recipient agrees that, for any Contract entered into prior to the entering into of this Agreement and which does not include the requirements of section 5.2 of this Agreement, it will make its best efforts to include the requirements of section 5.2 in any Contract which is renegotiated or renewed.

f) The Recipient agrees to provide to Canada the final detailed engineering assessment reports for Component I Carmacks-Stewart Transmission Line and Component II Mayo B within thirty (30) days of its completion.

g) Where required, the Recipient agrees to acquire all permits and authorizations at federal, provincial and municipal levels.

h) Where required, the Recipient agrees to perform First Nations consultations.

i) In addition to the Events of Default contained in section 7.3, a change of control of the Recipient to an entity which is not wholly owned, directly or indirectly, by the Government of Yukon, shall constitute an Event of Default under this Agreement. For the purposes of this Agreement, a "change of control" shall mean any change to the ownership of the Recipient.

j) For a period of 10 years after the completion of the Project, the Federal Minister may seek reimbursement of the contribution, in whole or in part, in the event of a change of control of the Recipient to an entity which is not wholly owned, directly or indirectly, by the Government of Yukon.

INTERVENTION

The Yukon Development Corporation hereby:

1. represents that it is a Crown Corporation established under the *Yukon Development Corporations Act*;
2. represents that it is the sole shareholder of the Recipient;
3. covenants that it will notify in writing the Federal Minister prior to any change of control of the Recipient for a period of 10 years after the completion date of the Project;
4. agrees that any breach of the covenant contained in paragraph 3 above shall constitute an Event of Default under this Agreement.

YUKON DEVELOPMENT CORPORATION:

By: _____

Title: CEO Yukon Development Corporation

SIGNATURES

This Agreement has been executed on behalf of Her Majesty the Queen in Right of Canada by the Minister of Transport, Infrastructure and Communities and on behalf of the Recipient by the

HER MAJESTY THE QUEEN IN RIGHT OF CANADA

Original signed by:

The Honourable John Baird
Minister of Transport, Infrastructure and Communities

Date: AUG 17 2009

YUKON ENERGY CORPORATION

Original signed by:

Per:

David Morrison
President and CEO

I (~~We~~) have the authority to bind the corporation.

Date: Aug. 31/09

Per:

Name:
Title:

I (We) have the authority to bind the corporation.

Date:

SCHEDULE A – ELIGIBLE AND INELIGIBLE COSTS

A.1. *ELIGIBLE COSTS*

Eligible costs will be all direct costs which are in Canada's opinion properly and reasonably incurred and paid by an eligible recipient for an eligible investment under a contract for goods or services necessary for the implementation of a project. Eligible costs will include only the following:

a) the capital costs of acquiring, constructing or renovating a tangible capital asset, as defined and determined according to accounting principles generally accepted in Canada;
b) the costs of joint communication activities (press releases, press conferences, translation, etc.) and road signage recognition set out in the Communication Protocol that will form part of the federal/provincial Contribution Agreement;
c) all planning (including plans and specifications) and assessment costs specified in the agreement such as the costs of environmental planning, surveying, engineering, architectural supervision, testing and management consulting services. Canada will contribute no more than 15 percent of its contribution to this cost;
d) the costs of engineering and environmental reviews, including environmental assessments and follow-up programs as defined in the *Canadian Environmental Assessment Act* and the costs of remedial activities, mitigation measures and follow-up identified in any environmental assessment;
e) costs of project-related signage, lighting, project markings and utility adjustments;
f) costs of aboriginal consultation;
g) the costs of developing and implementing innovative techniques for carrying out the Project;
h) recipient audit and evaluation costs as specified in the agreement; and
i) other costs that, in the opinion of Canada, are considered to be direct and necessary for the successful implementation of the Project and have been approved in writing prior to being incurred.

Eligible project costs can begin to accrue effective as of the date indicated by the Federal Minister in writing (May 14, 2009) to the proponent following the Federal Minister's approval-in-principle of the project. However, all Eligible Costs outlined above can be reimbursed to the recipient only following the signing of the contribution agreement in respect of the project.

A.2. *INELIGIBLE COSTS*

The following are deemed ineligible costs:

a) costs incurred before the date indicated by the Federal Minister in writing (May 14, 2009) to the proponent following the Federal Minister's approval of the project;
b) costs incurred after the project completion date;
c) the cost of developing a business case or proposal for funding;
d) the cost of purchasing land, buildings and associated real estate and other fees;
e) financing charges and interest payments on loans;
f) leasing land, buildings, equipment and other facilities;
g) general repairs and maintenance of a project work and related structures, unless they are part of a larger capital expansion project tied to capital expansion;
h) services or works normally provided by the recipient, incurred in the course of implementation of the Project, except those specified as Eligible Costs;
i) the cost of any goods and services which are received through donations or in kind;
j) employee wages and benefits, overhead costs as well as other direct or indirect operating, maintenance and administrative costs incurred by the Recipient, and more specifically costs

relating to services delivered directly by permanent employees of the Recipient, or of a Crown Corporation or corporation owned and controlled by the Recipient or in cases where the Recipient can demonstrate value for money and that the costs are incremental;

k) provincial sales tax and Goods and Services Tax, for which the recipient is eligible for a rebate, and any other costs eligible for rebates; and

l) legal fees.

SCHEDULE B - THE PROJECT

B.1. *SCOPE OF THE PROJECT*

The Yukon Government has committed to establishing a Yukon-wide electrical grid and ensuring that there is an adequate supply of reliable, green energy for all Yukon customers. In line with this commitment, the Yukon Energy Corporation (YEC) has begun a multi-component Green Energy Legacy Project to link the two existing power grids (the Carmacks-Stewart Transmission Line or "CSTP") and capacity enhancement to the existing Mayo hydro facility ("Mayo B").

The Yukon Green Energy Legacy Project represents a significant step forward for YEC and for the Yukon itself. As the territory's primary electrical utility, YEC is responsible for meeting the territory's generation and transmission electricity infrastructure requirements today and for building the infrastructure the territory will need tomorrow. This needed infrastructure will directly reduce Yukon's dependence on diesel fuel, an expensive and carbon intensive, environmentally problematic energy source, to supply electricity needed for residential, commercial and industrial customers, including major new mine developments. For the purposes of this agreement, the Yukon Green Energy Legacy Project comprises two components as is noted below.

Project Component I - Carmacks-Stewart Transmission Line (CSTP)

In November 2008, YEC completed the first phase of the CSTP, with the construction of 172 kilometres (km) of transmission line from Carmacks North to Pelly Crossing. This brought the two grids in the Yukon close together. This project component will finalize the connection of the hydro transmission grids in the Yukon. The CSTP will extend the 138 Kilovolt (kV) transmission line 74 kilometres (km) from Pelly Crossing to Stewart Crossing, tying the two existing hydro-electric grids together.

There are three main project components to the CSTP:

- A new 138 kV transmission line of approximately 74 km in length located within a 60 metre right-of-way (ROW) between Pelly Crossing and Stewart Crossing.
- Expansion of the existing Stewart Crossing substation north of the Stewart River to enable the interconnected operation of the two grids.
- Modifications to the existing Carmacks switching station and the Minto Landing substation, and provision of new facilities to service Pelly Crossing.

Project Component II - Mayo B Hydro Enhancement

Mayo B is located in the Yukon interior, north of the Village of Mayo and approximately 50 km east of Stewart Crossing. This project component lies within the traditional territory of the First Nation of Na-cho Nyak Dun (NND). It will add additional infrastructure to the existing Mayo hydro facility downstream of Wareham Lake to increase generating capacity and will affect water levels at Mayo Lake and water flows in the Mayo River.

This component of the project will expand the existing Mayo hydro system without making changes to the existing Mayo Lake control structure or Wareham Lake dam. No new dams will be built, and no new flooding will occur. A new pipe and canal system will move water 3 km downstream from the current dam to a new powerhouse that will double current production capacity. The original dam uses only one half of the available head and this project component will utilize the additional capacity available. Operating regime changes will occur at Mayo Lake and on the lower Mayo River. Mayo B construction project components inside the Construction

Footprint Area include:

- A new powerhouse with installed capacity of approximately 10 to 12 megawatts (MW), approximately 3.9 km downstream of the existing powerhouse.
- A new penstock-canal system that will divert water from the existing intake tunnel to the new powerhouse.
- A new all-weather access road to the new powerhouse from the existing YEC access road serving the current Mayo hydro facility.
- A new distribution line of approximately 1.7 km to provide station service power and communication to the new powerhouse.
- A new transmission line of approximately 3.6 km from the new powerhouse to the existing YEC transmission grid substation located near the existing Mayo Hydro Plant.
- Temporary construction-related facilities including a work camp for a peak workforce of 50-75 workers, lay down areas, a concrete batch plant, and related facilities.

B.2. *PROJECT COMPONENTS, TIMELINE AND COST BREAKDOWN*

Name of Project Component	Description of Project Component.	Estimated Component Start Date (S) / Estimated Component Finish Date (F)	Estimated Total Costs ($000)	Estimated Eligible Costs ($000)	Estimated Contribution by Canada ($000)	Estimated contribution to Eligible Costs per Party, per Fiscal Year ($000)				
						Contributor	2009 / 2010	2010 / 2011	2011 / 2012	Total Contribution per Component
CSTP Second Phase	• 138 kV transmission line - Pelly Crossing and Stewart Crossing • Expansion of existing Stewart Crossing substation • Modifications to existing Carmacks switching station and Minto Landing substation	S - Q1 2009/10 F - Q3 2010/11	$40,000	$35,300	$17,650	Canada	$4,462	$13,188	$0	$17,650
						[redacted]	$0	$12,000	$0	$12,000
						Total (YEC + YG)	$4,585	$1,065	$0	$5,650
						YEC	$0	$300	$0	$300
						YG	$4,585	$765	$0	$5,350
Mayo B	• A new powerhouse with installed capacity of approximately 10 to 12 megawatts (MW) • A new penstock-canal system • A new all-weather access road • A new distribution line • A new transmission line Temporary construction related facilities	S - Q1 2009/10 F - Q3 2011/12	$120,000	$106,700	$53,350	Canada	$2,500	$26,332	$24,518	$53,350
						Total (YEC with NND FN + YG)	$2,395	$26,408	$24,547	$53,350
						YEC with NND FN	$0	$18,686	$18,014	$36,700
						YG	$2,395	$7,722	$6,533	$16,650

TOTAL		S - Q1 2009/10 F - Q3 2011/12	$160,000	$142,000	$71,000	Canada	$6,962	$39,520	$24,518	$71,000
						[redacted]	$0	$12,000	$0	$12,000
						Total (YEC with NND FN + YG)	$6,980	$27,473	$24,547	$59,000
						YEC with NND FN	$0	$18,986	$18,014	$37,000
						YG	$6,980	$8,487	$6,533	$22,000

For greater certainty, Canada's total contribution cannot exceed the amount set out in Section 3.1.

SCHEDULE C – REPORTING, AUDIT AND EVALUATION

C.1. *REPORTING*

C.1.1 ANNUAL AND QUARTERLY PROGRESS AND PERFORMANCE REPORTS

Save as herein provided, quarterly and annual progress reports must be submitted by the Recipient to Canada. The introduction must provide a general description of the Project focusing on major achievements to date.

The quarterly progress reports shall include the following:

a) Detailed summary information on the Project progress according to project components and description of project components as outlined in Schedule B.2;

b) Amounts received from Canada for the Project;

c) Amounts expended on the Project, including the total federal share; and

d) The quarterly reports shall be submitted according to the following schedule:

First Quarterly Report – by July 31 of the fiscal year;

Second Quarterly Report – by October 31 of the fiscal year;

Third Quarterly Report – by January 31 of the fiscal year; and

Fourth Quarterly Report – by April 30 of the fiscal year.

The annual progress reports shall include all of the elements required in the quarterly report as well as the following:

e) An annual aggregate of amounts received from Canada and expended in accordance with C.1.1 b) and c);

f) An overview about the status of both expected and unanticipated significant environmental issues related to the Project and the proposed mitigation strategies to deal with these concerns;

g) An update of qualitative and quantitative project benefits (environmental, economic, social, cultural, safety, etc.) along with results or successes achieved during the fiscal year and in support of the program's Performance Measurement Strategy. The Recipient will ensure that appropriate data collection processes are in place to enable the capture and reporting of benefits and project outcomes as noted in s.12.1 of the Agreement;

h) An explanation of any variations from Schedule B.2 in this Agreement, along with the intended course of action to remedy the situation;

i) Any areas of concern on risk factors and proposed mitigation strategies affecting the schedule or the budget of the Project;

j) Any issues or risk factors that may affect completion of the Project as per original plans;

k) Highlights of communication activities of the project this fiscal year; and

l) Whenever possible and if cost-effective, recent photographs of project construction to validate progress made according to Schedule B.2 timelines.

C.2. *SHARED INFORMATION MANAGEMENT SYSTEM FOR INFRASTRUCTURE (SIMSI)*

Infrastructure Canada (INFC) has established the Shared Information Management System (SIMSI) for INFC to manage its Program-related information. SIMSI, a secure, user-friendly, bilingual, web-based information management system, assists GIF management and stakeholders, where applicable and appropriate, in managing and tracking the multitude of projects that are initiated.

The Recipient must keep all pertinent information a minimum of six (6) years after completion of a project. Canada information is subject to the Policy on Information Management and consequently the *Library and Archives Act of Canada*. With the assistance of its GIF partners, INFC will set up a retention and disposal schedule for Canada Information. It is very likely that some of the information will be transferred to the National Archives at the end of the retention period because of its historical value.

C.3. *AUDIT*

The Recipient is responsible for requesting and managing the undertaking of all audits of the Project and delivering them in the timeframe determined by the Agreement Management Committee. All audits will be carried out at the Recipient's expense by accredited and independent auditors in accordance with Generally Accepted Auditing Standards (GAAS). The costs of carrying out these audits, by the Recipient, are recognized as Eligible Costs in accordance with Schedule A – Eligible and Ineligible Costs, of this Agreement.

C.3.1. *AUDIT PLANS*

The Agreement Management Committee is responsible for establishing, overseeing, managing and implementing a project audit plan, including any required corrective actions. The Committee will use an agreed upon risk-based assessment approach. INFC will provide a model risk assessment tool for use by the Committee. The audit plan of the Project will be determined within three (3) months of the establishment of the Committee. The Committee reserves the right to have final approval of the audit plan. Canada reserves the right to conduct at any time a full audit of the Project as deemed necessary.

Audit plans must specify:

a) the audit objectives to be achieved for the audits in question, including both the financial audits and compliance audits;

b) the audit methodology;

c) the costs and resources to be allocated for the audit plan;

d) clear understanding with respect to access to working papers by Canada and the Recipient; and

e) the time frames for audits and public access to audit reports.

There may be a requirement for a separate environmental audit to be undertaken. Audit(s) may be posted on relevant websites of the departments/agencies and available under Access to Information legislation.

C.3.2. *FINANCIAL AUDIT(S)*

a) financial audits must be conducted by external auditors in accordance with the GAAS.

b) the key objective of the annual financial audit is to determine whether information has been coded correctly and presented fairly in the project/entity financial statements in accordance with GAAP.

C.3.3. *COMPLIANCE AUDIT(S)*

The key objectives of the compliance audit(s) are to:

a) determine whether funds were expended for the purposes intended and with due regard to economy, efficiency and effectiveness;

b) determine compliance with the Agreement;

c) ensure that project and financial information is complete, accurate and timely, in accordance with the Terms and Conditions of the Agreement;

d) ensure that information and monitoring processes and systems are sufficient for the identification, capture, validation and monitoring of achievement of intended benefits;

e) to assess the overall management and administration of the project;

f) provide recommendations for improvement or redress; and

g) ensure that prompt and timely corrective action is taken on audit findings.

C.4. *EVALUATION*

Evaluations will be scheduled according to a risk based five-year evaluation plan that is currently being updated which will include the Green Infrastructure Fund (GIF) and other Infrastructure Canada (INFC) transfer payment programs.

During 2009-2010 and 2010-2011, the INFC Audit and Evaluation Division will focus on assessing the clarity of expected outcomes, the adequacy of performance indicators, and the adequacy of performance monitoring for the GIF and developing evaluation frameworks.

The purpose will be to ensure that program logic is clear enough, and performance information - as identified in the Performance Measurement Strategy - is robust enough, that the INFC Audit and Evaluation Division will be able to draw conclusions on program performance, relevance and alternatives when evaluations are conducted.

As required by Section 42.1 of the *Federal Accountability Act* and the Treasury Board Policy on Transfer Payments, INFC will evaluate its transfer payment programs at least every five (5) years in time to inform program renewal decisions.

A recent evaluation, the Evaluation of the Canada Strategic Infrastructure Fund (2009) brought forward design and management lessons that have been adopted within the Building Canada Fund already. These same lessons will be useful to incorporate in the design and management of the GIF.

SCHEDULE D – SOLEMN DECLARATION/CERTIFICATION OF SUBSTANTIAL COMPLETION

In the matter of the Agreement entered into between Her Majesty the Queen, in right of Canada, represented by the Minister of Transport, Infrastructure and Communities, and the *Recipient*, represented by (.....), on_____

I, _____, a Registered _____ in the Yukon Territory do solemnly declare/certify as follows:

1. That I am the and as such have knowledge of the matters set forth in this affidavit;
2. That the work identified as Project_____ in the above-mentioned Agreement has been substantially completed as described in Schedule B, _____, dated on the _____ day of _____ 20____.
3. That the work:
   - was carried out by (*the prime contractor*), between the dates (*start date*) and (*completion date*);
   - was supervised and inspected by qualified staff;
   - conforms with the plans, specifications and other documentation for the work;
   - conforms with applicable environmental legislation, and appropriate mitigation measures have been implemented; and
   - conforms with the guidelines referenced in this Agreement or any other equivalent provincially sanctioned guidelines approved by the Committee established under the above mentioned Agreement.

Declared at ___(city)_____, in the Yukon Territory

this _____day of

_____

(name, title)

_____

(Witness name, title)

SCHEDULE E – COMMUNICATIONS PROTOCOL

1. SCOPE

1.1 This schedule applies to communications activities carried out or communications products in all media produced jointly or separately by the signatories to this Agreement.

1.2 The Recipient will be required to respect Schedule E lest an Event of Default be declared as per s. 7.3 of this Agreement.

2. GUIDING PRINCIPLES

2.1 Canada and the Recipient agree to undertake joint communications activities – at a minimum upon signing the contribution agreement and when the funded project goes into service. Canada and the Recipient will collaborate on preparing products for those activities to ensure open, transparent, proactive and effective communications with Canadians. This transparency and accountability will be achieved through appropriate and consistent public communications activities that recognize the contributions of all participating Parties under this Contribution Agreement.

2.2 Wherever possible, planning for such events requires fifteen (15) days' notice to the other Party. The Parties agree to do all possible to hold these joint events in a timely manner or agree on other means to effect that communication. Costs for such events will be equally shared.

2.3 The Parties agree that all communications products produced pursuant to Article 2.1 above will include the overarching Government of Canada brand as provided by Canada, including for its Economic Action Plan. All such material shall fairly reflect the contribution of the Parties to this Agreement. This includes ensuring equal recognition and prominence where words, logos, symbols and other types of identification are incorporated into materials. Finally, all such public information material will be produced in both Official Languages (English and French).

2.4 The Recipient and Canada may establish a communications sub-committee under the Agreement Management Committee to provide advice and support on such matters. This sub-committee shall be comprised of at least one federal representative and one Recipient representative.

2.5 The parties can carry out their own communications activities relating to their infrastructure investments that are part of or include the work to be done under this Agreement.

3. PROJECT COMMUNICATIONS

3.1 Contracts

All public information material related to calls for tendering for Projects shall clearly and prominently indicate that the Project is receiving financial support, in part, from the Government of Canada.

3.2 Project Promotion

a) The Recipient is responsible for the promotion of the Project and its activities and objectives within their community or jurisdiction. The Recipient will provide, as appropriate, Project communications such as: a project website, print, audiovisual and other communications about the Project as it proceeds. The Recipient will inform Canada of any such promotional communication before it takes place. The Recipient will also ensure appropriate mention of the partnership nature of the funds and the contribution of all Parties in annual reports, speeches or other opportunities, as appropriate.

b) The Recipient is solely responsible for operational communications including calls for tender, construction, and public safety notices. Operational communications as described above are not subject to official language policy.

c) The Recipient will share information promptly with Canada, on significant emerging media issues relating to the project (for example, joint management questions or serious safety matters). Canada will advise the Recipient, where appropriate, about media inquiries received concerning the project.

d) Canada and the Recipient each reserve the right to refer to funding provided under the Green Infrastructure Fund in their own separate, and non-Project specific communications. Each Party commits to acknowledge the other Party's involvement in the Project.

e) The Recipient will provide, whenever possible and cost-effective, professional quality audio-visual material (e.g. photographs - digital 596 X 304 pixels or larger, high resolution and in .jpg format) about the project to Canada to support wider communications about funding under the Green Infrastructure Fund.

4. COMMUNICATING WITH THE PUBLIC

4.1 General

a) Canada and the Recipient shall consult with each other, fifteen (15) working days in advance, about all proposed news releases or public announcements relating to the Project. This is to provide all Parties with sufficient notice of key Project communications, and, where appropriate, the time to determine a course of action, line-up principals and prepare joint material. Notwithstanding the advance notice

requirement, consent shall not be unreasonably withheld by either Party if a news release or public announcement must be issued in less than fifteen (15) working days as the result of unforeseeable circumstances, including matters of public safety or where an emergency response is required.

b) The Recipient will advise Canada regularly of upcoming public events or community relations activities relating to the Project as per the initial communications plan specified below. Each Party commits to acknowledge the other Party's involvement in the Project.

c) The Project will include a communications plan showing how the Recipient intends to manage communications and provide funding partners with equal visibility. This plan should also forecast: major milestones for joint and separate communications; Project communications activities (e.g., tender notices, plans to provide partner visibility after Project completion, and estimated expenditures for key communications activities and issue management).

4.2 News Releases

The Parties shall issue joint news releases after funding decisions are made, or upon project milestones, as appropriate. In all such news releases, the Parties shall receive equal prominence. The Parties shall mutually agree on the use of quotes from the designated representatives of Canada or the Recipient in the news releases.

4.3 News Conferences, Public Announcements, Official Events or Ceremonies

a) Canada and the Recipient agree to hold news conferences, official events or ceremonies at the request of either Party. The requestor shall provide at least fifteen (15) working days notice of such a news conference, which will take place at a mutually agreed date and location. The Ministers, or a designated representative of either Party, should participate in such news conferences.

b) The Parties shall co-operate in the organization of announcements or ceremonies. The Table of Precedence for Canada, as established by Canadian Heritage (http://www.pch.gc.ca/progs/cpsc-ccsp/pe/precedence_e.cfm), or other mutually agreed protocol, should be respected. Messages and public statements for such events should be mutually agreed upon.

4.4 Signage

a) The Recipient shall provide and install temporary signage or other appropriate identifiers at a prominent location where there is visible activity related to the Project indicating the participation of all funding partners, and bearing any other message approved by Canada.

b) Design, wording and specifications of joint signage shall reflect the participation of Canada and must be approved before installation. Signage and other identifiers must conform to the overarching Government of Canada brand as provided by Canada including for its Economic Action Plan. Wording in both Official Languages, designs, and logos of one Party should be of the same size and occupy the same

amount of space as the other Party's. Signs or other identifiers shall have appropriate space indicating participation by the Recipient, if requested.

c) Temporary signs must be removed within ninety (90) days of Project completion.

d) The Recipient will provide and install, upon completion of the Project, where feasible, a plaque, permanent sign or other suitable identifier bearing an appropriate inscription. The design, wording and specifications of such permanent signs shall respect the general provisions of this Agreement and the overarching Government of Canada brand as provided by Canada, and must be approved by Canada.

e) The requirements set out in this section for temporary and permanent signage may be waived by Canada in the rare situation where it is deemed impractical or impossible to comply.

f) The recipient shall set up, maintain and dismantle project signage which is an eligible expense.

4.5 Advertising

Recognizing that advertising can be an effective means of communicating with the public, either Party may, at its own cost, organize an advertising or public information campaign related to the Green Infrastructure Fund. However, such a campaign must respect the provisions of this Agreement. In the event of such a campaign, the sponsoring Party agrees to inform the other Party of its intention as soon as possible, as early notice is essential for any required review process. In any event, notice must be provided a minimum of twenty (20) working days before launch.

ATTACHMENT F

Yukon
Office of the Minister
Box 2703, Whitehorse, Yukon Y1A 2C6

December 1, 2009

Mr. Ray Hayes
Chair, Yukon Development Corporation Board of Directors
P.O. Box 5920
Whitehorse, YT
Y1A 6S7

Dear Mr. Hayes,

RE: Yukon Development Corporation (YDC) Funding Assistance

The Carmacks to Stewart Transmission Project Stage 2 (CSTP Stage 2) and the Mayo Hydro Enhancement Project (Mayo B) play an important role in further developing Yukon's electrical infrastructure. These projects will support economic development, avoid an increase in future greenhouse gas emissions, avoid increased diesel generation, and provide long term rate benefits to the ratepayers.

The total cost of both of these projects is estimated to be $160 million ($120 million for the Mayo B project and $40 million for the CSTP Stage 2).

A federal Contribution Agreement with Yukon Energy Corporation was signed by the parties in August 2009. This Contribution Agreement establishes key terms and conditions for the $71 million federal funding grant for CSTP Stage 2 and Mayo B. Approximately $17.7 million of this federal contribution will be used for CSTP Stage 2 and the remaining $53.3 million will support the Mayo B project.

Yukon Development Corporation, as an agent of Yukon Government, will borrow the funds required to finance working capital needs and these legacy projects on a long-term basis. To ensure that ratepayers will not be adversely affected, Yukon Government will also provide an annual contribution to Yukon Development Corporation for the principal and interest payments related to a portion of the borrowing up to $52.5 million.

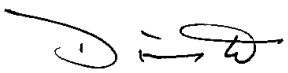
Yukon Development Corporation will also ensure that all proceeds to the projects from new industrial customers connecting to CSTP will reduce Yukon Government's funding contribution to Yukon Development Corporation in proportion to the outstanding

principal amount in accordance with the terms of the Yukon Development Corporation borrowing conditions.

I look forward to finalizing the transfer agreement and the details involved in this financial arrangement.

I would also like to acknowledge the recent approval of a formal dividend policy by the Yukon Development Corporation Board of Directors. The dividend policy is a significant development in the corporate governance of the corporation.

Sincerely,



Dennis Fentie
Minister Responsible for Yukon Development Corporation