YUKON ENERGY CORPORATION

APPLICATION FOR AN ENERGY PROJECT CERTIFICATE AND
AN ENERGY OPERATION CERTIFICATE REGARDING
THE PROPOSED MAYO HYDRO ENHANCEMENT PROJECT (MAYO B)

INTERROGATORY RESPONSES FILED

MARCH 8, 2010

CITY OF WHITEHORSE
(CW)

TOPIC: Project Need

REFERENCE:

Application, Section 1.0, page 2

PREAMBLE:

YEC states:

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-YearResource 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.

QUESTION:

a) Please provide the material referred to above in a consolidated fashion. Please identify the points that YEC relies on to demonstrate that Mayo B is required.

b) Please confirm that this material was provided in support of deferred costs to be placed in rate base during the test years and not in support of the $120 million cost of the Mayo B Project. If not confirmed, please explain fully.

ANSWER:

(a)

Please see Attachment 1 to this response. The material as provided speaks to the underlying rationale for proceeding with Mayo B. This material has been further referenced and updated as required in the current Application which provides the most current case in support of the requirement for the Mayo B Project.

(b)

Not confirmed. Deferred costs for Mayo B were not placed into ratebase in the test years and no such approvals were sought for Mayo B as a part of the Yukon Energy 2008/2009 GRA.[1]

[1] Section 5.3.1 of the 2008/2009 GRA notes, "There are four major deferred cost projects with costs exceeding $1 million for the test years, totaling $2.5 million in 2008 and $15.3 million in 2009 (with projected customer offset of $1.0 million in 2009). All of these costs are projected to remain work in progress during the test years, and therefore do not affect projected test year amortization expenses or net rate base."

Yukon Energy Corporation
2008-2009 General Rate Application
UCG-YEC-1-89

REFERENCE: October 6, 2008 Application, Capital Projects, Page 5-20;

YEC states that the Mayo B hydro generation enhancement project ($1.7 million in 2008 and $6.5 Million in 2009 has been identified as a potential priority near term hydro generation expansion opportunity.

REFERENCE: **December 8, 2008, Hansard, Yukon Legislative Assembly**

Mr. McRobb: Still with capital plans, the officials mentioned **Mayo B**, which of course is an enhancement of the existing facility to provide a greater amount of generation. Can the officials indicate what the anticipated cost, timelines and process are for that facility?

Mr. Morrison: Well, timelines are difficult because it depends on where loads are and, with this mining environment, things are shifting a little bit. But the costs that we have seen so far, which are very expensive, are **$100 million**.

Mr. McRobb: And does that cover basically all of the expenses to upgrade the facility itself, including any shoreline mitigation or improvements to the transmission line or anything? Can the officials comment on that?

Mr. Morrison: To be clear, it **doesn't include the cost of a transmission line**. That's something separate. Secondly, it does cover all of the costs, as we know it, for the purposes of upgrading the capacity of the Mayo plant. I want to be clear, though, that from our perspective — we haven't looked at shoreline mitigation. We haven't made any decision that would, at least in the current plan, even include the possibility of shoreline mitigation.

QUESTION:

a) Please provide cost details and descriptions of components of the proposed Mayo B hydro generation enhancement project.

b) Please provide details on costs incurred to date, during the 2008 and 2009 test years, and estimated for subsequent years.

c) Please explain how this project fits in with YEC's 20-Year Resource Plan.

d) Please explain the treatment of this project for rate base purposes and the timing of it being added to rate base.

e) Please explain why Mayo B is now on the potential priority near term expansion opportunities when it was not even on the radar during the review of the 20-Year Resource Plan process.

ANSWER:

(a)

The components of the Mayo B Hydro Generation Enhancement Project are set out in the attached newsletter (provided as Attachment 1 to this response). Cost estimates provided in the 20 year Resource Plan were $101 million (2005$) (approximately $116 million in 2012$). These estimates are presently being updated.

(b)

The Application at page 5-20 notes forecast costs for 2008 and 2009 as $1.7 million and $6.5 million respectively. Budgets are subject to ongoing review. The total project cost, if developed, has been estimated at approximately $120 million; the net cost to Yukon Energy will depend on contributions from government, which are yet to be determined.

(c)

Mayo B was included in the 2006 Yukon Energy 20-Year Resource Plan filing (at Appendix B) as part of an inventory of hydro project options. As noted at page B-1 of the Resource Plan, the projects included in Appendix B represented “the primary alternatives identified to date 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) at page B-10 where the following was noted regarding the project:

> The existing hydro site at Mayo has the potential to be enhanced by various changes in configuration, either to develop further head below the existing reservoir or an expansion of capacity utilizing the same head. This leads to multiple potential alternatives. However, as a supply option

to WAF, these various projects are only of relevance if the Carmacks-Stewart transmission line is previously in service. The full capability of various potential Mayo enhancements to supply an interconnected WAF and MD system (as opposed to MD on its own) has not been fully studied, and should be re-examined in the event that the interconnection proceeds.

One configuration alternative considered is a 10 MW, 48 GW.h, $101 million (2005$) variation based on a separate conveyance route from the existing reservoir to a new plant lower in elevation than the existing plant, which would be able to operate in parallel with the existing plant. This concept has an initial LCOE of 11.2 cents/kW.h. Various other concepts require further study. However, although work is still in preliminary stages, it must be recognized that it is possible no credible facility enhancements of this type exist at Mayo.

The Resource Plan noted that small hydro projects in the range of 5-10 MW were potential candidates for development under Chapter 5 forecasts under the 25 MW industrial scenario or larger. These projects could also potentially be part of a development plan under the larger 40 MW scenario.

(d)

This project will be in Work-in-Progress until it is complete (the earliest possible in-service date is 2011 or 2012), at which time the net cost to YEC for the project will be included in rate base.

(e)

As noted in **(c)** above, Mayo B was included in the 20-Year Resource plan as potential small hydro project to address industrial development scenarios described in Chapter 5 of the Resource Plan. Reviews carried out in 2007-2008 to identify priority projects to provide 50 to 100 GWH/yr of new renewable energy within the 2010 to 2015 period identified Mayo B as the largest single source of such new energy, with good prospects to be in-service between late 2011 and 2012.

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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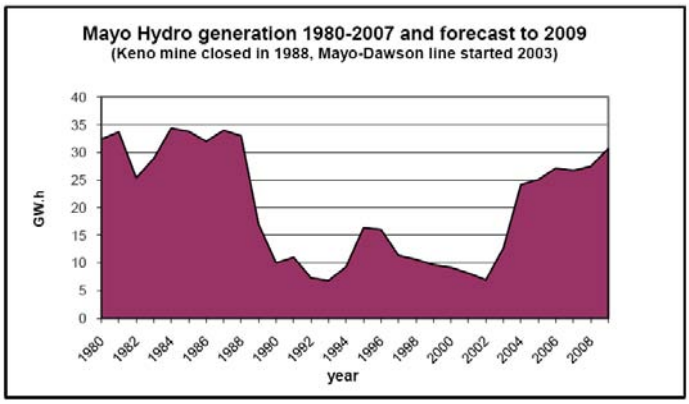
The Existing Facility

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

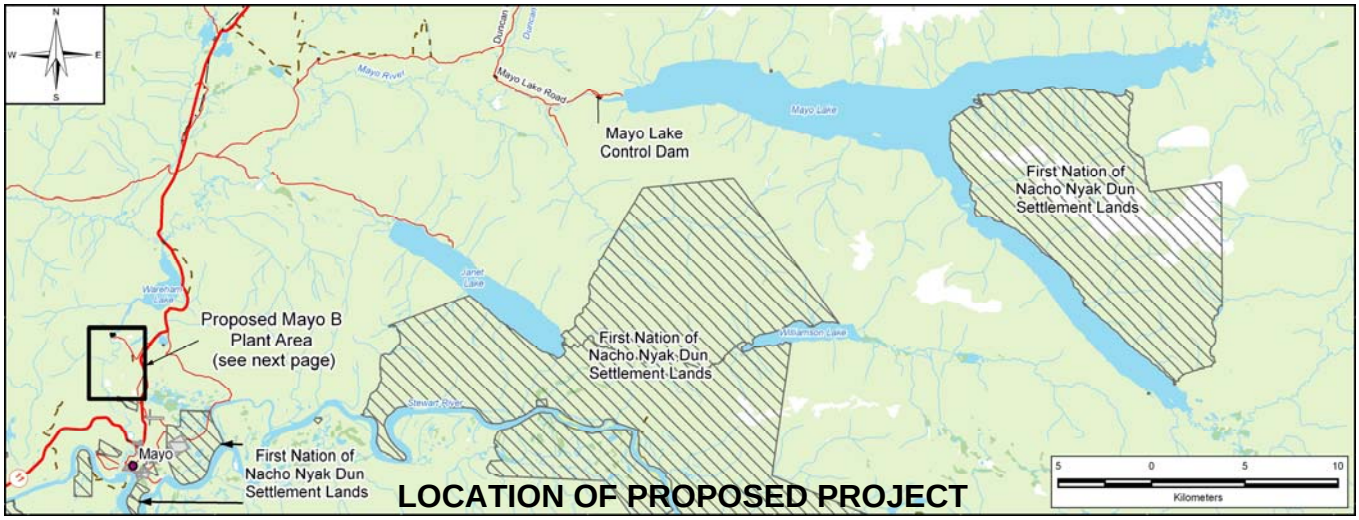
Generating Station: located on the Mayo River, the plant has two generating units of approximately 2.7 megawatts each, which operate with 36 metres of 'head' or vertical drop between Wareham Lake and the existing generating station.

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.



LOCATION OF PROPOSED PROJECT

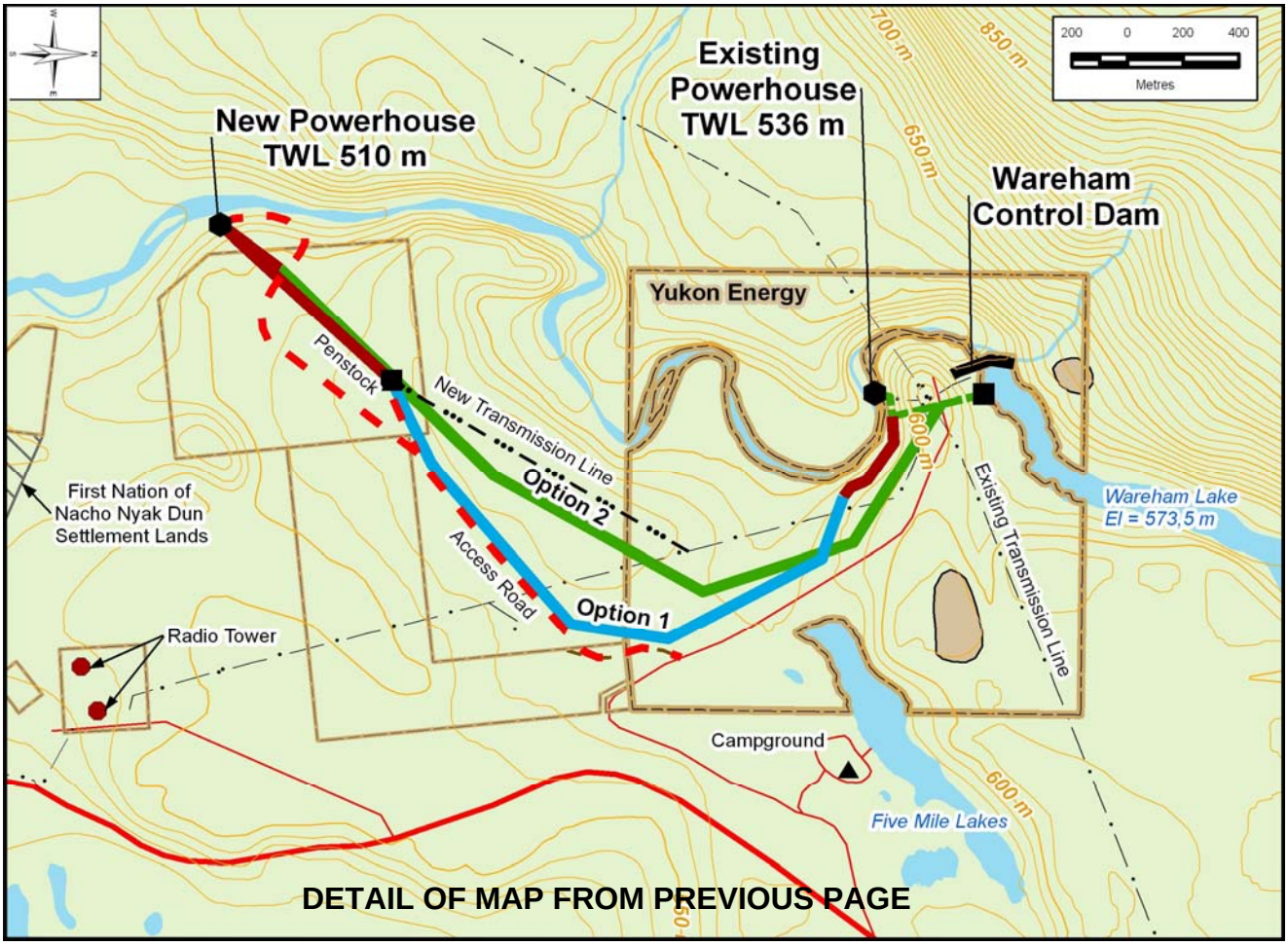
The proposed Mayo B project involves construction of a new powerhouse about three kilometres downstream from the existing powerhouse. The project will approximately double the amount of energy that can be generated from the Mayo River. No changes would be required at Wareham Lake or to the Wareham dam. 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

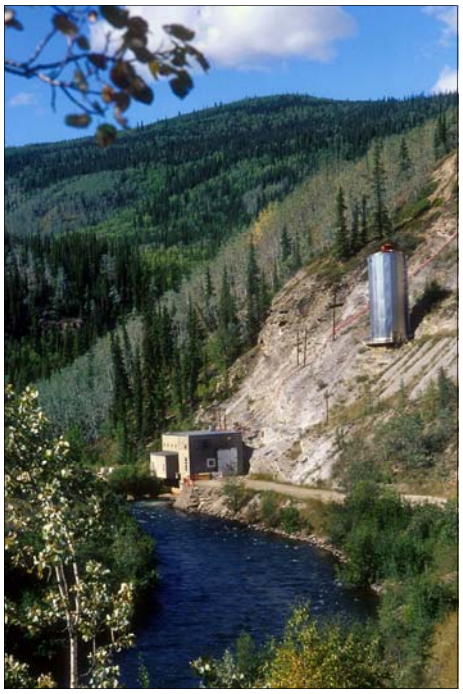
Project Introduction and Issues Identification

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?

Hector Campbell
Yukon Energy Corporation
Box 5920, #2 Miles Canyon Road
Whitehorse, Yukon
Y1A 6S7
Tel: (867) 393-5331
Fax: (867) 393-5323
business@yec.yk.ca
www.yukonenergy.ca

Undertaking #28 at Page 602, Line 7

YEC stated that it could not undertake to provide details as requested (estimates of when required, project timelines including regulatory process, cost estimates, energy outputs, and expected external load driving each project) on Mayo B, Atlin, Gladstone and other new hydro projects. At Page 602, YEC undertook to pull together what was available on these matters and to indicate in particular what external load is driving these projects and when such load would trigger each project.

YEC Response:

Summary of Grid Load Requirements and triggers for new renewable generation

Table 1 attached summarizes separately by grid YEC's projected generation requirements, and related forecast baseload diesel generation requirements assuming long-term average generation from existing facilities and the Aishihik 3rd turbine. To focus on trends and triggers, the analysis ignores timing issues for 2010 related to both the Alexco load and the Aishihik 3rd Turbine coming into service, as well as timing issues for potential Carmacks Copper mine load start up. This analysis remains preliminary and subject to ongoing refinements, particularly as regards assessments for specific years; it also ignores reductions in WAF hydro long-term average generation capability of about 10 GW.h/yr that apply so long as current Fish Act Authorization restrictions remain in effect.

In summary, without Carmacks Copper mine loads, projected long-term average baseload diesel generation requirements in Table 1 for the two grids approximate 15 GW.h/yr by 2011 and 29 GW.h/yr in 2012 (reflecting projected Minto and Faro mine site reclamation loads, plus projected Alexco loads – diesel requirements exist on each grid). If the Carmacks Copper mine load is added in 2012, the Table 1 projected overall long-term average baseload diesel generation requirement in 2012 increases to 64 GW.h/yr, growing to over 75 GW.h/yr by 2015. So long as current Fish Act Authorization restrictions remain in place, these projected baseload diesel generation requirements would be increased by up to 10 GW.h/yr.

Similar related load requirements were also addressed in the following most recent IRs (these responses updated earlier responses such as provided to CW-YEC-1-31 – numbers may differ from Table 1 herein due to ongoing refinements and adjustments):

- **YECL-YEC-1-8 Revised**
  - At page 7, Mayo Dawson grid diesel requirement projected (without CSTP Stage 2 or Mayo B) at over 3 GW.h in each of the first two years of Alexco mine operation, and about 10 GW.h/yr thereafter (Table 1 attached numbers are compatible);

- At page 7, WAF grid diesel requirements projected (without CSTP Stage 2 and without Carmacks Copper) at 14 GW.h/yr in 2011 and 23 GW.h/yr by 2013 (Table 1 attached numbers are slightly lower).

- **YECL-YEC-1-5 Revised**
  - At page 7, reviews forecast information on Alexco mine loads and Western Copper (Carmacks Copper) mine loads, and states that by 2012 the combined Minto, Carmacks Copper and Keno Hill loads (along with other projected WAF/MD firm loads, including added Faro mine reclamation loads but excluding secondary loads) would required over 70 GW.h of new generation beyond that which could be provided under long-term average water flows by the current WAF/MD hydro generation capability together with Aishihik Third Turbine and the completed CSTP Stage 2. (Table 1 attached numbers are lower, e.g., 64 GW.h vs. 76 GW.h of new energy generation in 2012; this specific difference largely reflects the impact of the current Aishihik Fish Act restrictions which Table 1 ignores but which were included in the 76 GW.h estimate.)

Potential Near Term Hydro Generation Projects

The following summarizes current assessments of the near-term major new hydro generation projects under active consideration (beyond the Aishihik Third Turbine project):

1. **Mayo B** – see YECL-YEC-1-5(b) Revised
   a. Potential generation capability to displace baseload diesel generation – near term at about 30 GW.h of net firm energy benefit; longer-term at full long-term load conditions is higher (initial estimates at about 38 GW.h/yr).
   b. Capital cost of $120 million , with levelized cost of energy (LCOE) for the capital cost at about $0.182/kW.h for near-term diesel displacement.
   c. Earliest in-service in late 2011, assuming secure required external funding as reviewed in the IR, and that YESAB review process is concluded so as to allow land based construction to start in spring/summer 2010.
   d. YESAB Project Proposal submission was filed February 27, 2009.

2. **Gladstone Diversion** – potential 18 GW.h/year of added winter generation at the existing Aishihik plant – licensing process for a water diversion involves YESAB Executive Committee and multiple First Nation interests, and time requirement is therefore uncertain at this time; once licenced, construction likely involves less than a year - initial cost estimate ($2007) estimate of $28 million indicates LCOE of about 8 cents/kW.h.

3. **Atlin winter small scale storage** – potential 18 GW/h year of added winter generation at Whitehorse plant – licensing process involves BC processes and inter-jurisdictional

interests, and time requirement is therefore uncertain at this time; once licensed, construction likely involves less than a year - initial cost ($2007) estimate of $14 million indicates LCOE of about 4 cents/kW.h.

4. **Marsh Lake fall-winter storage** - potential 7.7 GW/h year of added winter generation at Whitehorse plant – initial public consultations indicated local opposition to this project; if and when approved, construction likely involves much less than a year - initial cost ($2007) estimate of $1.1 million indicates LCOE of about 1 cents/kW.h.

Combined, the above four priority near term potential hydro projects could provide over 70 GW.h/yr of new renewable generation, all of which would be fully required with the Carmacks Copper mine load. Considerable regulatory uncertainty and risk is associated with the non-Mayo B projects, such that YEC currently cannot project any specific likely in-service dates for the above non-Mayo B projects, Yukon Energy is working to address these regulatory risk over the next one to two years with the objective to secure ability to develop one or more of these projects to be in-service by 2012/2013.

Without the Carmacks Copper mine load, the Mayo B project near-term capability (as currently proposed) would be able to displace almost all of the projected near term diesel generation requirements in Table 1.

Given the generation requirements projected in Table 1, the potential for additional major industrial loads not covered in that table, and the limitations noted for near term renewable generation options, Yukon Energy is also carrying out preliminary investigations of other resource options including potential near-term geothermal options and (for longer-term needs) priority larger scale hydro generation projects for potential in-service on or after 2015 (see YUB-YEC-1-38(b)). Yukon Energy's overall plan and decision process to develop such resource projects remains as set out in Figure 1 from the 20 Year Resource Plan (this is copied at YUB-YEC-1-38(b)(i) at page 4).

Table 1 - Near-Term Generation Requirements Forecasts (2010-2015)

Assumes current generation facilities plus Aishihik 3rd Turbine in 2010 - million kW.h (GW.h)

	2010	2011	2012	2013	2014	2015
WAF Grid with CSTP Stage 1						
Generation Required (firm sales)						
Normal Non-Industrial loads & losses	304	309	313	318	323	327
Faro mine site reclamation & losses			14	14	14	14
Minto Mine & losses	33	47	47	47	47	47
Sub-total required w/o Carmacks Copper	337	356	374	379	383	388
Fish Lake hydro & YEC wind generation	8	8	8	8	8	8
Long-term average YEC hydro generation	324	337	347	350	353	355
Baseload diesel generation required	5	11	19	21	23	25
Carmacks Copper mine & losses			56	56	56	56
less added YEC hydro gen that would arise under this load			21	19	17	15
Baseload diesel generation required w/CC			54	58	62	66
MD Grid						
Generation Required (firm sales)						
Normal Non-Industrial loads & losses	28	29	29	30	30	31
Alexco Mine & losses	14	14	19	19	19	19
Total required	42	42	48	49	49	50
Long-term average hydro generation	38	38	38	38	38	38
Baseload diesel generation required	4	4	10	10	11	11
Both Grids total - Summary						
total diesel (ex. losses on CSTP)						
without Carmacks Copper	9	15	29	31	34	36
with Carmacks Copper			64	68	73	77

Yukon Energy Corporation
2008-2009 General Rate Application
YECL-YEC-1-5 REVISED

REFERENCE: **Major Projects Page 5-20**

TOPIC: **Capital Projects**

PREAMBLE:

Yukon Electrical is seeking more information on Mayo B hydro expansion.

QUESTION:

a) Please provide the detailed costs associated with the expenditures proposed and or expended in the test years. Please include a breakdown of all costs by labour, material, contractor and other. Please provide the details in regard to any contracts for work associated with these expenditures and the process used to select such vendors.

b) Please provide the detailed business case for the Mayo B Expansion, including all options considered? Please provide the anticipated financing arrangements for this project and identify any customer contributions that are expected to be received. Identify the source and the amount of all such contributions.

ANSWER:

(a)

The costs forecast in the GRA filing for Mayo B total $1.7 million in 2008 and a further $6.5 million in 2009.

For 2008, the $1.7 million was approved as an increase to capital budgets in place at that time for hydro investigation work. The increase to $1.7 million was comprised of:

- Pre-feasibility work to date - $0.068 million
- Mapping and Survey related work - $0.097 million
- Geotechnical investigations - $0.247 million
- Project management and coordination - $0.234 million

- Engineering - $0.405 million
- Environmental and socio-economic field studies - $0.195 million
- Environmental assessment, consultation and YESAB filing - $0.300 million
- Power system modelling - $0.100 million
- AFUDC and ES&G - $0.050 million.

The $6.5 million for 2009 is a high-level estimate that is oriented towards a project construction start date in early 2010, and an assumed planning stage budget to that time of approximately 10% of the overall capital cost. Specific budgets for each phase of Mayo B, similar to other major projects, are approved only once specific timelines and tasks are established and work from previous phases is largely addressed.

The capital budget approval and related GRA budgets were not based on specific contracts or vendors in place at that time.

(b)

YECL initially requested a detailed business case for the Mayo B Expansion, including all options considered, anticipated financing arrangements, and expected customer contributions (by source and amount). Available information regarding the rationale for this expenditure has been provided in the Application (see page 5-20) and in responses to interrogatory requests (see YUB-YEC-1-38 and UCG-YEC-1-89). Further information on the Mayo B Enhancement Project is available in the Project Proposal Submission filed with YESAB on February 27, 2009. This is available on Yukon Energy's website site at http://www.yukonenergy.ca/about/projects/mayob/.

The Mayo B Expansion was also discussed in Chapter 5 of the Yukon Energy 20-Year Resource Plan. Mayo B was included in the 2006 Yukon Energy 20-Year Resource Plan filing (at Appendix B) as part of an inventory of hydro project options. As noted at page B-1 of the Resource Plan, the projects included in Appendix B represented "the primary alternatives identified to date 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) at page B-10. This is also discussed in

response to UCG-YEC-1-89(c).[1] The Resource Plan noted that small hydro projects in the range of 5-10 MW were potential candidates for development under Chapter 5 forecasts under the 25 MW industrial scenario or larger. These projects could also potentially be part of a development plan under the larger 40 MW scenario.

Order 2009-4 directed Yukon Energy to provide further information related to risk for the project, the risk of not proceeding with the project, the alternatives to this project which were considered and the potential benefits to customers. The further information provided below in response to Order 2009-4 builds on the following information already provided in response to YUB-YEC-1-38:

- Yukon Energy is currently undertaking all required planning, consultation, environmental, engineering and other related activities in order to obtain authorizations and approvals necessary to allow for a decision to commence construction of the Project in 2010. At this time, Yukon Energy has made no final decision to proceed with the Project.

- Yukon government and Federal government regulatory approvals and decisions are required before any construction activities may be undertaken; however, these approvals and decisions may only be made after the required screening assessment by the Executive Committee of the Yukon Environmental and Socio-economic Assessment Board (YESAB) of the Project Proposal Submission (Project Proposal). On February 27, 2009, Yukon Energy submitted the Project Proposal to YESAB.

[1] The response to UCG-YEC-1-89(c) provides an excerpt from Appendix B of the 20-Year Resource Plan which notes as follows regarding Mayo B: The existing hydro site at Mayo has the potential to be enhanced by various changes in configuration, either to develop further head below the existing reservoir or an expansion of capacity utilizing the same head. This leads to multiple potential alternatives. However, as a supply option to WAF, these various projects are only of relevance if the Carmacks- Stewart transmission line is previously in service. The full capability of various potential Mayo enhancements to supply an interconnected WAF and MD system (as opposed to MD on its own) has not been fully studied, and should be re-examined in the event that the interconnection proceeds. One configuration alternative considered is a 10 MW, 48 GW.h, $101 million (2005$) variation based on a separate conveyance route from the existing reservoir to a new plant lower in elevation than the existing plant, which would be able to operate in parallel with the existing plant. This concept has an initial LCOE of 11.2 cents/kW.h. Various other concepts require further study. However, although work is still in preliminary stages, it must be recognized that it is possible no credible facility enhancements of this type exist at Mayo.

- The cost estimate at this time (Level 3-Feasibility stage of study) for Mayo B is $120 million, including contingencies of 15% to 25% depending on the project component.

- Selection of canal (versus tunnel) option likely reduces the degree of tender price risk, and future geotechnical risk to Project costs.

- At $120 million (and ignoring potential government infrastructure funding), the full assumed output of the plant of 38.4 GWh (under full long-term load conditions) yields a levelized cost of energy ("LCOE") for the capital cost of the project of $0.142/kW.h.

- 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 (plus up to 10 GW.h of enhanced potential secondary energy should there be loads available to purchase this supply). In such a case the levelized cost of energy would approximate $0.182/kW.h.

- By comparison, diesel costs per UCG-YEC-1-62 remain at $0.248/kW.h at today's fuel prices.

- In order to keep costs and risks to Yukon ratepayers within acceptable bounds (e.g., more in line with B.C green market power purchase costs of 8 to 10 cents/kW.h), it is anticipated that government infrastructure funding will be secured for a material portion of the project costs.

- No further details on the precise form and source of financing, including government funding are available at this time.

1. Project Risks

Risks for the Mayo B Expansion Project include:

- **Regulatory delay risks** such that earliest construction on land based activities cannot commence in summer 2010 as required to achieve earliest Project in-

service by late 2011 – risks of such delays may affect current Yukon applications for federal infrastructure funding, as well as result in YEC incurring added diesel generation costs for the period of any in-service delays. Most regulatory requirements are reasonably apparent, even if there is limited Yukon YESAB Executive Committee assessment process experience with related federal and Water Board permitting and/or licensing; Yukon Government directions have not been made to date as regards any YUB review requirements. Overall, 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 – and any potential regulatory delays are not expected to delay earliest in-service timing by more than one year.

- **Capital cost increase and other construction risks** typical to any project of this nature, location, scale and stage of development with some added risks related to tight timing if the Project construction in fact starts in summer 2010. Additional geotechnical field studies are planned in summer 2009 to reduce further the uncertainties affecting the canal, penstock and powerhouse geotechnical conditions YEC is reviewing options to manage and mitigate construction contractor risks, including risks related to 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.

- **Other Project feasibility risks**, beyond regulatory and construction risks, include:
    - Delay in completion of Carmacks-Stewart Stage 2 beyond spring/early summer of the in-service year for Mayo B (would create need to use costly diesel generation [rather than surplus WAF hydro generation] when the existing Mayo 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);
    - Further sustained diesel fuel price decline such that Mayo B costs exceed diesel generation costs; and

- Inadequate near-term system loads to utilize Mayo B generation as planned (including material delays in connection of new mine loads such as Carmacks Copper and Alexco); due to the relatively small scale of this development 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.

- **Project Funding risks,** particularly as regards securing federal funding as is currently being sought by the Yukon Government. Material federal infrastructure funding would assist in reducing Project feasibility risks as well as reduce the ultimate impact on ratepayers (through reducing impacts on YEC ratebase).

2. Risks of Not Proceeding with Mayo B Expansion

As noted, no decision has been made by Yukon Energy at this time to proceed with Mayo B. Prior to YEC's Board of Directors approving each major stage of Mayo B development, including any commitment to start construction, all material risks are reviewed to confirm that it is prudent to proceed. At this time, the largest single factor likely to affect the risk of not proceeding with Mayo B expansion at this time relates to securing adequate federal infrastructure funding on a timely basis.

Assuming that the above question addresses risks tied to the option of not proceeding with Mayo B expansion, the major risk is that YEC and Yukon ratepayers will be required to fund an extra 30 GW.h or more per year of diesel generation (i.e., the diesel generation that Mayo B would otherwise displace) with its related costs and GHG emissions.

By reducing the surplus hydro generation, new industrial loads advance the timing for potential renewed diesel generation. As noted at page 5-19 and 5-20 of the Application and in responses to IRs (e.g., CW-YEC-1-31):

- Ongoing resource planning activities indicate that the current hydro generation surplus (after CSTP Stage One and Minto connection, and before any secondary sales) at long-term average flows will likely now be fully utilized by firm sales on WAF sometime between 2011 and 2014.

- The connection of additional industrial loads, possibly as soon as 2010/2011, could lead to the requirement for 50 to 100 GWh of baseload diesel generation within the 2010-2015 time period.

As noted in response to CW-YEC-1-31(a) and (b) and in the Application (Section 2.2.2.2) Western Copper and Alexco are currently both expected to require service within the 2010 to 2011 time period. While forecast information provided by potential industrial customers is subject to change, the following forecast information remains current:

- **Western Copper** – An in service date of late 2011 is projected with an expected annual requirement averaging approximately more than 4 GW.h per month (50 GW.h per year), and a mine life of at least six years.

- **Alexco Resource Corp** – Plans to commence mining and milling operations at the Keno Hill property in early 2010. The response to CW-YEC-1-31 notes an expected requirement of 11.7 GW.h for the first 2 years of service, increasing to 16.5 GW.h for the next three years of service.

It is currently projected that by 2012 the combined Minto, Carmacks Copper and Keno Hill loads (along with other projected WAF/MD firm loads, including added Faro mine reclamation loads but excluding all secondary loads) would require over 70 GWh of new generation beyond that which could be provided under long term average water flows by the current WAF/MD hydro generation capability together with Aishihik 3rd Turbine and the completed CSTP Stage Two. As reviewed in response to the next section below, without Mayo B there is today no apparent renewable resource option that could be developed in at least the near term (2012-2015) to replace the additional renewable generation that Mayo B would provide. At even the recent 25 cents/kWh incremental cost, 30 GWh of diesel 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.

3. Alternatives to Mayo B Project which were Considered

Mayo B has been identified as the largest single near-term renewable project opportunity (30 GWh/year of near-term incremental hydro generation) with the least risky timeline for

in-service between late 2011 and late 2012. Absent Mayo B, the current forecast load growth (see previous section) that Mayo B would serve would need to be supplied using diesel generation.

Alternatives to Mayo B were reviewed in YEC's 20-Year Resource Plan: 2006-2025, as well as in subsequent YEC studies.

Mayo B was reviewed as part of the 20-Year Resource plan as a potential small hydro project that could, in combination with other renewable resource projects, help to address various industrial development scenarios. Chapter 5 of the 20-Year Resource Plan noted that small hydro projects such as Mayo B (i.e., in the range of 5-10 MW), were candidates for development under the 25 MW industrial scenario or larger (up to 40 MW scenario). The Resource Plan's Appendix B noted that 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 provided summary information on the major options identified by these earlier studies.

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 for near term development (2010-2015 in-service) previously identified as relatively promising, in the range of 20-50 GW.h per year (subsequently expanded to 50-100 GW.h per year). Based on this review, no greenfield hydro generation sites (e.g., Drury) were considered to be competitive with Mayo B or other enhancement options based on the load and timing factors specified. To meet the timing requirements in particular, it was apparent that Yukon Energy needed to focus on enhancements to current WAF and MD hydro generation facilities.

Other supply options examined by Yukon Energy (and included in Deferred Costs (Tab 5, Section 5.3 of Application) as Other Generation Feasibility) are discussed in the response YUB-YEC-1-38(b). Aside from Mayo B, other hydro generation enhancement projects currently being investigated include the Gladstone Diversion project (up to 18 GW.h/year), small scale Atlin winter storage[2] (up to 18 GW.h/year), and Marsh Lake fall-

[2] As noted in PWP/HML-YEC-1-41 "Yukon Energy is considering a much smaller development that would store water in Atlin Lake within its natural high water levels and release it over the winter, very similar to what is currently undertaken with regard to Marsh Lake".

winter storage[3] (up to 7.7 GW.h/year). These generation enhancements, each of which is much smaller than Mayo B, can be developed at an attractive cost and with relatively short construction periods (typically in the order of one year); however, the earliest feasible near-term in-service dates present specific risks that depend on the timeframes necessary to plan and licence each project. Each of these smaller enhancement options was considered to face today much greater regulatory risks than Mayo B, both as to securing ultimate regulatory approvals as well as to potential likely timing for nearest feasible in-service. Yukon Energy has noted, however, that Mayo B alone would not displace even half of the likely baseload diesel generation forecast for 2012 on WAF/MD grids, and therefore Yukon Energy (as noted in the Application) is actively pursuing near term development of these other enhancement projects as soon as is feasible, i.e., ultimately these project options are expected to complement rather than compete with near term Mayo B development.

Yukon Energy is also pursuing any other enhancements to its existing hydro generation capabilities; however, no set of such enhancements has the ability to displace Mayo B's forecast near term ability to displace diesel generation requirements on the WAF/MD grids.

The discussion in YUB-YEC-1-10(a) addresses results of studies undertaken regarding renewable generation and the focus on enhancements in the near term, and notes as follows:

> The main focus of recent studies has been to identify and assess near term options (i.e., in-service as soon as 2010 and up to 2015) to serve potential new load that may be connected during this time.
>
> At a high level, the conclusions indicate that the unit costs of enhancement to existing hydro generation (as well as timing requirements to develop) are below the costs (and development timing) that would need to be incurred for developing new "greenfield" hydro sites.

[3] YUB-YEC-1-27(a) notes the following with regard to the status of Marsh Lake "Yukon Energy has undertaken studies to confirm the hydrology related to Marsh Lake water levels, and the Yukon Government has completed a Flood Assessment and Abatement Study. Marsh Lake storage continues to be an attractive resource option, in the event it can be completed without any significant adverse effects on the local residents."

Further, while larger scale Hydro (such as Hoole, at 100-300 GW.h/year) remain under investigation for potential relevance by 2015, larger scale greenfield hydro generation cannot likely be developed in less than 5-6 years even on an expedited schedule.

Outside of enhancements to existing hydro facilities, renewable power generation for northern (i.e. has a wintertime electrical peak) climates not connected to the North American grid 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").[4] 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. In particular, both geothermal and further wind generation are currently being investigated as potential renewable generation options.

While geothermal and wind in Yukon are not considered near-term alternatives to the Mayo B project in terms of either timing or scale of development, each can in the future be developed to complement this project. Geothermal generation is not considered an alternative at this time as it remains in exploratory stages, while 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). Appendix A to Yukon Energy's 20 Year Resource Plan 2006-2025 provides a more detailed review of these options as well as other options that were reviewed at the time of the Resource Plan hearing, including biomass, coal, coal bed methane, nuclear, solar, natural gas, hydrogen and demand-side management.

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 peaks. However, diesel is expensive for utility operations running to provide sustained energy on a regular basis throughout the year. As noted above, even at the recent 25 cents/kWh incremental cost, 30 GWh 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

[4] The resource plan filing and other materials are available on the Board's at the following link: http://yukonutilitiesboard.yk.ca/proceedings/yec_20/

levelized cost of near term energy related to Mayo B is approximately $0.182/kW.h even without any federal or other government infrastructure funding.

4. Potential benefits to customers

Similar to other hydro-based jurisdictions, Yukon's power system includes material assets with embedded costs well below the cost to bring on new generation today. Today, with anticipated load increases, both cost and environmental reasons provide strong incentives for Yukon Energy to expand 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 and on-going domestic load growth through additional renewable generation capacity available on the interconnected WAF/MD system. Long term benefits will be available due to lower cost (relative to diesel generation) renewable energy, as well as improved system reliability. 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[5] as well as Major Industrial customers, i.e., the benefits of Mayo B will accrue to all of these customers in Yukon and not only those in the vicinity of the Mayo B project.

YUB-YEC-1-38(a) notes the following with regard to Mayo B impacts over the near term:

> 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 GWh of firm energy (plus of up to 10 GWh of enhanced potential secondary energy should there be loads available to purchase this supply).

As noted above, even at the recent 25 cents/kWh incremental cost, 30 GWh of Mayo B near term added net grid generation will allow all retail customers in Yukon to benefit from the displacement of added annual diesel generation fuel and operating costs of

[5] Subject to run-off rate variations to reflect rate zone incremental generation cost variations.

approximately $7.5 million. By comparison, the levelized cost of near term energy related to Mayo B is approximately $0.182/kW.h prior to consideration of the lower costs resulting from the federal infrastructure funding currently being sought for Mayo B and Stage Two of the Carmacks-Stewart Transmission Project.

Long-term benefits to Yukon customers from Mayo B are expected to exceed those noted above for the near term, reflecting ongoing depreciation of Mayo B capital costs and enhanced net grid hydro generation from Mayo B associated with higher overall grid loads in the future[6].

The Mayo B Expansion expenditures included in the Application are all in Work In Progress, and will not materially affect the rate base or rates sought to be approved by the Board at this time. Yukon Energy is not seeking at this time approval from the Board for the addition of the Mayo B Expansion to rate base.

[6] Grid loads in 2012 will not yet be high enough to facilitate full use of the then existing WAF/MD hydro generation facility capability. For example, long-term average generation from Mayo B will exceed 34 GWh/yr (versus 30 GW.h/yr for 2012) when WAF/MD grid system load increases by about 100 GW.h/yr above the firm load s currently forecast for 2012 with Carmacks Copper (about 468 GWh/yr).

Yukon Energy Corporation
2008-2009 General Rate Application
YUB-YEC-1-38

REFERENCE: YEC GRA

ISSUE/SUB-ISSUE: Deferred Cost, Section 5.3

QUESTION:

a) Considering current fuel prices, please provide a cost-benefit analysis for the near-term Mayo B hydro generation expansion.

b) Please provide details as to what customers can expect in regard to YEC's proposed "Other Generation Feasibility" significant $7.6 million expenditure over the test years?
   ii. Please define what is meant by a "pre-feasibility study".
   iii. Does YEC perform the studies or are these third-party studies? Please explain.
   iiii. Please provide a cost-benefit analysis for the $7.6 million expenditure.

ANSWER:

(a)

The Mayo Hydro Enhancement Project ("Mayo B" or "the Project") involves enhancements to the existing Yukon Energy Mayo hydroelectric facilities to increase power production. It comprises the construction of a new powerhouse and related facilities, as well as adjustments to the management of water on the Mayo River system. The Project has a planned in-service date of late 2011.

Yukon Energy Corporation (Yukon Energy) is undertaking all required planning, consultation, environmental, engineering and other related activities in order to obtain authorizations and approvals necessary to allow for a decision to commence construction of the Project in 2010. At this time, Yukon Energy has made no final decision to proceed with the Project.

Yukon government and Federal government regulatory approvals and decisions are required before any construction activities may be undertaken; however, these approvals and decisions may only be made after the required screening assessment by the Executive Committee of the Yukon Environmental and Socio-economic Assessment

Board (YESAB) of the Project Proposal Submission (Project Proposal). On February 27, 2009, Yukon Energy submitted the Project Proposal to YESAB.

As noted in the Project Proposal, the Project cost estimates to date reflect a period of study oriented to confirming the technical ability to construct the Project, and the timing and configuration of major Project components. The estimates reflect activities oriented towards a "Level 3 – Feasibility" stage of study, and are subject to design refinement, and changing market conditions (including general economic conditions for construction in western Canada).

The cost of the Project is presently estimated at $120 million (including escalation, interest during construction, and contingencies of 15% to 25% depending on the Project component). This estimate has been subjected to a preliminary third-party review. This review indicated that there may be a potential upward adjustment to the cost of up to 5%.

Similar to other hydro projects, a material component of the Project costing cannot be confirmed with reasonable certainty until the Project is tendered. The selection of a canal format (as opposed to a tunnel) likely reduces the degree of tender price risk, and future geotechnical risk to Project costs, but this uncertainty cannot be eliminated prior to the tendering process being completed.

At $120 million (and ignoring potential government infrastructure funding), the full assumed output of the plant of 38.4 GWh (under full long-term load conditions) yields a levelized cost of energy ("LCOE") for the capital cost of the project of $0.142/kW.h. 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 (plus up to 10 GW.h of enhanced potential secondary energy should there be loads available to purchase this supply). In such a case the levelized cost of energy would approximate $0.182/kW.h. By comparison, diesel costs in the application are forecast at $0.3737/kW.h, and per UCG-YEC-1-62 remains at $0.248/kW.h at today's fuel prices.

In order to enhance the opportunity for stakeholders to secure benefits from the Project including Canada, Yukon, ratepayers and NND, a variety of possible financing approaches are being considered. No further details on the precise form and source of financing are available at this time. However, in order to keep costs and risks to Yukon

ratepayers within acceptable bounds (e.g., more in line with B.C green market power purchase costs of 8 to 10 cents/kW.h) it is anticipated that government infrastructure funding will be secured for a material portion of the project costs. Also there are ongoing discussions with NND relating to the possibility of NND investing in the Project.

(b)

The other supply options category comprises $0.7 million in 2008 and a further forecast $6.8 million in 2009. The current plan adopted by Yukon Energy for 2009 is reduced from the level assumed at the time of the GRA, to a level of $4.3 million, approximately as follows based on current draft plans:

- **Aishihik Diversions (Gladstone):** $800,000. This project has the potential of increasing Aishihik output by up to 18 GW.h/year on average, at a relatively low capital cost.

- **Atlin River:** $700,000. This small scale storage project has the potential to increase Whitehorse Rapids average annual output by up to 18 GW.h/year.

- **Marsh Lake Fall/Winter Storage:** $300,000. This project, previously reviewed by the YUB, is an attractive source of enhanced output at Whitehorse Rapids (up to 7.7 GW.h) and an update is required based on the new results of work completed by the Yukon Government, as well as Yukon Energy, with respect to the effects of high water levels on Marsh Lake.

- **Geothermal:** $1 million. This project remains in investigatory stages. No specific energy output has been identified.

- **Other Larger Hydro:** $600,000. Yukon Energy has updated its inventory of hydro sites in the 50-100 GW.h range, but has not done comparable work for larger sites in Yukon.

- **Existing System Operating Studies:** $220,000. Both Mayo and Aishihik plants have operating issues that may serve to alter the generation potential of the plants in future. For example, Aishihik's long-term output is currently constrained by the conditions of a Fish Act Authorization, which is subject to review based on

ongoing fisheries work. The impact of more restrictive fish conditions could readily be 5 or more GW.h per year on average, depending on load conditions.

- **Wind:** $30,000. Develop longer-term monitoring plan and assess the results of pre-feasibility work completed in 2008.

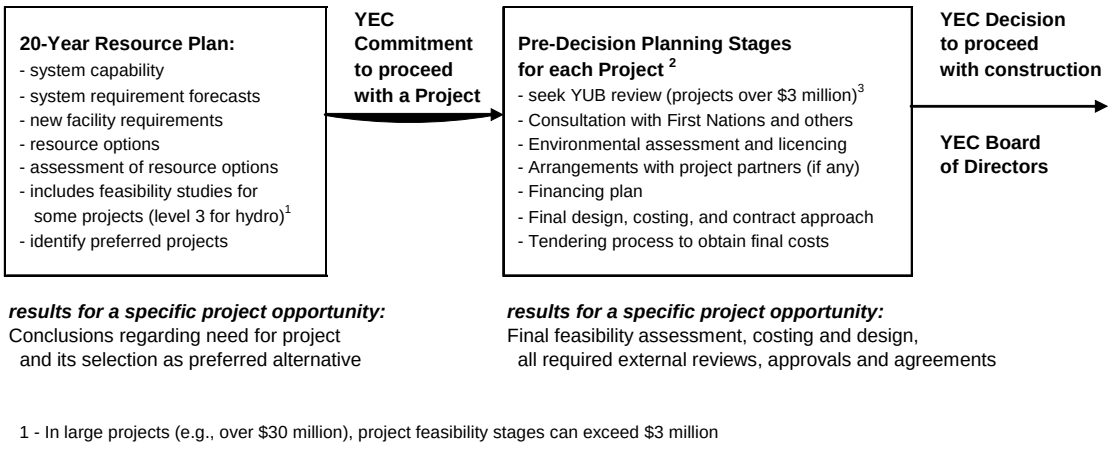
- **Internal Efficiency Projects and Overall Management:** $650,000. Budgets for internal reviews of the potential for significantly improving the output of existing facilities from re-runnering or other similar improvements in the generation or electrical areas.

(i)

Pre-feasibility studies are consistent with the activities noted in Figure 1.1 from the 20 Year Resource Plan (repeated below) as the activities leading to the selection of a specific project as a "preferred alternative" and the initiation of "pre-decision planning stages".

Figure 1.1 from 20 Year Resource Plan

20-Year Resource Plan and Decisions on Specific Projects



1 - In large projects (e.g., over $30 million), project feasibility stages can exceed $3 million and YEC would then seek YUB review prior to commitment to these stages.
2 - For individual projects, these planning stages will proceed in different sequences and with different timing. For projects over $3 million,Yukon Energy is committed to seek YUB review prior to a decision by the YEC Board to proceed with construction.
3 - An OIC under the Yukon Utilities Act can direct the YUB to review a YEC submission on need and justification for a project and to report on its findings to the Commissioner in Executive Council. This type of YUB review would be separate and distinct from a normal YUB review of project rate base costs as required for a Yukon Energy revenue requirements and rate application.

(ii)

Yukon Energy staff are involved in the studies, but typically they involve significant external expertise and support, particularly for generation projects.

(iii)

As noted above, the expenditure is now slated at the lower value of $4.3 million in 2009. No cost-benefit analysis is possible as the specific cost and output values associated with each project are not yet available, nor is the technical or environmental/licencing feasibility established (this is the basis for the pre-feasibility work).

TOPIC: Project Funding

REFERENCE:

Application, Section 1.0, page 3, Application, Table 1, page 12 and Attachment E; Section 3.1.2, page 12, Table 1

PREAMBLE:

YEC states:

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.

QUESTION:

a) Under what conditions would the full $71 million of Federal Government Funding not be available? Please refer to the appropriate sections of Attachment E, and any other information or materials that affect the availability and the extent of this funding.

b) Does Clause 3.1(a) limit the funding committed to Mayo B to the $53.35 million as shown in Schedule B.2 of Attachment E, i.e. nothing more would be available

from the combined $71 million limit, should the CSTP construction cost be less than anticipated? Would the reverse be true if Mayo B is built at less than the anticipated cost? Please explain fully.

c) Please confirm that the 'eligible costs' in the funding submission referred to in Note 1 of Table 1 remain approximated at $106.6 million. If not confirmed, please fully explain any differences and outline what effect these differences may have on the available Federal grant.

d) Do the same audit provisions, claims procedures, dispute resolution, etc. apply to the $52.5 million of no-cost capital available from the Yukon Government? If not, please provide a table indicating all differences between the terms on which the Federal and Territorial funds are available.

e) Please confirm that YEC requires customers to fund $36.5 million of Mayo B project costs through rates ($120 million-$53.35 million-$30.15 million). How will YEC finance this portion of project costs and maintain an equity ratio of 40%?

f) Please provide a pro forma monthly schedule of the project financing showing clearly the payments of claims by the Federal and Territorial governments and financing through debt (including the source of the debt) or an infusion of equity from the Yukon Development Corporation.

g) Please describe how YEC will maintain a 40% equity ratio during the construction of Mayo B and after this project enters rate base?

ANSWER:

(a)

The Federal Government Funding Agreement sets out all of the relevant terms and conditions, and it would not be feasible to summarize these terms in this response. Overall, at a high level, under section 3.1(a) of the Agreement Canada will not pay more than 50% of the total Eligible Costs during the three Fiscal Years starting in 2009-2010 and ending in 2011-2012, i.e., if such costs are less than $142 million, or fail to be in accordance with the Fiscal Year breakdown in Schedule B2 as amended in accordance with the Agreement, Canada could not pay the full $71 million.

(b)

Section 4.3 of the Federal Funding Agreement provides for changes to the allocations within Schedule B2, including changes to the costs allocated between the two components (CSTP Stage 2 and Mayo B), subject to the overall funding limit of $71 million. In the event that there was a basis for adjusting the project component allocations in order to retain access to the full $71 million of federal funding, YEC would expect to seek the required changes to Schedule B2.

(c)

Confirm that estimated "eligible costs" for CSTP Stage 2 and Mayo B remain equal to or greater than, the $142 million amount in effect assumed in the Federal Funding Agreement, and that projected "eligible costs" for Mayo B remain equal to, or greater than, the $106.7 million amount set out in Schedule B2 of the Federal Funding Agreement.

(d)

No. The funding available from the Yukon Government is provided to YDC pursuant to the letter in Attachment F to the Application and, based on this information, YEC is not able to provide a table as requested.

(e)

Confirmed. As set out in the Application, the net rate base to be funded by YEC is estimated at $36.5 million, and YEC will finance this rate base amount 60% through long term debt and 40% through equity, thereby maintaining an equity ratio of 40% overall.

(f) and **(g)**

YEC is currently reviewing project cash flow projections and, in coordination with YDC, using these projections to negotiate construction period financing arrangements. Accordingly, YEC is not able to provide a useful response at this time setting out a monthly or quarterly pro forma schedule of the project financing as requested. Payments of claims by the Federal Government will occur on a quarterly basis as set out in the Federal Funding Agreement, based on 50% of actual eligible costs incurred to date and

the time period required to review and approve such claims (assumed generally to be a one quarter lag in payments). YEC seeks to maintain its 60/40 debt to equity ratio for financing net rate base costs, which do not include work in progress relating to costs during construction. Prior to completion of the project, YEC expects that YDC will have secured sufficient new long term debt, likely through a bond issue, to finance its requirements for the Legacy Project as well as other ongoing YEC near term funding needs, and that YDC will use these funds to maintain the 40% equity ratio after this project comes into service and its net costs are included in rate base.

TOPIC: Project Summary Description and Risks

REFERENCE:

Application, Section 3.1; Application, Section 4.2

PREAMBLE:

YEC states that "the Project lies within the Traditional Territory of the First Nation of Nacho Nyak Dun ("NND")". YEC further states that "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."

QUESTION:

a) Please confirm that all necessary negotiations with the First Nation of NND with respect to the location of the project and the possible use of First Nation lands have been successfully concluded.

b) If not confirmed, please advise of any outstanding issues that remain to be addressed with the First Nation of NND.

c) Please provide details of any and all consultations YEC has made, or plans to make, with the First Nation of the NND.

d) Please confirm that any and all costs associated with the use of First Nation lands are included in YEC's estimate of $120 million for the Project. If so, please indicate where in Schedule B-2, Attachment E. If not confirmed, please explain fully.

ANSWER:

(a) and **(b)**

The Project lies within the Traditional Territory of the First Nation of Nacho Nyak Dun ("NND"). However, the Mayo B Project is to be located entirely on YEC lands or on Yukon Government Crown lands (including private property recently purchased by the

Yukon Government). Accordingly, YEC will not require any permits or authorizations from NND in order to proceed with the Mayo B Project.

The NND Project Agreement continues to be under negotiation, with the expectation that it will be finalized during March 2010. Yukon Energy continues to consult with NND on project related issues and concerns, including all submissions by to YESAB and regulators, to ensure that these concerns are addressed expeditiously.

(c)

Consultation activities regarding the Mayo Hydro Enhancement Project filed with YESAB on February 27, 2009 are discussed in Chapter 4 of the YESAB Project Proposal document, and summarized in Section 5 and Attachment B-1 of the current Application. Since these filings, consultations have continued at the Technical Working Group (TWG) level on YESAB, permitting issues and ongoing environmental studies related to Mayo B and the Mayo Lake Project.

(d)

See response to (a) and (b) above, i.e., no use of First Nation settlement lands will be required by the Mayo B project.

TOPIC: CSTP Stage 2

REFERENCE:

Application, Section 3.1.1, page 8

PREAMBLE:

YEC states:

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 the138 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.

QUESTION:

a) Please provide the documents concerning the CSTP Stage 2 project reviewed by the YESAB and YUB. Did CSTP Stage 2 receive YESAB and YUB approval?

b) If not already provided in the YESAB and YUB reviews, please provide breakdowns of the CSTP Stage 2 project by asset class (i.e. engineering, line and towers, substations, SCADA, contingencies, etc.) and also by material, labour, contracting and other, including contingencies.

ANSWER:

(a) and **(b)**

Review of CSTP Stage 2 is out of the scope of this proceeding. The CSTP project has previously been reviewed by YESAB (as part of the CSTP Project Proposal which

included both CSTP Stage 1 and CSTP Stage 2) and was also reviewed by the YUB as part of the 2007 CSTP Part III Application.[1]

Board approvals will be sought at the next GRA (to the extent required) for any CSTP Stage 2 costs to be included in YEC ratebase. As noted in Attachment E to the Mayo B Application (Schedule B2), the estimated cost for CSTP Stage 2 is $40 million with a federal no cost funding contribution of $17.65 million towards this cost. As noted in footnote 15 of the Mayo B Application, YDC will provide a no cost contribution to YEC for the balance of the CSTP Stage 2 cost up to $22.35 million (i.e., the balance of the Yukon Government no cost funding).

[1] Note neither review process results in "approvals" per se. The YESAB process results in recommendations to decision bodies (under section 58(1) of the YESAA) who must then issue decision documents accepting the recommendation or refer the recommendation back for review by the executive committee (pursuant to section 76(1)); permits may then be issued implementing the decision document. The YUB Part III process is undertaken to provide a report and recommendations to the Minister of Justice (under section 40 the Minister must refer an application to the Board for review and under section 41(1) of the Public Utilities Act the Board must submit a report and recommendations to the Minister) who may then issue an energy project certificate and energy operation certificate pursuant to Part III of the Public Utilities Act (pursuant to section 42(1) of the Public Utilities Act).

TOPIC: Project Cost Details

REFERENCE: Application, Section 3.1.2, p.10

PREAMBLE:

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).

QUESTION:

a) Please provide a detailed cost breakdown of the updated installed capital cost estimate for the proposed Mayo B hydro enhancement project of $120 million. Please provide a breakdown by asset class (structures, turbines, generators, substations, SCADA, etc.) including contingencies. Please also provide a breakdown by material, labour, contractor and other, including contingencies.

b) Please provide a cost/benefit analysis of this project.

ANSWER:

(a)

Table 1 below provides a detailed breakdown of the $120 million Mayo B capital cost budget estimate updated as at February 28, 2010. Work is ongoing to refine various elements of this budget estimate. Breakdown of direct construction costs is provided to the level of detail that YEC is able to provide for public review at this time.

Table 1 - Mayo B Capital Cost Estimate Breakdown - February 28, 2010 ($million)

Construction Contractor, Equipment & Detailed Engineering Costs			
Construction Contract (Kiewit)			
Site preparation & restoration		0.63	
Construct & maintain access roads		0.51	
Tunnel, intake modifications, portal		6.27	
Penstock and surge system		23.35	
Powerhouse & tailrace		8.35	
Turbine/Generator install		1.25	
Balance of plant (M&E systems)		4.21	
Distribution/Transmission lines		0.96	
Estimated indirects		19.53	
General & Administration Overheads		4.30	
Profit		8.32	
	Subtotal	77.70	
Base Target Price			77.70
Contingencies			7.70
Target Maximum Price			85.40
Turbine & Generator Supply			5.00
Detailed Engineering (KGS)			5.76
Assigned to Substation			0.60
Owner Contingencies			1.25
Sub-total			**98.01**
Owner Construction Costs			
Contract Administration (KGS)			3.82
Owner Admin			2.00
Land Acq			0.25
ES&G	0.50%		0.52
Interest (AFUDC) after 4Q-09			1.00
Contingency			1.38
Sub total			8.97
Pre-Construction & Other Permitting/Regulatory Planning Costs			
Feasibility Studies (to YESAB filing)			2.41
Post YESAB filing planning/engineering			8.81
Mayo B Part III review			0.30
Sub total			11.52
Total Mayo B Capital Costs			**118.50**
Env. Licensing (Mayo Lake)			1.50
Overall Total (Mayo B & Mayo Lake)			**120.00**

(b)

The Application provides the business case and overall cost/benefit analysis for the Project, including assessment in Figure 1 and Table 1 of the project costs and benefits (ratepayer savings in diesel generation costs). In summary, as set out in Table 1 of the Application, the levelized present value net cost of Mayo B to ratepayers ranges from 6.69 c/kW.h (with added Mayo Lake storage) to 7.59 c/kW.h (assuming no change in Mayo Lake licence); this cost compares to a present value levelized benefit to ratepayers of 26 c/kWh for savings in incremental diesel generation costs (see Figure 1 in the Application and footnote 17), yielding a cost/benefit ratio for ratepayers of between 3.4 and 3.9 .

Please see YUB-YEC-1-25(a) for detailed supporting information, and YUB-YEC-1-26(g).

TOPIC: Project Funding

REFERENCE:

Application, Section 3.1.2, pages 10 – 12 and footnote 12; Application, page 14, footnote 17; Application, Section 4.2, page 38, footnote 68

PREAMBLE:

YEC states:

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 $101million in 2005$ and a LCOE of 11.2 cents/kWh. 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 6.69c/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 BLCOE to within, or below, the 8 to 10 c/kW.h levelized cost target range.

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.

With no contributions and a ratebase cost of $120 million, the LCOE approximates 20.0 c/kW.h [emphasis added].

QUESTION:

a) Please provide the complete assumptions and detailed numerical analyses calculating the respective reported LCOE's of 14.2, 18.2, 11.2, 6.69, 7.59, 7.30, 8.19 and 20.0 c/kW.h as referenced above.

b) Please provide the complete assumptions and detailed numeric analysis supporting the statement that 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.

ANSWER:

(a) and **(b)**

The calculation of the 6.69 ¢/kW.h LCOE (Part III Application) and the 7.59 ¢/kW.h (Part III application with no Mayo Lake licence change) are provided in detail in YUB-YEC-1-25(a), as are the calculations of 7.30 ¢/kW.h (Part III Application with no Carmacks Copper) and 8.19 ¢/kW.h (Part III Application with no Carmacks Copper and no Mayo Lake licence change), and 20.0 ¢/kW.h (Part III Application without the benefits of the no-cost contributions).

In summary, the above analysis indicates that without the financial contributions from Canada and YDC, the LCOE for Mayo B approximates 20 c/kW.h; after these financial contributions, the LCOE for Mayo B under all scenarios examined (including no Carmacks Copper mine load and no enhanced storage at Mayo Lake) does not exceed 8.5 c/kW.h.

The other LCOEs noted vary from those calculations as follows:

- 14.2¢/kW.h was an earlier calculation based on gross output, indicating that if the project were able to make use of all power calculated to be available at that time of 38.4 GW.h (e.g., if there were export markets available) over the 65 year life, this would be the core project LCOE. The value was used to contrast with the practical LCOE given the realities of Yukon load constraints (i.e., no export markets) which raised the LCOE to 18.2 ¢/kW.h. These estimates assumed

capital cost of $120 million, no government financial contributions, and a real cost of capital of approximately 4.49%.

- The Resource Plan LCOE of 11.2 cents/kW.h was a much earlier estimate in 2005$ based on a capital cost of $101 million in 2005$ (which remains very close to the presently estimated cost of $120 million at in-service) and a much higher annual output of 48 GW.h and a cost of capital (real) of 5.41%. That estimate was prepared, similar to other screening-level project estimates, without the benefit of key studies such as environmental studies indicating the quantity of environmental in-stream flows that would be required for the project, or engineering studies on head losses, for example.

TOPIC: Project Funding

REFERENCE:

Application, Section 3.1.2, page 12

PREAMBLE:

YEC states:

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.

QUESTION:

a) Please explain fully what added capital costs YEC foresees in pursuing these refinements and/or options to the Project.

b) Please estimate what additional costs, if any, will or might be associated with these refinements and/or options.

c) Will these additional costs referred to increase YEC's estimated costs associated with the Project from the $120 million currently estimated?

d) If the answer to (c) is affirmative, please explain fully why YEC continues to project the estimated costs of the Project at $120 million.

ANSWER:

(a), **(b)**, **(c)** and **(d)**

Please see response to YUB-YEC-1-28 (a) and (b).

TOPIC: Diesel displacement

REFERENCE:

Application, Section 3.1.2, page 13

PREAMBLE:

YEC states:

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).

QUESTION:

a) Please confirm that diesel displacement on the WAF grid will not occur without the completion of CSTP Stage 2.

b) Does the phrase "assuming completion of CSTP Stage 2" mean that this part of the project has not been approved? Please explain fully.

c) Please provide a numerical example of how reduced generation at Whitehorse and Aishihik due to Mayo B occurs, for example, at the system winter peak.

d) If 30 GW.h of diesel generation will be displaced, what diesel units will be retired and decommissioned as a result of this Project? If none, please demonstrate in detail why all existing diesel units will still be used or required to be used.

e) What Secondary Sales will become available when Mayo B is commissioned?

ANSWER:

(a) and **(b)**

Diesel displacement on the WAF grid cannot occur from Mayo B without the completion of CSTP Stage II, which is presently underway and is scheduled to be completed during the winter of 2010/11.

(c)

Please see YUB-YEC-1-30A parts (a) and (c).

(d)

Diesel displacement from Mayo B refers only to avoiding the need to increase the utilization of existing diesels, and not to the retirement of such units (which may still be required for winter peak capacity planning). See response to YUB-YEC-1-41 for a review of existing diesel unit capability and use with and without Mayo B.

No specific diesel units are scheduled to be retired and decommissioned as a result of Mayo B. As noted in YEC's GRA application, future decisions about the timing of major capacity sources (e.g., the Whitehorse Mirrlees) will be made in light of capacity conditions on the system, and options exist to defer specific Mirrlees refurbishment (and instead "mothball" the unit) if their capacity is found not be required for either overall system support, or for local Whitehorse support.

(e)

Secondary sales under the base load forecast will remain as a limited offering with Mayo B, typically in summer of in high water years. Secondary sales interruptions under the forecast loads can be expected for extended periods of time (particularly when the various mine loads are connected).

Please see YUB-YEC-1-25(a), YUB-YEC-1-44, and footnote 46 at page 30 of the Application.

TOPIC: Anticipated Timeline

REFERENCE:

Application, Section 3.2, page 15

PREAMBLE:

YEC states:

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.

QUESTION:

a) Please confirm that the PKS contract referred to has been successfully concluded.

b) If not confirmed, please provide details of the competitive tender process and advise whether this process is currently underway.

ANSWER:

(a) and **(b)**

The construction contract key commercial terms were resolved in December and the full contract is currently being finalized.

TOPIC: System Capacity

REFERENCE:

Application, Section 4.1.2, page 27

PREAMBLE:

YEC states:

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.

QUESTION:

a) What are YEC's current planning criteria? If the current planning criteria are different from the LOLE system reliability criterion discussed in the 20 Year Resource Plan, please provide these new criteria and how YEC applies them in planning capacity additions.

b) Please provide the planning criteria and analysis that determined that the Mayo B Project was needed and should proceed. How does LOLE change when the two systems are connected?

c) Did the LOLE analysis identify any constraints on the existing transmission system that would require additional transmission upgrades when the two grids are connected? If so, please discuss.

d) How does YEC integrate YECL's generation capacity in its planning criteria?

e) If only "almost all" of Mayo B's capacity is available at the winter peak, what will be the exact contribution of Mayo B? Does this contribution differ at high, median and low water conditions? If yes, what is the contribution during these various conditions? Please explain fully.

f) What will be the transmission losses on the integrated system due to the additional generating capacity of Mayo B?

g) The discussion that follows the above quotation is in terms of energy (GW.h) output. Does YEC use energy output to determine its need for capacity (MW) at the winter peak or any other time of the year? If not, how does a discussion of energy help in deciding whether capacity is needed or not? Please explain fully.

ANSWER:

(a)

Please see response provided to YUB-YEC-1-6.

(b)

The analysis confirming that Mayo B is economic and should proceed is set out in the Application. It is not based on LOLE calculations or analysis of required capacity. It is based on sourcing a long-term supply of energy that is lower cost than diesel generation. Please see YUB-YEC-1-41.

(c)

Please see response provided to YUB-YEC-1-6.

(d)

YECL's dispatchable generation on WAF is included in the planning criteria. As noted in YUB-YEC-1-6, Yukon Energy does not yet have an updated LOLE model for the integrated systems, but as part of preparing that model it will be necessary to also address the now connected YECL generation at Pelly Crossing and Stewart Crossing.

(e)

The exact contribution of Mayo B at time of peak will be dependent on turbine and generator parameters that are still being finalized. The contribution has been modeled at 10.1 MW. This level of output at Mayo B, in determining the overall reliable firm winter

peak capacity contribution of the plant, is not sensitive to the relative availability of water on the system in a given year. (In principle, as demonstrated at the Whitehorse hydro plant, the peak winter capacity contribution of any hydro facility is assessed based on dependable water availability, i.e., at low flow conditions. In the case of Mayo B and Aishihik plants, sufficient storage exists to mitigate the effects of low flow water conditions in so far as such conditions affect winter peak capability.)

(f)

Please see YUB-YEC-1-20(e).

(g)

YEC does not use energy assessments to determine its need for capacity. The discussion regarding the economics of Mayo B focuses on energy, as the economic rationale for proceeding with Mayo B is based on energy generation cost benefits, not on its capacity contribution benefits. While Mayo B will also bring capacity benefits, these have not been included in the analysis (i.e., the analysis understates the full true benefit of Mayo B) as capacity benefits are more limited than the energy generation cost benefits, and are not required to confirm that Mayo B an economic and beneficial project for Yukon. Please see response to YUB-YEC-1-41.

TOPIC: Business Case and Risk Evaluation

REFERENCE:

Application, Section 4.2, page 34

PREAMBLE:

YEC states:

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.

QUESTION:

a) Please provide the business case presented to the Board of Directors that resulted in a decision to proceed with this Project.

b) If the business case presented to the Board of Directors does not include a PWAC (Present Worth of Annual Charges) analysis of the Mayo B Project, please provide this information.

c) If the PWAC analysis requested in (b) does not include the incremental O&M expenses, what are the annual incremental O&M expenses due to Mayo B and what annual inflation assumptions are reasonable to apply? Please explain fully.

ANSWER:

(a), **(b)** and **(c)**

The Board of Directors has not to date made a "decision to proceed with this Project". Such a final decision is made after required permits and approvals have been received, so that all key terms and conditions are known, and major construction contracts finalized.

As noted in the excerpt provided the Yukon Energy Board of Directors reviews and assesses all material risks prior to each major stage of project development to confirm it is prudent to proceed. For the business case as currently approved, please see the Application and the response to YUB-YEC-1- 26(g); for details on the analysis and present worth of costs, please see response to YUB-YEC-1-25(a); for a cost/benefit summary of this case, please see response to CW-YEC-1-5(b).

TOPIC: Project Risks

REFERENCE:

Application, Section 4.2, pages 34 - 35

PREAMBLE:

YEC states:

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. The Federal Contribution Agreement, however, has introduced its own specific risk requiring substantial completion of the Project on or before March 31, 2012. Yukon Energy has taken steps to mitigate these risks. A construction management approach was adopted to mitigate construction contractor risks related to contractor selection, price and delay.

QUESTION:

a) Please provide a detailed description of the construction management approach adopted and how this approach will mitigate ongoing risks.

b) Please explain fully the effects of failing to complete the Project on or before March 31, 2012, including the potential loss of Federal funding.

c) Please provide a detailed discussion of any analysis performed as to how YEC would address these effects if the Project is delayed beyond March 31, 2012.

d) Who bears the risk of additional costs if funding (either Federal or from the YDC) is lost, either as a result of delays or otherwise? Please explain fully.

ANSWER:

(a)

As noted in the Application at pages 35 and 36, the construction management approach adopted to mitigate construction contractor risks related to contractor selection, price and delay included early competitive selection of a construction contractor in spring 2009 through an MOU establishing procedures to arrive at an open book procurement and construction contract and a Alliance contract model for target pricing. As a result, YEC was able to secure a range of competitive proposals and to select a highly qualified contractor to work with YEC on finalizing the required contract planning as well as an Alliance model contract. This approach greatly enhanced YEC's ability, subject to permitting, to be able to start construction by June 2010 as required to complete the two full summer construction seasons needed to secure substantial completion before March 31, 2012 (as required under the Federal Funding Agreement). The Application also noted other positive outcomes to December 2009 from this approach, including the approach for early selection of the turbine generator contractor, added testing and refinement of the Project cost estimate and completion of more advance preliminary design engineering.

(b), **(c)** and **(d)**

YEC has focused on steps to protect against the risk of failing to complete the Project on or before March 31, 2012 through all relevant avenues, including permitting, contracting incentives and project work scheduling, long lead equipment ordering, and design options considered. The Federal Funding Agreement is the only information that YEC has to explain the effects of failing to complete the Project by this deadline, and YEC notes that its details in this regard are not necessarily apparent. Other effects of delay in Project completion include escalating project construction costs related to delay plus incremental diesel generation costs that could otherwise have been avoided. YEC would address such effects, if the situation arose, by doing what it could to get the Project completed as soon and cost effectively as possible and by pursuit of any and all potential options under the Federal Funding Agreement to secure deferral of the deadline as regards funding of eligible costs. Loss of federal or YDC funding would leave YEC exposed to the additional costs, and therefore YEC is taking all prudent steps to be protected against this risk.

TOPIC: The Effect of Mayo B on customer rates, Capital Cost Increase Risks

REFERENCE:

Application, Section 4.2, page 35

PREAMBLE:

YEC states:

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).

QUESTION:

a) Please provide a detailed analysis and explanation of the effect on customer rates over the next ten years of a 10% cost overrun on this Project (i.e. the Project costing $132 million rather than $120 million).

b) Please provide a detailed analysis and explanation of the effect on customer rates over the next ten years of a 20% cost overrun on this Project (i.e. the Project costing $144 million rather than $120 million).

c) Please provide a detailed analysis and explanation of the effect on customer rates over the next ten years of a 10% cost under run on this Project (i.e. the Project costing $108 million rather than $120 million).

d) If part of the answer to either (a), (b) or (c) is that, in the short-term the Proposed Flexible Debt Mitigation for Short Term Rate Neutral Impacts will keep rates from exceeding a 10 to 11 cents per kWh range, please provide a detailed numeric analysis in support of this claim.

ANSWER:

(a), **(b)**, **(c)** and **(d)**

The effects on ratepayers of the cost changes set out in this question will be mitigated by the flexible debt mitigation set out in the Application which caps costs to ratepayers at 10 to 11 cents per kW.h in 2012$. This is reviewed below.

The Application states (section 4.3.3, page 45) that YEC will arrange flexible debt financing with YDC for Mayo B similar to the current flexible term debt long term loan arrangements related to the Whitehorse #4 generating unit. The Mayo B flexible debt will allow the interest rate on the debt to be reduced as required below its face value, based on the IS grid generation load in any given year, 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/kW.h range (2012$). The final mechanisms for this flexible debt have yet to be determined. Please see YUB-YEC-1-25(b).

The Application, at pages 44 and 45, provides an analysis of the "unit cost ceiling target" for Mayo B that has been set at 10-11 cents/kW.h in 2012 (rising with inflation) to mitigate pressure on near term rates (beyond consideration of the benefits from Mayo B secured from diesel generation cost savings). 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. As a result, Mayo B costs would not be expected to create upward pressure on overall near term retail rates. An example was provided at page 44 of the Application of the results at a cap of 10.5 c/kW.h for the scenario with enhanced Mayo Lake storage benefits and Carmacks Copper:

- In year 1, net generation costs in excess of the 10.5 c/kW.h cap equal approximately $0.4 million;
- These decline to zero by year 3; and
- In year 8, after all mines are assumed to be closed in the forecast, these rise to $1.2 million[1], and decline thereafter to zero by year 13.

[1] Note that page 44 of the application cites $1.1 million, which has since been corrected.

Table 1 attached to this response sets out, as the base case, the above example for the first 10 years of Mayo B operation. This shows the extent to which the flexible debt mitigation would be required each year assuming a cap at 10.5 c/kW.h in 2012 and Mayo B net rate base costs of $36.5 million (per Table 1 of the Application).

Table 1 also presents the same analysis for each of the cost scenarios in the question.

- Cost increases at 10% and 20% result in all of the added costs going to YEC net rate base, i.e., no increases are assumed to occur in either the federal or YDC no cost capital contributions. As a result, the net rate base cost increases to $48.5 million (10% cost overrun) and $60.5 million (20% cost overrun).

- Cost decreases at 10% will not necessarily result in all of the cost decrease going to YEC net rate base, i.e., the net benefit to YEC rate base will be reduced to the extent that the Federal Funding contribution is reduced due to its cap at 50% of eligible costs. Table 1 assumes that Federal Funding is reduced by $3 million (implies that about half of the overall cost decrease results in a reduction of eligible costs below $106.7 million).

The Table 1 analysis shows the extent to which the proposed cap on net generation costs would be relevant in different years and/or different overall net rate base cost scenarios. It demonstrates the way in which near term ratepayer cost risks will be restricted by the proposed cap. However, the flexible debt mechanism will also act to enable YDC to recover interest costs as may be required in years when net generation costs are below the cap. Accordingly, at least in the near term for scenarios where the cap is relied upon materially to protect ratepayers in these initial years, the cap will also tend to apply as a minimum effective charge in years where savings are shown in Table 1.

Table 1
Mayo B Net Costs per kW.h During First 10 Years Operation
(With Mayo Lake enhanced storage benefits and Carmacks Copper load)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Base Case: $36.5 million Net Rate Base (Application pages 44-45)										
Mayo B $/kW.h (net)	0.119	0.112	0.108	0.104	0.100	0.099	0.126	0.208	0.180	0.165
10.5 cent index ($/kW.h)	0.105	0.107	0.109	0.111	0.114	0.116	0.118	0.121	0.123	0.125
Mayo B net costs (sav) to 10.5 c ($000)	379	148	(43)	(233)	(423)	(509)	175	1,234	913	682
10% Cost Overrun: $48.5 million Net Rate Base										
Mayo B $/kW.h (net)	0.156	0.147	0.141	0.135	0.130	0.129	0.164	0.271	0.234	0.214
10.5 cent index ($/kW.h)	0.105	0.107	0.109	0.111	0.114	0.116	0.118	0.121	0.123	0.125
Mayo B net costs (sav) to 10.5 c ($000)	1,345	1,102	899	697	495	396	1,069	2,115	1,783	1,539
20% Cost Overrun: $60.5 million Net Rate Base										
Mayo B $/kW.h (net)	0.192	0.181	0.173	0.166	0.160	0.159	0.202	0.334	0.287	0.263
10.5 cent index ($/kW.h)	0.105	0.107	0.109	0.111	0.114	0.116	0.118	0.121	0.123	0.125
Mayo B net costs (sav) to 10.5 c ($000)	2,312	2,056	1,841	1,627	1,413	1,302	1,962	2,997	2,652	2,397
10% Cost Underrun: $27.5 million Net Rate Base*										
Mayo B $/kW.h (net)	0.092	0.087	0.083	0.080	0.077	0.077	0.097	0.161	0.139	0.128
10.5 cent index ($/kW.h)	0.105	0.107	0.109	0.111	0.114	0.116	0.118	0.121	0.123	0.125
Mayo B net costs (sav) to 10.5 c ($000)	(346)	(567)	(750)	(930)	(1,111)	(1,188)	(495)	573	261	39

* Assumes that Federal Contribution reduced by $3 million

TOPIC: The Effect of Mayo B on Customer Rates

REFERENCE:

Application, Section 4.3.2, pages 41-42

PREAMBLE:

YEC states:

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 $3.1million/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 approximately $4.2 million/year for the 2012 to 2015 period. 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).

QUESTION:

a) Please provide the detailed calculations of the annual operating costs of Mayo B and the diesel alternative summarized in the quotation above.

b) Do these detailed calculations include any assumptions concerning changes in the cost of transportation of diesel? If yes, what are these assumptions and what is the basis underlying these assumptions? Please explain fully.

ANSWER:

(a)

Please see YUB-YEC-1-25(a). Annual operating costs for Mayo B have been estimated in current models on a long-term average basis without attempting to determine year-by-year variances beyond general inflation impacts.

(b)

No. The costs are based on forecast costs of diesel at 2012 reflecting NYMEX forecasts for light sweet crude/bbl in US$, and using standard conversions for volume, current values for US$/CDN$ exchange rate, and historically derived refining and transportation costs for delivery to Yukon. These estimates are consistent with current ratios. After 2012, fuel costs are escalated only for inflation.

TOPIC: Depreciation

REFERENCE:

Application, Section 4.3.3, page 42, footnote 75

PREAMBLE:

YEC states:

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.

QUESTION:

a) Should the second sentence read “capital intensive hydro project” rather than “hydro intensive project”?

b) Is the form of flexible debt financing referred to the same as shown on page 45 of the Application? If not, please explain fully.

c) How do the operating and maintenance costs of a hydro generation installation vary over time? Don’t labour costs increase with inflation and the maintenance costs of electrical and mechanical equipment increase as they get older?

d) Does YEC’s description of the costs of hydro generation hold true if electrical, mechanical and SCADA equipment must be replaced during the life of the generating station?

ANSWER:

(a)

Yes.

(b)

The flexible debt financing provision at page 45 of the Application follows the same principle as that established for the Mayo Dawson note: to mitigate potential annual rate impacts in the initial years of operation and to ensure annual per kWh costs are held within the defined cost ceiling during this period.

- For the Mayo-Dawson Project - in order to prevent ratepayers from paying higher costs at any time due to the Project than would occur with diesel generation [i.e., in those years before the "crossover point" is reached], flexible debt financing was provided to ensure ratepayers would not pay, in any year, more than they would have paid had Dawson remained on diesel fuel generation[1]. The note has a face interest rate of 6.55%, but actual interest payable in any year can be adjusted downwards to ensure that ratepayers are not paying any more in any year of the Project than the costs that would have been faced had Dawson remained on diesel generation.

- For Mayo B flexible financing - the interest rate on the debt will 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$). The interest rate on the debt will change based on the IS grid generation load, as required, to prevent the cost of Mayo B net generation used to displace diesel generation from exceeding a 10 to 11 c/kWh range (2012$). This provision will also include YDC funding at no cost to YEC of 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

[1]It was recognized that the MD project would normally result in higher costs than diesel generation in the first number of years of operation, and lower costs than diesel generation for the rest of the life of the project. In other words, up until the "crossover point" where the transmission line becomes less costly than diesel generation, ratepayers could otherwise be burdened with higher costs with the transmission line than with the diesel generation.

delays in connecting the Carmacks Copper mine load to the grid. 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 load over its life equal to YDC's long term borrowing costs when the flexible debt is established.

Please see also YUB-YEC-1-25(b).

(c) and **(d)**

The cost estimates address general inflation and maintenance requirements. Annual operating and maintenance costs for Mayo B have been estimated in current models on a long-term average basis without attempting to determine year-by-year variances beyond general inflation impacts. As noted in footnote 44 in the Application, these costs include provision (average over time) for major overhauls approximately once every 10 years. It is also understood that different components of the project will have different effective economic lives - the 65 year assumed overall depreciation is intended to provide a reasonable overall assessment for current purposes.

YEC's description of the costs of hydro generation as references in this question was intended to address the overall cost structure (capital versus other operation costs) for such projects relative to options such as diesel generation.

TOPIC: Potential Concerns Absent Proposed Mitigation

REFERENCE:

Application, Section 4.3.3, pages 42-44

PREAMBLE:

YEC provides a series of scenarios without the proposed flexible financing.

QUESTION:

a) Please provide the detailed calculations behind each scenario.

ANSWER:

(a)

Please see response to YUB-YEC-1-25(a) for the various scenarios, and CW-YEC-1-13 for additional information.

TOPIC: The Effect of Mayo B on Customer Rates

REFERENCE:

Application, Section 4.3.3, page 43 and footnote 77

PREAMBLE:

YEC states:

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.

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 [emphasis added].

QUESTION:

a) Please discuss how depreciation on this Project decreases over time if YEC employs straight-line depreciation methods.

b) Please provide the rates of depreciation that YEC intends to apply to the various classes of equipment that comprise the Mayo B Project. What assumptions has YEC made, if any, concerning changes in depreciation rates over the life of the Project?

c) Please confirm that the "added depreciation and allowed return on rate base" will be calculated on rate base net of contributions from the Canadian and Yukon governments.

d) Please outline all potential "costs not otherwise funded by federal or YDC funding contributions." Please confirm that this includes any cost overruns on the Mayo B Project. If not confirmed, please explain fully.

ANSWER:

(a)

Depreciation does not reduce over time. The sum of depreciation and return on rate base (the carrying costs of capital) reduce over time as the asset is depreciated. Please see YUB-YEC-1-25(a).

(b)

YEC has not identified the specific asset classes that will comprise the investment in Mayo B. YEC has used an estimated composite depreciation of 65 years, consistent with the present depreciation rate for Waterwheels, Turbines and Generators. As noted in footnote 45 in the Application, the overall average life assumed (65 years) 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.

(c)

Confirmed.

(d)

Costs not otherwise funded by federal or YDC funding contributions comprise all costs of the project, less $83.5 million, as set out at Table 1 of the Application. In the event the project costs are higher than $120 million, the contributions from federal and YDC sources remain the same. See also CW-YEC-1-13.

TOPIC: Hearings

REFERENCE:

Application, Section 4.3.3, page 43, footnote 77

PREAMBLE:

YEC states:

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.

QUESTION:

a) Does YEC intend to make a general rate application to recover these costs? If not, how does YEC propose to recuperate the Mayo B costs from customers?

b) Does YEC intend to make this general rate application coincide with the expiry of OIC 1995/90 and restructure rates as well?

ANSWER:

(a)

Mayo B was not included in the project ratebase costs reviewed by the Board at the 2008/2009 GRA, and therefore YEC intends to apply to the Board in its next general rate application to include such new project costs in adjusted rates (including rates to recover return on the added ratebase).

(b)

OIC 1995/90 provides the general rate policy directives in relation to rate setting in Yukon. This OIC has no expiry date. OIC 2008/149 and OIC 2007/94 amend this general rate policy direction provided in OIC 1995/90 with regard to interclass rate rebalancing and industrial rates respectively. These OIC's are both to expire December 31, 2012.

The timing of the next Yukon Energy General Rate Application has not yet been determined.

TOPIC: Annual Unit Cost Ceiling Target for Rate Neutral Annual Impacts

REFERENCE:

Application, Section 4.3.3, page 44

PREAMBLE:

YEC states:

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. 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.

QUESTION:

a) Please discuss how the unit cost ceiling target of 10-11 cents/kWh in 2012 was chosen.

b) Is this target the rate for energy delivered to customers or the specific rate for energy generated by Mayo B?

c) How does this target compare to the unit cost of energy delivered approved as a result of YEC's 2008-2009 general rate application?

d) Please provide a year by year table of forecast rates for energy delivered to customers for the next ten years for each scenario on pages 44 to 45.

e) Please respond to the question (d) above assuming there is a 10% capital cost overrun (i.e. the Project costs $132 million rather than $120 million).

f) Please respond to the question (d) above assuming there is a 20% capital cost overrun (i.e. the Project costs $144 million rather than $120 million).

g) Please respond to the question (d) above assuming there is a 10% capital cost under run (i.e. the Project costs $108 million rather than $120 million).

ANSWER:

(a)

As noted on page 44 of the Application, the unit cost ceiling of 10c/kWh to 11c/kWh in 2012 (rising with inflation) was based on the assumed average Major Industrial rates to be applied in 2012 in order that the Mayo B net generation revenue requirement costs would not materially exceed rate revenue growth per kW.h, i.e., Mayo B costs would therefore not be expected to create upward pressure on overall near term retail rates.

(b) and **(c)**

The unit cost ceiling target is specific to the net generation (i.e., diesel generation estimated to be displaced) by Mayo B, and does not include added costs for losses to deliver energy to customers. The unit cost of energy delivered approved for industrial customers in the YEC 2008/2009 GRA was 10.55 c/kWh in 2008 and 11.04 c/kWh for 2009 (see Schedule 11 of YEC Compliance filing – includes impacts of fixed Rider F).

(d), **(e)**, **(f)** and **(g)**

Please see response to CW-YEC-1-13 for the information that is available at this time, based on net generation costs.

TOPIC: Proposed Flexible Debt Mitigation for Short Term Rate Neutral Impacts

REFERENCE:

Application Section, 4.3.3, page 45

PREAMBLE:

YEC states:

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.

QUESTION:

a) Please identify which debt instrument on Schedule 13 of YEC's 2008-2009 rate application is the flexible term debt long term loan arrangements related to Whitehorse #4 generating unit?

b) Please quantify the rate mitigation effect of the proposed flexible debt financing on the Mayo Dawson Transmission Project and Mayo B.

ANSWER:

(a)

It is the Canada Flexible Term Note, currently now held by YDC.

(b)

There is no rate mitigation effect of the Mayo B project on the Mayo Dawson Transmission Project.

The Mayo-Dawson Note is separate long term flexible debt incurred as a component of financing the Mayo Dawson Transmission Project.[1] Consistent with its structure as long-term debt, the face interest rate on the note is fixed for the duration of the note at 6.55%.

The provisions of the Mayo Dawson Note are designed to protect ratepayers in the event of underperformance of the line, ensuring ratepayers will not pay more in any year than they would have had Dawson remained on diesel generation. The 6.55% face interest on the promissory note is the Maximum Interest Payable, and actual interest in any given year can be adjusted downwards to ensure that ratepayers are not paying any more in any year of the Project than the costs that would have been payable had Dawson remained on diesel generation. Consequently, the lender (YDC) bears risks with respect to the performance of the line and its role in YEC's system. It is not expected that any outside lender would accept such terms in any refinancing.

Benefits of the Mayo Dawson line were quantified in response to YUB-YEC-1-13 provided during the YEC 2008/2009 GRA where it was noted that for 2008:

> The Mayo Dawson line resulted in benefits to ratepayers of $4.700 million in avoided diesel fuel (16.488 GW.h of baseload diesel saved, at 3.8 kW.h/litre efficiency and an average price of $1.0832 per litre) and a further $0.263 million in avoided diesel O&M costs (at 1.6 cents/kW.h for 16.488 GW.h of diesel saved) as well as $0.314 million in avoided diesel capital costs as set out in the Mayo-Dawson financing agreement. Total diesel savings were therefore $5.278 million. This does not include the benefits to YECL of being able to purchase wholesale power from YEC at Stewart Crossing and avoid the use of diesel gensets.
>
> Total costs for the Mayo-Dawson line with an equity return at approved fair ROE levels of $0.913 million (project mid-year 2008 rate base at $25.923 million times 40% equity ratio at 9.05% rate of return as last approved by the YUB), interest on the flexible note of $1.052 million, plus depreciation of $0.724 million and O&M cost of $0.073 million. The resulting total costs of the project are $2.762 million.
>
> The net benefits of the Mayo Dawson project in 2008 were $2.516 million.

[1] In order to provide the 60% long-term debt component of the Mayo-Dawson project capital costs, and to ensure ratepayers would not be worse off in any year as a result of the Mayo-Dawson project than they would have been had Dawson remained on diesel fuel generation, Yukon Development provided an $18 million advance with flexible terms with respect to interest payable ("Mayo Dawson Note"). The forecast balance on the Mayo-Dawson Note is $15.607 million as at year-end 2008 and $15.157 million at year-end 2009.

YEC forecasts the actual rate of interest in 2009 to be 6.55%. Based on the calculation provided in the promissory note, and as long as the price of diesel remains above approximately 50 cents/litre, the interest on the note is expected to remain at the full 6.55%.

For discussion of Mayo B flexible debt as proposed, please see YUB-YEC-1-25(b).

TOPIC: Contributions - NND FN

REFERENCE:

Application, Section 5.0, p.47-48, Attachment E, Schedule B-2.

PREAMBLE:

YEC states:

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).

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.

QUESTION:

a) Please confirm that the above-referenced contributions are made by YEC. If not confirmed, please explain who makes the contribution.

b) Please identify the amount contributed towards the FNNND participation in the Planning Phase of the Mayo B Project.

c) Please identify the amount contributed towards the FNNND participation in the YESAB reviews and project-related consultation on the Mayo B Project.

d) Please confirm that these contributions are included in Schedule B-2 of Attachment E for Mayo B in the row entitled “YEC with NND FN”. If not confirmed, please explain fully.

e) Please provide a breakdown of the provision of these funds for the years 2009/10, 2010/2011 and 2011/2012 as per Schedule B-2 of Attachment E.

f) Please reconcile the difference between the $36.7 million total contribution to Mayo B as shown in Schedule B-2, Attachment E and the $36.5 million estimated cost for YEC shown in Table 1, p.12 of the Application.

ANSWER:

(a), **(b)** and **(c)**

The referenced contributions are made by YEC. Contribution agreements to date by YEC with NND for capacity funding towards planning activities of the Mayo B Project, including participation in the YESAB reviews and project-related consultation and studies on this project, equals $81,200. Additional funds of up to $55,000 have been committed for field studies undertaken (or to be undertaken) by NND.

(d) and **(e)**

The above contributions to NND have nothing to do with contributions referenced in Schedule B-2 of Attachment E. The Schedule E reference relates solely to the potential investment by NND in the net rate base costs of Mayo B. YEC contributions to NND as noted above are generally prior to March 31, 2010, although some of the additional funds for field studies will occur in 2010/2011.

(f)

The numbers in Schedule B-2 were prepared prior to signing of the Federal Funding Agreement in summer 2009, and therefore prior to finalizing the Yukon Government funding commitment to YDC. The $36.5 million in Table 1 of the Application reflects the Yukon Government funding commitment to YDC as set out in Attachment F of the Application.

TOPIC: System Capacity

REFERENCE:

Application, Attachment C-1

PREAMBLE:

YEC states:

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, 1MW YECL hydro, and 6 MW of YECL diesel).

QUESTION:

a) Please provide the capacity contribution in MW of each generating unit on the system at the winter peak under the current two grid system and for the system when integrated. For Hydro Units, please show the contribution at low, median and high water levels. Please include the capacity of diesel units that will be displaced by Mayo B but will not run at the system peak. How much of each unit's capacity can be dispatched?

b) Please provide the industrial, commercial and residential load at the winter peak. How much of this load is firm and how much is interruptible, i.e. what load can be shed to shave the peak?

c) Please describe YEC's current system control center. Is any additional investment and labour required in YEC's system control center in order to operate an integrated grid? If so, have these additional costs been incorporated in the $120 million cost of the Project?

ANSWER:

(a)

The capacity contribution of each unit does not change when the two systems are integrated. The winter capacity of the units (in MW) is as follows:

- Whitehorse Hydro (4 units) – combined firm capacity of 24 MW (at low winter flows – summer nameplate is 40 MW).
- Aishihik Hydro (3 units, once AH3 is commissioned) – combined firm capacity of 37 MW under LOLE analysis, but no contribution to firm load carrying capability under N-1 due to transmission constraints.
- Mayo Hydro A (2 units) – 5 MW.
- Whitehorse Diesel (7 units) – 25 MW. Two of these units (Mirrlees at 4 MW and 5 MW respectively) require recommissioning in the next few years to ensure their continued ability to be considered firm capacity.
- Faro Diesel (4 units) – 10 MW.
- Mayo Diesel (2 units) – 2 MW.
- Dawson Diesel (4 units) – 4 MW.
- YECL Diesel – 6 MW (4 WAF diesel backup units, plus 3 units at Pelly Crossing and 3 units at Stewart Crossing). One unit (Haines Junction) has no contribution to firm load carrying capability under N-1 due to Aishihik transmission line constraint.

To this complement Mayo B will be added at approximately 10 MW.

(b)

Firm load at peak without industrials is provided in response to YUB-YEC-11, and peak loads including industrials are provided in YUB-YEC-1-12. These loads include only firm loads and not interruptible or secondary loads.

YEC cannot readily provide peak loads by class, as its forecasts are prepared based on wholesales to YECL. YEC does not directly serve most retail customers in Yukon.

The coincident peak load of secondary customers is estimated at 4-5 MW, but is not directly metered as a class.

(c)

The Mayo B project does not involve creation of an integrated grid, i.e., CSTP Stage 2 is a separate project in this regard, and not the subject of the Application. To the extent there are costs related to that interconnection, they are part of the CSTP Stage 2 project. The system control center presently has visibility and control over generation at Mayo, and this will remain the case with Mayo B. Costs to implement this control and SCADA connection for Mayo B at the site are part of the project costs.

TOPIC: Growth in Load

REFERENCE:

Application, Attachment D-2, Table D-1

PREAMBLE:

YEC provides the following Table:

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

QUESTION:

a) Please provide the source of YEC's projected population growth.

b) Please confirm that the forecast growth rate used by YEC for non-industrial customers is 1.85%. If not please provide the forecast growth rate.

c) What is the forecast growth rate for "WAF and MD Normal Non-Industrial loads & losses" as shown in Figure D-1 on p.D-4? If different from the response to b) above, please explain why.

ANSWER:

(a)

The Whitehorse population for December 2008 is 25,403, per the Yukon Bureau of Statistics, found here:

http://www.eco.gov.yk.ca/stats/pdf/population_dec_2008.pdf

The population for December 2005 was 23,511, also per Yukon Bureau of Statistics. While this document is no longer available online, the number is cited and referenced in response to YUB-YEC-1-8(c) from Yukon Energy's 2006-2025 Resource Plan hearing.

Note that the December 2009 value is now available, at 25,690 (per the same source[1]), which yields a 4 year grow rate of 2.24% (i.e., as compared to December 2005), which remains well above the 2005 level forecast.

The Yukon Bureau of Statistics Medium Growth projection is set out here:

http://www.eco.gov.yk.ca/stats/pdf/population_projections_2018.pdf

This document shows the total 10 year growth rate (to 2018) at 5.4%.

(b)

Confirmed.

(c)

It is 1.85%, the same as in part (b).

[1] http://www.eco.gov.yk.ca/stats/pdf/population_dec_2009.pdf

TOPIC: Growth in Load

REFERENCE:

Application Attachment D-3, Table D-2 and Figure D-1

QUESTION:

a) What are the risks of forecast industrial loads of the Minto, Alexco and Carmacks Copper mines to the year 2018 as shown in Table D-2 not materializing?

b) If industrial loads do not materialize as forecast, please explain the effects on residential and commercial rates over the next 10 years.

c) Assuming the projected industrial load materializes, will it require YEC to bring on additional diesel generation to supply system peak demand? If so, how will YEC address this matter? Will a new diesel plant need to be commissioned? Please explain fully.

d) What are the risks of the forecast increase in "WAF and MD Normal Non-Industrial loads & losses" over the next 10 years, as shown in Figure D-1, not materializing?

e) If these non-industrial loads do not materialize as forecast, please explain the effects on residential and commercial rates over the next 10 years.

ANSWER:

(a), **(b)** and **(c)**

Attachment D of the Application notes at page D-3 that the above-noted loads referenced in Table D-2 reflect either operating mines (i.e., Minto), or in the case of Carmacks Copper and Alexco, mines undergoing advanced permitting or development activities.

Material reductions in near term loads for mines already developed or now under construction, such as Alexco and Minto, are not considered a major risk to the Project.

The Application specifically reviews the risk of Carmacks Copper not proceeding as assumed (including not proceeding at all) – in the case of Carmacks Copper, a delay in start of its operations is a materially different risk than it not starting to operate in the time period noted.

Long term variances from the base case forecast are not considered a major risk to the Project's ability to secure diesel cost savings. At page 38, the Application notes that were the Carmacks Copper load to not materialize on the system, the Project would continue to provide cost savings relative to diesel generation each year (demonstrated by Figure 4 provided at page 39 of the Application).

As noted in the Application, residential and commercial rates will be mitigated over the next ten years by the flexible debt financing provisions for Mayo B (see responses to YUB-YEC-1-25(b), CW-YEC-1-13 and CW-YEC-1-19).

YEC has not updated its LOLE capacity planning analysis for the integrated grid (WAF and MD) and has not therefore assessed at what point added diesel capacity would be required for winter peak loads. Mayo B will defer this requirement. (Please see YUB-YEC-1-41, YUB-YEC-1-11, and YUB-YEC-1-12).

(d) and **(e)**

The risks of the non-industrial loads not materializing is considered low at this time. The effects of this risk on retail rates, if it occurs, would be minimized by the flexible debt financing provisions for Mayo B.

TOPIC: Allowance for Funds Used During Construction (AFUDC) and Project Financing

REFERENCE:

Application, Attachment E

PREAMBLE:

The City wishes to investigate the interim financing costs for the Project.

QUESTION:

a) Section 6.2 of Attachment E states that claims are to be submitted at three month intervals. How does YEC intend to finance the projects in the interim between payments to contractors and receipt of grants? Please explain fully.

b) Does YEC intend to create an AFUDC account for financing costs incurred during construction? If not, what regulatory treatment does YEC propose for AFUDC that will be incurred during the construction phase of Mayo B? How will YEC treat AFUDC incurred by the Mayo B and CSTP Stage 2 on its financial statements?

c) What is the total amount of AFUDC that will be accumulated by this Project? Has this been included in the estimated cost of $120 million or is this an additional cost to be recovered through rates?

d) Please provide a monthly schedule of AFUDC incurred by the Mayo B Project separated into debt and equity components.

ANSWER:

(a)

YEC is arranging short term financing with the Yukon Government and with its bankers, in order to secure low cost interim financing as required for Mayo B and CSTP Stage 2.

In addition, YDC is arranging for bond financing that will provide added funds as required for these projects during construction as well as on a long term basis.

(b), **(c)** and **(d)**

See Table 1 provided as response to CW-YEC-1-5. Provision for AFUDC is included under Owner's Costs ($1 million during construction - other AFUDC is included in planning costs). AFUDC will be charged based on short term financing costs incurred, and not based on YEC's average rate base cost of debt and equity.

YEC is currently finalizing project cash flow projections and, in coordination with YDC, construction period financing arrangements are also still being finalized. Accordingly, YEC is not able to provide a useful response at this time setting out a monthly schedule of the project financing or of AFUDC as requested (See CW-YEC-1-2(f) and (g)).

TOPIC: Project Funding

REFERENCE:

Application, Attachment F

PREAMBLE:

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.

QUESTION:

a) What is the portion referred to in the above quotation? If the portion is less than 100%, who is responsible for the remaining portion? Please explain fully.

b) Is the loan in the name of the Yukon Government or the Yukon Development Corporation?

c) How will YEC treat this capital on its own financial statements?

ANSWER:

(a), **(b)** and **(c)**

Subject to YDC borrowing more than overall magnitude of funds for the projects as described in Schedule F, the Yukon Government's annual contribution to YDC of the principal and interest will relate to $52.5 million of the borrowing. YEC understands that the loans as referenced will be in the name of YDC, and that YEC will only carry on its books those net costs for which it is responsible. Please also see response to YUB-YEC-1-16.

TOPIC: Hearing Costs

REFERENCE:

Hearing Reserve Account

PREAMBLE:

The City wishes to investigate the regulatory costs incurred by the Mayo B Project as these were apparently not included in YEC's 2008-2009 general rate application.

QUESTION:

a) Please provide the anticipated regulatory costs associated with this Project before the YESAB, Transport Canada, Department of Fisheries and any other regulatory body, including this hearing.

b) Please confirm that these costs are included in the $120 million forecast Project cost. If not confirmed, how does YEC propose recovering the costs of these various applications?

ANSWER:

(a) and **(b)**

Please see response to YUB-YEC-1-26. All costs related to the current YUB process for review of this project will be subject to Board approval and will comply with Board directives. Other project costs, including other regulatory cost for YESAB and permitting, will be included in the capital cost of the project to be reviewed as part of a future general rate application proceeding after the project is in service.

Estimates for all anticipated regulatory costs associated with Mayo B are included in the $120 million forecast budget cost (see CW-YEC-1-5(a)).

TOPIC: Phase 2 and Cost of Service Study

REFERENCE:

Current Phase 2 Application

PREAMBLE:

The City supports the Utilities and intervenors working towards determining costs that are as close as possible to representing the "true costs" to service each rate class. The City understands that the costs of the Mayo B project will not be included in the cost of service study proposed in the current joint YEC/YECL Phase 2 GRA.

QUESTION:

a) Please confirm that the costs of the Mayo B Project will not be included in the cost of service study proposed in the current joint YEC/YECL Phase 2 GRA. If unable to confirm, please explain fully.

b) If confirmed, will YEC undertake to provide a pro forma cost of service study to show how rates will be affected when Mayo B enters service?

ANSWER:

(a) and **(b)**

The joint YEC and YECL Phase II Rate Application filed February 19, 2010, does not include Mayo B costs. It is based YEC and YECL approved revenues requirements for 2009.

Cost of service impacts of Mayo B should be measured against the conditions (revenues and rates) that exist at the time Mayo B is brought in service. To include Mayo B in a cost of service study based on 2009 revenues would not provide meaningful or appropriate results. YEC is not able to undertake a cost of service study today to show how costs will be affected for each rate class when Mayo B enters service.

UTILITIES CONSUMERS' GROUP
(UCG)

TOPIC:

REFERENCE:

Application, page 1

YEC indicates that "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".

QUESTION:

a) Please explain the requirements of the funding agreement with the Federal government that are determining the construction schedule of this Yukon infrastructure project.

b) What efforts have been taken to extend the funding agreement timeframes to allow for a more complete and thorough review of this project? Please provide all correspondence related to these efforts.

ANSWER:

(a)

Section 3 of the Federal Funding Agreement sets out the obligations of the parties; section 3.1 notes the contribution to be paid by Canada is subject to the Terms and Conditions of the agreement, including Schedule B.[1] Section 3.1(a) states that Canada will not pay more than 50% of the Eligible Costs (up to $71 million) during the three Fiscal Years starting in 2009-2010 and ending in 2011-2012. Section 3.2 obligates the funding recipient (YEC) to be responsible for complete, diligent and timely Project Implementation within the costs and deadlines specified in the Agreement. This would include the requirement to have the project complete by funding deadline of March 31,

2012 per the timeline provided in Section 3.1(a) and in Schedule B2 (estimated completion date of December 31, 2011).

(b)

YEC is obligated to meet the terms and conditions of the Agreement, in order to be eligible to receive the $71 million in federal funding towards the Legacy Project. This includes meeting the timelines provided in Schedule B.

See also, response to CW-YEC-1-12.

TOPIC:

REFERENCE:

Application, page 1-2

On page 1, the application states that "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. 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".

On page 2, the application states that "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".

QUESTION:

a) Please explain whether an additional 1 meter drawdown of Mayo Lake is still a component of the Mayo Hydro Enhancement Project under review by the YUB.

b) If the additional drawdown is included, please explain how the YUB could make a final determination and recommendation on the proposed Mayo B project without having a complete environmental evaluation by the YESAB.

c) If the additional drawdown is not included, please explain what impact this would have on the rates and bills of ratepayers.

ANSWER:

(a) and **(b)**

The energy project designated for review by the YUB is as described in OIC 2009/220 and in the Terms of Reference provided to the YUB by the Minister on December 18, 2009. The additional 1 meter of drawdown at Mayo Lake (i.e., the Mayo Lake Project, or the Mayo Lake Drawdown)) is not included in Mayo B Project as defined in OIC 2009/220; it is also no longer included in the Mayo B Project currently being reviewed by YESAB.

However, the YUB's Terms of Reference for review of this Application (section 3(b)) task the Board with "reviewing the implications of Mayo B prior to the environmental and socio-economic assessment and regulatory approval of the Mayo Lake Drawdown "including how, if at all, Mayo B's expected impact on YEC and its customers differs according to whether the Mayo lake Drawdown is permitted or not", and (at 3(c) (vi)) the risk arising from "the possibility that the Mayo Lake Drawdown does not proceed". These matters are addressed in the Application (section 4.2 addresses risk related to Mayo Lake removal or delay of Mayo Lake storage enhancement, and rate effects are discussed in section 4.3).

See also response to YCS-YEC-1-1. The general purpose of the current Mayo B Application and Board review is to "obtain the YUB's report and recommendations on the potential benefits, costs, risks and customer impacts that influence whether Mayo B should proceed as proposed by YEC." A summary of environmental and socio-economic impacts of the Mayo B project is provided at section 3.4 of the Application, however, this proceeding is not to review in exhaustive detail or make determinations related to the environmental or socioeconomic effects of the Mayo B project. Similarly, the Board can address the Mayo Lake Drawdown as required under the Terms of Reference.

The current YUB process is being undertaken to provide the Minister with recommendations related to the designated project prior to the issuance of the Energy Project Certificate and Energy Operation Certificate for the designated project. While the Minister cannot issue these certificates until the YESAB process is complete and decision documents are issued, the current Board review (since it does not specifically result in a permit or approval for the project to proceed) may be undertaken with recommendations to the Minister absent the completion of any related YESAB review. In

the only prior Part III review (the review of CSTP), the YUB report was in fact prepared and submitted prior to even a draft YESAB screening report on the CSTP.

(c)

The effects of Mayo Lake Drawdown not being approved are addressed in the Application. Please see sections 4.2 and 4.3 of the Application. At page 37, the Application notes that "based on long term average flows, Yukon Energy would be required to provide 4 GWh/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). At 26 cents/kWh incremental cost for diesel generation (2012$), the 4 GWh 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."

TOPIC:

REFERENCE:

Application, pages 2

"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".

QUESTION:

a) Please explain any differences between the "Mayo B" project proposed in Appendix B of the Resource Plan and the Mayo Hydro Enhancement Project currently before the YUB.

b) Please provide evidence where the YUB referenced the "Mayo B" project in its January 15, 2007 Report to Commissioner in Executive Council regarding YEC's 20-Year Resource Plan.

c) Please provide details of the specific review that was conducted of the Mayo Hydro Enhancement Project during the review of the Resource Plan.

ANSWER:

(a)

The project as discussed in the 20-Year Resource Plan was discussed as a potential enhancement to the existing facility at Mayo. The response to UCG-YEC-1-89(c) filed

during the Yukon Energy 2008/2009 GRA provides an excerpt from Appendix B of the 20-Year Resource Plan which notes as follows regarding Mayo B:

> The existing hydro site at Mayo has the potential to be enhanced by various changes in configuration, either to develop further head below the existing reservoir or an expansion of capacity utilizing the same head. This leads to multiple potential alternatives. However, as a supply option to WAF, these various projects are only of relevance if the Carmacks- Stewart transmission line is previously in service. The full capability of various potential Mayo enhancements to supply an interconnected WAF and MD system (as opposed to MD on its own) has not been fully studied, and should be re-examined in the event that the interconnection proceeds. One configuration alternative considered is a 10 MW, 48 GW.h, $101 million (2005$) variation based on a separate conveyance route from the existing reservoir to a new plant lower in elevation than the existing plant, which would be able to operate in parallel with the existing plant. This concept has an initial LCOE of 11.2 cents/kW.h. Various other concepts require further study. However, although work is still in preliminary stages, it must be recognized that it is possible no credible facility enhancements of this type exist at Mayo.

The currently proposed project has been subject to, and further defined by, more rigourous, detailed review and feasibility planning (as discussed in detail in the project description provided in section 3.1 of the Mayo B Part III Application and Attachment A2-1 which describes alternatives and alternative configurations considered). Conceptually, the current Mayo B project reflects the configuration alternative as discussed in the Resource Plan, but with a lower level of expected overall added generation.

(b)

The Mayo B project is not specifically referenced[1] in the Board's report, however, the Board does address and endorse in the report the long term planning approach of YEC.

[1] Much of the focus of attention at the time of the 20-year Resource Plan and the Board's report was meeting near term capacity requirements discussed in Chapter 4 of the 20-Year Resource Plan, as well as other near term developments proposed by YEC. However, longer term planning requirements and scenarios were reviewed and addressed in the report (without specific reference to Mayo B or any other small hydro projects in the range of 5-10 MW that may be candidates for development under Chapter 5 forecasts under the 25 MW industrial scenario or larger).

While not recommending a specific longer-term project such as Mayo B, the Board sets out a process for review of the next project determined to be required to meet longer term load requirements.

In its report the Board recommended that YEC continue to monitor potential material load additions and, when warranted, make a filing with the Board when new facilities are required to meet increased loads, outlining the risk of proceeding, the benefits to existing ratepayers, and sensitivities to existing ratepayers if the economic life of the project is shorter than forecast.

Specifically, the report to the Commissioner in Executive Council regarding the 20-Year Resource Plan notes at page 7 (with regard to discussion of longer term industrial load forecast discussed in detail in Chapter 5 of the 20-year Resource Plan):

> The Board is cognizant of the risks within this type of forecast and yet sees benefits to all ratepayers when infrastructure is constructed for industrial developments. The Board recognizes the efforts of YEC in investigating future potential industrial loads and the planning guidelines it follows when assessing these potential developments and agrees with the balanced approach that YEC utilizes. It is recommended that YEC continue to monitor these potential material load additions and, when warranted, make a filing with the Board when new facilities are required to meet these increased loads. Within the filing, YEC should outline the risk of proceeding, the benefits to existing ratepayers, and sensitivities to existing ratepayers if the economic life of the project is shorter than forecast. Further, YEC should outline how its contribution policy is being applied and what contributions it will receive from the industrial customer for the infrastructure created to satisfy the load.

At page 49, the report notes that it agrees with YEC's long term planning approach utilized in the Resource Plan and notes that, "when YEC proposes a new facility, YEC is to outline the risk of proceeding, the benefits to existing ratepayers, and sensitivities to existing ratepayers if the economic life of the project is shorter than forecast.[2]"

(c)

The Mayo B Expansion was discussed in Chapter 5 of the Yukon Energy 20-Year Resource Plan (see, Chapter 5 and Appendix B of that filing) as part of an inventory of hydro project options. The details provided were summaries from previous studies, and included an estimated LCOE as noted.

As noted at page B-1 of the Resource Plan, the projects included in Appendix B represented "the primary alternatives identified to date based on review of the numerous studies conducted in Yukon." Mayo B was specifically discussed in that document as one of a group of small projects being considered (within the 5 to 10 MW range) at page B-10. The Resource Plan noted that small hydro projects in the range of 5-10 MW were potential candidates for development under Chapter 5 forecasts under the 25 MW industrial scenario or larger. These projects could also potentially be part of a development plan under the larger 40 MW scenario.

[2] Specifically, the Board notes at page 47 of the Report to the Minister that, "The Board agrees with the long-term planning approach utilized by YEC in the Plan. The approach by YEC in assessing the industrial development factors versus the Yukon Energy factors is balanced. On a go-forward basis, YEC should attach probabilities to the industrial development scenarios. This would assist the Board in comparative analysis when future resource plans are filed or when applications under Part 3 of the Public Utilities Act are submitted. As recommended in the Load Forecast section, when YEC proposes a new facility, YEC is to outline the risk of proceeding, the benefits to existing ratepayers, and sensitivities to existing ratepayers if the economic life of the project is shorter than forecast."

TOPIC:

REFERENCE:

Application, page 2

"The business case (justification, need for and alternatives to) for pursuing the Mayo B project was reviewed during recent YEC 2008/2009 GRA".

QUESTION:

a) Please confirm that the costs associated with the proposed Mayo Hydro Enhancement Project were included as deferred costs during Phase 1 of YEC's 2008/2009 GRA and that none of these costs had been included in rate base.

b) Please confirm that the YUB's decision for Phase 1 of YEC's 2008/2009 GRA (page 47) indicated that there was a lack of business cases provided for projects identified in the deferred costs classification and that the YUB believed that the absence of significant and material information prevented projects like Mayo B from being declared justifiable.

c) Please provide details on when YEC expects to be able to proceed with a separate YESAB filing and review process to secure the required licences and approvals for Mayo Lake enhanced storage.

ANSWER:

(a)

Confirmed as regards those elements of the Mayo B costs included in YEC's 2008/2009 GRA filing.

(b)

Not confirmed. The Board did not indicate that the absence of a business case prevented deferred cost projects from "being declared justifiable", but instead noted that it accepted YEC's position that undertaking feasibility work provided enduring benefits to

ratepayers. The Board was comforted by YEC's position that these projects were being prudently managed and acknowledged "the numerous steps that are involved in bringing a project to fruition and the fine balance that exists between micro managing and allowing a utility to conduct its business." The Board went on to note that intervenor concerns related to the lack of business cases for individual projects to be justifiable, but stated that information in support of these costs is to be provided "in future, for those costs which YEC wishes to include in its revenue requirement".

Specifically, the Board, in Order 2009-8, noted as follows (at paragraph 243):

The Board accepts YEC's arguments regarding the enduring benefits of:

- Having projects that are "shelf ready" such that they are ready to proceed at some future date as circumstances warrant;
- The feasibility work that already has been undertaken may result in products that have other uses and applications of ongoing value to the utility; and
- The benefits of engaging with the local community and working with them through the issues.

The Board finds these benefits justify incurring the deferred costs.

Further, at paragraph 244 and 245 the Board provided:

> Despite intervener comments regarding the lack of cost-benefit considerations in respect of deferred costs, the Board takes some comfort with YEC's assertion that Mayo B deferred costs were prudently managed[1]....
>
> ....The Board is also aware of the numerous steps that are involved in bringing a project to fruition and the fine balance that exists between micro managing and allowing a utility to conduct its business. However, the Board finds intervenor

[1] The Board provides a quote from YEC's Argument in that proceeding (page 54-55) noting as follows, "We look at the project and look at a certain set of information. We had to do some baseline, we had to do a series of tasks we had to complete in order to file an environmental Application. We have done that with YESAB. We filed the Application. We are not going very much further down this road in terms of expenditure, and I mean very much at all, without getting some clear indication as to whether or not we are going to get funding."

comments regarding the lack of business cases for each the individual projects and hence the absence of significant and material information to be justifiable. Therefore, in future, for those costs which YEC wishes to include in its revenue requirement, the Board directs YEC to provide appropriate business cases to support those costs.

(c)

As noted at page 1 of the Mayo B Part III Application, "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." Further detail is provided at page 16, 37-38 of the Application. In addition to completion of the Mayo B YESAB process, additional field studies as indicated to be needed by YESAB must be completed in summer 2010 before YEC can finalize a YESAB Project Proposal filing for the Mayo Lake Project.

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.

TOPIC:

REFERENCE:

Application, page 5, 12; Application Attachment E; December 18, 2009 Letter from Minister to YUB

On page 5, the application states that the Mayo Hydro Enhancement 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".

On page 12, the application contains a table showing a breakdown of project costs and financing. Yukon ratepayers are contributing $66.65 million and Federal taxpayers are contributing $53.35 million of the current $120 million estimated cost of a project expected to add 10 MW to the gross generation capacity at Mayo.

In her December 18, 2009 letter to the YUB, the Yukon's Minister of Justice stated that "Mayo B will receive up to 53.3 million dollars from the Government of Canada as part of the Canada-Yukon Energy Corporation Green Infrastructure Fund: Agreement for the Yukon Green Energy Legacy Project 2009-1012011-2012".

QUESTION:

a) Please confirm YEC's understanding that for the YUB's energy generation model analysis used during its review of YEC's 20 Year Resource Plan, the YUB assumed that hydro generation in the Mayo-Dawson grid was not assumed to supply WAF loads due to line losses.

b) Please provide details of the electricity customer base served by the Mayo-Dawson grid.

c) Please explain how any single infrastructure project estimated to cost $120 million (or $12 million per MW) could be justified for a ratepayer base identified in (b) or even a Yukon-wide ratepayer base of less than 17,500.

d) Please provide illustrations of what similar projects have cost per MW and per ratepayer in other jurisdictions.

e) Please compare the cost per MW of the proposed Mayo B project with the cost of installing new site-specific diesel generation (estimated to be $1.035 million per MW in the 2008-2009 GRA).

f) Please provide YEC's explanation of how the Federal government's contribution to the proposed Mayo B project would be less than $53.3 million.

g) Please reconcile YEC's assumption of $53.35 million contribution from the Federal government and the Minister's determination of a maximum $53.3 million contribution from the Federal government.

h) Please provide details of the annual carrying costs that will be incurred by the staggered funding outlined in Attachment E to the Application.

i) Please provide details by cost component of costs incurred to date for the proposed Mayo B project for each historical year and estimated for subsequent years.

j) Please discuss the risks to ratepayers that the capital costs could exceed $120 million.

k) Please provide details of how YEC determined that the proposed project would only qualify for $53.3 million of the $71 million available from the Federal government.

ANSWER:

(a)

Confirmed, as reviewed in UCG-YEC-1-6(b).

Notwithstanding this specific comment in the YUB report, discussion of the CSTP project in the YEC Resource Plan was not based on any such premise. As reviewed in response to UCG-YEC-1-3, Resource Plan references to Mayo B specifically noted a need to have the CSTP connection in place as a precondition to further examination of this development.

(b), **(c)**, **(d)** and **(e)**

Contrary to the second paragraph of the above preamble, YEC has secured $83.5 million in contributions towards the Mayo B project ($53.35 million of federal funding provided through the federal contribution agreement and $30.15 million of no cost capital contribution from YDC), reducing the overall project costs to ratepayers from $120 million to $36.5 million (and not $66.65 million as above-noted).

As noted in the Mayo B Application, this project is being advanced to meet the near term and long term electricity requirements of the Yukon integrated grid by providing a source of renewable generation that will be available to displace the increasing requirement for costly baseload diesel generation. Mayo B is not being proposed to supply specifically the electricity customer base served by only the current Mayo Dawson grid.

Contributions towards the project provided by Canada and YDC, have materially reduced the LCOE to within or below 8 to 10 c/kWh levelized cost target range. As noted, such costs are well within the range of current BC hydro development project costs to ratepayers (see also YUB-YEC-1-27(c)).To ensure ratepayers are not adversely affected in the initial years of project in service, flexible debt financing will also be provided by YDC that will cap annual net generation costs at 10-11 cents/kWh (2012$).

It is not meaningful, for the purpose of assessing ratepayer cost per kW.h of useful energy, to compare capital cost per MW of a hydro generation unit with the capital cost per MW of a diesel generation unit. The meaningful cost comparison is present value LCOE per kW.h assessed over the economic life of the hydro generation option, as provided in the Application.

(f), **(g)** and **(h)**

Please see response to CW-YEC-1-2, CW-YEC-1-25, and CW-YEC-1-21(f) as regards the Federal Funding Agreement and cash flow assessments relevant to YEC.

(i)

Please see response provided to CW-YEC-1-5(a) and CW-YEC-1-2(f) and (g).

(j)

Please see discussion provided at page 35-36 of the Part III Application and response provided to CW-YEC-1-12 and CW-YEC-1-13.

(k)

The allocation was based on the estimated Eligible Costs as filed in the application for federal funding and Canada's award of up to $71 million for the Legacy Project. Please see response to CW-YEC-1-2(a), (b) and (c).

TOPIC:

REFERENCE:

Response to YUB-YEC-1-38 – YEC 2008-2009 GRA

"As noted in the Project Proposal, the Project cost estimates to date reflect a period of study oriented to confirming the technical ability to construct the Project, and the timing and configuration of major Project components. The estimates reflect activities oriented towards a "Level 3 – Feasibility" stage of study, and are subject to design refinement, and changing market conditions (including general economic conditions for construction in western Canada).

The cost of the Project is presently estimated at $120 million (including escalation, interest during construction, and contingencies of 15% to 25% depending on the Project component). This estimate has been subjected to a preliminary third-party review. This review indicated that there may be a potential upward adjustment to the cost of up to 5%."

QUESTION:

a) Please provide a copy of the third party review of the $120 million cost estimate.

b) Please confirm YEC's understanding that for the YUB's energy generation model analysis used during its review of YEC's 20 Year Resource Plan, the YUB assumed that hydro generation in the Mayo-Dawson grid was not assumed to supply WAF loads due to line losses.

c) For all capital projects completed over the last 15 years, currently underway or currently proposed valued at over $1 million, please provide the original estimated cost, the date this cost estimate was made and the final cost (or updated cost if not finished).

d) For all projects identified in (c), please provide the cost-benefit worksheets used by the YEC's Project Review Committee.

e) For all projects identified in (c), please provide details of the costs paid by any party other than ratepayers (i.e., government grants / loans, third party contributions).

ANSWER:

(a)

The third party review noted was performed January 2009 at a very early stage in cost estimating. Since that time the scope of the project has been further refined, such that the earlier review is no longer relevant.

See discussion of the project description in the Application at section 3.1.1 of the Application which notes the YESAB filing was revised in July 2009 to delete the Mayo enhanced storage and then updated November 20, 2009 to reflect ongoing design refinements resulting from geotechnical field studies and engineering (i.e., the canal/penstock option was determined to not be cost effective and it was determined to extend the penstock through the entire distance to the new powerhouse; routing changes for the penstock were also required to avoid a zone of discontinuous permafrost; and tunnel construction was modified to move the connection at the existing intake closer to the intake structure).

(b)

As stated in response to UCG-YEC-1-5(a), this is confirmed as reviewed below. Notwithstanding this specific comment in the YUB report, discussion of the CSTP project in YEC's Resource Plan was not based on any such premise. As reviewed in response to UCG-YEC-1-3, Resource Plan references to Mayo B specifically noted a need to have the CSTP connection in place as a precondition to further examination of this development.

The question is in effect referencing what the Board noted at page 23 of its report.[1] When addressing its own assessment of annual diesel generation for YEC's and an alternative expansion plan (to assess the potential relevance of fuel cost savings in assessing different specific alternatives then under review), the Board noted that "it should be emphasized that, due to many assumptions made and several modeling

[1] The YUB Report to Commissioner in Executive Council re YEC 20-Year Resource Plan – Jan. 15/07.

limitations, these generation figures are only adequate for the purpose of comparing the relative merits of one plan over the other and to verify YEC's assertion". At footnote 18 the Board went on to note as follows with regard to the assumptions used by the YUB in its model:

> The Board used an energy generation model that "dispatches" generating units to supply the load, which was represented by the same load duration curves (LDC) used in the LOLE calculation. This model also accounts for random outages of generating units using the equivalent load method, i.e. the LDCs are modified using the FOR of each generator after dispatched, so that the next generator in the staking order would face a slightly higher load that accounts for the outages of generators already dispatched. Only units connected to the WAF were used in the analysis and there was no consideration of must-run units and/or units that run for emergency standby or voltage support purposes. Also, hydro generation in the MD grid was not assumed to supply WAF loads due to line losses.

(c), **(d)** and **(e)**

The information requested is not relevant and in any event simply cannot be assembled in the time frame set out for responding to IRs. Further all projects of such magnitude that are in Rate Base have already been subjected to review by the YUB.

The current proceeding is to obtain the YUB's report and recommendations on the potential benefits, costs, risks and customer impacts that influence whether or not Mayo B should proceed as proposed. Please refer to the Minister's Terms of Reference for this proceeding.

TOPIC:

REFERENCE:

Application, page 8; Attachment B1-5 - Project Components and Options, page 5.

On page 8, the application states that one of the components of the Mayo B project is "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".

On page 5 of Attachment B1-5 - Project Components and Options, the reference is to a "temporary work camp for 50-75 people for up to two years".

QUESTION:

a) Please explain the difference between these two descriptions of what appear to be the same temporary structure.

b) Please describe what will be done with the temporary facilities purchased once the project is put into service.

ANSWER:

(a)

As noted in footnote 7 at page 8 of the Mayo B Part III Application, the work camp size was 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 at the site. This change to the project description was made in an update provided to YESAB on November 20, 2009.

(b)

Temporary facilities used for the construction of the Project will be provided by the Contractor. These temporary facilities are owned by the Contractor and will be demobilized once work is complete.

TOPIC:

REFERENCE:

Application, page 9

On page 9, the application states that the MOU contract awarded to Peter Kiewit and Sons 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.

QUESTION:

a) Please provide details of efforts to secure the construction contract and the terms of that contract.

b) Please provide details of the results of the competitive process for the long lead turbine/generator equipment.

ANSWER:

(a)

The construction contract key commercial terms were resolved in December and the full contract is currently being finalized.

(b)

Please see response to YUB-YEC-1-24(b).

TOPIC:

REFERENCE:

Application, page 10

On page 10, the application indicates that "the Project cost estimates, including contingencies, have been subject to further and more detailed review" and that the total estimated cost of the project remains at $120 million.

QUESTION:

a) Please provide a comparison of the project cost components before and after the referenced review with explanations on the cost drivers for each component. Please isolate all contingencies as a separate cost component.

ANSWER:

(a)

No single review was undertaken. Review of project cost estimates was an ongoing and iterative process involving ongoing interactions between YEC, the project engineer (KGS) and the MOU contractor (Kiewit). Please also see UCG-YEC-1-6(a) for review of material changes since early 2009.

Please see Table 1 provided in response to CW-YEC-1-5(a) for project cost estimates updated as at February 28, 2010.

TOPIC:

REFERENCE:

Application, page 11

On page 11, the application states that Yukon Energy secured $30.15 million in "no cost YDC funding" towards Mayo B capital costs.

QUESTION:

a) Please provide details of the sources of revenue to the Yukon Development Corporation.

b) Given that Yukon Energy Corporation is regarded as a public utility owned by a Crown Corporation of the Yukon government, please provide YEC's understanding of how a contribution to the financing of the proposed Mayo B project meets conditions within Section 5 of the Yukon Development Corporation Act - "the objects for which the corporation is established are to participate with the private sector in the economic development of the Yukon".

c) Please explain what is meant by "no cost" given that the majority of revenues of YDC are initially recovered from Yukon electricity ratepayers.

ANSWER:

(a) and **(b)**

The sources of revenue for YDC and its mandate are out of the scope of this proceeding.

(c)

The capital is being provided to YEC, for use in supplying electric power to ratepayers, at a cost of $0 (as a no cost contribution). Accordingly, in seeking approval from the YUB for recovery through rates of its cost, YEC is not entitled to include any depreciation or return costs related to the "no cost" amounts provided by YDC.

TOPIC:

REFERENCE:

Application, page 12

"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".

QUESTION:

a) Please provide LCOE costs and associated calculations assuming that the addition to rate base was $89.85 million.

b) Please provide LCOE costs and associated calculations assuming that the addition to rate base was $120 million.

ANSWER:

(a) and **(b)**

See Table 1 attached. Also see YUB-YEC-1-25(a) for electronic files of LCOE calculations used in the Application and all related assumptions and data (the $120 million Net Rate Base case is included).

Table 1: Mayo B Cost of Energy - Summary ($000s)

		With Mayo Lake	No Mayo Lake
With Carmacks Copper - Net Rate Base $89.85 million			
NPV O&M		7,917	7,917
NPV depr+return		95,129	95,129
less: NPV Secondary		(2,236)	(2,225)
NPV net		100,810	100,821
PV energy (MW.h)		660,909	582,615
real LCOE (2012$)	cents/kW.h	15.25	17.30
With Carmacks Copper - Net Rate Base $120 million			
NPV O&M		7,917	7,917
NPV depr+return		126,909	126,909
less: NPV Secondary		(2,236)	(2,236)
NPV net		132,590	132,590
PV energy (MW.h)		660,909	582,615
real LCOE (2012$)	cents/kW.h	20.06	22.76

TOPIC:

REFERENCE:

Application, page 14, Figure 1

QUESTION:

a) Please provide details of the data used to create Figure 1. Please provide the data in Excel format with notes explaining the data and its sources.

b) Please provide details behind YEC's assumption of the cost of incremental diesel generation (26 cents per kWh).

ANSWER:

(a)

Please see response to YUB-YEC-1-25(a).

(b)

Footnote 42 at page 29 of the Part III Application notes the incremental cost of diesel of 26.38 cents/kW.h was determined as follows:

> 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 ($0.38/litre shipping[1], 3.9 kW.h/litre baseload efficiency) for a fuel price for 2012 of 96.26 cents/litre, or 24.68 cents/kW.h. (very close to 2009 GRA approved price), plus 1.7 cents/litre in 2012$ 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.

[1] This also includes refining.

TOPIC:

REFERENCE:

Application, pages 15-16; May 31, 2007 Board Report on Proposed CSTP, page 7

On page 15, the application states, since the proposed Mayo Hydro project lies within the Traditional Territory of the First Nation of Nacho Nyak Dun, "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".

On page 16, the application states that the "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".

On page 7 of its Report on the regarding the proposed Carmacks-Stewart Transmission Project, the Board stated "However, the Board recommends that any government funding for the Aishihik third turbine be applied directly to rate base before consideration of any cost overruns or potential disallowances from the Board".

QUESTION:

a) Please provide an update on any investment that Nacho Nyak Dun or any other First Nation intends to make on the proposed project.

b) Please explain why only the project funding commitment of Yukon Development Corporation would be reduced by investment by other parties instead of reducing the investment being made by Yukon Energy Corporation on behalf of its ratepayers. Please explain the cost benefit to ratepayers of adjusting project funding commitments as proposed by YEC versus adjusting the amount that will need to be borrowed by YEC.

c) Please explain how YEC's proposed treatment of project funding compares to the Board's determination regarding the Aishihik third turbine.

ANSWER:

(a)

Please see response to YUB-YEC-1-34.

(b)

As stated in the Application at page 15, any investment by NND in the Mayo B Project would only impact related YDC funding requirements with regard to YEC rate base costs and would have no impact on ratepayers costs.

YDC is the parent of YEC, and is providing YEC with the equity and flexible debt financing as required for Mayo B. As noted in the summary of project costs and financing provided in the Part III Application (Section 3.1.2 and summarized in Table 1 at page 12), YEC has secured a federal grant ($53.35 million) and no cost YDC contributions ($30.15 million) which have reduced the total costs that are required to be paid from ratebase from $120 million to $36.50 million. To finance the remaining $36.50 million to be included in ratebase, YEC will secure equity plus flexible debt financing from YDC that will cap the annual net generation costs at 10-11 cents/kWh (2012$).

Any separate investment in the Project by NND is intended to earn an investment return for NND based on the regulated returns on YEC's net rate base, i.e., NND would earn a return on its investment on the same basis as YDC. As any amounts invested by NND would be on the same terms as that of YDC (i.e., as if YDC had invested the full amount required), YEC and ratepayers will be basically in the same position as if YDC had invested the entire amount.

(c)

In its recommendations to the Yukon Government following the CSTP Part III review, the Board recommended in relation to Aishihik 3rd Turbine that, "any government funding for

the Aishihik third turbine be applied directly to rate base before consideration of any cost overruns or potential disallowances from the Board[1]."

With regard to Mayo B, the federal grant provided pursuant to the Federal Funding Agreement and the YDC no cost contribution are both applied directly to reduce the project costs that are required to be recovered from ratebase (reducing amounts to be recovered from $120 million to $36.5 million).

[1] See YUB Report re Part 3 Review of CSTP page 7.

TOPIC:

REFERENCE:

Application, page 15

"Under the terms of the Federal Contribution Agreement, substantial completion of the Project is required by no later than March 31, 2012".

QUESTION:

a) Please provide details of what is meant by "substantial completion".

b) Please provide details of discussions that YEC or other parties associated with the proposed Mayo B project have had with the Federal government to arrive at this definition of "substantial completion" and/or the flexibility of the March 31, 2012 deadline.

ANSWER:

(a) and **(b)**

Substantial completion under the Federal Contribution Agreement is as defined in that agreement, it "occurs when the Project can be used for the purposes for which it was intended".

The Federal Contribution Agreement reflects Canada's standard terms for such funding. The definition of substantial completion and the wording related to the March 31, 2012 deadline were not subject to discussion.

TOPIC:

REFERENCE:

Application, page 18

"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".

QUESTION:

a) Please confirm that the YUB is to review the environmental, socio-economic and social components of the proposed Mayo B project in order to fulfill the Minister's direction to provide recommendations on the "potential benefits, costs, risks and customer Impacts that Influence whether Mayo B should proceed as proposed by YEC".

ANSWER:

(a)

The YUB review of these matters is related to the Minister's overall Terms of Reference, and not as a separate review of the matters that are properly before YESAB to review. See response to YCS-YEC-1-1.

TOPIC:

REFERENCE:

Application, page 21

"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".

QUESTION:

a) Please provide copies of all technical, economic and financial feasibility studies undertaken for this proposed project.

b) Please provide a copy of all engineering and other studies conducted to establish the proposed project's components and estimated costs and expected timelines.

c) Please provide a copy of the reviews of alternatives to the proposed project.

ANSWER:

(a) and **(b)**

Please see material filed in support of the Mayo B Enhancement Project Proposal Submission filed with YESAB on February 27, 2009, and available on Yukon Energy's website at http://www.yukonenergy.ca/about/projects/mayob/ or the YESAB Registry: http://www.yesab.tzo.com/wfm/launch/YESAB.

The Mayo B Part III Application provides the most current consolidation of technical, economic and financial feasibility information related to the project. Aside from information filed with YESAB, including summary field study reports, the engineering

work conducted to date has focused on specifications and cost estimates as required for construction contracting and has not resulted in specific reports at this time.

(c)

Please see the discussion provided in section 4.1.3 of the Mayo B Part III Application and Attachment A-2 which excerpts the discussion related to alternatives and alternative configurations provided in the February 27, 2009 Mayo Hydro Enhancement Project proposal to YESAB. YEC understands that this provides all of the information that is relevant in this regard for the current review.

TOPIC:

REFERENCE:

Application, page 24

"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".

QUESTION:

a) Please confirm that the need to proceed with the proposed project is not driven by the electricity needs of current ratepayers.

ANSWER:

(a)

Not confirmed. Existing customer interests are served by timely development of renewable supply options required to displace diesel generation that would otherwise need to be recovered through rate increases to all customers. Aside from the fact that current ratepayers are interested in their future rates, when addressing the "electricity needs" of ratepayers served on a common grid it is necessary to consider all of these ratepayers as contributing to the load requirements at any time (versus attempting to separate 'new' versus current or 'old' customers).

The need for the project is discussed in detail in section 4.1 of the Mayo B Part III Application – the discussion therein notes that at its core, the 'need' for the Project reflects an opportunity available today to reduce diesel generation in a cost effective and

timely manner[1]" to the benefit of ratepayers in the near term and the longer term. In summary, the following are noted:

- The Application clearly notes that Mayo B will come into service at a time when electricity loads over the near term will require grid service and energy materially beyond available surplus hydro.[2] This will drive new diesel generation requirements in Yukon over the near term and the longer term absent development new renewable resource options.[3]

- The requirement to proceed at this time is not directly tied to the timing of a specific emergent industrial load (such as was the case with the 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 a major grid interconnection) with minimal risk and reduced costs to ratepayers.

[1] See Mayo B Part III Application page 22.
[2] See Attachment D and section 4.2.1.
[3] At page 24.

TOPIC:

REFERENCE:

Application, page 35

"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".

QUESTION:

a) Please provide copies of meeting notes and other materials related to the referenced consultations.

ANSWER:

(a)

The information requested lacks the required specificity that would allow YEC to reasonably determine whether providing such information would be helpful or even relevant to the Board's review. The Application, as well as the filings with YESAB, have summarized in detail the consultations related to the YESAB process and ongoing permitting as referenced at page 35. See also UCG-YEC-1-23. YEC believes this detailed information is sufficient for the purposes of the current YUB review.

TOPIC:

REFERENCE:

Application, page 38

"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".

QUESTION:

a) Please provide descriptions of all issues and concerns identified as related to the bottom storage at Mayo Lake.

ANSWER:

(a)

The key issue raised during the YESAB review process primarily relates to the baseline data available to make the adequacy determinations YESAB deems to be required to commence its assessment of the Project's affects.[1] This primarily related to potential effects on fisheries resources in Mayo Lake (i.e., whitefish and lake trout),[2] and potential effects on the wetlands complex.[3] It was suggested by YESAB that Fisheries studies in Mayo Lake were only conducted during the end of one field season (2008), and there was limited success in the sampling lake trout and lake whitefish populations (providing a limited data set). YESAB required that further baseline data be provided related to

[1] YESAB expressed concern that fisheries studies in Mayo Lake were only conducted during the end of one field season (2008), and there was limited success in the sampling lake trout and lake whitefish populations (providing a limited data set).

[2] Changes to existing water levels within Mayo Lake can pose potential adverse effects to resident fish populations, including limiting access to available habitat, limiting access to spawning grounds and affecting egg viability due to the increased chances for ice scour and desiccation of spawning grounds.

[3] For example, adverse effects to vegetation and the quality of wildlife habitat in the wetlands, adverse effects on access and use of these habitats by wildlife species (e.g., moose), impacts to connectivity between the lakes within the wetland complex, impacts on resource user access and subsequent effects on resource use, and potential adverse effects to the ecological health and functioning of the wetland complex itself.

Mayo Lake Fisheries and Mayo Lake wetlands before it would make a determination that it had adequate information available to commence its effects assessment.

TOPIC:

REFERENCE:

Application, page 44

"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".

QUESTION:

a) Please provide a copy of the fully allocated cost of service study used to determine the average major industrial rates referenced as the unit cost ceiling target.

b) Please provide illustrations from other jurisdictions where this method of mitigation has been used in the past.

ANSWER:

(a)

No such cost of service study was carried out for this Application. Average industrial rates as referenced were based on current rates applicable to these customers.

Rates for industrial customers are currently established by OIC 2007/94 which requires that the Board ensure the rates charged to Major Industrial Customers from January 1, 2008 until December 31, 2012 conform to Rate Schedule 39, Industrial Primary, attached as Schedule A to the OIC. Consequently, industrial rates cannot currently be determined using a fully allocated cost of service study.

The forecast average industrial average rate per kW.h for 2009 (per the Yukon Energy Compliance Filing) was 11.04 cents/kWh.

(b)

The Yukon experience is the relevant precedent. YEC is not aware of similar recent practice in other jurisdictions.

The practice in Yukon has been to advance infrastructure projects for the long term benefit of Yukon ratepayers, while providing for measures that ensure risks or rate impacts related to the development of such infrastructure are moderated. This principle has in the past been applied in relation to the Canada Flexible Term Debt provisions as well as with regard to the financing underlying the Mayo Dawson Transmission Project (i.e., the Mayo Dawson Note). Please see discussion in response to YUB-YEC-1-25(b) which discusses previous flexible debt instructions for YEC (e.g., the flexible term note for WH Unit #4 and the Mayo Dawson note). The following provides a brief summary of each instrument:

- **Canada Flexible Term Note -** During the period of the negotiations between Canada and Yukon to buy the NCPC Yukon-based assets, Yukon was reluctant to assume the full risks associated with Whitehorse #4 given the possibility that the Faro mine could close.[1] The parties resolved a mechanism for a "Flexible Term Loan" from Canada to Yukon for $40 million. This loan provided that Canada would receive annual principal payments of $1 million and interest of 7% when the unit was fully required (the annual system sales were above 310 GW.h), and all interest was forgiven and principal deferred when the unit was not required (system sales below 200 GW.h). In the range of 200 and 310 GW.h, the interest and principal payments were adjusted on a linear sliding scale. As such, Canada retained all load-related risks associated with the unit.

- **Mayo Dawson Note -** This financing was designed to ensure ratepayers would be no worse off in any year as a result of the Mayo-Dawson Project than they would have been had Dawson remained on diesel generation. The agreement with Yukon Development provides that YDC will forgive interest, as necessary,

[1] In the mid 1980s, NCPC had developed a fourth wheel at the Whitehorse Hydro facility to increase the installed capacity of the facility from 20 MW to 40 MW. The unit was added to displace diesel generation costs associated with the Faro Mine; however, the unit was of no value when the Faro mine was closed as the system had substantial surplus hydro.

based on a detailed formula, to ensure the costs with the transmission line are no higher than they would be had Dawson remained on diesel.

Yukon Energy is not aware of flexible debt provisions similar to the above provisions being available in any other Canadian jurisdictions.

Yukon Energy can note an example from Manitoba where lease payments for the development of the Nelson River HVDC transmission line were structured to provide economic relief to ratepayers in the early years of development, with anticipated higher rates during the later years.[2] Under the agreement the line was leased to Manitoba Hydro, with payments to Canada based on a share of the revenue from sales of electricity over the line. When the payments fell far short of the annual interest payments (interest rate of 5.625 per cent) a repayment schedule was devised that gradually increased from $2.5 million in 1977/78 to $22.5 million in 1988/89. Any balance remaining at that time was to be amortized over the next thirty years (to 2018/2019) at the original 5.625 per cent interest rate. Unpaid interest accrued to capital which increased from an initial sum of approximately $227 million to approximately $370 million as at 1987. In 1991-1992, Manitoba Hydro bought-out the lease agreement for $198.1 million, resulting in lower charges to operations in the future than should they have continued with the arrangement. This lease back arrangement enabled Manitoba Hydro to develop the Kettle Rapids hydro generating station, which would not have been viable had the HVDC line been capitalized with the project.

[2] In 1966, Manitoba and Canada signed an agreement (Canada-Manitoba Nelson Transmission Line Agreement) that enabled the development of Manitoba's hydro potential on the Nelson River. Canada, through its agent Atomic Energy of Canada, agreed to build an HVDC transmission line between Nelson River and Winnipeg as well as the converter stations and the related microwave communication system. Without this agreement Manitoba Hydro's next best alternative would have favoured thermal generation in southern Manitoba.

TOPIC:

REFERENCE:

Application, page 45

"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".

QUESTION:

a) Please explain how the proposed debt financing maintains the 60/40 debt/equity structure of YEC and how ratepayers will not ultimately be paying more for the proposed project over the long-term.

ANSWER:

(a)

The flexible financing provisions will operate similar to other flexible financing provisions utilized in Yukon to mitigate risk of rate impacts to ratepayers, i.e., the Flex Term Note and the Mayo Dawson Note. Please see discussion in response to YUB-YEC-1-25(b) which describes the mechanics of other flexible debt instruments, and notes that the YEC debt will be with regard to the 60% of the final net rate base of Mayo B (after all no cost capital contributions are considered).

See also response to CW-YEC-1-27 (e),(f) and (g) which notes that YEC will finance this net rate base amount 60% through long term debt and 40% through equity, thereby maintaining an equity ratio of 40% overall.

TOPIC:

REFERENCE:

Application, page 47

"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".

QUESTION:

a) Please explain how the referenced consultation (or any other consultation on the proposed project) aided the decision making process for any electricity ratepayer outside of the Mayo area.

ANSWER:

(a)

Yukon Energy developed a public involvement approach for the YESAB review in particular in order to incorporate community input in the Project design and environmental assessment. This approach was required to meet the regulatory requirements for public consultation in an effective and credible manner, and as a standing corporate principle for good planning.[1] This public involvement process was integral to the development of the project and advancing it through the regulatory review and permitting process. Expeditious approval of this enhancement opportunity benefits all ratepayers, not just those in the Mayo area. As noted in Section 4 (Project Justification) of the Part III Application, Mayo B will reduce the use of diesel to generate electricity in Yukon, saving costs for electricity customers and reducing GHG emissions.

[1] Public involvement is required under YESAA, and is consistent with the guidance provided by YESAB (2005) in its Proponents Guide to Information Requirements for Executive Project Proposal Submissions. Section 2.0 of this guidance document states: Before submitting a proposal to the Executive Committee, the proponent of a project shall consult any First Nation in whose territory, or residents of any community in which, the project will be located or might have significant environmental or socio-economic effects.

TOPIC:

REFERENCE:

Application, page 47

"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".

QUESTION:

a) Please provide copies of all notes and presentation materials related to the referenced meetings.

ANSWER:

(a)

The summary of the public consultation process and the materials provided as part of the YESAB Application is provided in Section 5 and Attachment B of the Mayo B Part III Application. Other notes and presentation materials related to 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 are confidential to NND and YEC and therefore not available for release.

Appendices to Chapter 4 of the Mayo B Project Proposal Submission to YESAB provide supporting documentation 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 communication. The publically available consultation materials include the following materials available on the YESAB registry specific to consultation activities related to NND:

- Section 4.1.1 of the Project Proposal to YESAB describes the consultation activities involving NND and notes that activities involving NND focused on four groups: 1) Chief and Council, 2) the Lands and Resources Department, 3) the

Project Agreement Working Team, and 4) NND membership. Table 4-1 provides a summary of these activities (including date, location and purpose of meeting), while the presentation materials used and meeting notes produced are provided in chronological order in Appendix 4C.

- Electronic, paper and other media communication used to inform stakeholders and interested publics about the project. The details and contents of each of these forms of communication are provided in Appendix 4B of the YESAB Project Proposal.

- Appendices 4C, 4D, 4E, and 4F provide the supporting consultation materials including meeting notes and any materials used during meetings. In many instances, the same materials were used with different stakeholders. As such, some materials are cross-referenced to the first location in which they appear.

- Appendix 4G provides a summary of personal communications with various individuals and organizations.

The YESAB Project Proposal is available at the following link:

http://www.yukonenergy.ca/about/projects/mayob/

Information is also available on the YESAB registry at the following link:

http://www.yesab.tzo.com/wfm/launch/YESAB

TOPIC:

REFERENCE:

Application, page 48

"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".

QUESTION:

a) Please provide copies of all Contribution Letters of Agreement with FNNND.

b) Please provide copies of all notes and presentation materials related to the meetings of the Technical Working Group.

c) Please explain what is meant by a Project Agreement main table and its function.

ANSWER:

(a) and **(b)**

The agreements are not available for public release, and all notes and presentation materials related to meetings of the Technical Working Group, other than those made public through the YESAB process, are confidential to NND and YEC. Please see CW-YEC-1-21 (a), (b) and (c) as well as UCG-YEC-1-23.

(c)

The Project Agreement Main Table is the Project Agreement negotiation team comprised of individuals from NND and YEC. Their role is to negotiate the Project

Agreement, and generally to oversee the activities of the Technical Working Group (TWG) in relation to the Project Agreement, providing direction to the TWG, as required, and receiving reports from the TWG.

TOPIC:

REFERENCE:

May 31, 2007 Board Report on Proposed CSTP, page 9.

"The Board's view is the same as that expressed in the YEC 20-Year Resource Plan Report, that is, YEC should not pursue Stage Two of the CSTP unless there is a firm commitment to connect a new mine load, and under the condition that ratepayers would not be adversely affected".

Although the project was identified in the 20-Year Resource Plan, insufficient information has been provided with respect to this stage. The conditions for the Board's recommendation from the January 15, 2007, report have not been met. Based on YEC's evidence and the commitment from the Government of Yukon, the Board considers that an additional condition should be added - that being, Stage Two should only be committed without any adverse impacts to other ratepayers.

The Board recommends that Energy Project and Energy Operation Certificates not be issued for Stage Two until such time as the above two conditions are met (there is a firm commitment to connect a major industrial load such as the Carmacks Copper Mine and there will be no adverse impacts to other ratepayers). When the conditions are met, the Board recommends that a joint Part 3 and PPA process take place. As there is some overlap of issues between a Part 3 and a PPA proceeding, the Board considers that a joint process would be more efficient. Further, the Board recommends that in the future, more time be provided for this process. This could also allow for the possibility of a written proceeding, which should be less costly".

QUESTION:

a) Please provide details of any firm commitments to connect new industrial load to the Mayo system before or after the proposed project is put into service.

b) Please explain how ratepayers will not be adversely impacted by the proposed project when the proposed mitigation measures simply delay the recovery of project costs over a longer period (with carrying costs) and the potential risks

(schedule risks, capital cost escalation risks, risks of major design modifications resulting from regulatory processes, etc.) that could adversely impact ratepayers.

c) Please outline the decision points in the Mayo B work plan where YEC will evaluate whether it is prudent to proceed with the next step(s) of the proposed project in order to manage project risk.

ANSWER:

(a)

Please see Attachment D, page D-3 of the Part III Application which notes the industrial load forecast included in the Application reflects operating mines (Minto) or those undergoing advanced permitting or development activities (Alexco and Carmacks Copper). No other industrial loads are forecast in this Application.

Alexco is presently in advanced discussions with Yukon Energy towards a Power Purchase Agreement, has all required major permits to begin mining and processing operations and has announced the decision to proceed with mill development. 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. 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.

Please see also response to CW-YEC-1-24 (a), (b) and (c).

(b)

Risks and measures to mitigate risks on ratepayers related to Mayo B are discussed in the Application at sections 4.2 and 4.3. This is discussed in further detail in response to CW-YEC-1-12 and CW-YEC-1-13. If the question relates to CSTP Stage 2 and not to Mayo B, the Application and current YUB review do not address these issues as regards CSTP Stage 2.

(c)

YEC has been addressing the major contracts required for construction of the Project. It will shortly review the YESAB draft screening report. Ongoing review relates to the specific permitting terms and conditions that will apply to the Project, including the recommendations of the YUB in the current review, to assess the impact of these terms and conditions on the project's feasibility. A key step prior to start of construction will be the timing of when the required permits are in place, and any impact that delays in this regard have on project feasibility and financing. Please also see response to CW-YEC-1-11.

TOPIC:

REFERENCE:

Application, Attachment A2, page 3

"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.

QUESTION:

a) Please confirm when Stage 2 of the CSTP will undergo a Part 3 review similar to the current proceeding for the Mayo B project.

ANSWER:

(a)

CSTP Stage 2 was included in and reviewed as part of the CSTP Part III Application process undertaken in 2007. An Energy Project Certificate has been obtained and project construction has commenced. Please see response to YECL-YEC-1-4(a).

TOPIC:

REFERENCE:

Application, Attachment A2, page 3

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.

QUESTION:

a) Please provide details of the likelihood that the growth in electricity demand in the Mayo area will be anything but minimal.

b) Please provide details of the analysis used to determine that "materially higher power rates" would occur without the proposed Mayo B project.

c) Please confirm that on-site generation would be a viable alternative to the proposed Mayo B project for any industrial load that may only exist for a limited life (e.g., 7-10 years) of a mine.

d) Please provide details of the "economic development opportunities that could be realized" only because of the proposed Mayo B project and without any of the alternative electricity supply options available.

ANSWER:

(a)

The above quote is not specific to Mayo and notes that "Yukon power systems will experience ongoing growth that cannot be served from existing renewable power sources."

The grid is expected to be integrated before 2012 via the completion of CSTP Stage 2. Attachment D of the Application notes consolidated electrical loads on the integrated system 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. Load growth on MD will include 5.8 GWh of new industrial load (Alexco) along with 1.85% forecast growth in non-industrial load. It is noted that after 2011 (when the grids are expected to be interconnected) Minto and Alexco are both expected to add new loads until 2012-13 when both mines are expected to reach full capacity at a combined load of 50 GWh (excluding losses). Carmacks Copper is expected to add a further 52 GWh in 2012, with overall loads on the system expected to grow to 495 GWh through 2016.

(b)

Figure D-2 at page D-5 of Attachment D notes material requirements to supply baseloads from diesel generation, driving material fuel-related costs on the system which would be reflected in rates. Figure D-3 provides the annual diesel cost without Mayo B from 2012 until 2031, and notes forecast transition to material diesel generation from 2012 to 2017 would drive costs (absent Mayo B) 30-40% higher than current Yukon-wide revenue requirements. The analysis underlying the tables provided in Attachment D is provided in response to YUB-YEC-1-25(a).

(c)

The Minto mine connection, which was reviewed and recommended by the YUB in a similar Part III review of the CSTP, is one example where a mine in fact started its operation as an isolated diesel site and was then connected to the grid. However, on a go-forward basis, all of the mine loads included in the Application's load forecasts are now not isolated diesel site options. Please see responses to YUB-YEC-1-37 (c) and (d). Industrial customers that are connected to the hydro grid system, such as Minto and Alexco (as well as Carmacks Copper in future forecasts), make up a portion of the grid firm load requirements that Yukon Energy must plan for and serve from utility generation on a non-discriminatory basis.

(d)

Specific examples have not been referenced at this time. In the past, however, it was demonstrated that the major mining operations at Faro and Keno, which provided the basis to develop the hydro infrastructure that benefits Yukon ratepayers today, were highly dependent on development of new hydro generation resources. In the longer term, future economic development opportunities in Yukon may well be foregone if the supply of cost effective renewable hydro generation such as Mayo B is not developed to displace reliance on diesel generation.

TOPIC:

REFERENCE:

Application, Attachment A1

QUESTION:

a) Please provide a map identifying all current and proposed transmission lines in the Yukon as well as current and potential industrial customers.

ANSWER:

(a)

Please see Attachment 1 to this response.

Yukon Exploration Projects 2009

MAP FEATURES

- communities
- capital city
- deep water port
- primary highway
- secondary highway
- mineral claims staked in 2009
- mineral claims
- parks - withdrawn areas

Generating station
- diesel
- hydroelectric

Transmission line
- <138 kv
- Pelly-Stewart transmission project
- 138 kv

Proposed infrastructures
- 1942 surveyed railway route
- pipeline route

COMMODITY

- silver
- gold
- copper
- nickel +/- pge
- lead/zinc
- tungsten
- molybdenum
- uranium

DEPOSIT TYPE

- iron oxide breccias/vein
- mafic/ultramafic associated
- mississippi valley type
- porphyry/sheeted vein
- sediment associated
- skarn/replacement
- vein/breccia
- volcanic associated

* ● indicates project which was drilled in 2009
advanced projects (>$100k in expenditures) are large labelled symbols
early stage projects (<$100k in expenditures) are small unlabelled symbols

0 200
km

November 2009

Old Crow
Dawson City
Mayo
Pelly Crossing
Carmacks
Faro
Ross River
Beaver Creek
Burwash Landing
Haines Junction
Whitehorse
Carcross
Teslin
Watson Lake
Skagway
Haines

ANTIMONY
INDIAN
LEOTTA
BREWERY CREEK
DUBLIN GULCH
GOLD (SCHEELITE) DOME
FISHER
KENO HILL
RAU
NADALEEN
JPROSS
EUREKA
WHITE GOLD
POLAR
YELLOW GOLD
KODIAK
BREW
BEAR/CUB
BLACKFOX
COFFEE
KIT
CASINO
CANADIAN CREEK
SONORA GULCH
MEL
DAD
APEX
SFN 1
CARMACKS COPPER
CLEAR LAKE
MINTO
PROSPECTOR MOUNTAIN
NUCLEUS
WS TOTAL
PLATA
MACTUNG
SELWYN PROJECT
GREW CREEK
ANGIE
GOLDEN CULVERT
WELLGREEN
KLUANE
GROUNDHOG
KETZA RIVER
TAY-LP
KIDLARK
NEBOCAT
WOLVERINE
SKUKUM CREEK
CMC SILVER (SILVER HART)
NORTHERN DANCER
JENNINGS
WILDCAT
MOR

Alaska
Northwest Territories
British Columbia

The exploration activity data represented on this map was compiled by the Mineral Services Unit of the Yukon Geological Survey.

March 8, 2010

YUKON CONSERVATION SOCIETY
(YCS)

TOPIC: **Fish and Fish Habitat**

REFERENCE:

QUESTION:

a) Please include all fish and fish habitat studies in Mayo Lake and Mayo River watershed as exhibits (not as footnotes or references to YESAB).

ANSWER:

(a)

The relevant information of fish and fish habitat studies has been made available to the public through the YESAB review process.

Per the Minister's Terms of Reference, the general purpose of the current YUB Part III review is to "obtain the YUB's report and recommendations on the potential benefits, costs, risks and customer impacts that influence whether Mayo B should proceed as proposed by YEC."

While a summary of environmental and socio-economic impacts of the Mayo B project is provided at section 3.4 of the Application,[1] this Part III proceeding is not intended to review in exhaustive detail or make determinations related to the environmental or socioeconomic effects of the project. That separate review is being undertaken by YESAB pursuant to its jurisdiction under the *Yukon Environmental and Socio-economic Assessment Act*. The YUB has a mandate that is directly related to the review and determination of just and reasonable rates and any consideration of environmental or socio-economic impacts should be considered in light of that mandate.

[1] Note that pursuant to OIC 2007/50, an application for an energy project certificate or an energy operation certificate under section 39 of the Public Utilities Act must include as part of the project description (per section 1(b)(iv)) a summary of environmental or socio-economic impacts of the project that may materially affect costs, benefits, schedule, operation, risks or overall feasibility.

The Board recognized this in Order 2006-8,[2] where it determined that that the YUB's review of the 20-Year Resource Plan should be limited to general comparative information in terms of potential economic impacts to ratepayers.

Information related to the YESAB review process is available and can be reviewed at the following links:

YEC's website:

http://www.yukonenergy.ca/about/projects/mayob/

The YESAB Registry:

http://www.yesab.tzo.com/wfm/launch/YESAB

[2] This order arising out of the 20-Year Resource Plan hearing arose in part by the Board's question to intervenors regarding whether or not YESAB legislation precludes the YUB from considering environmental and socio-economic issues and whether environmental impacts could be considered during the YUB proceeding. The board in its order determined that the scope of review includes environmental considerations, but that this review would be limited to general comparative information in terms of potential economic impacts to ratepayers. This would be in accordance with past reviews such as the 1992 capital resource plan (the Board stated there in that its review must be fully aware of all potential environmental costs that may impact the company's resource plan.

TOPIC: **Fish and Fish Habitat**

REFERENCE:

QUESTION:

a) Please show how YEC intends to enhance salmon habitat below the Wareham Dam in the section of river between the existing powerhouse and the proposed new powerhouse.

ANSWER:

(a)

Please see response to YCS-YEC-1-1. While this request is not in the scope of the current proceeding, in order to be responsive it is noted that detailed information on salmon habitat enhancement is provided as part of the Mayo Enhancement Project Proposal filing with YESAB.

In particular, the following information filed during the YESAB process relates to salmon and salmon habitat enhancement:

- **Lower Mayo River Flow Regime** - Section 6.2.4 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.

- **Fisheries and Aquatic Resources Report** - Appendix 7A.

- **Supplementary information on habitat in lower Mayo River** - YESAB-YEC-4.1.1 Attachment A (provides Lower Mayo River Habitat Mapping Technical Memo); see also, YESAB-YEC-4.1.2 and YESAB-YEC-4.2.

- **Monitoring Programs** (section 8.1) - addresses and Chinook Spawning and Juvenile Rearing in Zone 2 in Section 8.1.2.

- **Potential Follow-up Programs** – address Chinook Salmon Habitat Cross Sections at Section 8.2.1, Examining Changes in Channel Morphology at section 8.2.3, and Examination of Fish Stranding at section 8.2.4.

- **Mayo Hydro Electric Facility Flow Reduction Ramping Procedures** – addressed in Appendix 5D.

This information is available and can be reviewed at the following links:

YEC's website:

http://www.yukonenergy.ca/about/projects/mayob/

The YESAB Registry:

http://www.yesab.tzo.com/wfm/launch/YESAB

TOPIC: **Fish and Fish Habitat**

REFERENCE:

QUESTION:

a) Please explain where YEC intends to get the water to increase minimum flows below Wareham Dam.

ANSWER:

(a)

The water will come from sources above the Wareham Dam, through use of current storage facilities. With regard to fish and fish habitat issues, please see response to YCS-YEC-1-1 and response to YCS-YEC-1-2.

TOPIC: **Fish and Fish Habitat**

REFERENCE:

QUESTION:

a) Please show incremental cost benefit analyses incorporating environment and economics for different possible drawdown allowances (from no drawdown, to 6 inches, etc, up to the full one metre).

ANSWER:

(a)

Initial information on this was provided in the initial Mayo B filings to YESAB, confirming the net economic benefit of securing additional storage through added drawdown of the lake (rather than through any added flooding) and that added drawdown beyond 1 metre was not worthwhile. This analysis will be updated and provided in support of the separate Mayo Lake Project proposal expected to be filed with YESAB in the fall of 2010.

TOPIC: **Fish and Fish Habitat**

REFERENCE:

QUESTION:

a) Please show all studies on the drawdowns on Mayo Lake since the dam was built. Please include how often the range has been fully utilized and what effects the current operating range has been found to have on fish habitat and wildlife?

ANSWER:

(a)

Information on these matters was provided in YEC's initial filings to YESAB on the Mayo B Project, including review of how often the current licenced range has been fully utilized before and after closure of the United Keno Hill Mine. Please see response to YCS-YEC-1-1 and YCS-YEC-1-2. Further information for this request is not in the scope of the current proceeding.

TOPIC: **Power Capacity and Economics**

REFERENCE:

QUESTION:

a) Please state the existing generating capacity (MW and GWh) of the Mayo Hydro facility.

ANSWER:

(a)

Please see description of existing facilities provided at section 3.1.1 of the Mayo B Part III Application. The Mayo A facility has two generating units of approximately 2.7 MW (nameplate) units each (36 GW.h/year). See YUB-YEC-1-21, Table 1.

TOPIC: **Power Capacity and Economics**

REFERENCE:

QUESTION:

a) Please state the proposed generating capacity (MW and GWh) of the proposed new turbine power plant (both with and without the additional one metre drawdown).

ANSWER:

(a)

The proposed new powerhouse will have approximately 10-12 MW (nameplate); with respect to GW.h (with and without the additional one metre drawdown), please see the response to YUB-YEC-25(a). Also see YUB-YEC-1-21, Table 1.

TOPIC: **Power Capacity and Economics**

REFERENCE:

QUESTION:

a) Please state the net increase in generating capacity of the entire Mayo facility if Mayo B is constructed. Please include projections both with and without the additional one metre drawdown.

ANSWER:

(a)

As noted in the project description provided at section 3.1 (page 5 of Part III Application) the Project will increase renewable hydroelectric generating capacity on the Mayo River system from approximately 5 MW to approximately 15 MW. The capacity Mayo B can generate at peak bears no relation to the 1 metre additional drawdown. The additional drawdown will only have an energy-related impact.[1] Please see YUB-YEC-1-21(a) to (f), Table 1 and related text.

[1] Section 3.1.2 (page 9 of Application) notes that 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.

TOPIC: **Power Capacity and Economics**

REFERENCE:

QUESTION:

a) Please state load projections for the proposed Alexco and Carmacks Copper mines as well as the current and projected requirements for the Minto mine.

ANSWER:

(a)

Please see Attachment D to the Mayo B Part III Application which notes as follows with regard to these projected customer loads:

- **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). Minto's current load is approximately 29 GWh.

- **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.

- **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).

See also, response to YUB-YEC-1-25(a).

TOPIC: **Alternatives to Mayo B**

REFERENCE:

QUESTION:

a) What is the power generating capacity (in MW and GWh) of the existing Mayo Hydro facility system (without Mayo B) with an extra one metre drawdown on Mayo Lake?

ANSWER:

(a)

See response to YCS-YEC-1-6, YCS-YEC-1-7, and YCS-YEC-1-8. The Mayo A facility has two generating units of approximately 2.7 MW (nameplate) units each. The capacity Mayo A could generate at peak bears no relation to the 1 metre additional drawdown at Mayo Lake. As with Mayo B, the additional drawdown at Mayo Lake would only have an energy related impact. Although model studies have not been prepared for this option with only Mayo A, the added energy effect would be greatly reduced with only Mayo A as compared with Mayo B (due to the reduced capability of Mayo A versus Mayo B), such that the added drawdown at Mayo Lake would likely not then be proposed.

TOPIC: **Alternatives to Mayo B**

REFERENCE:

QUESTION:

a) Was the alternative of simply replacing the existing Mayo Hydro facility turbines with newer more efficient ones investigated? What would be the cost of this and the increased capacity?

ANSWER:

(a)

No. The runners at Mayo were replaced with newer units prior to the connection of the Mayo-Dawson transmission line, and as such are already of modern vintage. There was some investigation into the potential to simply add a third turbine at the existing Mayo plant, to permit the plant to make better use of above average flows, but this was discarded as the project did not provide material sustained generation benefits in winter, and did not capture the benefits of the increased head that is achieved by the Mayo B project.

TOPIC: **Alternatives to Mayo B**

REFERENCE:

QUESTION:

a) Please share all demand side management scenarios investigated to meet future load.

ANSWER:

(a)

Yukon Energy described its recent DSM activities in response to interrogatories provided during the Yukon Energy 2008/2009 GRA (see responses to LE-YEC-1-20 to LE-YEC-1-25 and UCG-YEC-1-20).[1] DSM activities historically undertaken by Yukon Energy and YECL were discussed in the 20-Year Resource Plan (see pages 2-17 to 2-22 of Chapter 2). Programs that have been developed and tested by Yukon Energy and ESC since 1992 are discussed in detail in Section 2.4: Bulk Power Planning Since 1992. It is also noted at page 2-10 that more recently DSM activities have been undertaken and coordinated by ESC.

The 20-Year Resource Plan notes that with regard to meeting capacity requirements "major new DSM initiatives or various other potential new generation technologies are not typically considered by utilities to provide reliable capacity towards meeting near term capacity shortfalls of the type forecast in Yukon" (see page 4-38). With regard to longer term bulk planning issues the Resource Plan notes that Yukon Energy would possibly need to give greater consideration to DSM (in particular where industrial load scenarios provide for sustained 10 MW mine loads extending past 2016). At page 12 of the 20-Year Resource Plan it was noted in particular that, "If loads of this scale and duration develop, further consideration will be given to DSM programming focused

[1] In respect of DSM, the Board has set out its expectations in Appendix A of Order 2009-2 which notes as follows at page 44: "The Board views DSM as another critical issue for Yukon. The Board directs YECL in conjunction with YEC, to consult with stakeholders and develop a policy paper with respect to DSM initiatives and include this policy paper as part of YECL's and YEC's next GRA. To be clear, YEC and YECL are to jointly lead these processes and jointly submit the policy papers (IPP and DSM) in their next GRA. The DSM policy papers are to provide DSM initiatives developed through negotiations with Intervenors and communities in its service territory and YEC's service territory." Yukon Energy has reviewed the Board's decision on this matter but has not yet had an opportunity to meet with YECL in this regard.

primarily on reduction of system peak demand." (This is also discussed in chapter 5 pages 5-52 and 5-53).

During the 2008/2009 Yukon Energy GRA it was noted (in response to LE-EYC-1-61(a)) that Yukon Energy would be in 2009 assessing several internal DSM and supply side enhancement (SSE) areas as part of their 20-Year Resource Plan objectives focused first on improving the utilization of their existing facilities. This work will identify potential options for improving water turbine efficiencies and reducing station services losses and fossil fuel use. In addition, prefeasibility work is underway on a potential expansion to the wind generation complement.

YUKON ELECTRIAL COMPANY LIMITED
(YECL)

TOPIC: Costs Incurred

REFERENCE: Throughout the Application

PREAMBLE:

Regarding the Proposed Mayo Hydro Enhancement Project (Mayo B) The wording of the Application seems to imply that no work has been undertaken because no regulatory approvals have been received.

QUESTION:

a) Please confirm whether YEC has in fact undertaken any work regarding the Mayo B Project to date.

b) If there has been any work undertaken on the "proposed" Mayo B project please provide a breakdown of the specific costs incurred to date and the anticipated costs that will be incurred until the end of this regulatory process assuming a decision will not be provided until May 2010.

c) What is YEC's planned treatment of any such costs should this project not receive YUB regulatory approval?

ANSWER:

(a), **(b)** and**(c)**

As required, no construction work on the Mayo B project will occur until the required permits and approvals are obtained. Accordingly, no further response is required to (b) and (c) as asked.

As reviewed in Yukon Energy's 2008/2009 GRA, planning work has been progressing on Mayo B as required to secure permits and approvals, complete preliminary engineering, carry out contracting and other activities needed to begin construction (see response to CW-YEC-1-5(a)). If the decision is made to proceed with the project, these costs will be included in the overall final cost of the project. If the decision is made to not proceed, the costs will be amortized as study costs.

TOPIC: Project Business Case

REFERENCE: Page 2 of Introduction

PREAMBLE:

YEC refers to the business case for the Mayo B project. In YUB Decision 2009-6 YEC is requested to provide the following information:

> "To alleviate existing concerns regarding YEC's ability to estimate, the Board directs YEC, in future, to file any Part 3 applications before this Board only when preliminary engineering estimates are available and included as part of the application. Further, in future GRA applications, the Board directs YEC to include business cases for major capital items, including electronic models. Business cases will include:
>
> descriptions of the project
> economic analysis including preliminary engineering estimates
> discussion of alternatives and how the chosen option was determined
> discussion of the risks of proceeding with the chosen alternative
> discussion of risks of not proceeding with the chosen alternative; and
> discussion of assumptions included in the business case including escalation factors, loading, financial measures, term of project and associated ancillary costs. "

QUESTION:

a) Please provide the comprehensive business case for the Mayo B project including updated itemized financial details, costs, cash flows, alternatives, etc in a single business case format.

b) Please provide the electronic economic models for the business case.

ANSWER:

(a) and **(b)**

Please see YUB-YEC-1-26(g) regarding the business case; for details on the analysis and electronic models, please see YUB-YEC-1-25(a); for a cost/benefit summary of this business case, please see CW-YEC-1-5(b).

The above quote is from Board Order 2009-8 (and not 2009-6 as noted in the preamble), and notes the requirement for YEC to include business cases for major capital items when seeking approval for inclusion of such items in the revenue requirement at the next GRA.

The current Mayo B Part III Application provides a detailed justification for the project (including a review of the need for the project, the risk of proceeding and the effect on ratepayers) and reviews each of the items which the Board noted should be included in any business case:

- A description of the Project is provided in section 3.1 of the Part III Application.

- Economic analysis and preliminary engineering estimates are provided in section 3.1.2 (Project Costs, Financial and Economics) as well as section 4.1.2 (Economics of Project).

- A discussion of alternatives and how the chosen alternative was determined is provided in section 4.1.3 (Alternatives to Mayo B) and Appendix A2 (Alternatives and Alternative Configurations).

- A discussion of risks of proceeding with the chosen alternative is discussed in section 4.2 (Risks).

- A discussion of risks of not proceeding with the chose alternative is discussed in section 4.2 (Risks).

- A discussion of escalation factors, loading, financial measures, term of project and associated ancillary costs is provided in section 3.1.2 and 4.1.2.

The application also provides a detailed discussion in section 4.2 of the effect on ratepayers, including consideration of the context of the project effect on ratepayers (4.3.1), the ratepayer diesel cost saving effects (4.3.2) and short term annual rate impacts and rate neutral mitigation (4.3.3).

TOPIC: Sales Forecast

REFERENCE: Introduction Page 2

PREAMBLE:

"….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."

QUESTION:

a) Please provide a detailed sales forecast in support of this application and project for both the WAF and MD grids.

b) Please provide the long term diesel forecast relied upon for the project economics for this project.

ANSWER:

(a) and **(b)**

Detailed load and generation forecasts were provided as Attachment D-1 of the Part III Application, and are further detailed in YUB-YEC-1-25(a).

TOPIC: Carmacks Stewart Transmission Line Stage 2

REFERENCE: Application Page 8

PREAMBLE:

"The construction of the proposed Project is contemplated to occur concurrently with Stage Two of the CSTP".

QUESTION:

a) Does YEC have a Project Certificate for Stage 2 of CSTP? If so please provide a copy of this certificate. If not when will an application be made? Please provide the latest detailed cost estimates for this project.

b) Please provide a comprehensive list of the benefits that the joining of the two grids will provide to customers. Will the Mayo system be able to provide backup for the WAF grid? If not what specific benefit do customers on the WAF grid receive from the grid interconnection? If so, please provide the magnitude of back-up capability in GWhr and in MW (peak)?

ANSWER:

(a) and **(b)**

Yukon Energy has an Energy Project Certificate as required to proceed with construction of Stage 2 of CSTP (the Application noted that construction had commenced on this project). A copy is attached. The latest capital cost budget estimate for Stage 2 of CSTP is $40 million.

Examination of CSTP Stage II detailed costs or a comprehensive list of its benefits are not within the scope of the terms of reference provided by the Minister of Justice to the Board for the Part III review of the Mayo B project. The benefits of integrating the WAF and MD grid have been extensively discussed and reviewed during the following past proceedings (as summarized in the response to YECL-YEC-1-8(b) filed during the recent Yukon Energy 2008/2009 GRA):

- The 2006 Yukon Energy 20-Year Resource Plan hearing
- The 2007 Minto PPA hearing
- The 2007 CSTP Part III review
- The Yukon Energy 2008/2009 GRA

Yukon

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

October 8, 2009

Mr. David Morrison
President and Chief Executive Officer
Yukon Energy Corporation
#2 Miles Canyon Road
Box 5920
Whitehorse, Yukon
Y1A 6S7

Dear Mr. Morrison:

RE: ENERGY PROJECT CERTIFICATE

Further to Yukon Energy Corporation's application of April 2, 2007 under the *Public Utilities Act*, I am pleased to provide the enclosed Energy Project Certificate for Stage Two of the Carmacks-Stewart Transmission Line Project.

With this statutory requirement met, I look forward – as I know you and your colleagues do – to the completion of Stage Two and the important benefits it will provide to all Yukoners.

Yours very truly,

Marian C. Horne
Minister of Justice

Enclosure (1)

Yukon
Justice

Certificate No. 2009-01

IN THE MATTER OF

The *Public Utilities Act*, R.S.Y. 2002, c. 186
and
An Application by Yukon Energy Corporation
in respect of the Carmacks-Stewart Transmission Line Project

ENERGY PROJECT CERTIFICATE

WHEREAS:

A. Order-in-Council 2007/51, dated March 16, 2007, designates as a regulated project within the meaning of section 36 of the *Public Utilities Act* (Act) the Carmacks-Stewart Transmission Line Project (Project) of the Yukon Energy Corporation (Corporation), which Project is identified in the Order-in-Council as follows:

> "an electricity transmission line approximately 172 kilometres in length, and related new substation facilities, connecting the Whitehorse-Aishihik-Faro electricity grid at Carmacks and the Mayo-Dawson electricity grid at Stewart Crossing, and any stage undertaken with regard to such project."

B. On April 2, 2007, the Corporation applied to the Minister of Justice (Minister), in accordance with section 39 of the Act, for energy project and energy operation certificates.

C. The Corporation's application divides the Project into two stages. Stage One includes construction of a 138 kV transmission line of approximately 98 km between the Whitehorse-Aishihik-Faro grid at Carmacks and Pelly Crossing, and includes construction of substations at Carmacks and Pelly Crossing. Stage Two includes construction of a 138 kV transmission line from Pelly Crossing to the existing Mayo-Dawson grid substation at Stewart Crossing, and includes expansion of the existing Stewart Crossing substation.

D. On April 2, 2007, the Minister referred the Corporation's application, for both Stage One and Stage Two of the Project, to the Yukon Utilities Board (Board), in accordance with section 40 of the Act.

E. The Board held public hearings and on May 31, 2007 submitted its report and recommendations to the Minister, in accordance with section 41 of the Act.

F. On December 4, 2007, the Minister granted an energy project certificate to the Corporation for Stage One of the Project.

G. Since the granting of the Stage One energy project certificate, the Government of Yukon has worked with the Corporation and the Government of Canada to ensure that Stage Two of the Project can be constructed with no negative impact on utility ratepayers.

H. Those efforts have succeeded. The Government of Canada has approved funding, from its Green Infrastructure Fund, of up to 50% of the eligible costs of both Stage Two of the Project and the Mayo B hydroelectric generation upgrade project, to a combined maximum of $71 million.

I. Federal funding is contingent on both projects being completed by 2012.

J. The Minister has determined, based on the above, that it is in the public interest that an energy project certificate be issued to the Corporation for Stage Two of the Project, subject to the terms set out below.

NOW THEREFORE in accordance with section 42 of the Act the Minister grants as follows:

1. This Energy Project Certificate is granted to the Corporation for Stage Two of the Project.

2. All contributions or funding from the Corporation's parent company (Yukon Development Corporation) or any other government or other contributions or funding are to be applied directly to the rate base.

3. As recommended by the Board, the Corporation is not to seek the addition to the rate base under section 32 of the Act of any portion of its incurred capital costs of Stage Two of the Project if the addition of that portion of the capital costs would have an adverse impact on utility ratepayers, compared to what would occur without Stage Two of the Project. For greater certainty, major industrial customers are not to be considered utility ratepayers for this purpose.

4. The Corporation is directed to file with the Minister responsible for the Yukon Development Corporation quarterly progress reports on the construction schedule of Stage Two of the Project, costs, and any variances or difficulties that Stage Two of the Project may be encountering and the Corporation's intended actions to resolve those. The form and content of the reports are to be approved by that Minister.

5. Upon completion of the construction of Stage Two, or of any segment of it that requires an energy operation certificate, the Corporation is directed to file with the Minister of Justice a construction completion report. Each such report is to include final cost estimates to date

and is to indicate whether the Corporation considers that it is compliant with the relevant terms of this Energy Project Certificate and, if the Corporation does not so consider, to provide a detailed explanation of the nature of, and reasons for, that non-compliance.

Dated at Whitehorse, Yukon, this 7th day of October, 2009.

Minister of Justice

TOPIC: Carmacks Copper and Alexco

REFERENCE: Throughout the application

QUESTION:

a) Please provide the details of the contracts that are being negotiated with these two industrial customers. Please provide specific details in a schedule format that show how each of these customers will contribute financially to the Mayo B project and the associated financial benefit to existing customers.

ANSWER:

(a)

Details of discussions with industrial customers cannot be provided at this time, and will not be provided until such agreements are concluded. All information currently available is provided in the Mayo B Part III Application.

New industrial customer such as Carmacks Copper and Alexco mines will be served under Major Industrial Rate 39. This rate schedule cannot be changed until after December 31, 2012 (per OIC 2007/94). Neither Alexco nor Carmacks Copper will make a contribution towards Mayo B. Based on current Yukon practice incorporated in the Electric Service Regulations and in the Purchase Power Agreement with Minto Explorations, industrial customers make contributions towards the transmission or distribution required to serve them, but are not required to make contributions towards generation.

TOPIC: Construction Management

REFERENCE: Page 17 of the Application

PREAMBLE:

Contracts have been negotiated with PKS and KGS to provide contract management for the Project.

QUESTION:

a) Please provide the detailed cost associated with each line item that contractors are managing related to this project.

b) Are there other contractors involved in this project? If so please list each contractor and the scope of work they are providing and the cost associated with each contractors work.

ANSWER:

(a) and **(b)**

Please see Table 1 provided in response to CW-YEC-1-5(a) for the cost details that are available at this time. This information notes key contractors currently involved in the design and construction of the project and associated costs as follows:

- Construction Contract (Kiewit) – The construction contract key commercial terms were resolved in December and the full contract is currently being finalized. Base Target Costs are $77.7 million with an additional $7.7 million of contingency for a Maximum Target Price of $85.4 million. Subcontracts for specific work on site will be with this primary contractor. Specific bid processes for these subcontracts have not commenced.

- Detailed engineering (KGS) – A contract for final design and related matters is being finalized with KGS for detailed engineering (costs for this component are estimated at $ 5.76 million for final design and contract preparation services and

non-resident engineering support services). A portion of this will be subcontracted by the engineering contractor.

- Contract Administrator – A contract is being finalized with KGS for contract administration (costs for this component are estimated at $ 3.82 million). The scope of work would include provision for non-resident contract administrator, resident contract administrator, Turbine/Generation management, additional site services (site visits, QA site surveys, potential for added field support), additional QA services for the penstock supply, and full-time site inspection.

- Turbine/ Generator Supply - ABB Inc. was awarded a Preliminary Agreement with YEC in January 2010 for turbine/generator supply design work and provision for a final contract to be completed by the end of March 2010. The costs associated with this overall scope of work for the turbine/ generator equipment supply are currently estimated at $5 million.

TOPIC: Technical Considerations

REFERENCE:

Page 1	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 5MW to approximately 15MW**	5MW = 43.8GW.h/yr 15MW = 131.4GW.h/yr
Page 5	…increase renewable hydroelectric generating capacity on the Mayo River system **from approximately 5MW to approximately 15MW**	5MW = 43.8GW.h/yr 15MW = 131.4GW.h/yr
Page 6	[Components of the project include] A new powerhouse of **approximately 10MW to 12MW of nameplate generating capacity**	10MW = 87.6GW.h/yr 12MW = 105.1GW.h/yr
Page 10	…updated installed capital cost for Mayo B at the planned powerhouse location, with long-term **average annual net generation of 41.4GW.h** (under full long term dispatchable generation load conditions of 720GW.h/yr with Mayo Lake enhanced storage), remains at $120 million.	4.7MW = 41.4GW.h/yr
Page 13	…under the **best case forecast**, Mayo B net generation contribution to the system (with Mayo Lake enhanced storage) **approximates 26.4GW.h in 2012**	3.0MW = 26.4GW.h/yr
Page 13	…under the best case forecast, Mayo B net generation contribution to the system (with Mayo Lake enhanced storage)… **ranges from 14.9 to 41.4GW.h/yr** over the Project's assumed 65 year economic life…	1.7MW = 14.9GW.h/yr 4.7MW = 41.4GW.h/yr
Page 27	Mayo B will add approximately 10MW to the IS capacity, and almost all of this will augment firm winter peaking capacity	10MW = 87.6GW.h/yr
Page 27	At a total IS dispatchable generation load of 416.7GW.h, the Mayo B contribution is approximately **19.2GW.h**	2.2MW = 19.2GW.h/yr
Page 27	At 468.1 GW.h IS generation load, the Mayo B contribution is approximately **28.2GW.h**	3.2MW = 28.2GW.h/yr
Page 28	At 575.1 GW.h IS generation load, the Mayo B contribution is approximately **38.0GW.h**	4.3MW = 38.0GW.h/yr
Page 29	In approximately year 2019, with the presently assumed closure of all industrial customers, the contribution reaches **a low of 14.9GW.h.**	1.7MW = 14.9GW.h/yr
Page 29	The **absolute maximum** of 41.4GW.h is not assumed until 2052…	4.7MW = 41.4GW.h/yr

PREAMBLE:

The above table shows several references to the approximate capacity of Mayo B as mentioned throughout the YEC Application to Board. The third column provides conversions of MW into GW.h/yr and vice-versa by assuming output of a plant running 24 hrs a day, 365 days a year. One useful measure which is absent from the Mayo B

application is “load factor”, which compares real energy output with installed nameplate capacity.

Yukon Electrical is interested in Mayo B’s load factor.

QUESTION:

a) Please explain what is meant by “average” (in the context of page 10.) (For example, if the best case in 2012 is 26.4GW.h/yr, and the range varies from 14.9GW.h/yr to an “absolute maximum” of 41.4GW.h/yr, how is the average 41.4GW.h/yr?).

b) In GW.h, what is the average annual net generation over the 65 year life of the project? (For example, if one year is 26.4GW.h, and another year is 14.9GW.h, the average over those two years is 20.65GW.h.).

c) What is the load factor of the average calculated in (b), assuming 10MW installed nameplate capacity?

ANSWER:

(a)

Each of the cited Mayo B annual energy numbers from the Application are net energy generation (i.e., diesel displacement due to Mayo B) averaged across 20-years of historical water flows for a specified grid firm load level.

For example, at 2012 forecast loads with Carmacks Copper connected, the precise net contribution of Mayo B to system supply depends on water conditions on each system – low water, high water, etc. It is not possible to know which water supply condition will exist in 2012, so hydro electric utilities use planning models that look, for any specific load scenario, at each possible water scenario and determine the net generation contribution under each of those conditions, and then take the average of all of these water flow conditions to determine the “average” net generation at the specified load level. At a very high load to be supplied (e.g., if Yukon had an export market), Mayo B could provide net benefits to the system of 41.4 GW.h/year – sometimes higher and

sometime lower depending on water conditions, but averaging to this value over the long-term.

The ranges of Mayo B net generation noted in the Application have been determined on the above basis, and reflect different net generation effects that occur at different firm grid load levels. It is not useful for this purpose to consider an average of the net generation at these different grid loads.

(b)

Using the values set out in YUB-YEC-25(a), the net generation averaged across all 65 years of the project (each of which in itself is an average of all of the water flow conditions that may arise in each year) is 35.191 GW.h (assuming the base load forecast and enhanced Mayo Lake storage).

(c)

The value is 40%. It is important to note that the load factor arising from the generation noted in (b) is not a meaningful number in the context of normal plant “capacity factor” or “load factor”, as the value noted in (b) is a net contribution to the system, it is not the generation that will actually occur at Mayo B. The average plant capacity factor reflecting gross generation will be higher (see YUB-YEC-1-30A(c)).

TOPIC: Technical Considerations

REFERENCE: From Page 1 of YEC Application to Board:

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.

From Page 6 of YEC Application to Board:

A new powerhouse of approximately 10 to 12 MW of nameplate generating capacity, 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.

QUESTION:

a) Please define hydro generation capacity. Is it total name plate capacities combined or is it total additional output of the combined Mayo Hydro?

b) For each year of the life of the project, please provide a chart that shows when (and for how long) each of these units will be producing at their capacity.

ANSWER:

(a)

Hydro generation capacity refers generally to nameplate and total output, which are very similar values in respect of the Mayo plants. As noted in CW-YEC-1-10(e), the precise nameplate value is yet to be determined.

(b)

The precise contribution of each unit in a given year will depend on the water flow conditions. The response to YUB-YEC-1-37(f) shows the seasonal distribution of Mayo generation based on a 468 GW.h load level.

TOPIC: Technical Considerations

Project Financing Costs, Project Economics and Risks

REFERENCE: From page 13 of YEC Application to Board:

"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.

PREAMBLE:

While the application refers to the Mayo facility being enhanced from 5 MW to 15MW, there is limited analysis regarding enhancement from a past production point of view. Yukon Electrical is interested in this background information.

QUESTION:

a) Regarding Mayo 'A':
   i. In MW, what is the nameplate generation capacity at Mayo 'A'?
   ii. For years 2000-2009, what is the output (in GW.h per year) of Mayo 'A'?
   iii. For years 2000-2009, what is the load factor of Mayo 'A'?
   iv. What is the expected output of Mayo 'A' (in GW.h per year) when Mayo B is in service?
   v. What is the expected net output of Mayo 'A' and Mayo B after Mayo B is in service?
   vi. Was the displaced hydro capacity of Mayo 'A' taken into consideration similarly as displaced diesel?
   vii. For years 2000-2009, please provide a list of maintenance and upgrade projects and associated costs for Mayo 'A'.

ANSWER:

(a)

i. Mayo A nameplate capacity is 5.4 MW.
ii. Please see YUB-YEC-1-47(a).
iii. The load factor varies by year, but approximates 21% before the connection of the Mayo-Dawson line and 53% after connection.
iv. Please see YUB-YEC-1-21.
v. Please see YEC-YEC-1-21.
vi. No. It was taken into account in determining the net contribution of Mayo B. Displaced diesel is an economic benefit of Mayo B. Reductions in generation at Mayo A are not.
vii. It is not possible in the time available to provide the list of every maintenance and upgrade activity and capital project undertaken at the Mayo plant over the last 10 years. Any major project was reviewed in the YEC GRA's during this period.

TOPIC: Technical Considerations

Project Financing Costs, Project Economics and Risks

REFERENCE:

QUESTION:

a) In order to better understand the costs of potential alternatives or options, please provide the cost per Megawatt of other projects being considered or undertaken by YEC and/or PKS including Aishihik 3.

ANSWER:

(a)

The information currently available is provided in "Assessment of Potential Hydroelectric Sites Concept Phase Study – Executive Summary", Attachment A1 (pages A2-9 to A2-11) to the Application, which provides at page A2-11 a summary of the development schemes reviewed in 2007 by YEC.

TOPIC: Technical Considerations

Project Financing Costs, Project Economics and Risks

REFERENCE:

From page 13 of YEC Application to Board:

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).

QUESTION:

a) When do seasonal peak generating conditions occur for Mayo B?
   i. Please provide a typical 12 month generation output profile in MW and GW.h

b) Do these peak generating conditions coincide with seasonal peak load conditions?

c) When are flood condition flows expected? How often are flood conditions expected?

ANSWER:

(a)

Please see YUB-YEC-1-37(f).

(b)

Yes.

(c)

Flood condition flows occur on the Mayo River in years where the annual rainfall and snowfall are above average. The precise years in which this will occur in future cannot be predicted. High flows occurring above Mayo Lake serve to help in increasing the lake storage and if in excess of what can be stored, to spill from Mayo Lake through the lower system typically in late summer. High inflows occurring below Mayo Lake tend to arise in May and June, and as they cannot be stored, are required to be used for generation or spilled in these months.

TOPIC: Technical Considerations

REFERENCE:

From Page 1 of YEC Application to Board:

The timing for Mayo B also reflects the opportunity to displace diesel generation energy requirements associated with growing power loads on both grids.

PREAMBLE:

Yukon Electrical is interested in historical loads on the Mayo-Dawson and WAF grids to better understand the impact of Mayo B.

QUESTION:

a) Regarding the Mayo-Dawson grid, for each year from 2000-2009:
    i. In MW, what was the peak load each year?
        i. When does this peak typically occur?
    ii. In MW, what is the installed nameplate capacity of all hydro on the MD grid?
    iii. In GW.h per year, what was the production of the installed hydro?
    iv. What was the load factor of the installed hydro?
    v. In MW, what is the installed nameplate capacity of diesel?
    vi. In GW.h per year, what was the production of the installed diesel?
    vii. In MW, how much hydro is spinning, productive hydro for:
        i. Normal operation
        ii. Peak operation
    viii. In MW, over the past 10 years, how much diesel was spinning, productive diesel for:
        i. Normal operation
        ii. Peak operation

b) Regarding the Whitehorse-Aishihik-Faro grid, for each year from 2000-2009:
    i. In MW, what was the peak load each year?
        i. When does this peak typically occur?
    ii. In MW, what is the installed nameplate capacity of hydro?

iii. In GW.h per year, what was the production of the installed hydro?
iv. What was the load factor of the installed hydro?
v. In MW, what is the installed nameplate capacity of diesel?
vi. In GW.h per year, what was the production of the installed diesel?
vii. In MW, how much hydro is spinning, productive hydro for:
    i. Normal operation
    ii. Peak operation
viii. In MW, over the past 10 years, how much diesel is spinning, productive diesel for:
    i. Normal operation
    ii. Peak operation

c) Load flow calculations are a fundamental tool used to determine energy flows in an electrical grid. For the interconnected system please provide the following:
    i. With no industrial load and maximum output of Mayo A+B on the Interconnected System (IS) how much energy will be flowing south of the Minto Land substation.
    ii. With no industrial load and maximum output of Mayo A+B on the IS how much energy will be flowing south and east of the Carmacks substation.
    iii. With no industrial load and maximum output of Mayo A+B on the IS how many communities could Mayo A+B support islanded.
        a. Under peak load conditions
        b. Under minimum load conditions
    iv. With no industrial load and maximum output of Mayo A+B on the IS how much energy is fed into the old WAF grid.

ANSWER:

(a), **(b)** and **(c)**

The Terms of Reference for the Board's review of the Application do not anticipate a detailed concurrent review of the two existing grids or the pending transmission energy flows on the new integrated grid following completion of CSTP Stage 2. In the time available for this proceeding, YEC is not able to provide a response to this request and in any event the information requested deals with issues that go beyond the scope of what would be useful to the Board in its review of the Application.

TOPIC: Project Financing Costs, Project Economics and Risks

REFERENCE:

From Page 5 of YEC Application to Board:

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.

QUESTION:

a) What are the tolerances around the estimated $120M project costs? What is the range of costs?

b) Please explain how YEC will deal with any cost overruns. Who is expected to pay for any such potential cost overruns?

ANSWER:

(a) and **(b)**

Please see response provided to YUB-YEC-1-31(d) and (e), and CW-YEC-1-13.

TOPIC: Technical Considerations

REFERENCE:

From page 8 of YEC Application to Board:

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.

QUESTION:

a) Please provide a breakdown of the diesel units (location) that make up the 30 GW.h?

b) What was the final cost of CSTP Stage One?

i Was the original scope of the project changed? If so, what was added and/or removed from the original scope and what was the financial implication of each of these items?

ANSWER:

(a)

The displaced diesel was at Minto mine and Pelly Crossing.

In the 2008/2009 Yukon Energy GRA (see Tab 2, page 2-3) YEC forecast grid sales to Pelly Crossing at 2,300 MW.h in 2008. YEC forecast grid sales to Minto mine for 2009 at 29,023 MW.h. (see Tab 2, page 2-5 and 2-6).

(b)

Examination of CSTP Stage I cost is not within the scope of the terms of reference provided by the Minister of Justice to the Board for the Part III review of the Mayo B project. Final costs for CSTP Stage 1 were addressed during the recent 2008/2009 GRA (see for example, response to LE-YEC-46 and LE-YEC-47).

TOPIC: Ratepayer Impacts Short and Long Term

Project Financing Costs, Project Economics and Risks

REFERENCE:

From page 14 of YEC Application to Board:

With a ratebase net cost of $36.5 million 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, grow to $5.7 million by year 5, and then fall to $1.6 million in year 8 (2019) when no industrial loads are assumed to be connected. Finally, higher annual savings for each subsequent year (e.g., $2.6 million in year 10, and $9.3 million in year 20) are shown.

From Attachment D-3, relating to supply of Carmacks Copper:

Yukon Energy supply to this mine will require a new 138 kV spur line (or alternative configuration).

QUESTION:

a) Please breakdown the “ratepayer savings” from the point of view of
   i. Residential ratepayers; and
   ii. Industrial ratepayers.

b) Please explain YEC’s policy regarding transmission extensions to large industrial loads, how such policy pertains to the Terms and Conditions of Service (formally Electric Service Regulations), and how large industrial loads have historically paid for their connection to the existing grid.

c) What is the estimated length of the Distribution and/or Transmission facilities for Alexco?

d) What is the estimated cost of the Distribution and/or Transmission facilities for Alexco?

e) What is the estimated length of the 138 kV spur line to Carmacks Copper?

f) What is the estimated cost of the 138 kV spur line to Carmacks Copper?

g) What are the potential financing arrangements for this project?

ANSWER:

(a)

Ratepayer savings to each customer class will depend on future rate decisions by the Board and any related OIC rate directives. Overall savings available to be so allocated are addressed in the Application.

(b)

YEC's policy regarding transmission extensions to large industrial loads has been previously discussed in detail during the 2007 Minto PPA proceeding (see response to YUB-YEC-1-7 provided during that proceeding). Most recently, this has been summarized in the joint Yukon Energy and Yukon Electrical 2009 Phase II Application. Please see Tab 5, section 5.3.5 of the joint Yukon Energy and Yukon Electrical 2009 Phase II Rate Application as well as Schedule B of the proposed Terms and Conditions of Service provided as Appendix 5.1 to that Application. It may be summarized as follows:

- Future industrial customers connecting to the Carmacks-Stewart Transmission Project ("CSTP") must pay appropriate share of CSTP and the full cost any spur line connection to the CSTP:
  - Principle underlying payments towards any spur line – When only one customer is planned to be served by specific transmission facilities, that one customer generally should pay the full actual cost of the facilities so required. Minto Mine paid the full cost of its Mine Spur contribution. This reflects the fact that these specific transmission facilities were built to serve a single customer (Minto) and are generally expected to be decommissioned and removed after the Mine closes.
  - Principle underlying payment towards bulk transmission (such as Carmacks – Stewart Transmission Project (CSTP)) – Long term use is planned for CSTP

facilities (or other bulk transmission) to benefit all Yukon ratepayers and such facilities are not built solely to serve one customer (i.e., no plans for decommissioning or shutdown of facilities when the current industrial customer ends service). Capital Cost Contributions by new major industrial customers towards these facilities is to be based on the need to secure from the new Mine the maximum reasonable customer capital cost contribution that would otherwise be required by the Mine to secure grid service (i.e., reasonable costs estimated for the minimum-sized line segment and voltage level that the Mine would otherwise require to receive Grid Electricity on its own without the CSTP). In general, due to projected diesel generation cost savings that a mine currently secures by grid connection, this approach reflects the extent to which a new mine connecting to the CSTP can afford to pay for capital costs otherwise required for it to connect to the grid system; for Minto there were material cost savings available from the grid even if the Carmacks to Minto Landing portion of Stage 1 was not built and the mine was required to pay 100% of the cost estimated for the basic additional facilities to connect the mine to the grid (i.e., additional 35 kV line facilities between Carmacks and Minto Landing).

(c) and **(d)**

The estimated length of the line is 1.65 km. All costs will be paid by Alexco. An estimate is not currently available.

(e) and **(f)**

The distance between a tap of the CSTP at McGregor Creek and the Carmacks Copper mine site is approximately 11 km, across the Yukon River. As noted in the 2008/2009 GRA, any amounts expended are expected to be fully recovered from the customer.

Supply options are still being considered and have not been finalized.

TOPIC: Estimating and Project Management

Technical Considerations

Rate Base Impacts Short and Long Term

REFERENCE:

From page 24 of the YEC's Mayo B application:

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).

From page 40 of YEC application:

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.

PREAMBLE:

The application refers to ratepayer savings due to displaced diesel as part of the justification for the Project.

QUESTION:

a) If "customers isolated from the grid" – specifically, large industrial customers – would normally be supplied by their own on-site diesel generation whose costs are excluded from YUB consideration for the purpose of rate setting, why would ratepayers be at risk for the "additional forecast 28GW.h or more" used in the economic analysis from 2012 -2016?

   i. How much of the forecast diesel generation is due to large industrial customers who would otherwise be supplied by their own on-site generation (absent any new service lines)?

ANSWER:

(a)

None. The forecast diesel generation requirements discussed in the Mayo B Part III Application relate to grid diesel requirements and not to requirements of isolated industrial customers, i.e., industrial customers who are not connected to the grid and therefore require their own on-site generation (which may typically be diesel generation, but could in principle be other generation sources where that is feasible).

The question sets out a premise that some of the industrial customers included in the Application's forecast connected grid load "…would otherwise be supplied by their own on-site generation (absent any new service lines)." Whereas each new industrial customer requires a "new service line" (transmission and/or distribution facilities) to become connected to the grid, it cannot be assumed that each such new industrial customer "would otherwise be supplied by their own on-site generation". As reviewed in YUB-YEC-1-37(c) and (d), and in CW-YEC-1-27(c), the Minto mine is the only one of the three specified industrial loads in the forecast grid loads that at one time "would otherwise be supplied by their own on-site generation", i.e., available information does not suggest that either the Alexco load or the Carmacks Copper load would proceed based on on-site generation. And today the Minto mine is connected, pursuant to a PPA approved by the Board as well as CSTP Stage 1 as developed.

For resource planning purposes, YEC would examine each new industrial development to assess the extent to which it is readily able to pay the costs to connect to the current grid (e.g., Alexco and Carmacks Copper). In this regard, Yukon Energy's 20-Year Resource Plan focused on industrial development opportunities that were within 50 km of the existing electric grid or of the potential electric grid.

TOPIC: Technical Considerations

Rate Base Impacts Short and Long Term

Project Financing Costs, Project Economics and Risks

REFERENCE: From page 20 of YEC Application – under "positive effects":

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.

From page 5 of YEC Application:

The Project's development at this time has been conditional upon the completion of stage 2 of CSTP to connect the two grids.

QUESTION:

a) Please explain how reliability is foreseen to be improved. For example, interconnection may decrease reliability because events in Dawson City could potentially propagate to Whitehorse.

b) Please provide historical reliability (from 2000- 2009) of the Mayo-Dawson Grid regarding underfrequency, overfrequency, undervoltage, overvoltage, and blackout events.

c) Please provide historical reliability (from 2000- 2009) of the WAF Grid regarding underfrequency, overfrequency, undervoltage, overvoltage, and blackout events.

d) Please provide evidence that suggests these outages will not propagate from the WAF grid to the MD grid and vice-versa.

e) Please provide evidence (load flow analysis) that quantifies the power which ratepayers on the WAF grid can expect from Mayo B.

ANSWER:

(a)

Reliability is expected to improve due to Mayo B, assuming that the CSTP interconnection is in place with or without Mayo B, for the following reasons:

- Improved geographical diversity and increase in the number of generation sources to serve customers on one larger interconnected hydro grid compared to two discrete smaller hydro grids.

- Increase in existing backup generation capacity for the new grid due to the ability of all generation on both grids to now be available as backup; i.e., Mayo and Dawson generation is now available as backup generation capacity for WAF loads and similarly WAF generation will be available to serve as backup generation capacity for Mayo-Dawson loads).

- Design of the Stewart Crossing substation, that will interconnect the two grids, incorporates isolation of transmission and generation faults and sectionalizing of the transmission system to address fault propagation.

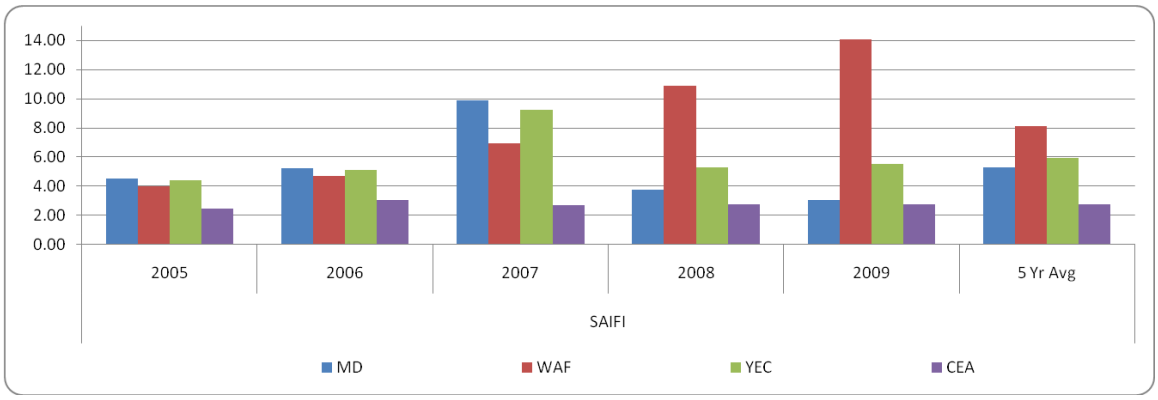
(b) and **(c)**

Historic reliability statistics characterized by under/over frequency, under/over voltage and blackout events are not kept. Yukon Energy does track and record outages by industry standard reliability measures recognized by the Canadian Electricity Association. This information is provided below:

System Average Interruption Frequency Index (SAIFI)

SAIFI is the average number of interruptions per customer for the period (a year in this case). It is a measure of how many outages an “average” customer experienced throughout the year. SAIFI is calculated by taking the total number of customer interruptions divided by the total number of customers served.

The graph as presented below shows the annual SAIFI index for the Mayo-Dawson Grid then WAF then YEC (Mayo-Dawson and WAF combined) and compared to the CEA index[1] for the same year plus a 5 year average.



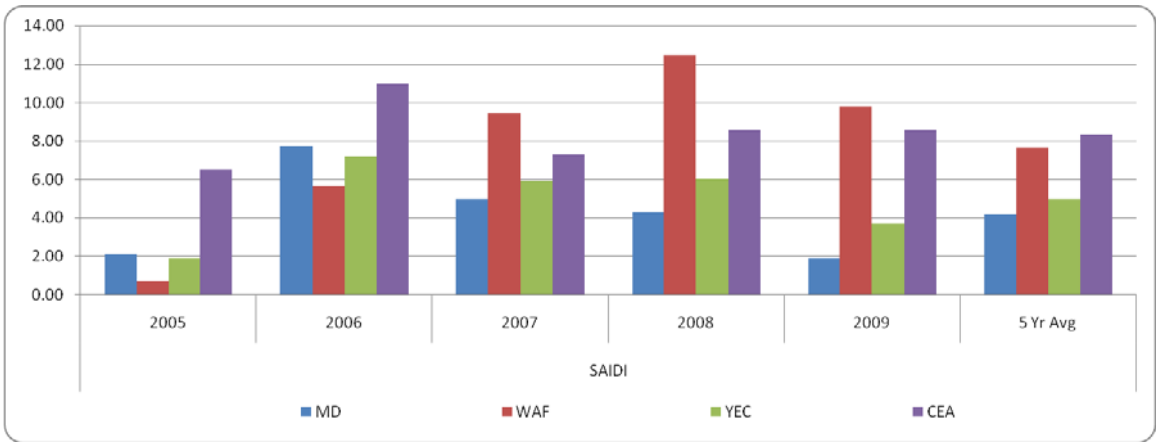
Notable events when viewing the graph are the increased frequency of outages on the WAF grid during 2008 and 2009. The 2008 outages reflect difficulties YEC encountered with new digital governors installed on WAF hydro units. These carried over and were addressed by installation of different governors in 2009. The 2009 higher frequency is due to increased weather outages and incidents where maintenance on generation units caused outages.

System Average Interruption Duration Index (SAIDI)

SAIDI is the system average interruption duration for customers served for the period (a year in this case). It is a measure of how long all customers were affected (i.e., the last customer to be restored power). SAIDI is calculated by totaling the customer hour interruptions and dividing by the total number of customers served.

The graph as presented below shows the annual SAIDI index for the Mayo-Dawson Grid then WAF then YEC (Mayo-Dawson and WAF combined) and compared to the CEA index for the same year plus a 5 year average.

[1] As CEA statistics are not yet available for 2009 the 2008 values have been used again for 2009 comparatives for SAIFI, SAIDI and CAIDI.

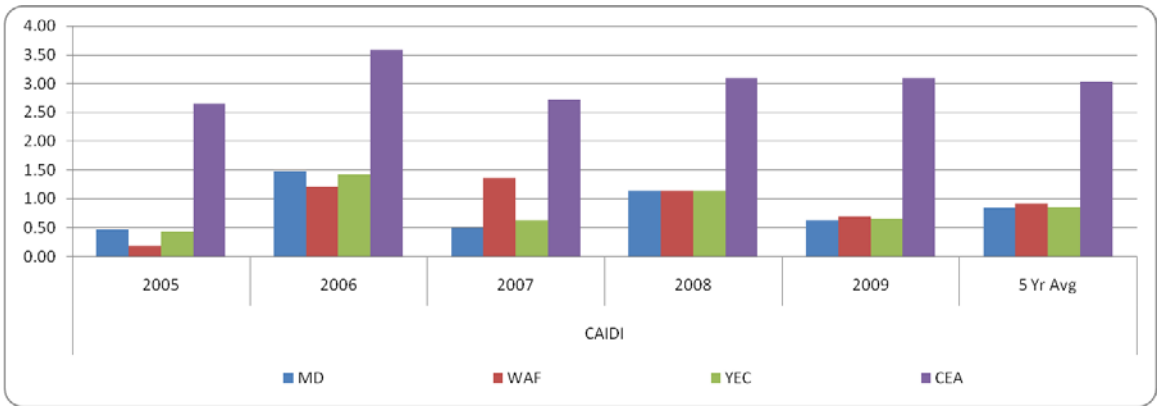


When viewing the graph there are increased cumulative duration of outages on the WAF grid during 2008 and 2009. As a larger number of customers are affected by outages affecting generation units it results in a higher SAIDI index.

Customer Average Interruption Duration Index (CAIDI)

CAIDI is the average customer interruption duration for customers interrupted. It is a measure of how long the "average" outage lasted for the customers affected. CAIDI is the total number of customer hour interruptions divided by the total number of customer interruptions.

The graph as presented below shows the annual CAIDI index for the Mayo-Dawson Grid then WAF then YEC (Mayo-Dawson and WAF combined) and compared to the CEA index for the same year plus a 5 year average.

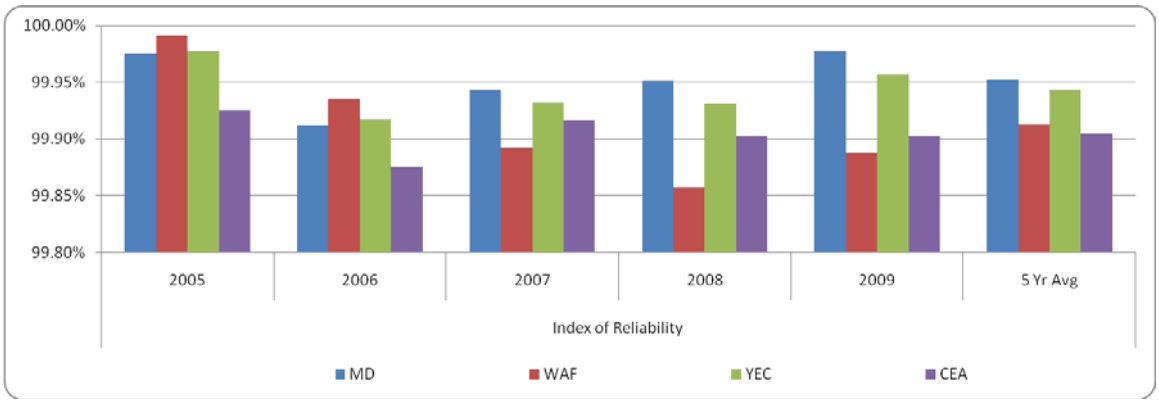


As observed with SAIFI and SAIDI the 2008 outages due to hydro unit governors resulted in a larger number of customers being affected for a longer time which results in a higher CAIDI index in 2008. (It is coincidental that the 2008 CAIDI for both the MD and WAF grids is exactly the same when both values are derived from different events on those grids.) As is typical, the YEC CAIDI index is significantly lower than the CEA average because as a small grid we are able to restore power more quickly when an outage occurs.

Index of Reliability (IOR)

IOR is the annual customer-hours that service is available measured as a percentage. It is determined by (8,760 hours/year – SAIDI) divided by 8,760 hours/year.

The graph as presented below shows the annual IOR for the Mayo-Dawson Grid then WAF then YEC (Mayo-Dawson and WAF combined) and compared to the CEA index for the same year plus a 5 year average.



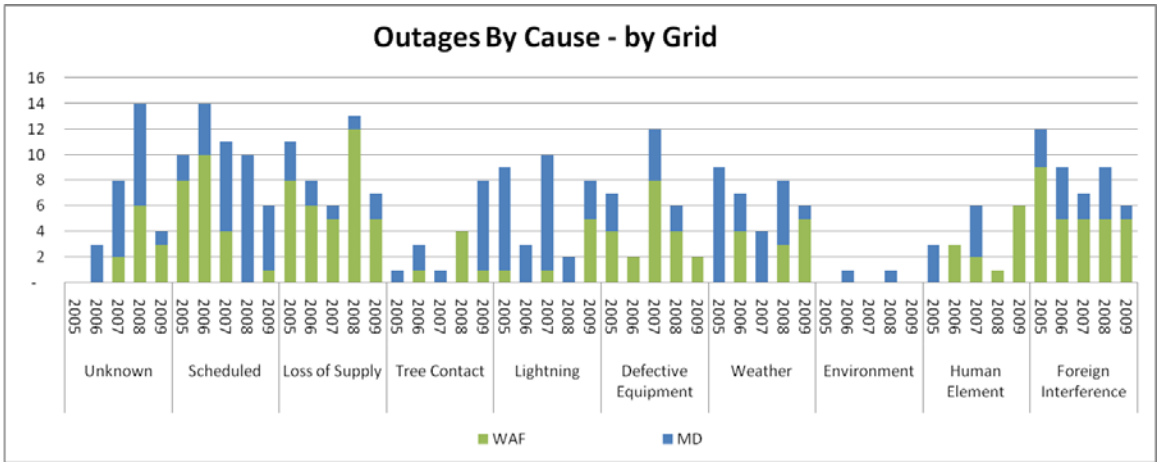
As has been discussed for the past indices, the difficulties with the hydro digital governors resulted in a lower IOR for the WAF in 2008 which reduces the YEC overall IOR for the same period. When compared on a 5 year average basis against the CEA average YEC is ahead of national averages.

Classification of Interruptions by Cause:

Yukon Energy classifies the primary cause of an interruption to match the CEA classification groups. Each customer interruption has been defined in terms of the primary cause of the interruption. The causes of interruptions for 2005 through 2009 are summarized below in tabular form.

Cause of Interruption	2009	2008	2007	2006	2005
0. Unknown/Other	4	14	8	3	0
1. Scheduled Outage	6	10	11	14	10
2. Loss of Supply	7	13	6	8	11
3. Tree Contacts	8	4	1	3	1
4. Lightning	8	2	10	3	9
5. Defective Equipment	2	6	12	2	7
6. Adverse Weather	6	8	4	7	9
7. Adverse Environment	0	1	0	1	0
8. Human Element	6	1	6	3	3
9. Foreign Interference	6	9	7	9	12
Total	**53**	**68**	**65**	**53**	**62**

The following graph illustrates the outage causes by grid for the years 2005 through 2009:



In recent years *Loss of Supply* and *Foreign Interference* have been significant contributing factors to the number of outages YEC has experienced with *Human Element* being another key area where YEC is paying particular attention in its efforts to reduce outages to improve reliability.

(d)

The Stewart Crossing substation design includes the breaker and disconnect switch configuration that provides the isolating and sectionalizing actions required so that outages will not propagate from the WAF grid to the MD grid and vice versa. In addition

Yukon Energy is currently assessing the feasibility of improving the load rejection and load pickup capabilities of its hydroelectric generators. Yukon Energy is also working with YECL in reviewing the current use of under-frequency load shedding in the transmission and distribution systems.

(e)

Modeling of economic benefit analysis for Mayo B does not include detailed load flows analysis as it is not needed. Yukon Energy models the generation dispatch on a per plant basis in order to calculate the benefits of any new hydro generation in displacing diesel generation, rather than just spilling water at another hydro generating station. Weekly customer loads, with system line losses added, is an input to the model. The economic model calculates the net benefit of Mayo B to the entire interconnected grid (i.e. to all customers on the former WAF and M-D grids).

TOPIC: Project Financing Costs, Project Economics and Risks

Estimating and Project Management

Alternatives Considered

REFERENCE:

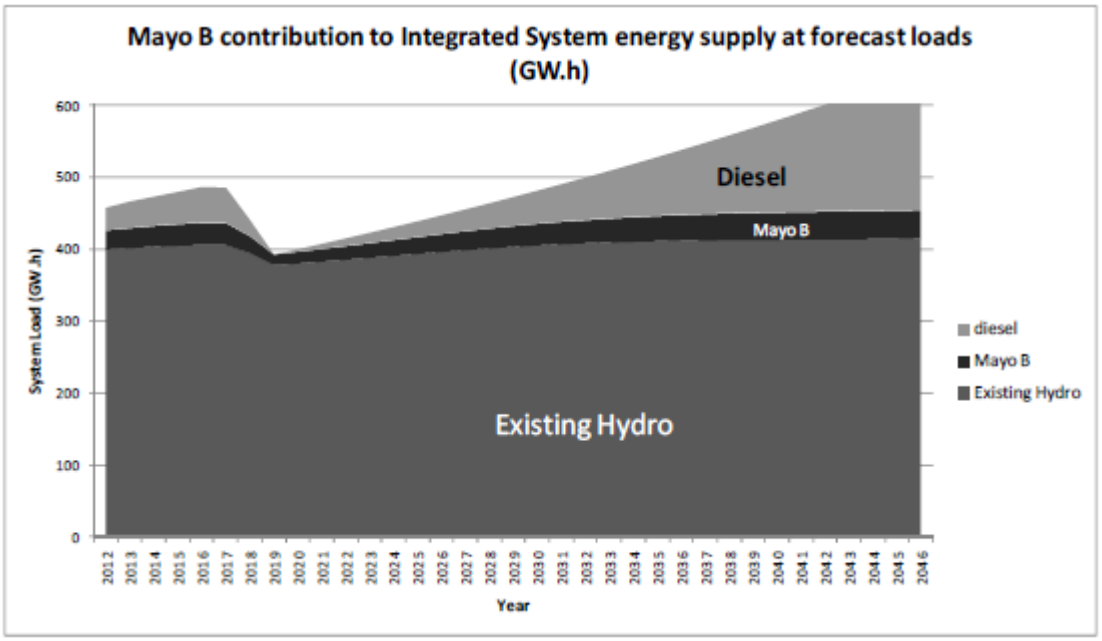
From page 25 of YEC Application:

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

From page 27 of YEC Application:

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.

From page 29 of the YEC's Mayo B application, see Figure 2.



PREAMBLE:

Much of the Project's justification relies on forecast load. Yukon Electrical believes that forecast supply may influence the need for the Project.

QUESTION:

a) Was medium to long-term Interconnected system (IS) supply forecast considered? For example, if a medium-to-large-scale (producing at 5-20MW) renewable generation project comes online in the next 15 years, how would that affect "Mayo B economics"?

Please provide Figure 2 for the following scenarios:

i. A new renewable supply, producing at 5MW, in 2025
ii. A new renewable supply, producing at 20MW, in 2025

b) Which if any projects were considered as part of YEC's load forecast and which are renewable generation?

ANSWER:

(a)

There is no specific medium to long term IS supply forecast to be considered at this time. As set out in Yukon Energy's 20-Year Resource Plan, a balanced planning approach has been adopted to ensure that Yukon Energy is sufficiently prepared so as to "protect" feasible options to proceed with power projects quickly once new industrial loads develop, while at the same time not spending more than is prudent today to protect and advance potential power projects. This balanced approach does not result in Yukon Energy proposing any specific medium (let alone long term) IS supply forecast as the foundation for its resource planning.

The planning approach adopted in the Resource Plan requires that each new supply project be assessed at the time of its proposed development based on the existing and then committed facilities and the most recent load forecasts. The earlier CSTP Part 3 Application proceeded on this basis, and the current Mayo B Application is also proceeding on this basis. If and when other new renewable generation projects are assessed in the next 15 years, this same approach will be followed – and, assuming that its development proceeds, Mayo B will at that time be part of the "existing and committed facilities".

Figure 2 from YEC's Application includes all current generation, plus a 10 MW renewable generation project ("Mayo B") coming on line for 2012. With respect to other renewable generation presently in the planning stages, please see YUB-YEC-1-8(a) and YUB-YEC-1-39(a).

It is not feasible to model in a meaningful way some theoretical proxy "MW" level renewable development as part of Figure 2 as requested without specific information about the characteristics of such development (including energy generation expectations by season and the degree of reliability of such expectations), how it would interact with existing generation, timing for the development (which is specified in the question) and what loads would underlie the development. This is the same reason that the other near-term renewable generation projects presently in active planning (e.g., Gladstone diversion) cannot be modeled in this fashion without further investigation, as noted in YUB-YEC-1-8(a).

(b)

YEC's load forecast focuses on the projects of Minto mine (through 2018), Carmacks Copper (through 2018) and Alexco (through 2017). As noted in YUB-YEC-1-25(f), there are no other industrial or mine development projects included in the load forecast.

TOPIC: Technical Considerations

Rate Base Impacts Short and Long Term

REFERENCE:

From page 25 of YEC Application:

Mayo B economics have been considered and assessed on the following basis:
From page 27 of YEC Application:

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.

QUESTION:

a) With Carmacks Copper coming on at 52GW.h/year and Mayo B contributing, under best case assumptions, 41.4GW.h/year, how is the IS secondary energy potential increased?

ANSWER:

(a)

Please see response to CW-YEC-1-8, as well as YUB-YEC-1-25(a), YUB-YEC-1-44, and footnote 46 at page 30 of the Application.

TOPIC: Technical Considerations

System Sales and Generation

Estimating and Project Management

REFERENCE: From page 25 of YEC Application:

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

From page 27 of YEC Application:

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.

QUESTION:

a) If "Contribution to Firm Winter Peak Capacity" is part of the basis of Mayo B economics;
   i. What is meant by "almost all of this will augment firm winter peaking capacity"?
   ii. Will Mayo B provide 10MW output during the winter?

ANSWER:

(a)

This should state that, subject to future review of actual operations, all of the new capacity will augment firm winter peaking capacity. Please see CW-YEC-1-10(e).

TOPIC: Technical Considerations

REFERENCE:

From page 27 and 28 of YEC Application:

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

QUESTION:

a) Please clarify. What are "very high IS load scenarios"?
   i. When are they expected?

ANSWER:

(a)

Circumstances for very high IS load scenarios are expected under the assumption that there is enough load to use all available generation (e.g., the ability to access and make sales to export markets). The ability to access and make any energy sales into an export market is not currently expected. Based on extrapolation it has been estimated that this level of net generation would occur at firm grid loads of approximately 720 GW.h (see

YUB-YEC-1-30A(a), footnote 7) or in about 41 years (2052) per the base case forecast assuming no industrial loads after 2018 (see detailed models per YUB-YEC-1-25(a)).

TOPIC: Technical Considerations

System Sales and Generation

Rate Base Impacts Short and Long Term

Project Financing Costs, Project Economics and Risks

REFERENCE:

From footnote on page 27 of YEC Application:

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).

From footnote on page 28 of YEC Application:

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.

And from page 29 of YEC Application:

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 - equaling approximately $8.8 million/year in diesel savings (2017$) in that year alone).

From page 26 of YEC Application:

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.

PREAMBLE:

Yukon Electrical is concerned that Fish Lake and Haeckel Hill were not taken into consideration as the 9.73GW.h of energy they provide is not "orders of magnitude" different than the output/diesel displacement of Mayo B (ranging from 14.9 to 41.4GW.h,) not to mention the significant attention paid to the 4GW.h of energy the enhanced Mayo Lake license will provide.

QUESTION:

a) Why were ~10GW.h of renewable generation not included when discussing best case scenarios of generating 41.4GW.h and displacing 30GW.h of diesel?

b) If YEC considers that 10GW.h of renewable generation can be excluded, why is emphasis placed on the additional 4GW.h that the expanded water license will allow?

c) Given the "relatively severe constraints" on the Whitehorse plant's dispatchable operation, why is it included in the calculations?

ANSWER:

(a), **(b)** and **(c)**

Fish Lake and Haeckel Hill were fully considered in the Application as regards all Mayo B net generation estimates. See footnote 37 which notes specifically that all IS generation loads in that section of the Application assessing Mayo B economics are net of Fish Lake generation (approximately 8.73 GW.h) and YEC wind generation (approximately 1 GW.h). In summary, all existing and currently committed generation and transmission resources are fully considered.

TOPIC: Technical Considerations

System Sales and Generation

Rate Base Impacts Short and Long Term

Project Financing Costs, Project Economics and Risks

REFERENCE:

From page 41 of the YEC's Mayo B application:

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.

From page 43 of the YEC's Mayo B application:

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.

PREAMBLE:

It is not clear whether the, 8.73GW.h and 1GW.h for Fish Lake and Haeckel Hill, respectively, has been taken into consideration. The following table summarizes the above, and also includes Fish Lake and Haeckel Hill (as per this report.):

Scenario	Diesel Savings (when Fish Lake and Haeckel Hill are included)	Diesel Costs (at $.26 / kWh)	Diesel Savings, net of Federal and YDC contributions (i.e. subtract $3.1 million)
Including Carmacks copper	28GW.h – 1GW.h – 8.73GW.h = 18.27GW.h	$4.75 million	$1.65 million
Excluding Carmacks Copper	18GW.h – 1GW.h – 8.73GW.h = 8.27GW.h	$2.15 million	-$0.95 million
Excluding Carmacks Copper and Enhanced storage	15.8GW.h – 1GW.h – 8.73GW.h = 6.07GW.h	$1.5 million	-$1.6 million

QUESTION:

a) Did YEC take Fish Lake and Haeckel Hill into consideration for the economics as referenced in page 41 and page 43 of the application?

b) As demonstrated in the table above, please provide the actions considered and taken by YEC to mitigate the risk to the ratepayers under the scenarios outlined.

ANSWER:

(a) and **(b)**

The Application fully considered Fish Lake and Haeckel Hill. See response to YECL-YEC-1-22. The Application addresses the actions taken to mitigate ratepayer risks related to loads and other risks, including flexible term debt provisions set out in Section 4.3.3 of the Application.

TOPIC: Technical Considerations

System Sales and Generation

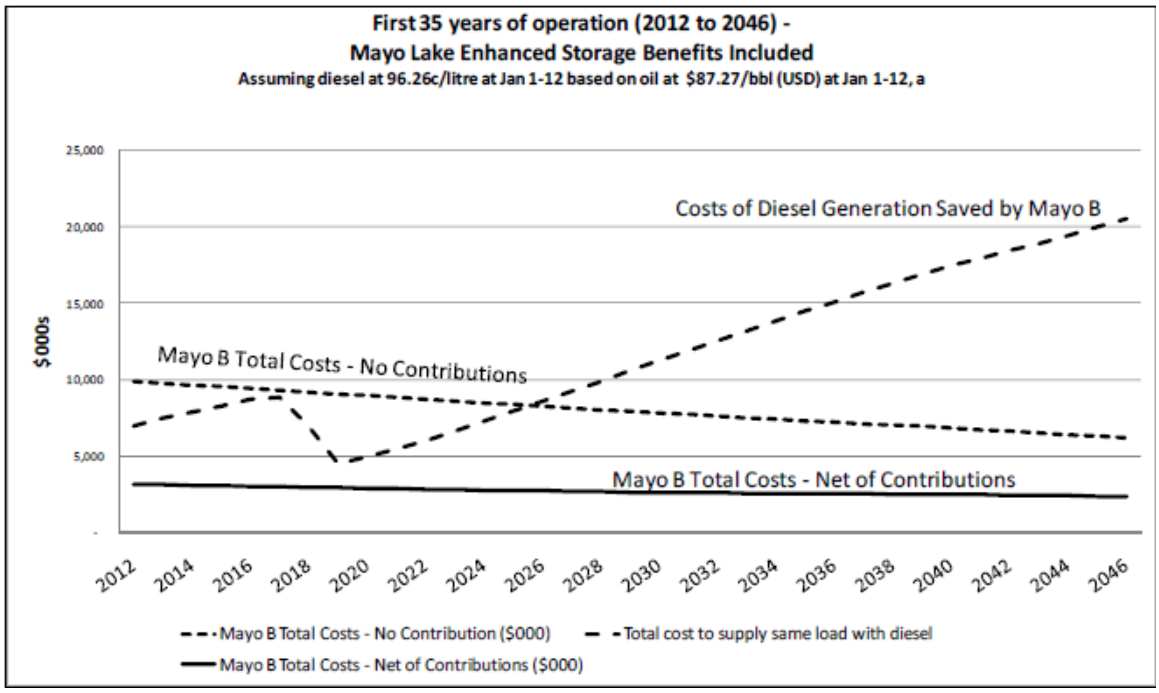
Rate Base Impacts Short and Long Term

Project Financing Costs, Project Economics and Risks

Estimating and Project Management

REFERENCE:

On Page 14 of YEC Application, see Figure 1.



QUESTION:

a) Please Provide Figure 1 showing "Costs of Diesel Generation Saved by Mayo B" if:

   i. Carmacks Copper and Alexco do not come online

   ii. Fish Lake (8.73GW.h) and Haeckel Hill (1GW.h) are included

   iii. Enhanced Lake storage excluded

iv. All of the above

b) From Figure 1, absent any Federal or Territorial funding, Mayo B appears not to result in any real diesel cost savings until the year 2026. Is it reasonable to conclude that this figure suggests there are no plans for any other dispatchable, large renewable generation plants coming online before 2026, which also might contribute to diesel cost savings?

ANSWER:

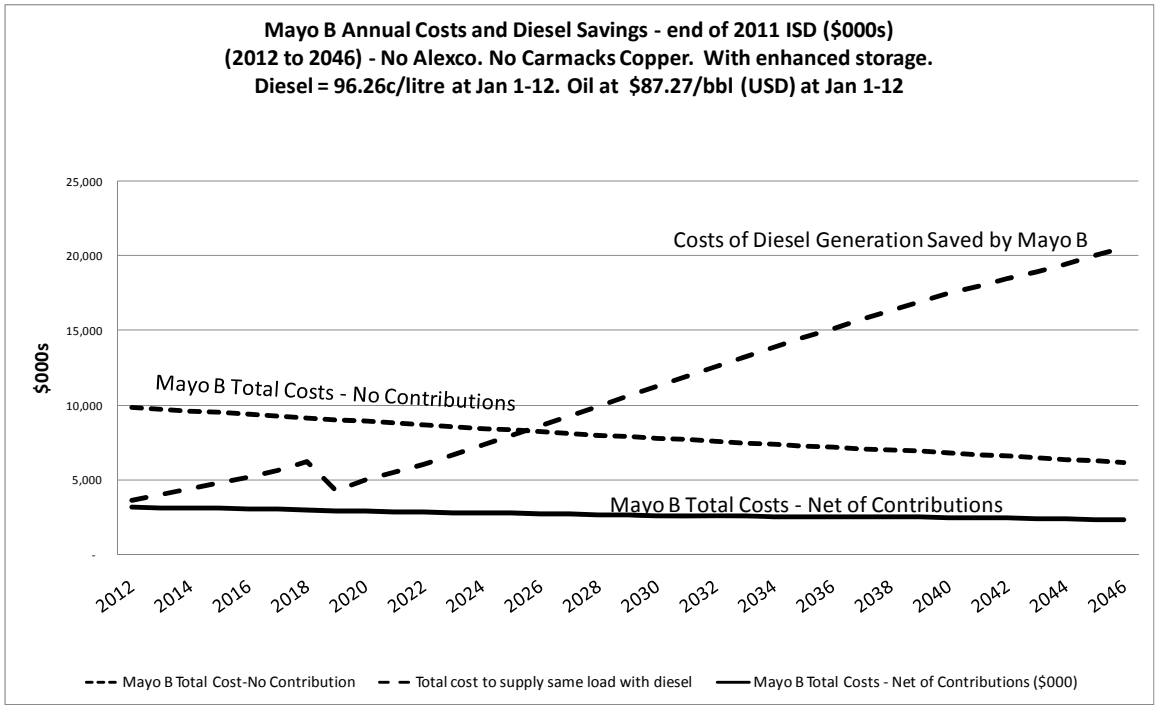
(a)

The Application provides the LCOE for scenarios without Carmacks Copper, both with and without any change to the Mayo Lake licence (see footnote 68 at page 38). YEC has not considered deletion of the Alexco load as a risk meriting similar attention. In all of the Application's analysis, Fish Lake and Haeckel Hill are fully considered.

(i)

Please see Figure 1 below

Figure 1: Part III Application revised for No Carmacks Copper and Alexco

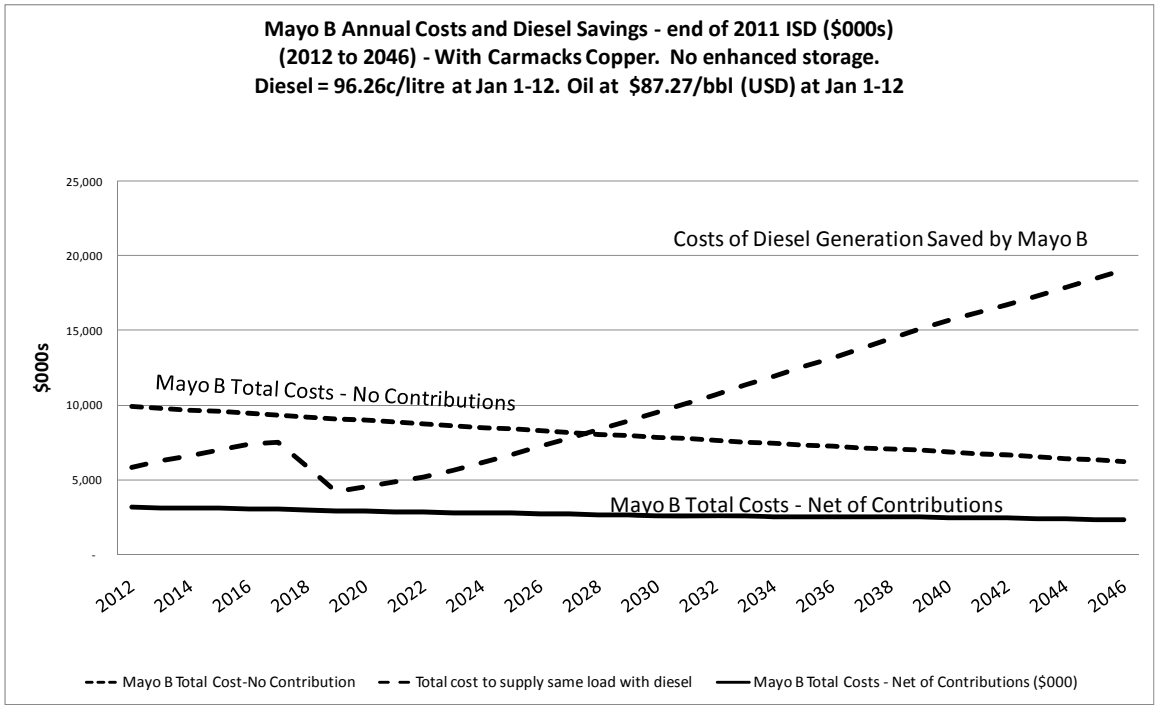


(ii) Fish Lake and Haeckel Hill are included in all of the analyses. They are simply included as a value subtracted from the total load to determine the net load to be served from dispatchable generation. See YECL-YEC-1-22 (a).

(iii)

Please see Figure 2 below.

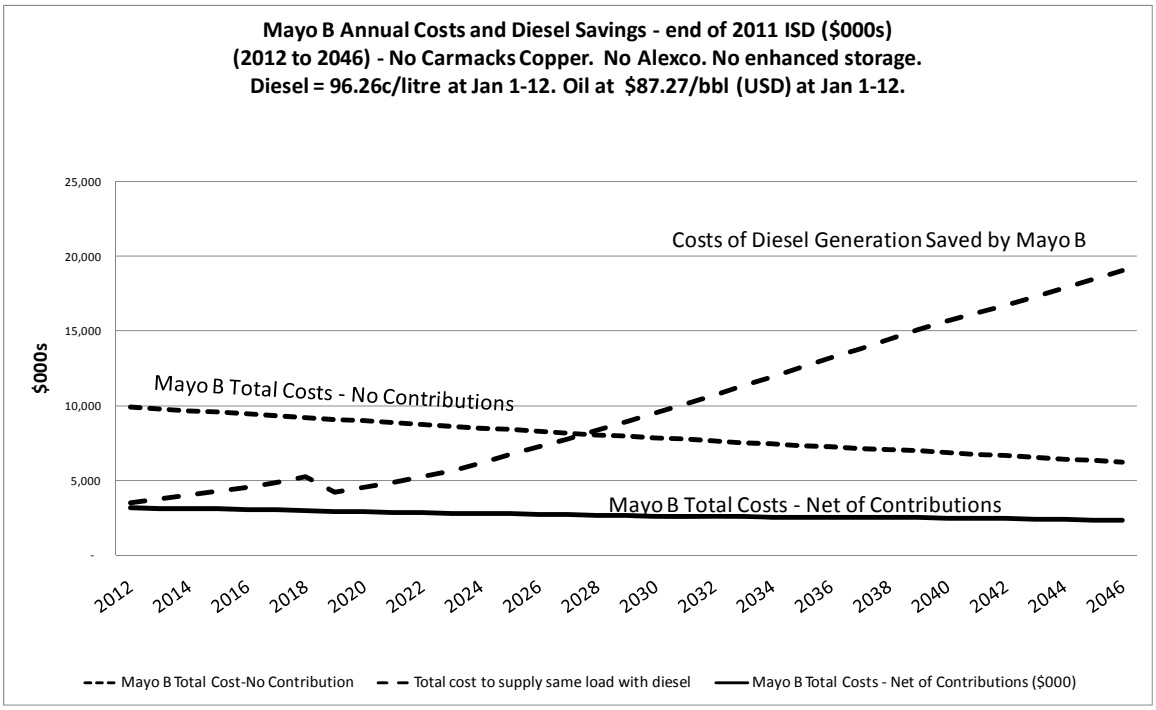
Figure 2: Part III Application with no Mayo Lake Enhanced Storage



(iv)

Please see Figure 3 below.

Figure 3: Part III Application with no Carmacks Copper, no Alexco, and no Mayo Lake Enhanced Storage



In each of the sensitivities noted above, the costs of Mayo B in any given year are lower than the costs of replacing the equivalent quantity of energy with diesel generation.

(b)

The interpretation noted is not correct. Mayo B results in “real diesel cost savings” from the day it is placed into service (the dotted line entitled “Cost of Diesel Generation saved by Mayo B”). Without the committed Federal and YDC no cost funding, however, these diesel cost savings would not match or exceed Mayo B annual costs until the year 2026.

It is not reasonable to conclude that this figure suggests there are no plans for other dispatchable, large renewable generation plants coming online before 2026. The quantity of diesel displaced by Mayo B is a benefit of this project. However, as shown in

YUB-YEC-1-25(a) there remains significant additional diesel on the system in many years that is not displaced by Mayo B that may be suited to other additional renewable generation projects coming online during this period. See response to YUB-YEC-1-17(b) with regard to other near term hydro developments that YEC continues to pursue.

TOPIC: Technical Considerations

Project Financing Costs, Project Economics and Risks

REFERENCE:

From page 36 of YEC Application:

It became apparent during the YESAB adequacy review process that provision for an additional metre of water storage at Mayo Lake in the Mayo B Project proposal presented a significant risk to project timelines and available federal funding.

QUESTION:

a) What are YESAB's concerns regarding the additional metre?

ANSWER:

(a)

YESAB's concerns regarding additional studies relating to the additional metre of drawdown were provided in the Adequacy Review Report of Supplementary Information Requests provided on July 23, 2009. In that correspondence, YESAB determined that all information supplied with respect to the Project was sufficient with the exception of those issues related to the additional one metre drawdown of Mayo Lake.

YESAB's concerns in this regard related mainly to its view that there was insufficient information to understand the potential effects of the proposed drawdown on Mayo Lake fisheries resources and on wetlands, and that this information was required before YESAB could determine it had adequate information to proceed with its screening review. The additional information required before adequacy could be determined in this regard included additional baseline information, effects characterization, and mitigations of values. Since these studies would not have been completed until late in 2009, and in order for allow the adequacy review to proceed in order to move forward with the assessment expeditiously, the one metre drawdown of Mayo lake was removed from the Project proposal.

TOPIC: Project Financing Costs, Project Economics and Risks

Estimating and Project Management

REFERENCE:

From page 3 of YEC Application to Board:

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.

QUESTION:

a) Please outline the competitive bid process followed to select KGS and PKS groups.

b) Please provide all RFPs and a corresponding list of bidders and bids for all contracts and MOUs involved in the Project (including turbine/generator (T/G) equipment).

c) What contractual commitments have been made to KGS and/or PKS regarding construction of Mayo B?

d) What contractual commitments have been made for T/G equipment?

e) What are the financial consequences to YEC or related parties of withdrawing from these contracts?

ANSWER:

(a)

For the construction contract the competitive bid process included an RFP process. Five bids were received, and two contractors were short listed based on relevant experience

and cost structure. The evaluation process included a review of the submissions received, as well as interviews and reference checks.

KGS was initially retained by YEC to work on the Mayo B costing, 2008 field work and preliminary and feasibility engineering as required for the February 2009 YESAB submission. The selection of KGS in summer 2008 followed a competitive process administered by YEC where three firms were invited to bid and two firms responded; the initial award process provided that KGS would be retained for engineering as required for further stages of this work. Since summer 2008, KGS Group's work has been extended by YEC to provide concept design, 2009 field work and preliminary engineering as needed to finalize a construction contractor selection and contract as well as the selection of the Turbine/Generator supplier.

(b)

The RFPs for the MOU construction contractor selection, Turbine Generator selection, and Engineer selection are each attached. Yukon Energy will not release the bid packages as they contain commercially sensitive information and therefore are confidential.

The list of MOU construction contractor bidders who responded to public tender process is as follows:

- BBM Joint Venture (Bird / Black and McDonald)
- Big River (Pelly Construction, Valard Construction, NNDDC and others)
- Carillion with Collavino Construction
- Ledcor CMI Ltd.
- Peter Kiewit Sons Co.

The list of Turbine Generator bidders is as follows:

- ABB Inc.
- ANDRITZ Hydro Canada Inc.
- Litostroj Hydro
- Voith Hydro Inc.

The list of firms invited to bid on the preliminary engineering is as follows:

- KGS Group (did bid)
- Klohn Crippen Berger Ltd. (did not bid)
- Stantec (did bid).

(c)

YEC entered into an MOU with PKS to establish procedures to negotiate an open book procurement and construction contract including agreed upon construction and development schedule and a target pricing formula. The construction contract key commercial terms were resolved in December and the full contract is currently being finalized.

The contract with KGS for engineering design and contract administration will be finalized following completion of the construction contract.

(d)

ABB Inc. was awarded a Preliminary Agreement with YEC in January 2010. A final contract is expected before April 2010.

(e)

In general, prior to start of construction, YEC is liable for costs incurrent to date if it elects not to proceed with the project.

YUKON ENERGY CORPORATION
Attention: Purchasing
#2 Miles Canyon Road,
Box 5920, Whitehorse, Yukon
Y1A 6S7
Phone: (867) 393-5335

REQUEST FOR PROPOSAL
2009 - 020

MAYO B TURBINE AND GENERATOR SUPPLIER

Issue Date: September 16, 2009

YUKON ENERGY CORPORATION

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YEC RFP# 2009-020

PART 1
OVERVIEW

1.1 CORPORATE OVERVIEW

Established in 1987, Yukon Energy Corporation is a publicly-owned electrical utility that operates as a business, at arms length from the Yukon Territory Government. The Corporation is the main generator and a transmitter of electrical energy in the Yukon Territory and works with its parent company Yukon Development Corporation to provide Yukon Territory residents with a sufficient supply of safe, reliable electricity, and related energy services.

The Corporation is regulated by the *Business Corporations Act* (Yukon), the *Public Utilities Act* (Yukon), and the *Waters Act* (Yukon). The Corporation's headquarters are located near the Whitehorse Rapids hydro plant in Whitehorse with community offices in Mayo, Faro and Dawson City.

Additional Corporation information and annual reports can be viewed on the Corporation's website at: http://www.yukonenergy.ca.

1.2 GENERAL PROJECT DESCRIPTION

The Mayo B Project is proposed to enhance the current power generation capacity installed on the Mayo River. The Project is designed to improve power generation capacity at the Mayo hydro system to help displace diesel generation that would otherwise be required to meet the increased loads, including loads that are anticipated to arise following the completion of the Carmacks-Stewart Transmission Project.

The Project components are as follows (with two alternatives currently under consideration based on conceptual design and field work to date):

(a) a new powerhouse of approximately 10 MW, approximately 3.9 km downstream of the existing powerhouse;

(b) Alternative 1: a new penstock-canal system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 420 m long that extends from the newly extended tunnel to a new canal; a surface-run canal (approximately 2,610 m); and a pressurized 'downstream' penstock from the canal to the new powerhouse (approximately 565 m);

Alternative 2: a new penstock system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 3030 m long that extends from the new tunnel to a pressurized 'downstream' penstock, complete with surge tank, from the canal to the new powerhouse (approximately 565 m);

(c) a new all-weather access road of approximately 2600 m to the new powerhouse from the existing access road serving the current Mayo hydro facility;

(d) a new distribution line of approximately 1,700 m 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; and

(e) a new transmission line of approximately 3,600 m operating at 69 kV from the new powerhouse to the existing Yukon Energy substation (S249).

For additional detail relating to the Project, Proponents should refer to Chapter 6 of the "Mayo Hydro Enhancement Project - YESAB Executive Committee Project Proposal", dated February 27, 2009, available on the Corporation's website at www.yukonenergy.ca.

The Project is subject to a screening level assessment by the Yukon Environmental and Socio-economic Assessment Board. It is anticipated that this assessment will be completed by the end of 2009, and that the major permits required for land-based construction to proceed will be secured by May 2010.

The Corporation has entered into an MOU with Peter Kiewit Sons Co. ("Kiewit") to provide development work for the Project with a view to entering into a construction contract with Kiewit, provided that mutually satisfactory terms can be agreed. In any event, the Corporation intends to enter into a construction contract for the Project early in 2010 with a contractor.

The Project will be funded in part by way of a Federal contribution from the Green Infrastructure Fund, with the remaining funds being raised by the Corporation.

1.3 TURBINE AND GENERATOR SUPPLIER

The Corporation is issuing this RFP for the purpose of obtaining Proposals for the early involvement of a turbine and generator Supplier for the Project before the final designs are complete.

The selected Proponent will enter into a Preliminary Contract with the Corporation substantially in the form set out in Appendix A. Pursuant to the Preliminary Contract, the Supplier will provide technical design and other engineering information to the Corporation in order to allow the Corporation to develop other aspects of the Project. The Supplier will be paid for this preliminary work in accordance with its response to this RFP. It is anticipated that a Turbine Generator Contract will be entered into directly between the Supplier and the Corporation or the Construction Contractor.

The requirements of the Preliminary Contract include:

- Providing technical and cost information required for evaluating design options relating to the water conveyance system, hydraulic transients, operation in islanded mode and performance characteristics of the equipment provided.
- Providing layout drawings for the proposed equipment.
- Performing independent transient studies, on both conveyance options.
- Participating in the design process to add value to the Project.
- Performing engineering activities on the turbine and generator package equipment prior to signing a Turbine Generator Contract, as required, in order to meet the Project Schedule requirements.
- Negotiate the final Turbine Generator Contract if mutually acceptable pricing, terms and conditions are agreed to.

The Turbine Generator Contract will include the provision of the equipment and services described in Section 3.1 and Appendix B.

1.4 DEFINED TERMS

Capitalized terms used in this RFP are defined in Section 6.2.

PART 2
INSTRUCTIONS / INFORMATION TO PROPONENTS

2.1 LETTER OF INTENT TO RESPOND

After reviewing this RFP, the Corporation requests that all potential Proponents who intend to respond to this RFP identify themselves using the letter of intent to respond (the "**Letter of Intent**") provided in Part 7 of this RFP. Only those companies / individuals submitting a Letter of Intent will receive subsequent information, addenda and Q&A information.

2.2 DELIVERY OF PROPOSALS - HARD COPY

Proposals must be submitted in two packages as follows:

(a) Package One - Proposal Form 1, Proposal Form 3 and the information required under Section 4.2 of this RFP;

(b) Package Two - Proposal Form 2 containing the information required under Section 4.3 of this RFP.

Proposal Form 1, Proposal Form 2 and Proposal Form 3 are provided in Part 7 of this RFP.

For Proposals in hard copy, each Package must be enclosed in a separate sealed envelope, clearly identified and delivered in original form by hand or courier to:

Yukon Energy Corporation
Attention: Purchasing
#2 Miles Canyon Road
Box 5920, Whitehorse, Yukon
Y1A 6S7

2.3 DELIVERY OF PROPOSALS - ELECTRONIC FORMAT

The Corporation will accept Proposals submitted in electronic format, in accordance with this Section 2.3. If submitting a Proposal electronically, in order for the Proposal to be considered, the Proposal must:

(a) be identified and transmitted using two separate emails as follows:

(i) email 1 will be sent to tenderform1@yec.yk.ca and will consist of Package One and should be identified on the subject line as "Submission for RFP #2009-020, Package One"; and

(ii) email 2 will be sent to tenderform2@yec.yk.ca and will consist of Package Two and should be identified on the subject line as "Submission for RFP #2009-020, Package Two";

(b) also be delivered in hard copy form to arrive as soon as possible after the Closing Date and Time and email 1 must include shipment/courier details to assure the Corporation that the originally executed Proposal documents are in transit, including;

(i) the name of the courier company by which the original Proposal documents have been shipped; and

(ii) the courier company's document tracking number(s).

If there are discrepancies between the Proposal as submitted electronically and the hard copy Proposal received subsequently, the hard copy Proposal shall govern.

Proponent's sales literature and/or any information additional to that requested in this RFP, that the Proponent is including in its Proposal, need not be included in the electronic Proposal submission, but should be included in the hard copy submission.

Proponents should note that it is their responsibility to ensure that electronic transmissions are free from all viruses. If the Corporation receives an electronic transmission that is infected with a virus or other electronic code that, in the sole opinion of the Corporation, is harmful to the Corporation's computer systems, the Corporation reserves the right to take any action as deemed necessary to disinfect the electronic transmission. The Corporation will not be liable for any changes that may occur to the electronic transmission, including rendering the transmission unreadable, as a result of the disinfecting process.

Proponents should note that the Corporation's email system will not accept emails in excess of 10 MB. The Corporation prefers all attachments to be in PDF format. It is the responsibility of Proponents to ensure that emails are of a size that can be received by the Corporation and in a format that can be read by the Corporation.

2.4 PROPOSAL SUBMISSION

Each Proponent will clearly identify on the envelope containing the Proposal or in the first section of the first email referred to in Section 2.3(a), the name and address, telephone, and fax numbers of the Proponent, the name of the RFP, and the associated RFP number, and the Closing Date and Time.

Proposals submitted by hand or by courier must be submitted in **three** copies. One copy of each Proposal Form must be originally executed and include original signatures of duly authorized signatory(s) of the Proponent. Proponents should include an electronic copy of their Proposal on disc.

Proposals submitted electronically must be submitted in accordance with Section 2.3, and must show that the original of each Proposal Form 1 has been executed and includes signatures of duly authorized signatory(s) of the Proponent.

Proposals submitted via email which do not comply with Section 2.3 or are submitted via fax or other non-original formats will not be accepted without the prior written consent of the Corporation, which consent may be unreasonably withheld.

2.5 CLOSING DATE AND TIME

The date and time of Proposal closing is:

October 9, 2009 before 4:00 p.m. Whitehorse local time
(as per the Corporation time clock located at the Corporation's reception area for Proposals delivered by hand or courier and as per the time when both emails have been received by the Corporation's email server for Proposals delivered electronically).

In order to qualify under this RFP process, a Proposal must be received at the Corporation's Office before the Closing Date and Time. Proposals received by hand or courier on or after the Closing Date and Time will be rejected and will be returned to the Proponent unopened and time stamped. Proposals received electronically on or after the Closing Date and Time will be rejected, but will not be returned to the Proponent.

The Corporation assumes no risk, makes no guarantee, warranty or representation whatsoever and shall have no responsibility or liability whatsoever for and in connection with:

(a) the timely receipt of any Proposals or amendments to Proposals or any other information from any Proponent; or

(b) the working order, functioning or malfunctioning of the Corporation's email system or any computer used in connection with this RFP.

2.6 VERIFICATION OF RECEIPT OF PROPOSAL

Proponents may verify that their Proposal has been received prior to the Closing Date and Time by calling (867) 393-5335. The Proponent must identify the Proponent's name before this information will be released. No other information concerning the Proposal will be released prior to the Closing Date and Time.

2.7 QUESTIONS

Proponents are required to submit their questions, including questions relating to specifications, discrepancies, omissions, or any apparent ambiguities, in writing, by facsimile, or e-mail, per the schedule below to:

Yukon Energy Corporation
Attention: Matthew Sills, Buyer
Telephone: (867) 393-5335 Fax: (867) 393-5301
E-mail: matthew.sills@yec.yk.ca

Proponents will not contact or ask questions of any other Corporation personnel. Information obtained from any person or source other than the Corporation's Representative cannot be relied on for the purposes of this RFP process and cannot be incorporated into a Proposal. The Corporation may disqualify any Proponent who solicits information from any person other than the Corporation's Representative.

The Corporation will review the questions and where the information is not already provided, will issue an addendum to all Proponents under Section 2.8. Responses may be made up to 48 hours prior to the Closing Date and Time. The Proponent that submitted the question will not be identified in the Corporation's response.

To facilitate the question and answer process, the Corporation will use the schedule identified below for the receipt of questions and delivery of the Corporation's responses. The Corporation will make a reasonable effort to have the responses issued by the end of business on the Corporation's Response Date.

	Submission Date	**Corporation's Response Date**
Q&A Session #1	September 22, 2009	September 24, 2009

Q&A Session #2	September 29, 2009	October 1, 2009

2.8 ADDENDA

The Corporation may amend or supplement this RFP by addenda issued by the Corporation. All addenda will be in writing, sequentially numbered, and bear the date of issue. All addenda issued by the Corporation prior to the Closing Date and Time will become part of this RFP. It is the sole responsibility of the Proponent, prior to the Closing Date and Time, to ensure that it has received all addenda pertaining to this RFP. The Proponent should acknowledge receipt of all addenda in Proposal Form 1.

2.9 PROPOSAL WITHDRAWALS

Proposals may be withdrawn at any time prior to the Closing Date and Time by submitting a written withdrawal request to the Corporation's Office or by facsimile or email to the number and address given in Section 2.7. A Proposal that has been submitted by hand or by courier will be returned to the Proponent unopened and a Proposal that has been submitted electronically will be withdrawn, but not returned to the Proponent.

2.10 AMENDMENTS TO PROPOSALS

Where a Proposal has been received by the Corporation before the Closing Date and Time, amendments by facsimile or email are acceptable, provided that such amendments are sent to the number and address given in Section 2.7 and are received at that number or address before the Closing Date and Time. Amendments may be submitted in hard copy to the Corporation's Office before the Closing Date and Time.

Amendments to a Proposal must clearly state the name of the Proposal, the Closing Date and Time, and the name and address of the Proponent in accordance with this RFP. Any amendment must be duly signed by an authorized signatory of the Proponent.

2.11 PROPOSAL DETAILS

Proponents must provide complete and accurate information and details for all aspects of their Proposal. Failure to respond to any requests for information, costs or qualifications will be deemed to be a negative response, and may, at the sole discretion of the Corporation, disqualify the Proposal.

2.12 RIGHT OF ACCEPTANCE / REJECTION

The Corporation, in its sole discretion, may, at any time prior to selection of the successful Proponent, accept in whole or in part all Proposals it has received, withdraw any portion of this RFP, or cancel this RFP in its entirety. No act of the Corporation, other than a notice in writing signed by the Corporation's Representative, will constitute an acceptance of a Proposal. If none of the Proposals meet the Corporation's requirements, the Corporation may choose not to accept any Proposals and may cancel this RFP.

From the information submitted under this RFP, the Corporation will determine the successful Proposal, which in the sole judgment of the Corporation, provides the most economically advantageous solution for the Corporation in accordance with the requirements and criteria set out in this RFP.

This RFP is not an offer by the Corporation to enter into an agreement in relation to the Project. The Corporation is not bound to enter into a Preliminary Contract with the Proponent that submits the lowest price structure, or with any Proponent. The Corporation is under no obligation to receive further information, whether it is oral or written, from any Proponent.

2.13 NEGOTIATIONS

Notwithstanding any other provision in this RFP, the Corporation may in its sole discretion at any time and from time to time after submission of Proposals and before an agreement is entered into negotiate any terms and conditions of the Preliminary Contract and the Turbine Generator Contract, including negotiating terms and conditions that are or may be different from those contained in this RFP, with one or more Proponents, but not necessarily with all Proponents. The Corporation also reserves the right not to enter into negotiations with one or more Proponents; to terminate negotiations with any Proponent; not to offer the same or substantially the same negotiated terms and conditions of an agreement to more than one Proponent; and to award an agreement by acceptance of any Proposal so negotiated. If the Corporation selects a Proposal, the Proponent will enter into the Preliminary Contract, together with such modifications to such agreement as the Corporation, in its sole discretion, may require.

2.14 OPENING OF PROPOSALS

The opening of Proposals will be closed to the public. Information on Proponents' names received may be released at the Corporation's sole discretion. If Proponents' names are released, this information may be released only to qualifying Proponents after responses are opened and the Preliminary Contract is entered into with the successful Proponent.

2.15 WAIVER

In consideration for the Proponent being permitted to participate in this RFP process, the Proponent, by submitting a Proposal, agrees that it will not make a claim against the Corporation, for whatever reason including, without limitation, pursuant to contract, tort, law, equity or any actual or implied duty of fairness, relating to the Proposal or this RFP, and agrees that it waives and hereby releases the Corporation from any claim or recovery for costs, expenses, or damages incurred by a Proponent in preparing its Proposal, loss of profits, or any other matter whatsoever. The Corporation will have no liability to any of the Proponents as a result of this RFP.

2.16 EXTENSIONS

The Corporation may extend the Closing Date and Time by issuing a written addendum to all Proponents.

2.17 WAIVER OF IRREGULARITIES

The Corporation may, in its sole discretion, waive any minor irregularity or non-compliant issues in the Proposals received. Failure to comply with any item(s) of this RFP may result in the rejection by the Corporation, in the Corporation's sole discretion, of all or part of any Proposal.

2.18 FORM OF PROPONENT

Proponents may take any legal form, including corporations, joint ventures or partnerships. Where the Proponent is a joint venture or partnership, all members must sign each of the Proposal Forms. Other arrangements for Proponent teams will be considered, including the use of specified sub-contractors.

2.19 INCURRED COSTS / EXPENSES

Proponents are solely responsible for their own costs and expenses in preparing and submitting a Proposal and for any subsequent negotiation costs and expenses with the Corporation, if any. If the Corporation cancels this RFP or rejects all Proposals, the Corporation will not be liable to any Proponent for any costs or expenses of preparation or presentation of their Proposal.

2.20 IRREVOCABILITY

After the Closing Date and Time, Proposals will be irrevocable and may not be amended for a period of ninety (90) days, and a Proponent will not revoke its Proposal until the expiry of the Irrevocable Period.

2.21 CLARIFICATION

The Corporation may at any time seek clarifications of, or any additional information in connection with, or modifications of, any Proposal from any one or more Proponents, but not necessarily all Proponents, either serially or concurrently, and in any manner including through written correspondence, interviews, or presentations by Proponents.

Any clarifications, additional information, or modifications received may form part of a Proponent's Proposal and may be considered by the Corporation, in its sole discretion, in its RFP evaluation and decisions including without limitation as to acceptance, rejection, negotiation, or award, and the Corporation may accept any Proposal as clarified, supplemented, or amended through this RFP. The Corporation is not bound by any industry custom or practice in the exercise of its discretion.

2.22 PUBLICITY

The Proponent will not issue any press release or make any public announcement or disclosure concerning this RFP, the Proposal, or the Preliminary Contract, without the prior written consent of the Corporation, which consent may be unreasonably withheld.

2.23 CONFIDENTIAL AND PROPRIETARY INFORMATION

This RFP and all Proposals are the property of the Corporation, and all Proponents will keep confidential and will not use, reproduce, or distribute any information, drawings, or specifications included in or provided with this RFP except for the purpose of preparing a Proposal.

Each Proponent will clearly identify any information or records that it is providing in its Proposal that constitutes confidential information. The Corporation will use reasonable efforts to keep such information confidential, except as may be required by law. The Corporation may disclose the contents of Proposals, including any confidential information, to KGS, Kiewit and other external advisers and stakeholders who are involved in the Project or as may be necessary to obtain funding and approvals for the Project.

2.24 NO COLLUSION

Proponents will not discuss or communicate, in any form, with any other Proponent or any representative or agent of any other Proponent regarding the preparation or presentation of their Proposal. Proposals will be submitted without any connection, knowledge, comparison of information, or arrangement, with any other Proponent or any agent or representative of any other Proponent.

If a Proponent contemplates using the same subcontractor or supplier as another Proponent for a particular part of the Project, the Proponent will put into place appropriate ethical walls and other safeguards to protect the confidentiality of their information and to ensure collusion does not take place.

2.25 REFERENCES / CONTACTS

Proponents authorize the Corporation to contact any identified clients (current and past) and references regarding the information provided in their Proposal. Proponents authorize the Corporation to undertake credit checks and other financial enquiries.

2.26 FULL DISCLOSURE

Proponents will provide a written statement of full disclosure addressing the following particulars:

(a) any personal relationship to any employee of the Corporation who makes recommendations concerning the selection of the preferred Proponent, or any employee (or immediate relative of an employee) of the Corporation with any direct, or indirect pecuniary interest, ownership or directorship with respect to the Proponent;

(b) any business relationship with the Corporation, any of its staff, employees, officers, directors, or board members;

(c) any matter involving a dispute with a claimed value in excess of $50,000 which is the subject of any current, pending, or threatened mediation, arbitration, or litigation proceeding; and

(d) particulars of any proceedings involving the Proponent under the *Bankruptcy and Insolvency Act* (Canada), the *Companies' Creditors Arrangement Act* (Canada) or similar legislation.

Proponents must specifically address the requirements of this Section 2.26 in their Proposal by either providing appropriate disclosure or by indicating that they have nothing to disclose in respect of the matters listed above.

Proponents must advise the Corporation's Representative in writing of any change in the foregoing throughout the RFP process including any period up to and including the execution of the Preliminary Contract. The Corporation may reject any Proposal or terminate any resulting agreements without prejudice for failure to disclose the information required in this Section 2.26, or for disclosure at any time of proceedings in the nature of bankruptcy or insolvency by or against the Proponent.

2.27 KNOWLEDGE OF PROJECT

While the Corporation has attempted to ensure an accurate presentation of information in this RFP, that information is supplied solely as a guide for all Proponents. The information is not guaranteed or warranted by the Corporation to be accurate, nor is it necessarily comprehensive or exhaustive. Nothing in this RFP is intended to relieve Proponents from forming their own opinions and conclusions with respect to matters addressed in this RFP. The Corporation will not be liable to the Proponent for any misunderstanding on behalf of the Proponent as to the nature and scope of the Project, or any associated risks and conditions relating to the Project.

2.28 LEGAL COUNSEL

Davis LLP has provided and continues to provide legal advice to the Corporation in respect of this RFP. By submitting a Proposal, a Proponent is expressly consenting to Davis LLP continuing to represent and advise the Corporation in respect of this RFP, notwithstanding that Davis LLP may have information of the Proponent and notwithstanding any unrelated solicitor-client relationship that the Proponent may have or previously has had with Davis LLP.

2.29 PROPONENT DEBRIEFING

Debriefing may be provided to unsuccessful Proponents, at the sole discretion of the Corporation.

PART 3
SPECIFICATIONS

3.1 BASE OPTIONS

KGS and Kiewit on behalf of the Corporation have developed the Base Options, as set out in Appendix B to this RFP. This option is based on the information available at the date of this RFP, and includes estimates for unknown values. Proponents are asked to provide a fixed price for delivering each of the Base Options, to include:

- Turbines, including spiral cases, distributors, servo motors, draft tube elbows and draft tube liners
- Synchronous generators
- Static Excitation Systems
- Digital Speed Governors
- HPU's, including all oil piping
- Turbine inlet valves, including bypasses
- All mounting and installation hardware, including coupling bolts
- All lubricants required
- Shipping
- Installation and commissioning supervision and technical assistance
- Hydraulic design of the penstock bifurcation and penstock sections downstream of bifurcation
- Warranty
- Operations and maintenance manuals
- Training of the Corporation's operations staff
- Special tools as specified.

The Base Options must be suitable for operation in islanded mode. The maximum load change to be accepted and the maximum allowable frequency variation is not yet known (system studies are currently underway). Proponents shall therefore indicate the values used in their Proposals.

Proponents may proposed changes to the Base Options and provide pricing based on those changes, provided that they provide a price for the Base Options as set out in Appendix B. The Corporation is looking for the best value solution and therefore encourages Proponents to propose innovative solutions.

3.2 PRICE VARIATIONS

Proponents should note that as the Corporation, KGS and Kiewit continue to develop the specification for the Project, changes are very likely to occur in the specification for the Turbine and Generator from the Base Options. The successful Proponent will therefore be required to amend the price provided as part of its Proposal in order to meet such changes. Proponents are therefore asked to provide information as to how price changes will be referenced back to the Base Options so that the Corporation can verify that the price changes are reasonable.

3.3 SEPARATE PRICES

In particular, Proponents shall provide separate prices for the following:

(a) Delivery of all equipment to site of Project near to Mayo (Base Options provide for shipping to Port of Vancouver only).

(b) Complete installation, testing and commissioning of all equipment provided.

A separate price shall be provided for the Supplier's forces to perform the complete installation, commissioning and testing of the equipment and components provided under the Turbine Generator Contract.

Accommodation (including meals) for the Supplier's staff would be provided in the construction camp. The Supplier shall be responsible for all other costs, related to the installation, including but not limited to, site vehicles and travel costs.

The number of person days required to perform the complete installation, testing and commissioning shall be included in the Proposal so that camp requirements can be calculated.

(c) Double the inertia of the turbine and generator assembly provided in Base Options.

A separate price shall be provided to provide the turbine and generator units with double the natural inertia of the system. The increased inertia can be achieved, at the Supplier's discretion, by providing an alternate generator with increased inertia, or by the addition of one or more flywheels. All flywheels shall be provided with appropriate guarding.

(d) Triple the inertia of the turbine and generator assembly provided in the Base Options.

A separate price shall be provided to provide the turbine and generator units with triple the natural inertia of the system. The increased inertia can be achieved, at the Supplier's discretion, by providing an alternate generator with increased inertia, or by the addition of one or more flywheels. All flywheels shall be provided with appropriate guarding.

(e) Provide a separate price for a bypass system that would limit the rate of change of flow through the plant (flow ramping) when a fault occurs in the system that causes the units to go into over speed. The flow ramping shall start from the choke flow at plant over speed to plant shutdown and should take place over a minimum of 2 hours.

(f) Provide a separate price to provide a water bypass system that would maintain a minimum of 5 m^3/s when the units in Mayo B are not generating.

(g) Provide a separate price for the structural design of the bifurcation and penstock sections downstream of bifurcation

(h) Provide a separate price for the supply of the bifurcation and penstock sections downstream of bifurcation

(i) Provide a separate price for a generator braking system on each generator.

3.4 SCHEDULE

The Corporation is anticipating an increased demand for electricity during 2011, with the completion of the Carmacks-Stewart Transmission Project. The Corporation's existing hydro facilities, including the hydro

facility at Mayo, will not be able to meet this demand and until the Project is completed the Corporation will have to rely on diesel generators. Accordingly, completion of the Turbine Generator Contract by January 31, 2012 is of critical importance to the Corporation.

The following Project Schedule will apply to the Preliminary Contract and the Turbine Generator Contract:

Selection of preferred Proponent	October 22, 2009
Limited notice to proceed for detailed engineering	November 15, 2009
Final Turbine Generator Contract Signing	February 1, 2010
Design to allow PH Stage 1 Concrete Design	April 30, 2010
Turbine Embedded Parts	March 31, 2011
Last Generator Supplied	September 15, 2011
Commercial Operation	October 31, 2011
Performance Testing	December 15, 2011

3.5 CONDITIONS

The Corporation expects to enter into the Preliminary Contract on or before October 29, 2009 subject to approval of the Corporation's board of directors to proceed.

This condition is solely for the benefit of the Corporation, and may be waived by the Corporation in its sole discretion.

Further approvals will be required before the Corporation or the Construction Contractor may enter into the Turbine Generator Contract.

PART 4
SUBMISSION REQUIREMENTS

4.1 GENERAL

To provide the Corporation with complete information to enable comprehensive and accurate evaluation of the Proposals, Proponents will provide the information required by this Part 4 in their Proposal. Any additional information may be included at the Proponent's discretion. Omission of any information that the Corporation deems as pertinent to the Proposal may cause the Proposal to be rejected in the Corporation's sole discretion. Any supporting documentation such as personnel resumes should be attached as appendices and cross-referenced to the appropriate section of the Proposal.

Where a Proposal is submitted by a joint venture or partnership, all members of the joint venture or partnership will be treated as Proponents and the information requested at Sections 4.2(a)(i), 4.2(a)(ii) and 4.2(e)(i) must be provided in respect of each member of the joint venture or partnership.

4.2 PACKAGE ONE

Package One will consist of Proposal Form 1, Proposal Form 3 and the following additional information:

(a) General Information

Proponents will provide the following information:

(i) name and address of Proponent;

(ii) nature of Proponent entity (e.g., company, partnership, joint venture);

(iii) if applicable, nature of participation of any joint venture or partnership members (including percentage ownership);

(iv) if applicable, proposed contractual arrangements between joint venture or partnership members; and

(v) if applicable, previous working relationships between joint venture or partnership members.

Proponents will also provide the above information for all subcontractors whose scope of supply is more than $500,000.

(b) Technical experience

Proponents will provide the following information:

(i) a list of reference projects completed in the last five years of similar head, flow and output;

(ii) a one page sheet giving details of each project, including the Proponent's role, project size, value, duration, and date completed;

(iii) confirmation as to whether any of the reference projects used a tested hydraulic model and details of the model used; and

(iv) contact references for each project so the Corporation can confirm the Proponent's capabilities.

(c) Technical capability

Proponents will provide the following information:

(i) an indication of their willingness to provide Hill Charts for the proposed turbine generator that show Hmax and Hmin, unit power (HP11) and unit flow (Q11) once a Preliminary Contract has been signed;

(ii) information on how water transient studies will be completed. Proponents should provide guidance on what options can be taken to reduce the transient pressures. It is expected that the Proponent will perform independent preliminary transient studies for the water conveyance systems under consideration (canal option and penstock option). Proponents are reminded that in the penstock option, the existing Mayo A generating station will have to be taken into account in the transient study as both stations would be "linked" through the water conveyance system. Upon selection of a preferred water conveyance system alternative, a detailed transient analysis will be required;

(iii) guidance on how the proposed turbine and its setting would change if units were to be operated at flows above the design flow (e.g. change in setting);

(iv) the largest load change that can be accommodated when operating in islanded mode;

(v) guidance on how the design would change if flow ramping (controlled rate of flow variation) for extended periods (2 hours plus) is required in the design. Proponents should provide options for passing various flow levels ranging from 30% of the design flow to ramping down from the choking flow of the plant, (i.e. choking flow occurs when the plant goes off line);

(vi) guidance on how the design would change if the passing of 5m3/s is required for long periods of time when the plant is off line and not generating;

(vii) guidance on the how the design would change if the inertia requirements are increased. This should include information on the allowed frequency drops (delta frequency/delta power) for the various design options;

(viii) a description of how the design will be robust and with low maintenance features;

(ix) the minimum turbinable flow and maximum turbinable flow (design basis above generator capacity) (to be included on Proposal Form 3);

(x) generator capability curves;

(xi) seal water requirements (typical is acceptable);

(xii) maximum runway speed and peak pressure rise; and

(xiii) equipment delivery information (# pieces, # loads, weights) (to be included on Proposal Form 3).

(d) Technical support

Proponents will provide the following information:

(i) names, resumes, office locations and availability of the following team members:

A. Project Manager;

B. Technical Manager;

C. Transient Designer;

D. Hydraulic Designer; and

E. Technical support manager during installation. (resumes of potential candidates should be supplied);

(ii) likely number of other projects that key personnel would be managing during this Project;

(iii) number of design discussion meetings in Vancouver/Winnipeg allowed for (minimum of four meetings should be allowed for);

(iv) number of man-days on-site for installation/commissioning manager allowed for (accommodation at site for the Supplier's staff will be provided by installing contractor); and

(v) information on how support during and after the two year warranty period to be included in the Turbine Generator Contract can be provided.

(e) Financial Information

The Proponent will provide the following:

(i) audited financial statements of the Proponent for the past two financial years. Where the Proponent is a joint venture or partnership, this information must be provided for each member of the joint venture or partnership; and

(ii) where a Proponent intends to offer a parent company guarantee as part of its security package (see Section 4.3(e)), audited financial statements of the parent company for the past two financial years, together with consolidated audited financial statements for the group as a whole.

(f) Schedule information

Proponents will accept the Project Schedule. Proponents will provide an explanation as to how they will address schedule risk, including mitigation measures and options for reducing the schedule risk. Where possible, Proponents should provide examples of how they have addressed schedule risk in other projects.

(g) Approach to working with the Corporation

Proponents will include details of their approach to working with the Corporation during the preliminary stage in order to determine the following:

(i) how the Proponent will ensure that they are able to provide reasonable costs for changes in design during the Preliminary Contract Stage in relation to establishing the Turbine Generator Contract Price;

(ii) ways in which the Proponent considers it can add value to the Project; and

(iii) the process that the Proponent uses for quality control and quality assurance.

4.3 PROPOSAL FORM 2

The Proponent will include a complete Proposal Form 2 with the following information:

(a) the Preliminary Contract Price;

(b) the Contract Price for the supply of each of the Base Options;

(c) prices for all separate items listed in Section 3.3;

(d) detailed information as to how changes to the Contract Price for the Base Options will be established, including where technical and operational design changes are made;

(e) evidence of ability to provide the Proponent's preferred security option, choosing between:

(i) parent company guarantee and letter of credit for 30% of the Contract Price; or

(ii) a performance and supply bond for 100% of the Contract Price; and

(f) highest offered performance liquidated damages (minimum liquidated damages will be $400,000 for each 1% reduction over the net head table and flow duration curve. The actual loss to the Corporation for each 1% reduction is estimated at $2,000,000).

The pricing elements of the Proposal will, where applicable, be in Canadian dollars and will include all applicable duties and taxes, with the exception of the federal Goods and Services Tax (GST).

4.4 PROPOSAL FORM 3

The Proponent will include a completed Proposal Form 3 with the following information:

(a) completed performance table;

(b) completed technical data sheets; and

(c) an itemized list of all proposed deviations from, or non-conformances to, the Base Options.

PART 5
EVALUATION CRITERIA

5.1 EVALUATION METHODOLOGY AND PROCESS

Each Proposal will be reviewed to ensure compliance with the requirements of this RFP. Proposals will be evaluated by an evaluation committee. References may be taken up at this stage of the evaluation process.

Proposals will be evaluated based on a combination of price, technical experience, technical ability, technical support, financial capability, schedule and technical proposal (including equipment output and efficiency).

Following the evaluation the evaluation committee will recommend a preferred Proponent to the Corporation's board. The board will make the final decision as to which Proponent, if any, is invited to enter into the Preliminary Contract.

PART 6
SUMMARY

6.1 RECOGNITION

The Corporation thanks all Proponents in advance for participating in this RFP. We recognize the time, resources, and energy that it takes to provide a Proposal. We do not take lightly the work and effort made to provide a Proposal. The Corporation is committed to the highest standards of business practice and services, and we appreciate your company helping us achieve these goals.

6.2 DEFINITIONS

The following defined terms are used in this RFP:

Defined Term	Meaning
Base Options	the base options for the turbine and generator as set out in Appendix B
the Closing Date and Time	the date and time given in Section 2.5
Construction Contract	the construction contract which will be entered into between the Corporation and the Construction Contractor
Construction Contractor	Kiewit or such other entity as enters into a Construction Contract with the Corporation
the Corporation	Yukon Energy Corporation
the Corporation's Office	the address given in Section 2.1
the Corporation's Representative	the person whose details are given in Section 2.7
Irrevocable Period	the period during which Proposals are irrevocable, as set out in Section 2.20
KGS	KGS Group, the firm retained by the Corporation to provide engineering services in relation to the Project
Kiewit	Peter Kiewit Sons Co.
Preliminary Contract	the contract to be entered into between the successful Proponent to this RFP and the Corporation, substantially in the form set out in Appendix A
the Project	the Mayo B project, as more particularly described in Section 1.2
Project Schedule	the preliminary project schedule as set out in Section 3.4

Defined Term	Meaning
Proponent	a person who responds to this RFP by submitting a Proposal. Where a Proposal is submitted by a joint venture or partnership, all members of the joint venture or partnership will be considered to be Proponents.
Proposal	proposals submitted in response to this RFP
Proposal Forms	Proposal Form 1, Proposal Form 2 and Proposal Form 3 as set out in Part 7 of this RFP
RFP	this request for proposals
Supplier	the successful Proponent under this RFP who enters into Preliminary Contract with the Corporation
Turbine Generator Contract	the turbine generator contract to be entered into between the Supplier and the Corporation or the Construction Contractor at the expiry of the Preliminary Contract, if mutually acceptable pricing and conditions are agreed to

PART 7
LETTER OF INTENT AND PROPOSAL FORMS

LETTER OF INTENT TO RESPOND

TO YUKON ENERGY CORPORATION'S
REQUEST FOR PROPOSALS #2009-020

FOR MAYO B TURBINE AND GENERATOR SUPPLIER

RFP #2009-020

Email to: **Matthew Sills, Buyer**
Yukon Energy Corporation
matthew.sills@yec.yk.ca

THIS IS TO CERTIFY THAT:

_____ intends to respond to the above-noted Request for Proposals.
(Name of company / individual)

Our contact is:

Name: _____

Mailing Address: _____

_____

_____

Email Address: _____

Telephone Number: _____

Facsimile Number: _____

Signed by: _____

(Print name): _____

Title: _____

Note: Only those Proponents who indicate their intent to respond will receive subsequent information.

PROPOSAL FORM 1

REQUEST FOR PROPOSAL – RFP #2009-020
For the Mayo B Project Turbine and Generator Supplier
Yukon Energy Corporation

This document must be submitted in Package One of the Proponent's Proposal.

We hereby submit a Proposal for the Project, in accordance with these documents.

(i) We have carefully examined the specifications of the Project together with all other factors affecting the Project and hereby propose to enter into the Preliminary Contract on terms and conditions substantially in the form attached to the RFP as Appendix A, together with such modifications to such agreement as the Corporation, in its sole discretion, may require.

(ii) We hereby accept the principal terms of the Turbine Generator Contract, substantially in the form set out in Appendix C and in particular confirm that the following provisions are accepted:

A. the minimum performance liquidated damages will be $400,000 per each 1% efficiency reduction over the net head table and flow duration curve;

B. a shortfall in performance of 5% or more will result in a breach of contract, with the full value of the contract at risk as compensation;

C. a two year warranty period; and

D. liquidated damages for a failure to meet the Project Schedule as follows:

Late design deliverables that delay work	$1000 per calendar day
Late delivery of major embedded parts	$10,000 per calendar day
Late delivery of generators	$25,000 per calendar day per generator
Late commercial operation beyond January 31, 2012	Breach of Contract

(iii) We acknowledge receipt of, and have taken into consideration, the following addenda issued during this RFP:

#_____ #_____ #_____ #_____ #_____ #_____

(iv) Closing Date and Time: **October 2, 2009 at 4:00 p.m. Whitehorse Local Time**

(v) The Corporation need not necessarily accept the lowest, the highest ranked, or any Proposal, and may reject or accept any Proposal.

(vi) In consideration of being permitted to submit a Proposal, we agree that this Proposal is irrevocable and open to acceptance by the Corporation at any time during the Irrevocable Period, whether any other Proposal has been accepted or not.

(vii) We acknowledge the provisions of Section 2.26 of the RFP and confirm as follows:

Section 2.26 (a)	Details of personal relationships	None/see details attached
Section 2.26 (b)	Details of business relationships	None/see details attached
Section 2.26 (c)	Disputes over $50,000	None/see details attached
Section 2.26 (d)	Bankruptcy proceedings	None/see details attached

Proponent's Full Business Name:

_____

Proponent's Full Business Address:

_____

Telephone Number: _____ **Fax**: _____

Email: _____

Attested to and delivered on behalf of the Proponent this _____ day of _____ 2009:

Signature(s): _____ **Title**: _____

Witness Signature: _____ **Name**: _____

PROPOSAL FORM 2

REQUEST FOR PROPOSAL – RFP #2009-020
For Mayo B Project Turbine and Generator Supplier
Yukon Energy Corporation

This document must be submitted in Package Two of the Proponent's Proposal.

Please complete the table below with the information requested in Section 4.3 of the RFP.

(a) Preliminary Contract

Price element	**Proposal**
Preliminary Contract Price (excluding the cost to begin engineering of turbine generator equipment prior to securing the Turbine Generator Contract in order to meet the Project Schedule)	$
Price to begin engineering of turbine generator equipment prior to securing the Turbine Generator Contract in order to meet the Project Schedule	$
Total	$

(b) Turbine Generator Contract

Price element	**Proposal**
Turbine Generator Contract Price (for the supply of the Base Option)-Alternate 1-Penstock Canal Conveyance	$
Turbine Generator Contract Price (for the supply of the Base Option)-Alternate 2-Penstock Conveyance	$
Turbine Generator Contract Price (based on any variations from the Base Options identified in Proposal Form 3)	
Price to provide parent guarantee and 30% letter of credit	$
Price to provide performance and supply bond for 100% of the Contract Price	$

(c) Separate Pricing Elements

Separate Price #1: Delivery of all equipment to site of Project near to Mayo	$
Separate Price #2: Provide complete installation, testing and commissioning of all equipment provided.	$
Separate Price #3: Double the inertia of the turbine and generator assembly provided in Base Options.	$
Separate Price #4: Triple the inertia of the turbine and generator assembly provided in Base Options.	$
Separate Price #5: A bypass system that would limit the rate of change of flow through the plant (flow ramping) when a fault occurs in the system that causes the units to go into over speed from the choke flow to plant shutdown.	$
Separate Price #6: A water bypass system that would maintain a minimum of 5 m^3/s when the units in Mayo B are not generating.	$
Separate Price #7: Optional structural design of the bifurcation and penstock sections downstream of bifurcation.	$
Separate Price #8: Supply of the bifurcation and penstock sections downstream of bifurcation.	$
Separate Price #9: A generator braking system on each generator.	$

(d) Price Variations

Attach a separate sheet setting out how changes to the Contract Price for the Base Options will be established, including where technical and operational design changes are made.

(e) Security option

Attach evidence of your ability to provide your preferred security option, choosing between:

(i) parent company guarantee and letter of credit for 30% of the Contract Price; and

(ii) a performance and supply bond for 100% of the Contract Price.

(f) Performance Liquidated Damages

We will accept liquidated damages of $_____ (minimum $400,000) for each 1% reduction over the net head table and flow duration curve.

Proponent's Full Business Name:

_____

Attested to and delivered on behalf of the Proponent_____, 2009 in the presence of:

Name (Please Print) _____

Signature(s): _____

Title (Please Print): _____

Witness Signature: _____

Witness Name (Please Print): _____

PROPOSAL FORM 3

REQUEST FOR PROPOSAL – RFP #2009-020
For Mayo B Project Turbine and Generator Supplier
Yukon Energy Corporation

This document must be submitted in Package One of the Proponent's Proposal.

(a) Performance Tables

Performance Table – Alternative 1: Penstock and Canal Water Conveyance System

Unit #1 Turbine Flow (m^3/s)	Nominal Net Head* (m)	Unit #1 Turbine Opening (%)	Unit#1 Turbine Efficiency (%)	Unit #1 Turbine Power (kW)	Unit #1 Generator Efficiency at 1.0 pf (%)	Unit #1 Generator Power at 1.0pf (kW)	Unit #1 Combined Efficiency at 1.0pf (kW)	Unit #1 Generator Efficiency at 0.9 pf (%)	Unit #1 Generator Power at 0.9 pf (kW)	Unit #1 Combined Efficiency at 0.9 pf (kW)
10	60.44									
9	61.29									
8	62.06									
7	62.75									
6	63.36									
5	63.89									
4	64.35									
3	64.71									
2	65.01									

* Net head is as defined in Technical Specification M-1, section 4.4, contained in Appendix B

Performance Table – Alternative 2: Full Length Penstock with Surge Tank Water Conveyance System

Unit #1 Turbine Flow (m^3/s)	Nominal Net Head* (m)	Unit #1 Turbine Opening (%)	Unit#1 Turbine Efficiency (%)	Unit #1 Turbine Power (kW)	Unit #1 Generator Efficiency at 1.0 pf (%)	Unit #1 Generator Power at 1.0pf (kW)	Unit #1 Combined Efficiency at 1.0pf (kW)	Unit #1 Generator Efficiency at 0.9 pf (%)	Unit #1 Generator Power at 0.9 pf (kW)	Unit #1 Combined Efficiency at 0.9 pf (kW)
10	58.86									
9	60.04									
8	61.11									
7	62.05									
6	62.88									
5	63.59									
4	64.18									
3	64.64									
2	65.00									

* Net head is as defined in Technical Specification G-1, section 4.4, contained in Appendix B

It is expected that the two units would be identical. Proponents shall identify any differences between the units. Proponents should attach all reference curves that were used to establish the performance guarantee including model efficiency curves, cavitation curves or cavitation test reports, or complete model test report, etc.

(b) Technical Data Sheets

The attached data sheets shall be completed to the maximum extent possible, and duplicate sheets shall be made and completed for each generating unit if different from one another.

	Item	Value
1	**General**	
1.1	Maximum weight of heaviest piece (kg)	
1.2	Number of pieces to be shipped	
1.3	Number of loads to ship equipment	
2	**Turbines**	
2.1	Synchronous speed (rpm)	
2.2	Maximum instantaneous overspeed (rpm)	
2.3	Maximum continuous overspeed (rpm)	
2.4	Maximum duration at maximum continuous overspeed (rpm) 60 minutes minimum	
2.5	Estimated first critical speed of unit (rpm)	
2.6	Rated Unit Specific Speed (metric units)	
2.7	Peak turbine efficiency (%)	
3	**Distributor**	
3.1	Operating ring servomotor(s), type and quantity	
3.2	Operating ring servomotor(s), normal operating pressure (kPa)	
3.3	Wicket gate material (ASTM)	
3.4	Number of wicket gates	
3.5	Height of wicket gates (mm)	
3.6	Overall distributor weight (kg)	
3.7	Number of pieces that distributor is shipped in	
4	**Runner**	
4.1	Runner overall outer diameter (mm)	
4.2	Design Setting (referenced to centre line of shaft) (indicate whether above or below tailwater level) (m)	
4.3	Max. operating setting (m / flow)	
4.4	Number of blades	
4.5	Blade material (ASTM)	
4.6	Runner hub material (ASTM)	
4.7	Runner band material (ASTM)	

	Item	Value
4.8	Runner construction (cast, welded, forged, machined, etc.)	
4.9	Shaft connection type	
4.10	Runner weight (kg)	
4.11	Runner inertia (kg-m^2) in GD^2	
4.12	Minimum allowable tailwater level (m)	
4.13	Minimum acceptable operating head (m)	
4.14	Minimum margin of safety between plant sigma and critical sigma for cavitation protection at rated power, under rated net head and the minimum tailwater level (2.64 m minimum)	
4.15	Minimum turbinable flow (m^3/s)	
4.16	Maximum turbinable flow (m^3/s)	
4.17	Estimated flow at speed-no-load (m^3/s)	
4.18	Runner handling tool included (Y/N)	
5	**Spiral Case**	
5.1	Spiral case material (ASTM)	
5.2	Maximum/Minimum wall thickness (mm)	
5.3	Inlet pipe diameter at upstream flange (mm)	
5.4	Number of delivered sections	
5.5	Water volume of assembled spiral case (m^3)	
5.6	Weight of assembled empty spiral case (kg)	
5.7	Spiral case connections (Flange/Weld)	
5.8	Hydrostatic test blind flanges included (Y/N)	
5.9	Spiral case piece lifting eyes included (Y/N)	
5.10	Factory test assembly included (Y/N)	
5.11	Factory weld inspection included (type/%)	
5.12	Maximum allowable transient pressure (kPa)	
5.13	Maximum allowable working pressure (kPa)	
5.14	Manhole included (Y/N)	
5.15	Interior paint (type / thickness)	
5.16	Exterior paint (type / thickness)	
6	**Turbine and Generator Shafts and bearings**	
6.1	Turbine shaft diameter (mm)	
6.2	Turbine shaft length (mm)	
6.3	Turbine shaft material (ASTM)	
6.4	Generator shaft diameter (mm)	
6.5	Generator shaft length (mm)	

	Item	Value
6.6	Generator shaft material (ASTM)	
6.7	Shaft seal type	
6.8	Shaft seal cooling water requirements (L/s)	
6.9	Turbine shaft weight (kg)	
6.10	Generator shaft weight (kg)	
6.11	Guide (journal) bearing material	
6.12	Thrust bearing material	
6.13	Bearing lubrication (passive or forced)	
6.14	Bearing oil cooling method (air, forced air, water, open or closed loop)	
6.15	Turbine bearing temperature RTD's included (#)	
6.16	Vibration sensors (#)	
7	**Hydraulic Pressure Unit**	
7.1	Manufacturer	
7.2	Quantity per turbine	
7.3	Pump type and capacity	
7.4	Number of pumps	
7.5	Number and size of accumulators	
7.6	Normal operating pressure (kPa)	
7.7	Maximum operating pressure (kPa)	
7.8	Oil volume per HPU (L)	
7.9	Weight of HPU (kg) (dry)	
7.10	Hydraulic piping (material / type)	
7.11	Hydraulic fluid type	
7.12	Hydraulic fluid included (Y/N)	
8	**Governor**	
8.1	Manufacturer	
8.2	Governor cubicle provided (Y/N)	
8.3	Fast resync included (Y/N)	
8.4	Islanded operation (Y/N)	
8.5	Maximum load step acceptable in islanded operation (MW)	
9	**Turbine Inlet Valve**	
9.1	Manufacturer and model no.	
9.2	Type	
9.3	Diameter (mm)	

	Item	Value
9.4	Maximum pressure rating (kPa)	
9.5	Hydrostatic test pressure (kPa)	
9.6	Maximum head loss across valve at 9.5 m^3/s flow (m)	
9.7	Maximum penstock flow for emergency closure from fully open (m^3/s)	
9.8	Number of counterweights	
9.9	Number of servomotors	
9.10	Weight of complete valve w/o counterweight (kg)	
9.11	Weight of counterweight (kg)	
9.12	Factory pressure test (Y/N)	
9.13	Dismantling coupling included (Y/N)	
9.14	Guaranteed maximum leakage (L/s)	
9.15	Actuator type (Hydraulic)	
9.16	Bypass diameter (mm)	
9.17	Bypass actuator type (hydraulic/electric)	
9.18	Manual isolation valves included (Y/N)	
10	**Generator - General**	
10.1	Manufacturer	
10.2	Model and type	
10.3	Rated output at rated P.F. (kW)	
10.4	Rated output at unity P.F. (kW)	
10.5	Rated voltage/maximum voltage (V)	
10.6	Rated power factor	
10.7	Power factor range (overexcited/underexcited limits)	
10.8	Rated frequency (Hz)	
10.9	Number of poles	
10.10	Rated synchronous speed (rpm)	
10.11	Maximum allowable runaway speed (60 minutes) (rpm)	
10.12	First critical speed (rpm)	
10.13	Short circuit ratio at rated voltage & current	
10.14	Generator total Weight (kg)	
11	**Generator - Inertias**	
11.1	Generator GD^2 ($kg \cdot m^2$)	
11.2	Generator Inertia Constant (H) (MW·s/MVA)	
12	**Generator - Losses**	

	Item	Value
12.1	Total generator losses at rated kVA (generator only) (kW)	
12.2	Copper losses in stator and stray load losses at rated kVA (kW)	
12.3	Iron losses at rated kVA (kW)	
12.4	Windage and friction losses (kW)	
12.5	Excitation losses (kW)	
13	**Generator - Windings**	
13.1	Connection, number of leads	
13.2	Stator winding material & insulation type (attach additional description)	
13.3	Rotor winding material & insulation type (attach additional description)	
13.4	Stator and rotor insulation ratings - Rotor	
13.5	- Stator	
14	**Generator – Reactance (pu)**	
14.1	Direct axis synchronous reactance (X_d)	
14.2	Direct axis transient reactance at rated voltage (X'_d)	
14.3	Direct axis subtransient reactance at rated voltage (X''_d)	
14.4	Quadrature axis synchronous reactance (X_q)	
14.5	Quadrature axis transient reactance at rated voltage (X'_q)	
14.6	Quadrature axis subtransient reactance at rated voltage (X''_q)	
14.7	Zero sequence reactance (X_o)	
14.8	Negative sequence reactance (X_2)	
14.9	Armature reaction leakage reactance (X_L)	
14.10	Effective armature resistance per phase (Re)	
15	**Generator – Time Constants**	
15.1	Direct axis transient open circuit time constant (T'_{do})	
15.2	Direct axis subtransient open circuit time constant (T''_{do})	
15.3	Direct axis transient short circuit time constant (T'_d)	
15.4	Direct axis subtransient short circuit time constant (T''_d)	
15.5	Quadrature axis transient open circuit time (T'_{qo})	
15.6	Quadrature axis subtransient open circuit time constant (T''_{qo})	
15.7	Quadrature axis transient short circuit time (T'_q)	
15.8	Quadrature axis subtransient short circuit time constant (T''_q)	
15.9	Armature time constant (Ta)	
16	**Generator – Current (Amps)**	

	Item	Value
16.1	Sustained short circuit current with field adjusted for rated kVA at rated P.F.	
16.2	Rated phase current (at rated kVA & Class B temperature rise based on 40°C ambient)	
16.3	Field current at no load & rated voltage	
16.4	Field current at rated load, rated voltage & rated power factor	
16.5	Field current at rated load, rated voltage & unity power factor	
16.6	Field current at rated load, 110% rated voltage & rated power factor	
17	**Generator – Temperatures**	
17.1	Continuous operating temperature of stator windings at rated kVA for ambient temperature of 40 °C (by RTD) (°C)	
17.2	Continuous operating temperature of rotor windings at rated kVA for ambient temperature of 40 °C (by resistance) (°C)	
17.3	Maximum continuous safe operating temperature of rotor winding at rated power (by resistance) (°C)	
17.4	Maximum safe operating temperature of stator winding at rated power (by RTD) (°C)	
18	**Generator – Collector Rings & Brushgear**	
18.1	Collector ring material (attach additional description if required)	
18.2	Number of brushes per collector ring	
18.3	Maximum current per brush	
19	**Generator – Dimensions & Weights**	
19.1	Diameter of stator interior (mm)	
19.2	Diameter of stator exterior (mm)	
19.3	Maximum height & width of stator (mm)	
19.4	Diameter of rotor hub (mm)	
19.5	Diameter at rotor pole ends (mm)	
19.6	Weight of stator (kg)	
19.7	Weight of rotor (kg)	
19.8	Weight of shaft (kg)	
19.9	Weight of runner (kg)	
19.10	Total weight of machine (kg)	
20	**Generator – Terminal Boxes**	
20.1	Main terminal box dimensions (mm)	
20.2	Neutral terminal box dimensions (mm)	

	Item	Value
21	**Generator – Neutral Grounding Cabinet**	
21.1	Transformer rating (kVA)	
21.2	Transformer voltage (V)	
21.3	CT ratio	
21.4	CT relaying class	
21.5	Resistor ratings current & time (amps, seconds)	
21.6	Neutral grounding cubicle dimensions (mm)	
22	**Static Excitation System - General**	
22.1	Continuous current [A]	
22.2	Nominal Voltage [A]	
22.3	Ceiling current [A]	
22.4	Positive ceiling voltage [V]	
22.5	Negative ceiling voltage [V]	
22.6	Describe or include literature on SE programming interface features and control parameter programming software.	
22.7	Describe or include literature on SE alarm indication features:	
22.8	Describe or include literature on SE diagnostic interface features and fault logging features.	
22.9	SE Mean Time between failure and any other pertinent reliability statistics.	
22.10	Enclosure Approximate Dimensions [HxWxD] (mm)	
23	**Static Excitation System - Automatic Voltage Regulator:**	
23.1	Accuracy [%]	
23.2	Control Range [% of generator rated voltage]	
23.3	Voltage Response time to reach 95% ceiling voltage on 5% step change in generator terminal voltage. [ms]	
23.4	PT fuse failure detection and automatic transfer to Manual [Yes/No]	
23.5	Over-excitation limiter [Yes/No]	
23.6	Under-excitation limiter [Yes/No]	
23.7	Voltage per Hertz limiter [Yes/No]	
23.8	Reactive Current Compensation [Yes/No]	
23.9	List settings and range of each setting available on PID control.	
24	**Static Excitation System - Manual Voltage Regulator:**	
24.1	Accuracy [%]	
24.2	Control Range [%]	

	Item	Value
25	**Static Excitation System - Rectifier:**	
25.1	Number of thyristors in parallel per bridge leg	
25.2	Number of thyristors in series per bridge leg	
25.3	Current limiting fuses [Yes/No]	
25.4	Crowbar circuit on DC output [Yes/No]	
25.5	Convection cooled [Yes/No]	
25.6	Separate cooling fan [Yes/No]	
26	**Static Excitation System - Power Potential Transformer:**	
26.1	Primary voltage [kV]	
26.2	Secondary voltage [V]	
26.3	Primary fuse type	
26.4	Rating [kVA]	
26.5	Insulation class	
26.6	Temperature rise [ºC]	
26.7	BIL [kV]	
26.8	Weight [kg]	
26.9	Enclosure Approximate Dimensions [HxWxD]	
27	**Static Excitation System - AC Field Breaker**	
27.1	Nominal Voltage [V]	
27.2	Nominal Current [A]	
27.3	Closing Coil operating voltage [V]	
27.4	Tripping Coils operating voltage [V]	
28	**Static Excitation System - SE Data Acquisition Interface:**	
28.1	Modbus format [Yes/No]	
28.2	Number of programmable analog inputs (4-20 mA)	
28.3	Number of programmable analog outputs (4-20 mA)	
28.4	Number of programmable digital inputs	
28.5	Number of programmable digital outputs	

Proponent's Full Business Name:

_____

Attested to and delivered on behalf of the Proponent_____, 2009 in the presence of:

Name (Please Print) _____

Proposal Form 3

Signature(s): _____

Title (Please Print): _____

Witness Signature: _____

Witness Name (Please Print): _____

APPENDIX A
FORM OF PRELIMINARY CONTRACT

PRELIMINARY AGREEMENT

THIS PRELIMINARY AGREEMENT ("**Agreement**") is dated for reference , 2009.

BETWEEN:

Yukon Energy Corporation, of #2 Miles Canyon Road,
Whitehorse, Yukon Territory, Y1A 5L6

("**YEC**")

AND:

("**Supplier**")

(Individually a "Party" and collectively the "Parties")

BACKGROUND

A. YEC proposes to upgrade the Mayo hydro facility and increase its capacity from approximately 5 MW at the existing plant to approximately 15 MW.

B. The Mayo B project is proposed to enhance the current power generation capacity installed on the Mayo River. The project is designed to improve power generation capacity at the Mayo hydro system to help displace diesel generation that would otherwise be required to meet the increased loads, including loads that are anticipated to arise following the completion of the Carmacks-Stewart Transmission Project.

C. The project components are as follows:

(a) a new powerhouse approximately 3.9 km downstream of the existing powerhouse;

(b) Alternative 1:a new penstock-canal system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 420 m long that extends from the newly extended tunnel to a new canal; a surface-run canal (approximately 2,610 m); and a pressurized 'downstream' penstock from the canal to the new powerhouse (approximately 565 m);

Alternative 2: a new penstock system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 3030 m long that extends from the new tunnel to a pressurized 'downstream' penstock, complete with surge tank, from the canal to the new powerhouse (approximately 565 m);

(c) a new all-weather access road of approximately 2600 m to the new powerhouse from the existing YEC access road serving the current Mayo hydro facility;

(d) a new distribution line of approximately 1,700 m 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;

(e) a new transmission line of approximately 3,600 m operating at 69 kV from the new powerhouse to the existing Yukon Energy substation (S249); and

(f) 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,

collectively (the "**Project**").

D. YEC requires a new turbine and generator ("**TG**") as part of the Project.

E. YEC has developed a base design for the TG, with expected values for elements that are unknown at this time ("**Base Option**") and this is set out in Schedule A.

F. Supplier and its affiliates are collectively experienced in, and capable of, supplying a TG that is suitable for the Project.

G. YEC wishes to engage Supplier to supply the TG.

H. The Parties wish to enter into this Agreement for the purpose of developing the Base Option, finalizing the design of the TG, determining the price to be paid for the TG and giving YEC the option of entering into a contract with Supplier or transferring that option to the company engaged by YEC to construct the Project.

NOW THEREFORE in consideration of the foregoing and the mutual covenants hereinafter contained, the Parties agree as follows:

PART 1
TG DESIGN

1.1 **Design Activities.** Supplier and YEC will, after the date of execution of this Agreement (the "**Effective Date**"), initiate and carry out the following activities (the "**Design Activities**") necessary to determine the final design of the TG:

(a) providing technical and cost information required for evaluating design options relating to the water conveyance system, hydraulic transients, operation in islanded mode and performance characteristics of the equipment provided;

(b) providing layout drawings for the proposed equipment;

(c) performing independent transient studies, on both conveyance options;

(d) participating in the design process to add value to the Project;

(e) performing engineering activities on the turbine and generator package equipment prior to signing a contact for the supply of the TG (the "**Turbine Generator Contract**"), as required, in order to meet the Project schedule requirements; and

(f) negotiate the final Turbine Generator Contract if mutually acceptable pricing, terms and conditions are agreed to.

1.2 **Yec's Consultants**: YEC has engaged KGS Group to carry out overall engineering services to the project and is working with Peter Kiewit Sons Co. ("Kiewit") to develop the project design. YEC may also retain the services of one or more independent consultants or advisers to provide technical, financial, contractual or legal advice in connection with the design activities and supplier will cooperate with YEC, KGS Group, Kiewit and YEC'S consultants.

1.3 **Ownership Of Contract Data:** Upon full payment by YEC of the Design Costs, as defined in Section 4.1 of this Agreement, YEC will own all rights, title, and interest in and to the information, quotations, drawings, designs, plans, specifications and like materials specifically prepared or obtained by Supplier as part of the Design Activities ("**Contract Data**") with full right to exploit same, provided that Supplier will have no liability of any nature to YEC in respect of the Contract Data or YEC'S use of any Contract Data except as set out in a duly executed and delivered Turbine Generator Contract and provided further that nothing contained in this Agreement shall mean or be deemed to mean that Supplier has transferred to YEC any proprietary rights related to its know-how or methodology used as part of preparing or collecting the Contract Data. Supplier shall deliver the contract data to YEC forthwith after the Termination Date (as defined in Section 6.1).

PART 2
CONTRACT PRICING

2.1 **Pricing For Base Option:** Supplier's agreed price for the Base Option is set out in Part 1 of Schedule B. The Parties acknowledge that where the Final Design varies from the Base Option, the price as set out in Part 1 of Schedule B will need to be adjusted in order to establish the price to be included in the Turbine Generator Contract ("**Contract Price**").

2.2 **Price Variations** Where the Final Design varies from the Base Option, the Contract Price shall be established as follows:

(a) Part 2 of Schedule B sets out Supplier's agreed prices for certain specified variations from the Base Option. These agreed prices shall be used for those specified variations.

(b) [**NTD:** For variations beyond those specified in Part 2 of Schedule B, this section will be completed with information from successful Proponent's proposal.]

PART 3
TURBINE GENERATOR CONTRACT

3.1 **Turbine Generator Contract:** While developing the Final Design and determining or agreeing the Contract Price, the Parties will work together in good faith to agree the form of Turbine Generator Contract, which will be based substantially on the key terms and conditions set out in Schedule C.

3.2 **Parties To Turbine Generator Contract:** Supplier acknowledges that YEC is working with Kiewit with a view to entering into a contract with Kiewit for the construction of the Project. If that contract is executed prior to the Turbine Generator Contract being executed, Supplier will enter into the Turbine Generator Contract with Kiewit and Supplier acknowledges that Kiewit will be involved in the negotiations over the form of the Turbine Generator Contract.

3.3 **Turbine Generator Contract Assignable:** If Supplier enters into a Turbine Generator Contract with YEC, Supplier acknowledges that the Turbine Generator Contract may be assigned or novated to any person engaged by YEC to construct the Project, including Kiewit.

PART 4
PAYMENT

4.1 **Design Costs:** YEC shall pay Supplier for the work carried out under this Agreement to develop the Final Design as follows:

Price element	**Price**
Preliminary Contract Price (excluding the cost to begin engineering of turbine generator equipment prior to securing the Turbine Generator Contract in order to meet the Project Schedule)	$
Price to begin engineering of turbine generator equipment prior to securing the Turbine Generator Contract in order to meet the Project Schedule	$
Total Design Costs	$

4.2 **Legal Costs:** Each Party's external legal costs incurred in connection with this Agreement and the Turbine Generator Contract, if any, will be at the expense of the Party who engaged the legal services.

PART 5
ANCILLARY TERMS AND CONDITIONS

5.1 **Good Faith:** Each of the Parties agrees to cooperate in good faith and use its commercially reasonable efforts to resolve issues and agree on a Turbine Generator Contract.

5.2 **Exclusivity:** For a period from the Effective Date to the Termination Date (as defined in Section 6.1), YEC agrees that it will not:

(a) directly or indirectly solicit, initiate or participate in any discussions or negotiations with any third party in relation to the subject matter of the Turbine Generator Contract contemplated by this Agreement; or

(b) provide any information to a third party with a view to that third party investigating or entering into a transaction in relation to the subject matter of the Turbine Generator Contract contemplated by this Agreement.

5.3 **Required Approvals:** The Parties acknowledge that entry into, and legal effectiveness of, the Turbine Generator Contract or any related agreements will require:

(a) prior approval of the Board of Directors of YEC; and

(b) prior approval of Supplier's Board of Directors or equivalent.

If Supplier does not obtain the approvals referred to in (b), YEC shall be relieved of any obligation to pay the Design Costs and Supplier shall reimburse any prior Design Costs paid by YEC.

YEC may by notice to Supplier waive the requirement for approval of the Turbine Generator Contract by the Board of Directors of YEC.

5.4 **Insurance:** Before commencing any work under this Agreement, Supplier shall obtain and maintain appropriate insurance for the term of the Agreement. Supplier shall notify YEC of the insurances that it has taken out within 7 days of the Effective Date.

Supplier shall be solely responsible for determining the appropriate type and amount of insurance that Supplier should have in place from time to time.

[**NTD**: YEC may have further insurance requirements for this preliminary agreement which will be notified by addendum.]

5.5 **Records And Accountability:** Supplier shall keep full records of all work carried out under this Agreement and shall report to YEC as reasonably required by YEC.

YEC shall be entitled to audit Supplier's records relating to this Agreement on giving reasonable notice and Supplier shall ensure that YEC is given full access to all relevant records, with the right to take copies. YEC shall have the right of access on reasonable notice to any site where Supplier is carrying out work relating to this Agreement.

Supplier acknowledges that funding for this Agreement is being provided in part by the Government of Canada and agrees that YEC's audit rights may be exercised directly by a representative of the Government of Canada.

5.6 **Compliance With Applicable Laws:** Supplier shall comply with all laws applicable to the Project and this Agreement, including, without limitation, all laws relating to labour, the environment and human rights.

PART 6
TERMINATION

6.1 **Termination:** Unless extended by mutual agreement of the Parties, this Agreement will terminate on the date (the "**Termination Date**") which earliest of:

(a) the date of execution of a Turbine Generator Contract;

(b) January 31, 2010; and

(c) any earlier date mutually agreed between the Parties.

6.2 **YEC's Rights:** Supplier acknowledges that if this Agreement is terminated, YEC may procure the TG by alternative means. The Parties anticipate that Supplier will have received information pursuant to this Agreement which would provide it with an unfair advantage in any further procurement process relating to the TG and Supplier agrees that it will abide by any decision made by YEC in relation to Supplier's participation in such a procurement process. Supplier acknowledges that YEC may exclude Supplier from any such procurement process.

PART 7
GENERAL PROVISIONS

7.1 **Governing Law And Dispute Resolution:** This Agreement is governed by the laws of the Territory of the Yukon. In the event of any dispute arising in connection with this Agreement, the Parties will attempt to resolve the dispute as set out in this Section 7.1. All documents, discovery and other information related to any such dispute, and the attempts to resolve or arbitrate such dispute, will be kept confidential to the fullest extent possible. The Parties agree to attempt in good faith to negotiate a resolution of the dispute for a period of 20 days from the date of notice. If the matter is not resolved within such 20-day period, then the dispute shall be arbitrated. The Parties agree to be bound by the selection of arbitrators, and to settle the dispute exclusively by binding arbitration, in accordance with the following procedures:

(a) a Party (the "**Initiating Party**") may commence arbitration proceedings by giving a written notice to the other Party (the "**Responding Party**") identifying the nature of the dispute that is to be the subject of the arbitration, and any amount involved and the remedy sought. Within 10 Business Days following receipt of such notice by the Responding Party, the Initiating Party and the Responding Party will designate a single arbitrator acceptable to both of them. If the Parties fail to appoint such a single arbitrator within such period of time, the Initiating Party will, by written notice to the Responding Party, appoint an arbitrator. The Responding Party will, within 10 Business Days following receipt of such notice, appoint an arbitrator by written notice to the Initiating Party, and the two arbitrators so appointed will select a third arbitrator acceptable to both of them. If the Responding Party fails to appoint an arbitrator within such period of time (or such additional period of time as the Parties may agree), the Initiating Party may appoint an arbitrator on behalf of the Responding Party and is hereby appointed the agent of the Responding Party for such purpose. If the two arbitrators so appointed are unable to agree upon the third arbitrator within 10 Business Days following the appointment of the arbitrator by (or on behalf of) the Responding Party, either Party may apply under the International Commercial Arbitration Act (Yukon) to the Chief Justice of the Supreme Court of the Yukon (or his or her designate) to appoint the third arbitrator, and the provisions of the International Commercial Arbitration Act will govern such appointment. No person may be nominated or appointed to act as an arbitrator who is or at any time has been interested in the conduct of the works or in the business affairs of either Party;

(b) in the conduct of the arbitration, the arbitrator(s) will determine their own procedure. The arbitrator may order any discovery permitted under the IBA Rules on the Taking of Evidence in International Commercial Arbitration (1999);

(c) the arbitration will take place in Whitehorse, Yukon or at any other place mutually agreed upon;

(d) the award of the arbitrator(s) will be final, binding and non-appealable. Judgment on the award may be entered in any court having jurisdiction;

(e) the fees and expenses of the arbitrator(s) and the other direct costs of the arbitration, including legal fees of the Parties, will be awarded as determined by the arbitrator(s).

7.2 **Restriction:** No partnership or joint venture or similar legal entity or co-venture between the Parties is hereby created or will be deemed to exist as a result of this Agreement and neither Party will have the authority to bind the other Party without the prior written consent of such other Party.

7.3 **Assignment Of Rights Or Obligations:** Supplier may not assign its rights or obligations under this Agreement without the prior written consent of YEC. YEC may assign its rights under this Agreement without the consent of Supplier so long as such assignment is to an entity in which YEC or its shareholder are controlling members, or equity owners or such assignment is to the person engaged by YEC to construct the Project. Supplier may assign its rights under this Agreement to a licensed and permitted affiliate so long as the obligations created by this Agreement are guaranteed by Supplier's ultimate parent company.

7.4 **Severability:** If any term or provision of this Agreement, or the application thereto to any person or circumstance is rendered or declared illegal, invalid or unenforceable for any reason, the remainder of this Agreement and the application of such term or provision to other persons or circumstances will not be affected hereby but will be enforced to the greatest extent permitted by applicable law.

7.5 **No Waiver:** The failure of a Party to exercise any right hereunder will not be deemed a waiver of such right in the future.

7.6 **Notices And Communication:** All notices pursuant to this Agreement shall be made in writing and delivered by e-mail, hand or facsimile to the respective addresses or facsimile numbers set out below, or such other address or facsimile number as each Party may from time to time notify to the other:

If sent to:

Yukon Energy Corporation
#2 Miles Canyon Road
Whitehorse, Yukon Territory
Y1A 5L6

Facsimile number: 867 393 5338
E-Mail: ed.mollard@yec.yk.ca
Attention: Ed Mollard

If sent to:

Supplier

Facsimile number:
E-Mail:
Attention:

Any such notice or communication shall be deemed to have been served:

(a) if delivered by hand during business hours at the recipient's location, on the date of delivery; or

(b) if sent by e-mail or facsimile, upon receipt of the confirmation of transmission at the end of the message but not before first obtaining in person or by telephone appropriate evidence of the capacity of the addressee to receive the same, as the case may be.

7.7 **Successors And Assigns:** This Agreement will be binding upon and will inure to the benefit of the Parties and, subject to section 7.3, their respective successors and assigns.

7.8 **Complete Agreement:** This Agreement sets forth the sole and complete understanding between the Parties with respect to the subject matter hereof, and supersedes all other prior agreements, arrangements and understandings (oral or written) between the Parties.

7.9 **Effect Of Contract:** If the Turbine Generator Contract is executed, then this Agreement will be superseded by the Turbine Generator Contract. The Parties further agree that if the Turbine Generator Contract is executed all work performed under this Agreement will be incorporated into the Turbine Generator Contract for all purposes.

7.10 **Confidentiality:** Each Party agrees to not disclose to any third party and to keep and maintain as confidential for a period of three (3) years from the Effective Date of this Agreement all information received from the other Party and their affiliates in connection with the Project of a technical, business, commercial, financial, or proprietary nature, including (without limitation) all information relating to the Project, provided that a Party may disclose such information to its affiliates, employees, contractors, advisors, officers, directors and employees on a need to know basis in connection with the Project. This restriction will not apply to YEC in connection with the Contract Data, which information will become the property of YEC when received from Supplier hereunder. Each Party agrees that an injunction would be an appropriate remedy (but not an exclusive remedy) for breach by a Party of this Section 7.10 and each Party hereby waives any right to challenge the same except on the basis that this Section 7.10 has not been breached. This Section 7.10 will survive after the termination date.

TO EVIDENCE THEIR AGREEMENT, the Parties have caused this Agreement to be executed by their duly authorized representatives effective the day first written above.

Yukon Energy Corporation		**Supplier**	
By:	_____	By:	_____
Name:	_____	Name:	_____
Title:	_____	Title:	_____

SCHEDULE A
BASE OPTION

[To reflect Appendix B from RFP]

SCHEDULE B
PRICING

Part 1 - Pricing for Base Option

[To be taken from successful Proponent's Proposal]

Part 2 - Pricing for specified variations

[To be taken from successful Proponent's Proposal]

SCHEDULE C
MATERIAL TERMS OF TURBINE GENERATOR CONTRACT

[To be inserted from Appendix C to the RFP]

APPENDIX B
BASE OPTIONS

See separate documents as listed below

TECHNICAL SPECIFICATION G-1: GENERAL

TECHNICAL SPECIFICATION M-1: TURBINES

TECHNICAL SPECIFICATION M-2: GOVERNORS & HPU'S

TECHNICAL SPECIFICATION E-1: GENERATORS

TECHNICAL SPECIFICATION E-2: STATIC EXCITATION SYSTEMS

APPENDIX C

KEY TERMS AND CONDITIONS FOR TURBINE GENERATOR CONTRACT

1 Supplier to perform all work in accordance with agreed technical specification.

2 Two year warranty period two years from substantial completion of the Project. Extended period of one year for items repaired under this warranty.

3 Security will be either:

(a) parent company guarantee and letter of credit for 30% of the Contract Price; or

(b) performance and supply bond for 100% of the Contract Price.

4 Liquidated damages for each 1% reduction over the net head table and flow duration curve will be $[ ]. (Minimum of $400,000, actual figure to be inserted as per Proposal).

5 A shortfall in performance of 5% or more will result in a breach of contract, with the full value of the contract at risk as compensation.

6 Liquidated damages for failure to meet project schedule as follows:

Late design deliverables that delay work	$1,000 per calendar day
Late delivery of major embedded parts	$10,000 per calendar day
Late delivery of generators	$25,000 per calendar day, per generator
Late commercial operation beyond January 31, 2012	Breach of contract, with the full value of the contract at risk as compensation

7 If the Turbine Generator Contract is entered into with Kiewit, it will reflect key provisions from the Construction Contract between Kiewit and YEC and will generally be on a back to back basis.

8 Minimum insurance requirements:

(a) Workers compensation to statutory limits.

(b) Employer's liability of not less than $1,000,000 per accident.

(c) Commercial general liability of not less than $5,000,000 for each occurrence and in the aggregate.

(d) Automobile liability of not less than $2,000,000 per accident.

(e) For items (c) and (d), YEC and any Construction Contractor shall be named as additional insureds.

9 Supplier shall indemnify YEC/Kiewit and all their consultants, agents, employees etc. against all:

(a) intellectual property claims;

(b) third party claims for property damage, injury or death arising from Supplier's negligence;

(c) claims for payment, liens etc.; and

(d) claims arising from Supplier's failure to comply with all laws.

10 Intellectual property developed in the performance of the Turbine Generator Contract shall remain the property of the Supplier. Supplier will provide YEC/Kiewit an irrevocable, fully paid, royalty free, non-exclusive licence with respect to all items created or owned by Supplier and provided to YEC/Kiewit under the Turbine Generator Contract. In particular, YEC/Kiewit will be entitled to use the intellectual property for all purposes in connection with the equipment supplied, including, without limitation, maintenance, upgrades and additions.

11 Payments to be made in accordance with agreed payment schedule. All payments to be subject to 10% retention. YEC/Kiewit to have full right of set off for all amounts due from Supplier pursuant to the Turbine Generator Contract, including in respect of third party claims and indemnities.

12 Supplier to ensure that no liens attach to the equipment or materials or any work carried out by Supplier. Supplier shall immediately remove any liens filed and must certify that no liens exist in order to receive payment.

13 Supplier to keep full and accurate records and accounts, with audit rights for YEC/Kiewit. If the Turbine Generator Contract is entered into with YEC, the Government of Canada will also have audit rights.

14 Equipment and materials will be delivered to [Port of Vancouver][Project Site] DPP (Incoterms 2000). Title and risk will pass on complete delivery of all equipment and materials. If Supplier performs complete installation, testing and commissioning, title and risk will pass at substantial completion of the Project.

15 Supplier to obtain all permits needed for supply of equipment and materials, including, without limitation, all transportation and import permits.

16 YEC/Kiewit will not provide any representations or warranties as to any information provided as part of the procurement process or pursuant to the Preliminary Agreement.

17 Events of default by Supplier:

(a) insolvency;

(b) a shortfall in performance of 5% or more;

(c) failure to reach commercial operation by January 31, 2012; and

(d) other breach of contract not remedied within agreed period of time.

18 Governing law will be laws of the Yukon Territory and Supplier will submit to jurisdiction of the Yukon Territory court.

YUKON ENERGY CORPORATION
Attention: Purchasing
#2 Miles Canyon Road,
Box 5920, Whitehorse, Yukon
Y1A 6S7
Phone: (867) 393-5338

REQUEST FOR PROPOSAL
2009 - 007

MOU STAGE FOR THE MAYO B HYDRO CONSTRUCTION CONTRACT

Issue Date: May 6, 2009

YUKON ENERGY CORPORATION

TABLE OF CONTENTS

PART 1
OVERVIEW

1.1 CORPORATE OVERVIEW

Established in 1987, Yukon Energy Corporation is a publicly-owned electrical utility that operates as a business, at arms length from the Yukon Territory Government. The Corporation is the main generator and a transmitter of electrical energy in the Yukon Territory and works with its parent company Yukon Development Corporation to provide Yukon Territory residents with a sufficient supply of safe, reliable electricity, and related energy services.

The Corporation is regulated by the *Business Corporations Act* (Yukon), the *Public Utilities Act* (Yukon), and the *Waters Act* (Yukon). The Corporation's headquarters are located near the Whitehorse Rapids hydro plant in Whitehorse with community offices in Mayo, Faro and Dawson City.

Additional Corporation information and annual reports can be viewed on the Corporation's website at: http://www.yukonenergy.ca.

1.2 GENERAL PROJECT DESCRIPTION

The Mayo B Project is proposed to enhance the current power generation capacity installed on the Mayo River. The Project is designed to improve power generation capacity at the Mayo hydro system to help displace diesel generation that would otherwise be required to meet the increased loads, including loads that are anticipated to arise following the completion of the Carmacks-Stewart Transmission Project.

Based on conceptual design and field work to date, the Project components are as follows:

(a) a new powerhouse of approximately 10-12 MW, approximately 3.9 km downstream of the existing powerhouse;

(b) a new penstock-canal system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 460 m long that extends from the existing tunnel to a new canal; a surface-run canal (approximately 2,500 m); and a pressurized 'downstream' penstock from the canal to the new powerhouse (approximately 800 m);

(c) a new all-weather access road of approximately 2600 m to the new powerhouse from the existing access road serving the current Mayo hydro facility;

(d) a new distribution line of approximately 1,700 m 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;

(e) a new transmission line of approximately 3,600 m operating at 69 kV from the new powerhouse to the existing Yukon Energy substation (S249); and

(f) 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.

The capital cost of the Project, as estimated by KGS based on conceptual design, is $120 million, of which approximately 80% is estimated for total direct construction costs, including contingencies and camp. This equates to a Maximum Feasible Contract Price of approximately $100 million.

For additional detail relating to the Project, Proponents should refer to Chapter 6 of the "Mayo Hydro Enhancement Project - YESAB Executive Committee Project Proposal", dated February 27, 2009, available on the Corporation's website at www.yukonenergy.ca.

The Project is subject to a screening level assessment by the Yukon Environmental and Socio-economic Assessment Board. It is anticipated that this assessment will be completed by the end of 2009, and that the major permits required for land-based construction to proceed will be secured by May 2010.

The Corporation will apply for the major permits associated with the Project, with the Contractor being responsible for those permits relating to its construction methodology and implementation. Schedule B to the MOU attached at Appendix A contains a list of the main permits that the Corporation expects will be required for the Project, together with a preliminary indication of who will be responsible for which permits. Proponents are expected to make their own assessment of the permits required, to the extent necessary for this RFP Stage.

The Project will be funded in part by way of a Federal contribution from the Green Infrastructure Fund, with the remaining funds being raised by the Corporation. Application has been made to the Federal government and agreement in principle is expected by the end of May 2009 that will enable the Corporation to proceed with the MOU in June 2009. The Corporation will not proceed with the Project beyond this RFP Stage until agreement in principle has been received and will not proceed to a Construction Contract until the Federal government has provided an appropriate level of commitment.

1.3 MOU STAGE CONTRACTOR INVOLVEMENT

The Corporation is issuing this RFP for the purpose of obtaining Proposals for the early involvement of a construction contractor for the Project. The selected proponent will enter into a memorandum of understanding with the Corporation substantially in the form set out in Appendix A. Pursuant to the MOU, the Corporation and the Contractor will work co-operatively to develop the scope and design for the Project to the preliminary engineering design stage and to agree on the terms of a target priced contract for the construction of the Project. Further details of the MOU Stage are set out in Section 3.1 below.

1.4 INFORMATION DVD

An Information DVD will be made available to interested Proponents who request it from the Corporation's Representative (see Section 2.5). The Information DVD will contain further background information in relation to the Project.

In order to receive the Information DVD and any further information, recipients of this RFP are required to complete, sign, and return all portions of the Receipt Confirmation Form, attached as Appendix B. The Receipt Confirmation Form may be returned in hard copy or by facsimile or email to the number and address given in Section 2.1(d) The Information DVD will be sent via courier to all parties who return the Receipt Confirmation Form.

1.5 DEFINED TERMS

Capitalized terms used in this RFP are defined in Section 6.2.

PART 2
INSTRUCTIONS / INFORMATION TO PROPONENTS

2.1 DELIVERY OF PROPOSALS

Proposals must be submitted in two packages as follows:

(a) Package One - Proposal Form 1 and the information required under Section 4.2 of this RFP;

(b) Package Two - the information required under Section 4.3 of this RFP and Proposal Form 2 containing the information required under Section 4.4 of this RFP.

Proposal Form 1 and Proposal Form 2 are provided in Part 7 of this RFP. Each Package must be clearly identified and delivered as follows:

(c) either enclosed in a sealed envelope which must be delivered in original form by hand or courier to:

Yukon Energy Corporation
Attention: Purchasing
#2 Miles Canyon Road
Box 5920, Whitehorse, Yukon
Y1A 6S7

(d) or delivered electronically by facsimile to (867) 393-5301 or by email to ed.mollard@yec.yk.ca, with the original to follow by post or courier to the above address.

2.2 PROPOSAL SUBMISSION

Each Proponent will clearly identify on the envelope containing the Proposal or on the cover page of the facsimile or email submission the name and address, telephone, and fax numbers of the Proponent, the name of the RFP, and the associated RFP number, and the Closing Date and Time.

Proposals submitted by hand or by courier must be submitted in three copies. One copy must be originally executed and include original signatures of duly authorized signatory(s) of the Proponent.

Proposals submitted by facsimile or email shall be submitted in one copy, clearly showing that the original has been executed and includes signatures of the duly authorized signatory(s) of the Proponent.

2.3 CLOSING DATE AND TIME

The date and time of Proposal closing is:

May 28, 2009 at 4:00 p.m. Whitehorse local time
(as per the Corporation time clock located at the Corporation's reception area for Proposals or amendments delivered by hand, courier or facsimile and as per the clock on the receiving computer for Proposals and amendments delivered by email).

In order to qualify under this RFP process, a Proposal must be received at the Corporation's Office on or before the Closing Date and Time. Proposals received by hand or courier after the Closing Date and Time will be rejected and will be returned to the Proponent unopened and time stamped. Proposals received by facsimile or email after the Closing Date and Time will be rejected, but will not be returned to the Proponent. Proposals submitted by facsimile or email shall be considered to have been delivered after the Closing Date and Time if transmission of the fax or email begins before the Closing Date and Time and is completed after the Closing Date and Time.

The Corporation assumes no risk, makes no guarantee, warranty or representation whatsoever and shall have no responsibility or liability whatsoever for and in connection with:

(a) the timely receipt of any Proposals or amendments to Proposals or any other information from any Proponent; or

(b) the working order, functioning or malfunctioning of facsimile transmission equipment, the email system or any computer used in connection with this RFP.

2.4 VERIFICATION OF RECEIPT OF PROPOSAL

Proponents may verify that their Proposal has been received prior to the Closing Date and Time by calling (867) 393-5338. The Proponent must identify the Proponent's name before this information will be released. No other information concerning the Proposal will be released prior to the Closing Date and Time.

2.5 QUESTIONS

Proponents are required to submit their questions, including questions relating to specifications, discrepancies, omissions, or any apparent ambiguities, in writing, by facsimile, or e-mail, not less than three business days before the Closing Date and Time to:

Yukon Energy Corporation
Attention: Ed Mollard, CFO
Telephone: (867) 393-5338 Fax: (867) 393-5301
E-mail: ed.mollard@yec.yk.ca

Proponents will not contact or ask questions of any other Corporation personnel. Information obtained from any person or source other than the Corporation's Representative cannot be relied on for the purposes of this RFP process and cannot be incorporated into a Proposal. The Corporation may disqualify any Proponent who solicits information from any person other than the Corporation's Representative.

The Corporation will review the questions and where the information is not already provided, will issue an addendum to all Proponents under Section 2.6. Responses may be made up to 48 hours prior to the Closing Date and Time. The Proponent that submitted the question will not be identified in the Corporation's response.

2.6 ADDENDA

The Corporation may amend or supplement this RFP by addenda issued by the Corporation. All addenda will be in writing, sequentially numbered, and bear the date of issue. All addenda issued by the Corporation prior to the Closing Date and Time will become part of this RFP. It is the sole responsibility

of the Proponent, prior to the Closing Date and Time, to ensure that it has received all addenda pertaining to this RFP. The Proponent should acknowledge receipt of all addenda in Proposal Form 1.

2.7 PROPOSAL WITHDRAWALS

Proposals may be withdrawn at any time prior to the Closing Date and Time by submitting a written withdrawal request to the Corporation's Office or by facsimile or email to the number and address given in Section 2.1(d). A Proposal that has been submitted by hand or by courier will be returned to the Proponent unopened and a Proposal that has been submitted by facsimile or email will be withdrawn, but not returned to the Proponent.

2.8 AMENDMENTS TO PROPOSALS

Where a Proposal has been received by the Corporation before the Closing Date and Time, amendments by facsimile or email are acceptable, provided that such amendments are sent to the number and address given in Section 2.1(d) and are received at that number or address prior to the Closing Date and Time.

Amendments to a Proposal must clearly state the name of the Proposal, the Closing Date and Time, and the name and address of the Proponent in accordance with this RFP. Any amendment must be duly signed by an authorized signatory of the Proponent.

2.9 PROPOSAL DETAILS

Proponents must provide complete and accurate information and details for all aspects of their Proposal. Failure to respond to any requests for information, costs or qualifications will be deemed to be a negative response, and may, at the sole discretion of the Corporation, disqualify the Proposal.

2.10 RIGHT OF ACCEPTANCE / REJECTION

The Corporation, in its sole discretion, may, at any time prior to selection of the successful Proponent, accept in whole or in part all Proposals it has received, withdraw any portion of this RFP, or cancel this RFP in its entirety. No act of the Corporation, other than a notice in writing signed by the Corporation's Representative, will constitute an acceptance of a Proposal. If none of the Proposals meet the Corporation's requirements, the Corporation may choose not to accept any Proposals and may cancel this RFP.

From the information submitted under this RFP, the Corporation will determine the successful Proposal, which in the sole judgment of the Corporation, provides the most economically advantageous solution for the Corporation in accordance with the requirements and criteria set out in this RFP.

This RFP is not an offer by the Corporation to enter into an agreement in relation to the Project. The Corporation is not bound to enter into an MOU with the Proponent that submits the lowest price structure, or with any Proponent. The Corporation is under no obligation to receive further information, whether it is oral or written, from any Proponent.

2.11 NEGOTIATIONS

Notwithstanding any other provision in this RFP, the Corporation may in its sole discretion at any time and from time to time after submission of Proposals and before an agreement is entered into negotiate any terms and conditions of the MOU, including negotiating terms and conditions that are or may be different from those contained in this RFP, with one or more Proponents, but not necessarily with all Proponents.

The Corporation also reserves the right not to enter into negotiations with one or more Proponents; to terminate negotiations with any Proponent; not to offer the same or substantially the same negotiated terms and conditions of an agreement to more than one Proponent; and to award an agreement by acceptance of any Proposal so negotiated. If the Corporation selects a Proposal, the Proponent will enter into the MOU, together with such modifications to such agreement as the Corporation, in its sole discretion, may require.

2.12 OPENING OF PROPOSALS

The opening of Proposals will be closed to the public. Information on Proponents' names received may be released at the Corporation's sole discretion. If Proponents' names are released, this information may be released only to qualifying Proponents after responses are opened and the MOU is entered into with the successful Proponent.

2.13 WAIVER

In consideration for the Proponent being permitted to participate in this RFP process, the Proponent, by submitting a Proposal, agrees that it will not make a claim against the Corporation, for whatever reason including, without limitation, pursuant to contract, tort, law, equity or any actual or implied duty of fairness, relating to the Proposal or this RFP, and agrees that it waives and hereby releases the Corporation from any claim or recovery for costs, expenses, or damages incurred by a Proponent in preparing its Proposal, loss of profits, or any other matter whatsoever. The Corporation will have no liability to any of the Proponents as a result of this RFP.

2.14 EXTENSIONS

The Corporation may extend the Closing Date and Time by issuing a written addendum to all Proponents.

2.15 WAIVER OF IRREGULARITIES

The Corporation may, in its sole discretion, waive any minor irregularity or non-compliant issues in the Proposals received. Failure to comply with any item(s) of this RFP may result in the rejection by the Corporation, in the Corporation's sole discretion, of all or part of any Proposal.

2.16 FORM OF PROPONENT

Proponents may take any legal form, including corporations, joint ventures or partnerships. Where the Proponent is a joint venture or partnership, all members must sign each of the Proposal Forms. Other arrangements for Proponent teams will be considered, including the use of specified sub-contractors. Proponents should note Section 4.1 in this respect.

2.17 INCURRED COSTS / EXPENSES

Proponents are solely responsible for their own costs and expenses in preparing and submitting a Proposal and for any subsequent negotiation costs and expenses with the Corporation, if any. If the Corporation cancels this RFP or rejects all Proposals, the Corporation will not be liable to any Proponent for any costs or expenses of preparation or presentation of their Proposal.

2.18 IRREVOCABILITY

After the Closing Date and Time, Proposals will be irrevocable and may not be amended for a period of ninety (90) days, and a Proponent will not revoke its Proposal until the expiry of the Irrevocable Period.

2.19 CLARIFICATION

The Corporation may at any time seek clarifications of, or any additional information in connection with, or modifications of, any Proposal from any one or more Proponents, but not necessarily all Proponents, either serially or concurrently, and in any manner including through written correspondence, interviews, or presentations by Proponents.

Any clarifications, additional information, or modifications received may form part of a Proponent's Proposal and may be considered by the Corporation, in its sole discretion, in its RFP evaluation and decisions including without limitation as to acceptance, rejection, negotiation, or award, and the Corporation may accept any Proposal as clarified, supplemented, or amended through this RFP. The Corporation is not bound by any industry custom or practice in the exercise of its discretion.

2.20 PUBLICITY

The Proponent will not issue any press release or make any public announcement or disclosure concerning this RFP, the Proposal, or the MOU, without the prior written consent of the Corporation, which consent may be unreasonably withheld.

2.21 CONFIDENTIAL AND PROPRIETARY INFORMATION

This RFP, the information on the Information DVD and all Proposals are the property of the Corporation, and all Proponents will keep confidential and will not use, reproduce, or distribute any information, drawings, or specifications included in or provided with this RFP or the Information DVD except for the purpose of preparing a Proposal.

Each Proponent will clearly identify any information or records that it is providing in its Proposal that constitutes confidential information. The Corporation will use reasonable efforts to keep such information confidential, except as may be required by law. The Corporation may disclose the contents of Proposals, including any confidential information, to KGS and other external advisers and stakeholders who are involved in the Project or as may be necessary to obtain funding and approvals for the Project.

2.22 NO COLLUSION

Proponents will not discuss or communicate, in any form, with any other Proponent or any representative or agent of any other Proponent regarding the preparation or presentation of their Proposal. Proposals will be submitted without any connection, knowledge, comparison of information, or arrangement, with any other Proponent or any agent or representative of any other Proponent.

If a Proponent contemplates using the same subcontractor or supplier as another Proponent for a particular part of the Project, the Proponent will put into place appropriate ethical walls and other safeguards to protect the confidentiality of their information and to ensure collusion does not take place.

2.23 REFERENCES / CONTACTS

Proponents authorize the Corporation to contact any identified clients (current and past) and references regarding the information provided in their Proposal. Proponents authorize the Corporation to undertake credit checks and other financial enquiries on any Proponent Team Member.

2.24 FULL DISCLOSURE

Proponents will provide a written statement of full disclosure addressing the following particulars:

(a) any personal relationship to any employee of the Corporation who makes recommendations concerning the selection of the preferred Proponent, or any employee (or immediate relative of an employee) of the Corporation with any direct, or indirect pecuniary interest, ownership or directorship with respect to the Proponent or any Proponent Team Member;

(b) any business relationship with the Corporation, any of its staff, employees, officers, directors, or board members;

(c) any matter involving a dispute with a claimed value in excess of $50,000 which is the subject of any current, pending, or threatened mediation, arbitration, or litigation proceeding; and

(d) particulars of any proceedings involving the Proponent and any Proponent Team Member under the *Bankruptcy and Insolvency Act* (Canada), the *Companies' Creditors Arrangement Act* (Canada) or similar legislation.

Proponents must specifically address the requirements of this Section 2.24 in their Proposal by either providing appropriate disclosure or by indicating that they have nothing to disclose in respect of the matters listed above.

Proponents must advise the Corporation's Representative in writing of any change in the foregoing throughout the RFP process including any period up to and including the execution of the MOU. The Corporation may reject any Proposal or terminate any resulting agreements without prejudice for failure to disclose the information required in this Section 2.24, or for disclosure at any time of proceedings in the nature of bankruptcy or insolvency by or against the Proponent.

2.25 KNOWLEDGE OF PROJECT

While the Corporation has attempted to ensure an accurate presentation of information in this RFP and the Information DVD, that information is supplied solely as a guide for all Proponents. The information is not guaranteed or warranted by the Corporation to be accurate, nor is it necessarily comprehensive or exhaustive. Nothing in this RFP or the Information DVD is intended to relieve Proponents from forming their own opinions and conclusions with respect to matters addressed in this RFP. The Corporation will not be liable to the Proponent for any misunderstanding on behalf of the Proponent as to the nature and scope of the Project, or any associated risks and conditions relating to the Project.

2.26 LEGAL COUNSEL

Davis LLP has provided and continues to provide legal advice to the Corporation in respect of this RFP. By submitting a Proposal, a Proponent is expressly consenting to Davis LLP continuing to represent and advise the Corporation in respect of this RFP, notwithstanding that Davis LLP may have information of

the Proponent and notwithstanding any unrelated solicitor-client relationship that the Proponent may have or previously has had with Davis LLP.

2.27 PROPONENT DEBRIEFING

Debriefing may be provided to unsuccessful Proponents, at the sole discretion of the Corporation.

PART 3
SPECIFICATIONS

3.1 EARLY CONTRACTOR INVOLVEMENT

The Corporation is anticipating an increased demand for electricity during 2011, with the completion of the Carmacks-Stewart Transmission Project. The Corporation's existing hydro facilities, including the hydro facility at Mayo, will not be able to meet this demand and until the Project is completed the Corporation will have to rely on diesel generators. Accordingly, completion of the Project during 2011 is of critical importance to the Corporation. A preliminary Project Schedule is attached as Appendix C.

KGS Group, Winnipeg, have been engaged by the Corporation to provide engineering services in connection with the Project. They have produced concept drawings for the Project which are attached as Appendix D. Further site investigation work will be undertaken during the summer of 2009, with a view to producing preliminary engineering drawings by mid-November 2009.

Due to the critical importance of a 2011 completion date, the Corporation is looking to engage a construction contractor through this RFP process by the end of June 2009. The Contractor will work co-operatively with the Corporation pursuant to the MOU, assisting KGS and the Corporation with the development of the scope and design and working to agree to a target price Construction Contract prior to the end of the year. If agreement cannot be reached with the Contractor on the terms of a Construction Contract, the Corporation will tender the Project early in 2010.

The key elements of this process are:

(a) as part of the RFP Stage, Proponents will provide the Corporation with their proposals for various pricing elements of the MOU and the Construction Contract. These are more particularly set out in Section 4.4;

(b) KGS will continue to develop the design for the Project throughout 2009, including carrying out site investigation work and preliminary engineering;

(c) the Corporation will initiate the procurement of the turbines for the Project in September 2009, in order to maintain the Project Schedule;

(d) as part of the MOU Stage, a decision will be made as to whether the Corporation or the Contractor will undertake the detailed design work following execution of the Construction Contract. If the Contractor is to undertake that work, the Corporation and the Contractor may agree that KGS should become the design subcontractor to the Contractor, on terms and fees to be agreed;

(e) the Corporation will pay the Contractor a proportion of its costs incurred during the MOU Stage. Contractors will provide details under this RFP of their Development Cost Estimate and the percentage that they expect to be paid during the MOU Stage. Costs in excess of this estimate must be justified and agreed by the Corporation. The remaining percentage of the Development Costs will only be paid if the Corporation and the Contractor enter into the Construction Contract;

(f) assuming the Corporation and the Contractor are able to agree on all other commercial terms of the Construction Contract, the Contractor will propose both a Target Contract

Price and a Maximum Guaranteed Price to be agreed by the Corporation and included in the Construction Contract. These prices will be established on an open book basis, applying the overhead and profit margins proposed by the Contractor under this RFP;

(g) after the MOU Stage, assuming the Corporation and the Contractor are able to agree on all terms of the Construction Contract, the Construction Stage will proceed on an open book basis;

(h) if the final cost of the Construction Contract is below the Target Contract Price, the gain will be shared between the Corporation and the Contractor in percentages to be proposed by the Contractor under this RFP;

(i) if the final cost of the Construction Contract is above the Target Contract Price and less than the Guaranteed Maximum Price, the additional cost will be shared between the Corporation and the Contractor in percentages to be proposed by the Contractor under this RFP; and

(j) if the final cost of the Construction Contract is above the Guaranteed Maximum Price, the Corporation shall not be liable for any excess over that Guaranteed Maximum Price.

Details of the proposed MOU Stage and anticipated timeline can be found in Section 1.1 of the MOU.

Under the MOU the Corporation will take the lead on the development activities, with the Contractor providing feedback and input into key decisions. Given the tight Project Schedule it will be important for the Contractor to be able to respond quickly to requests for input and to remain actively engaged in the MOU Stage.

The Contractor must be available during the Construction Stage in 2010 and 2011 as required for timely completion of the construction work.

Either the Corporation or the Contractor may withdraw from the MOU Stage at any time. In these circumstances the Contractor will only be entitled to recover a proportion of its costs, as agreed to in the MOU. The Corporation reserves the right, if no Construction Contract is entered into with the Contractor, to put construction of the Project (with or without the design element) out to competitive procurement. If that occurs, the Corporation in its sole discretion will determine whether or not to allow the Contractor to take any part in that process.

3.2 CONDITIONS

The Corporation expects to enter into the MOU on or before June 30, 2009 subject to the following conditions:

(a) confirmation in principle that the Federal government will provide appropriate financial assistance to the Corporation for the Project; and

(b) approval of the Corporation's board of directors to proceed.

These conditions are solely for the benefit of the Corporation, and may be waived by the Corporation in its sole discretion.

Further approvals will be required before the Corporation may enter into the Construction Contract.

PART 4
SUBMISSION REQUIREMENTS

4.1 GENERAL

To provide the Corporation with complete information to enable comprehensive and accurate evaluation of the Proposals, Proponents will provide the information required by this Part 4 in their Proposal. Any additional information may be included at the Proponent's discretion. Omission of any information that the Corporation deems as pertinent to the Proposal may cause the Proposal to be rejected in the Corporation's sole discretion. Any supporting documentation such as personnel resumes should be attached as appendices and cross-referenced to the appropriate section of the Proposal.

As stated in Section 2.16, Proponents may take any form. Proponents should identify in their Proposal any Proponent Team Members and clarify the nature of their participation. Given the nature of the MOU Stage, the Corporation appreciates that Proponents may not have finalized their team structures for the construction element of the Project at the time of submission of Proposals. Proponents are therefore given flexibility in determining the level of detail to be provided at this stage. However, Proponents should note the following requirements:

(a) the named Proponent will be the entity that must enter into the MOU;

(b) in order to satisfy the pass/fail element of the evaluation process (see Section 5.1), either the Proponent or a named Proponent Team Member must have the relevant experience;

(c) where the Proponent wishes to rely on the experience of a third party for any aspect of the Proposal, that third party must be named as a Proponent Team Member and must execute Proposal Form 1;

(d) where a Proponent is a joint venture or partnership, each member of the joint venture or partnership must be named as a Proponent Team Member;

(e) if a Proponent wishes to change a Proponent Team Member after the Closing Date and Time, such a change will not necessarily disqualify the Proponent. The Corporation will evaluate the Proposal on the basis of the change, but will not allocate any increased score as a result of the new Proponent Team Member.

4.2 PACKAGE ONE

Package One will consist of Proposal Form 1 and the following additional information:

(a) General Information

Proponents will provide the following information:

(i) name and address of Proponent and each Proponent Team Member;

(ii) nature of Proponent entity;

(iii) nature of participation of Proponent Team Members (including percentage ownership, if applicable);

(iv) proposed contractual arrangements between Proponent and Proponent Team Members;

(v) previous working relationships between Proponent and Proponent Team Members;

(vi) principal owners and senior executives of Proponent and each Proponent Team Member; and

(vii) number of years in operation of Proponent and each Proponent Team Member.

(b) Relevant hydro-electric experience

Proponents will provide the following information:

(i) list any experience in the construction of hydro-electric facilities of similar scope and complexity to the Project completed in the last ten years; and

(ii) provide a one page sheet giving details of each project, including the Proponent's role (or the role of any Proponent Team Member), project size, value, duration, and date completed.

(c) Specific Project related information

Proponents will provide the following information:

(i) experience, internal or subcontracted, for the following elements of the construction work:

A. the tunnel;

B. the canal;

C. concrete structures;

D. the penstock; and

E. mechanical and electrical; and

(ii) information regarding workers' compensation, occupational health and safety and environmental policies and details of any enforcement action that has been taken in the past ten years against the Proponent or any Proponent Team Member under any legislation designed to protect workers' health and safety or the environment.

(d) Financial Information

The Proponent will provide the following:

(i) consolidated audited financial statements of the Proponent for the past three financial years. Where the Proponent is a joint venture or partnership, this

information must be provided for each member of the joint venture or partnership;

(ii) information regarding the Proponent's insurance company, insurance policy details and limits. Where the Proponent is a joint venture or partnership, this information must be provided for each member of the joint venture or partnership;

(iii) bank and bonding company reference details of Proponent and each Proponent Team Member;

(iv) details of the number and percentage of contracts of the Proponent and each Proponent Team Member that have resulted in litigation over the past five years; and

(v) details of any outstanding claims or lawsuits of the Proponent and any Proponent Team Member that may materially impact on the Proponent's ability to undertake the Project.

4.3 PACKAGE TWO

(a) Executive Summary

Proponents will include an Executive Summary of the key features of their Proposal which will include a brief description outlining how the Proponent considers itself to be uniquely capable of satisfying the Corporation's requirements as set out in this RFP and the key strengths it will bring to the successful completion of the Project.

(b) Experience in working on an open book and/or target price basis

The Proponent will:

(i) list any experience in working on an open book and/or target price basis in the last ten years; and

(ii) provide a one page sheet giving details of each contract, including details of the contracting process, the way in which the open book basis operated, the way in which the target price was dealt with in the contract and operated in practice, whether or not the project was brought in under the target price.

(c) Project Team

The Proponent will:

(i) outline the team of individuals that will be assigned to this Project, both during the MOU Stage and the Construction Stage and the availability and commitment of each individual, including the leader or leaders of the team during both Stages;

(ii) list all individual team members, their roles, their expected involvement for the duration of the MOU Stage and Construction Stage and education, general

experience and overall Project-related experience (resumes for key members may be attached to Proposals);

(iii) list the benefits that the team can provide to the Corporation and this Project;

(iv) list those core team members who have worked together on a hydro-electric project and outline their respective roles;

(v) define how the team will be organizationally structured (an organizational chart is recommended);

(vi) provide details of the overall resources available for assignment to the Project, both at the MOU Stage and the Construction Stage; and

(vii) show how it will have the ability to meet the demands, needs and timelines of the Project in relation to current ongoing and pending projects.

(d) Approach to working with the Corporation

Proponents will include details of their approach to working with the Corporation during the MOU Stage and the Construction Stage, including the following:

(i) how the Proponent will ensure that they are able to provide full open book accounting during the MOU Stage in relation to Development Costs and in establishing the Target Contract Price and the Guaranteed Maximum Price and during the operation of the Construction Contract;

(ii) the approach that the Proponent takes to assessing risk and contingency in setting contract prices;

(iii) any areas of the MOU that they consider could be amended in order to provide the Corporation with a better development process during the MOU Stage;

(iv) ways in which the Proponent considers it can add value to the Project, including examples of previous projects:

A. where the Proponent has been able to conclude a project within the project schedule and on budget; and

B. where the Proponent has contributed to design development and minimized design and construction costs, while optimizing life cycle costs;

(v) the approach that the Proponent takes to quality control and quality assurance, including a sample quality assurance program used on a project of similar complexity and scope to the Project;

(vi) methodology and approach to understanding the goals and needs of the Corporation and the challenge and objectives of this Project;

(vii) how it intends to assist the Corporation's aim of actively promoting the participation of local Yukon businesses and the First Nation of Na-cho Nyak Dun citizens and businesses in the Project;

(viii) understanding of the construction environment in the Yukon Territory, including details of any relevant experience on previous projects of a similar nature and scale in northern Canada or in other equivalent areas; and

(ix) any special reasons why the Proponent wishes to undertake this Project.

(e) References

The Proponent will provide client references (current or past) and contact information in relation to its abilities and references for the lead individuals and key personnel of the team for the following:

(i) hydro-electric construction projects underway or completed within the past ten years; and

(ii) other projects underway or completed within the past ten years utilizing an open book and/or target price approach.

Proponents will provide the company name of the reference, contact information (telephone, fax and e-mail), the position of the reference contact, and the date when the work was completed.

4.4 PROPOSAL FORM 2

The Proponent will include in Package Two a complete Proposal Form 2 with the following information:

(a) estimate of the Development Costs the Proponent will incur in the MOU Stage;

(b) the percentages of the Development Costs to be inserted in Sections 2.2(a) and 2.2(b) of the MOU as being the Current Development Costs and Deferred Development Costs;

(c) the Proponent's profit margin, expressed as a percentage of the value of the work of the Construction Contract, not including profit;

(d) the basis for the Proponent's cost of overhead; and

(e) the percentages to be inserted in Sections 3.3(a) and 3.3(c) of the MOU, representing the pain/gain share set out in Section 3 of the MOU.

The Development Cost Estimate will be based on estimated required hours and hourly unit rates for the activities involved during the MOU Stage. Proponents should note that pursuant to the MOU, the design work to be carried out during the MOU Stage will be undertaken by KGS at the expense of the Corporation and that the Proponent's Development Cost Estimate should therefore include only the review element of this work. Proponents should provide a breakdown for the fee estimates, showing the estimated required hours and hourly unit rates, as well as a breakdown of the major expense estimates and indicate estimated costs by the payment milestones set out in Section 2.2(a) of the MOU.

The scope of work anticipated by the Contractor at the MOU Stage is set out in Section 1.1 of the MOU and includes, but is not limited to, the following:

- familiarizing themselves with the existing information, meeting with KGS in Winnipeg to review the existing information and provide comment related to increased project value or potential alternates;
- participating in the definition, review and possible extension of the exploration program to be undertaken in the summer of 2009;
- visiting the site during July 2009 with individual team members responsible for the each of the construction activities outlined in Section 4.2(c)(i);
- determining, with the Corporation, the Maximum Feasible Contract Price, the engineering design criteria and definition of the turbine/generator contract terms of reference, the Scope of Work, the project schedule under the MOU, other Development Activities milestones set out in Section 1.1 of the MOU, and negotiation of the Construction Contract as provided for in Section 3.4 of the MOU;
- participating with KGS in the identification of risk items, quantity verification and preparation of cost estimates for the purpose of establishing Target Contract Price and Maximum Guaranteed Price;
- identifying mitigation measures and strategies to best accommodate risk items; and
- participating in the turbine/generator tender and selection process with the understanding that this contract will be assumed by the Contractor at the Construction Stage.

As set out in the MOU, increases to the Development Cost Estimate will only be allowed with the Corporation's consent, which may not be unreasonably withheld or delayed. Proponents should anticipate that the Corporation will not agree to an increase beyond the Development Cost Estimate to accommodate errors in the original estimate.

The pricing elements of the Proposal will where applicable be in Canadian dollars and will include all applicable duties and taxes, with the exception of the federal Goods and Services Tax (GST).

PART 5
EVALUATION CRITERIA

5.1 EVALUATION METHODOLOGY AND PROCESS

At each stage of the evaluation, each Proposal will be reviewed to ensure compliance with the requirements of this RFP. Proposals will then be evaluated by an evaluation committee.

Package One of each Proposal will be opened and evaluated on a pass/fail basis. In order to pass this stage of the evaluation, Proponents must show:

(a) that they have experience in the construction of hydro-electric projects of a similar scope and complexity to the Project;

(b) that they have a sound financial basis for completing the Project; and

(c) that they have an acceptable approach to health and safety and the environment.

If a Proponent does not pass this stage of the evaluation process, Package Two will not be opened and evaluated further.

For those Proponents who pass the first stage of the evaluation process, Package Two of their Proposals will be opened and Packages One and Two will be evaluated together. References may be taken up at this stage of the evaluation process.

Proposals will be evaluated based on a combination of experience and capability and approach. The Corporation will give roughly equal weight to each of experience and capability on the one hand and approach on the other hand. The areas that will be considered under each heading will include:

Experience and capability:

- Experience in the construction of hydro-electric facilities.
- Experience in the key project elements listed in Section 4.2(c)(i).
- Experience in working with open book and target priced contracts.
- The experience and availability of the team of individuals that are assigned to the Project.
- Overall experience and capabilities.

Approach:

- Overall approach to working with the Corporation, including the specific elements listed in Section 4.3(d).
- The financial impact of the Proposal, based on the information provided on Proposal Form 2.

A shortlist of Proponents whose Proposals score highest on the evaluation (expected to be three Proponents) will be invited to an interview with the Corporation. The purpose of the interviews will be to

explore in more detail the information provided in the Proposals and to give the Corporation the opportunity to question Proponents. The interviews will be used to evaluate the Proposals in more detail and may therefore result in a change to the ranking of Proponents.

Following the interview stage the evaluation committee will recommend a preferred Proponent to the Corporation's board. The board will make the final decision as to which Proponent, if any, is invited to enter into the MOU.

PART 6
SUMMARY

6.1 RECOGNITION

The Corporation thanks all Proponents in advance for participating in this RFP. We recognize the time, resources, and energy that it takes to provide a Proposal. We do not take lightly the work and effort made to provide a Proposal. The Corporation is committed to the highest standards of business practice and services, and we appreciate your company helping us achieve these goals.

6.2 DEFINITIONS

The following defined terms are used in this RFP:

Defined Term	Meaning
the Closing Date and Time	the date and time given in Section 2.3 of this RFP
Construction Contract	the construction contract which may be entered into between the Corporation and the Contractor following the MOU Stage
Construction Stage	the period after the Construction Contract is entered into between the Corporation and the Contractor following the MOU Stage, to completion of the construction of the Project by the Contractor
Contractor	the successful Proponent under this RFP who enters into an MOU with the Corporation
the Corporation	Yukon Energy Corporation
the Corporation's Office	the address given in Section 2.1 of this RFP
the Corporation's Representative	the person whose details are given in Section 2.5 of this RFP
Current Development Costs	as defined in the MOU
Deferred Development Costs	as defined in the MOU
Development Activities	as defined in the MOU
Development Costs	as defined in the MOU
Development Cost Estimate	the estimate of costs that the Proponent will incur during the MOU Stage
Information DVD	a DVD containing further information in relation to the Project which is available from the Corporation's Representative

Defined Term	Meaning
Irrevocable Period	the period during which Proposals are irrevocable, as set out in Section 2.18
KGS	KGS Group, the firm retained by the Corporation to provide engineering services in relation to the Project for the MOU Stage
Maximum Feasible Contract Price	as defined in the MOU
Maximum Guaranteed Price	as defined in the MOU
MOU	the memorandum of understanding, substantially in the form set out in Appendix A to this RFP, which may be entered into between the Corporation and the Contractor following this RFP Stage
MOU Stage	the period after signing of the MOU during which the Corporation and the Contractor carry on the activities outlined in the MOU
Package	each package of the Proposal, as set out in Section 2.1
the Project	the Mayo B project, as more particularly described in Section 1.2
Project Schedule	the preliminary project schedule as set out in Appendix C
Proponent	a person who responds to this RFP by submitting a Proposal
Proponent Team Member	a corporate member of the Proponent team who is of critical importance to the Proposal, as further described in Section 4.1
Proposal	proposals submitted in response to this RFP
Proposal Forms	Proposal Form 1 and Proposal Form 2 as set out in Part 7 of this RFP
Receipt Confirmation Form	the form attached as Appendix B
RFP	this request for proposals
RFP Stage	the period from the issue of this RFP to the signing of the MOU
Scope of Work	as defined in the MOU
Target Contract Price	as defined in the MOU

PART 7
PROPOSAL FORMS

PROPOSAL FORM 1

REQUEST FOR PROPOSAL – RFP #2009-007
For Early Contractor Involvement in the Mayo B Project
Yukon Energy Corporation

This document must be submitted with the Package One of Proponent's Proposal in a separate envelope.

I/We hereby submit a Proposal for the Project, in accordance with these documents.

(i) I/We have carefully examined the specifications of the Project together with all other factors affecting the Project and hereby propose to enter into the MOU on terms and conditions substantially in the form attached to the RFP as Appendix A, together with such modifications to such agreement as the Corporation, in its sole discretion, may require.

(ii) I/We acknowledge receipt of, and have taken into consideration, the following addenda issued during this RFP:

#_____ #_____ #_____ #_____ #_____ #_____

(iii) Closing Date and Time: **May 28, 2009 at 4:00 p.m. Whitehorse Local Time**

(iv) The Corporation need not necessarily accept the lowest, the highest ranked, or any Proposal, and may reject or accept any Proposal.

(v) In consideration of being permitted to submit a Proposal, I/We agree that this Proposal is irrevocable and open to acceptance by the Corporation at any time during the Irrevocable Period, whether any other Proposal has been accepted or not.

(vi) We acknowledge the provisions of Section 2.24 of the RFP and confirm as follows:

Section 2.24 (a)	Details of personal relationships	None/see details attached
Section 2.24 (b)	Details of business relationships	None/see details attached
Section 2.24 (c)	Disputes over $50,000	None/see details attached
Section 2.24 (d)	Bankruptcy proceedings	None/see details attached

Proponent's Full Business Name:

_____

Proponent's Full Business Address:

_____

Telephone Number: _____ **Fax**: _____

Email: _____

Attested to and delivered on behalf of the Proponent this _____ day of _____ 2009:

Signature(s): _____ **Title**: _____

Witness Signature: _____ **Name**: _____

Each Proponent Team Member:

We hereby acknowledge the Proposal submitted by [ ] and agree to being named in the Proposal as a Proponent Team Member. All information contained in the Proposal relating to us is correct:

Attested to and delivered on behalf of the Proponent Team Member this _____ day of _____ 2009:

Signature(s): _____ **Title**: _____

Witness Signature: _____ **Name**: _____

PROPOSAL FORM 2

REQUEST FOR PROPOSAL – RFP #2009-007
For Early Contractor Involvement in the Mayo B Project
Yukon Energy Corporation

This document must be submitted in Package Two of the Proponent's Proposal.

Please complete the table below with the information requested in Section 4.4 of the RFP. Please attach the details of the Development Cost Estimate as requested in that Section.

Price element	**Proposal**
Development Cost Estimate	$
Percentage for Section 2.2(a) of MOU	%
Percentage for Section 2.2(b) of MOU	%
Profit margin	%
Basis for cost of overhead	
Percentage for Section 3.3(a) of MOU	%
Percentage for Section 3.3(c) of MOU	%

Proponent's Full Business Name:

_____

Attested to and delivered on behalf of the Proponent_____, 2009 in the presence of:

Name (Please Print) _____

Signature(s): _____

Title (Please Print): _____

Witness Signature: _____

Witness Name (Please Print): _____

APPENDIX A
FORM OF MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING ("**MOU**") is dated for reference [●], 2009.

BETWEEN:

Yukon Energy Corporation, of #2 Miles Canyon Road,
Whitehorse, Yukon Territory, Y1A 5L6

("**YEC**")

AND:

ABC Co. Ltd., of [●]

("**ABC**")

(Individually a "Party" and collectively the "Parties")

BACKGROUND

A. YEC proposes to upgrade the Mayo hydro facility and increase its capacity from approximately 5 MW at the existing plant to approximately 15 MW.

B. The Mayo B project is proposed to enhance the current power generation capacity installed on the Mayo River. The project is designed to improve power generation capacity at the Mayo hydro system to help displace diesel generation that would otherwise be required to meet the increased loads, including loads that are anticipated to arise following the completion of the Carmacks-Stewart Transmission Project.

C. The project components are as follows:

(a) a new powerhouse approximately 3.9 km downstream of the existing powerhouse;

(b) a new penstock-canal system that will divert water from the existing intake tunnel to the new powerhouse, comprising a new tunnel extension that conveys flow to a low pressure 'upstream' penstock approximately 460 m long that extends from the existing tunnel to a new canal; a surface-run canal (approximately 2,500 m); and a pressurized 'downstream' penstock from the canal to the new powerhouse (approximately 800 m);

(c) a new all-weather access road of approximately 2600 m to the new powerhouse from the existing YEC access road serving the current Mayo hydro facility;

(d) a new distribution line of approximately 1,700 m 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;

(e) a new transmission line of approximately 3,600 m operating at 69 kV from the new powerhouse to the existing Yukon Energy substation (S249); and

(f) 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,

collectively (the "**Project**").

D. Concept drawings for the Project are contained in Schedule A to this MOU.

E. ABC and its affiliates are collectively experienced in, and capable of, engineering, procuring and constructing hydro power facilities.

F. YEC wishes to engage ABC to construct the Project.

G. YEC has applied to the Yukon Environmental and Socio-economic Assessment Board for a screening level assessment of the Project pursuant to the *Yukon Environmental and Socio-economic Assessment Act*.

H. The Parties wish to enter into this MOU for the purpose of establishing procedures to arrive at mutually agreeable terms for a construction contract (the "**Contract**") (with the option to include engineering design within the scope of work), including a mutually agreeable construction and development schedule (the "**Project Schedule**") and a pricing formula (the "**Contract Price Formula**").

NOW THEREFORE in consideration of the foregoing and the mutual covenants hereinafter contained, the Parties agree as follows:

PART 1

PROJECT DEVELOPMENT

1.1 Development Activities. ABC and YEC will, after the date of execution of this MOU (the "**Effective Date**"), initiate and carry out the development activities (the "**Development Activities**") on or before the target dates set out below necessary to determine the Contract Price Formula and finalize the Contract, including:

Development Activity		**Target Date**
(a)	initial visit to the intended site for the Project by the ABC team and YEC's engineer, KGS Group ("**KGS**"), with debrief;	<July 31, 2009>
(b)	mutual determination of a maximum price at which the Project is reasonably expected to be feasible (the "**Maximum Feasible Contract Price**"), based on the design criteria, drawings and specifications prepared by KGS, and YEC's ability to provide finance for the Project, it being acknowledged that the	<August 7, 2009>

Development Activity	**Target Date**
Maximum Feasible Contract Price will have an option for a price if detailed design work is carried out by ABC and an option for a price if detailed design work is carried out by YEC;	
(c) determination of the engineering design criteria and definition of the turbine/generator contract terms of reference, it being acknowledged that KGS will prepare the initial documentation, to be reviewed and agreed by ABC;	<September 11, 2009>
(d) determination of a scope of work ("**Scope of Work**") under the Contract (it being acknowledged that KGS will prepare the initial documentation, to be reviewed and agreed by ABC) including: (i) designation of the work site (the "**Site"**); (ii) the required engineering and design services; (iii) the required procurement services (it being understood that YEC will initiate the procurement process for the turbine/generators and that ABC will assume all rights and obligations under this procurement process on signing of the Contract and will procure all other equipment for the Project); (iv) the required construction services, including details of: A. structure definition and estimated quantities; B. equipment layouts; C. complete equipment lists; D. canal definition and estimated quantities; and E. penstock and tunnel 'tie-in' and estimated quantities; (v) the Project Schedule (a preliminary project schedule, outlining the roles of the Parties, is attached at Schedule C);	<October 9, 2009>
(e) agreement on: (i) whether YEC or ABC will undertake the detailed design work; (ii) if the detailed design work is to be undertaken by ABC, whether KGS will cease to be the design subcontractor to YEC and become the design subcontractor to ABC	<November 13, 2009>

Development Activity	Target Date
under the Contract; and (iii) if KGS becomes the design subcontractor to ABC, the terms and fees applicable thereto;	
(f) a determination of all required permits and a division of responsibility between YEC and ABC for obtaining such permits, it being acknowledged that YEC will obtain all major permits, with ABC being responsible for those that directly relate to its construction methodology and implementation (a preliminary list of permits is attached at Schedule B, with an indication of who will be responsible for obtaining each of them [and the anticipated timing for each permit]);	<November 13, 2009>
(g) a specific identification of all of YEC's obligations with respect to the Project, it being understood that YEC will assume responsibility for providing the Site and carrying out all consultations with First Nations, and that all engineering, procurement and construction risks other than those identified and expressly allocated to YEC under the Contract will be assumed by ABC;	<November 13, 2009>
(h) in consultation with YEC's project manager (the "**Project Manager"**): (i) a determination of appropriate quality control and quality assurance procedures; (ii) a determination of the appropriate monitoring regime; (iii) a determination of appropriate testing procedures to determine service commencement and total completion; (iv) a determination of appropriate warranties and performance guarantees; (v) a determination of appropriate security for performance by ABC; (vi) a determination of the basis for liquidated damages for failure to achieve target service commencement (which will be based upon revenue lost to and additional costs of YEC due to the delay); (vii) a determination of the basis for a bonus for achieving service commencement prior to the target date for service commencement;	<November 13, 2009>
(i) agreement on the preliminary engineering design for the Project;	<November 13, 2009>

Development Activity		Target Date
(j)	agreement on the open book basis of the Contract Price Formula and the appropriate monitoring and verification of ABC's costs; and	<November 13, 2009>
(k)	based on the foregoing activities, agreement on the material terms of a mutually acceptable Contract.	<November 30, 2009>

1.2 Supply of Information. YEC will supply ABC all documents and information that YEC has in its possession relevant to the construction of the Project, including drilling reports, soil reports, environmental reports, quantities, drawings, concepts etc. ABC will provide to YEC all documents and pricing information that is received from, or is the product of negotiations with, persons such as suppliers and contractors. YEC and the Project Manager may participate in any meetings with such persons.

1.3 Timing of ABC responses. The Parties acknowledge that YEC will take the lead role in the Development Activities and will rely on responses from ABC to requests for information and review. ABC will provide answers to all requests as soon as is practicable, and in any event within 14 days of receipt in sufficient detail to enable YEC to continue with the appropriate Development Activities.

1.4 ABC's Experience. ABC confirms to YEC that it has extensive experience in entering into and performing engineering, procurement and construction contracts in respect of projects similar to the Project and understands the nature of the obligations it will be expected to assume under the Contract in such context.

1.5 YEC's Consultants. In addition to the Project Manager, YEC may retain the services of one or more independent consultants or advisers to provide technical, financial, contractual or legal advice in connection with the Development Activities and ABC will cooperate with YEC and its consultants.

1.6 YEC's Stakeholders. YEC may directly involve its partners, lenders and other stakeholders (including First Nations) in the Project and their respective consultants and advisers in reviewing technical, financial, contractual, or legal aspects of the Development Activities and ABC will cooperate with such persons.

1.7 Ownership of Contract Data. Upon full payment by YEC of the Current ABC Development Costs, as defined in Section 2.2(a) of this MOU, YEC will own all rights, title, and interest in and to the information, quotations, drawings, designs, plans, specifications and like materials specifically prepared or obtained by ABC as part of the Development Activities and under the Contract ("**Contract Data**") with full right to exploit same, provided that ABC will have no liability of any nature to YEC in respect of the Contract Data or YEC's use of any Contract Data except as set out in a duly executed and delivered Contract and provided further that nothing contained in this MOU shall mean or be deemed to mean that ABC has transferred to YEC any proprietary rights related to its know-how or methodology used as part of preparing or collecting the Contract Data. ABC shall deliver the Contract Data to YEC forthwith after the Termination Date (as defined in Section 5.1).

PART 2

DEVELOPMENT COSTS

2.1 **ABC's Development Costs**. ABC estimates its costs to be incurred in connection with the Development Activities ("**ABC's Development Costs**") to be approximately C$[●] (the "**Original Estimate**"). Details of the calculation of the Original Estimate are set out in Schedule D. Any third party consultants or advisers required by ABC in connection with the Development Activities will be retained directly by ABC and such costs will form part of ABC's Development Costs. ABC will not incur Development Costs exceeding the Original Estimate without YEC's prior written consent, such consent not to be unreasonably withheld or delayed. ABC's Development Costs shall be reasonable and ABC will make available to YEC and YEC's consultants and advisers, on an open book basis, all details and background information with respect to each amount included in ABC's Development Costs, which information will be included with any invoice submitted pursuant to this MOU.

2.2 **Payment of ABC's Development Costs.** YEC and ABC agree that the current portion ("**Current ABC Development Costs**") and the deferred portion ("**Deferred ABC Development Costs**") of the ABC Development Costs shall be invoiced and payable according to the milestones and phases provided below:

(a) the Current ABC Development Costs are fixed at [●]% of the ABC Development Costs and shall become payable as follows:

(i) any Current ABC Development Costs incurred up to and including completion of the event provided for in Section 1.1(a);

(ii) any Current ABC Development Costs incurred up to and including completion of the events provided for in Section 1.1(d); and

(iii) all remaining Current ABC Development Costs incurred up to and including completion of the event provided for in Section 3.2;

(b) subject to Sections 4.4 and 5.2(b), the Deferred ABC Development Costs are fixed at [●]% of the ABC Development Costs and shall become payable only if the Contract is signed and the notice to proceed issued.

2.3 **Legal Costs.** Each Party's external legal costs incurred in connection with the Development Activities, this MOU and the Contract, if any, will be at the expense of the Party who engaged the legal services and, for greater certainty, will not form part of ABC's Development Costs.

PART 3

CONTRACT FINALIZATION

3.1 **Target Contract Price.** On or before <November 30, 2009>, ABC will provide its best estimate of the price to complete the Project determined on a cost plus basis (the "**Target Contract Price**"), which will be the sum of the following:

(a) ABC's best estimate of the cost of performing the Contract, which will include all labour, material equipment, engineering, procurement (including the turbines), project

management, transportation, insurance, escalations, construction consumables, testing, startup and commissioning required to provide a fully functional Project (not including the Development Costs paid under this MOU);

(b) ABC's G&A costs;

(c) risk and contingency; and

(d) ABC's profit.

ABC will make available to YEC and its consultants and advisers, on an open book basis, all details and background information with respect to the each amount included in the Target Contract Price.[1]

3.2 Maximum Guaranteed Price. On or before <December 15, 2009>, ABC will provide its firm quote for a maximum price (the "**Maximum Guaranteed Price**") to complete the Project.

3.3 Contract Price Formula. The Contract Price Formula to be set out in the Contract will be as follows:

(a) if the final contract cost on a cost plus basis (the "**Final Contract Cost**") is less than the Target Contract Price, YEC shall make payment to ABC of an amount equal to [●]% of such difference in accordance with the invoicing provisions to be set out in the Contract;

(b) if the Final Contract Cost is equal to the Target Contract Price, then such price shall be the final price between the Parties and neither Party shall owe the other any further amount in respect of the Contract;

(c) if the Final Contract Cost is greater than the Target Contract Price but less than the Maximum Guaranteed Price, YEC shall make payment to ABC of an amount equal to [●]% of such difference in accordance with the invoicing provisions to be set out in the Contract, except if such Final Contract Cost is greater than the Target Contract Price for reasons attributable to a scope change or additional works required by YEC under the Contract in which case 100% of such difference shall be paid to ABC in accordance with the invoicing provisions to be set out in the Contract;

(d) if the Final Contract Cost is in excess of the Maximum Guaranteed Price, YEC will make payment to ABC of the difference between the Target Contract Price and the Maximum Guaranteed Price in accordance with (c) above, and ABC will assume and be responsible for 100% of the amount of the Final Contract Cost in excess of the Maximum Guaranteed Price except if such excess is attributable to a scope change or additional works required by YEC under the Contract in which case 100% of such excess shall be paid to ABC in accordance with the invoicing provisions to be set out in the Contract.

3.4 Draft Contract. YEC will provide the form of the draft Contract on or before <August 10, 2009>. The Parties will negotiate the terms of the Contract during the period up to submission of the Target Contract Price as provided for in Section 3.1 with the expectation that, if the Target Contract Price and Maximum Guaranteed Price do not exceed the Maximum Feasible Contract

[1] Any elements of the price which are bid as part of the RFP process (such as profit margin) will be included as bid.

Price and subject to the other conditions of this MOU, a mutually acceptable Contract will be agreed on or before <November 30, 2009>.

PART 4

ANCILLARY TERMS AND CONDITIONS

4.1 **Good Faith**. Subject to Sections 4.4 and 5.2, each of the Parties agrees to cooperate in good faith and use its commercially reasonable efforts to resolve issues and agree on a Contract.

4.2 **Exceeding the Maximum Feasible Contract Price**. ABC will forthwith advise YEC if it becomes aware that the Target Contract Price or the Maximum Guaranteed Price is reasonably expected to exceed the Maximum Feasible Contract Price.

4.3 **Exclusivity.** For a period from the Effective Date to the Termination Date (as defined in Section 5.1), the Parties agree to negotiate a Contract on an exclusive basis and YEC agrees that it will not:

(a) directly or indirectly solicit, initiate or participate in any discussions or negotiations with any third party in relation to the subject matter of the Contract contemplated by this MOU; or

(b) provide any information to a third party with a view to that third party investigating or entering into a transaction in relation to the subject matter of the Contract contemplated by this MOU.

4.4 **Required Approvals**. The Parties acknowledge that entry into, and legal effectiveness of, the Contract or any related agreements will require:

(a) prior approval of the Board of Directors of YEC;

(b) the Yukon Development Corporation to obtain any and all approvals required under Order-in-Council 1993/108;

(c) the commitment of the Federal government to provide funding to YEC for the Project, in such form as YEC in its absolute discretion may require; and

(d) prior approval of ABC's Board of Directors or equivalent.

If ABC does not obtain the approvals referred to in (d), YEC shall be relieved of any obligation to pay ABC's Development Costs and ABC shall reimburse any prior Development Costs paid by YEC.

4.5 **Insurance.** Before commencing any work under this MOU, the Contractor shall obtain and maintain the following insurance policies during the term of the MOU:

(a) A commercial general liability policy, in an amount for each and every occurrence of $2 million, with a standard form cross liability clause and a broad form property damage endorsement, the latter in an amount equal to the full policy limit. The policy will name Yukon Energy Corporation as an additional insured with respect to liabilities that arise

out of Contractor's operations, and shall contain cross liability and severability of interest clauses or equivalent wording.

(b) Automobile insurance covering liability for bodily injury, including death, or property damage to third parties arising out of ownership, use or operation of Contractor owned or leased licensed motor vehicles of $2 million inclusive.

The Contractor shall within fourteen (14) days following a request by YEC's designate, provide a completed Certificate of Insurance evidencing the Contractor's compliance with this Section 4.5, except that no evidence of automobile insurance is required unless evidence of such insurance is specifically requested.

The Contractor shall be solely responsible for determining the appropriate type and amount of insurance that the Contractor should have in place from time to time, but must maintain during the term of the MOU at least the amount and type of insurance it is required to maintain under this Section.

The Contractor shall be responsible for the full amount of all deductibles of all insurance policies required. Failure to furnish proof of insurance shall be considered a breach of the MOU, allowing YEC to obtain such insurance and charge the cost to the Contractor, or to terminate the MOU at YEC's absolute discretion.

PART 5

TERMINATION AND WITHDRAWAL

5.1 Termination. Unless extended by mutual agreement of the Parties, this MOU will terminate on the date (the "**Termination Date**") which is the earliest of:

(a) the date of execution of an Contract;

(b) the date of the withdrawal from this MOU of any of the Parties pursuant to Section 5.2; and

(c) December 31, 2009.

5.2 Withdrawal.

(a) Subject to Section 5.2(b), either Party may withdraw from and terminate this MOU for any reason upon written notice at any time, whereupon it will have no further rights, obligations or liabilities hereunder other than:

(i) in the case of ABC, to furnish all Contract Data and deliverables described in this MOU to YEC;

(ii) in the case of YEC, to pay for the Development Costs in accordance with Section 2.2; and

(iii) in the case of both Parties, the obligation of confidentiality in accordance with Section 6.11.

(b) If after ABC provides the Maximum Guaranteed Price this MOU is terminated (other than for a breach or other default by ABC of this MOU, voluntary withdrawal from this MOU by ABC or failure by ABC to obtain the approvals in Section 4.4(d)) and YEC issues a notice to proceed with respect to the Project to a contractor other than ABC at any time during a two (2) year period following the date of termination at a price greater than 95% of the Maximum Guaranteed Price, then YEC will reimburse ABC for the Deferred ABC Development Costs.

5.3 YEC's rights. ABC acknowledges that if this MOU is terminated, YEC may procure the Project by alternative means, including putting the construction out to tender and entering into a construction or design-build contract with a third party. The Parties anticipate that ABC will have received information pursuant to this MOU which would provide it with an unfair advantage in any further procurement process relating to the Project and ABC agrees that it will abide by any decision made by YEC in relation to ABC's participation in such a procurement process. ABC acknowledges that YEC may exclude ABC from any such procurement process.

PART 6

GENERAL PROVISIONS

6.1 Governing Law and Dispute Resolution. This MOU is governed by the laws of the Territory of the Yukon. In the event of any dispute arising in connection with this MOU, the Parties will attempt to resolve the dispute as set out in this Section 6.1. All documents, discovery and other information related to any such dispute, and the attempts to resolve or arbitrate such dispute, will be kept confidential to the fullest extent possible. The Parties agree to attempt in good faith to negotiate a resolution of the dispute for a period of 20 days from the date of notice. If the matter is not resolved within such 20-day period, then the dispute shall be arbitrated. The Parties agree to be bound by the selection of arbitrators, and to settle the dispute exclusively by binding arbitration, in accordance with the following procedures:

(a) a Party (the "**Initiating Party**") may commence arbitration proceedings by giving a written notice to the other Party (the "**Responding Party**") identifying the nature of the dispute that is to be the subject of the arbitration, and any amount involved and the remedy sought. Within 10 Business Days following receipt of such notice by the Responding Party, the Initiating Party and the Responding Party will designate a single arbitrator acceptable to both of them. If the Parties fail to appoint such a single arbitrator within such period of time, the Initiating Party will, by written notice to the Responding Party, appoint an arbitrator. The Responding Party will, within 10 Business Days following receipt of such notice, appoint an arbitrator by written notice to the Initiating Party, and the two arbitrators so appointed will select a third arbitrator acceptable to both of them. If the Responding Party fails to appoint an arbitrator within such period of time (or such additional period of time as the Parties may agree), the Initiating Party may appoint an arbitrator on behalf of the Responding Party and is hereby appointed the agent of the Responding Party for such purpose. If the two arbitrators so appointed are unable to agree upon the third arbitrator within 10 Business Days following the appointment of the arbitrator by (or on behalf of) the Responding Party, either Party may apply under the International Commercial Arbitration Act (Yukon) to the Chief Justice of the Supreme Court of the Yukon (or his or her designate) to appoint the third arbitrator, and the provisions of the International Commercial Arbitration Act will govern such appointment. No person may be nominated or appointed to act as an arbitrator who is or

at any time has been interested in the conduct of the works or in the business affairs of either Party;

(b) in the conduct of the arbitration, the arbitrator(s) will determine their own procedure. The arbitrator may order any discovery permitted under the IBA Rules on the Taking of Evidence in International Commercial Arbitration (1999);

(c) the arbitration will take place in Whitehorse, Yukon or at any other place mutually agreed upon;

(d) the award of the arbitrator(s) will be final, binding and non-appealable. Judgment on the award may be entered in any court having jurisdiction;

(e) the fees and expenses of the arbitrator(s) and the other direct costs of the arbitration, including legal fees of the Parties, will be awarded as determined by the arbitrator(s).

6.2 Restriction. No partnership or joint venture or similar legal entity or co-venture between the Parties is hereby created or will be deemed to exist as a result of this MOU and neither Party will have the authority to bind the other Party without the prior written consent of such other Party.

6.3 Assignment of Rights or Obligations. Neither Party may assign its rights or obligations under this MOU without the prior written consent of the other Party. However, YEC may assign its rights under this MOU without the consent of ABC so long as such assignment is to an entity in which YEC or its shareholder are controlling members, or equity owners. [ABC may assign the Contract to a licensed and permitted affiliate so long as the obligations created by the Contract are guaranteed by ABC's ultimate parent company.]

6.4 Severability. If any term or provision of this MOU, or the application thereto to any person or circumstance is rendered or declared illegal, invalid or unenforceable for any reason, the remainder of this MOU and the application of such term or provision to other persons or circumstances will not be affected hereby but will be enforced to the greatest extent permitted by applicable law.

6.5 No Waiver. The failure of a Party to exercise any right hereunder will not be deemed a waiver of such right in the future.

6.6 Limitation of Liability and Exclusion of Liability for Consequential Damages. Other than as set out in a duly executed and delivered Contract, ABC's liability in connection with the performance (or lack thereof) of the Development Activities shall not exceed the amount of ABC's Development Costs (or portion thereof) which it is entitled to recover hereunder, provided no claim for defective or non-compliant Development Activities may be made by YEC unless ABC has first been given a reasonable opportunity to re-perform any defective or non-compliant Development Activities. If a Contract with ABC is not signed, ABC shall have no liability in connection with the use of the Contract Data by YEC or any other person and YEC shall indemnify and save ABC harmless from all costs and liabilities incurred as a result of any such use. Neither Party will bring (and each Party hereby releases) any claim against the other Party as a result of a failure to reach or enter into the Contract, other than the obligation to pay or repay Development Costs as provided in Sections 4.4 or 5.2(b). Neither Party will be liable or have any responsibility to the other for any indirect, special, consequential or punitive damages including, without limitation, lost earnings, production or profits. Such limitation on liability will apply to

any claim or action, whether it is based in whole or in part on contract, negligence, strict liability, tort, statutory or any other theory of liability.

6.7 Notices and Communication. All notices pursuant to this MOU shall be made in writing and delivered by e-mail, hand or facsimile to the respective addresses or facsimile numbers set out below, or such other address or facsimile number as each Party may from time to time notify to the other:

If sent to:

Yukon Energy Corporation
#2 Miles Canyon Road
Whitehorse, Yukon Territory
Y1A 5L6

Facsimile number:
E-Mail:
Attention:

If sent to:

ABC Co. Ltd.

Facsimile number:
E-Mail:
Attention:

Any such notice or communication shall be deemed to have been served:

(a) if delivered by hand during business hours at the recipient's location, on the date of delivery; or

(b) if sent by e-mail or facsimile, upon receipt of the confirmation of transmission at the end of the message but not before first obtaining in person or by telephone appropriate evidence of the capacity of the addressee to receive the same, as the case may be.

6.8 Successors and Assigns. This MOU will be binding upon and will inure to the benefit of the Parties and, subject to Section 6.3, their respective successors and assigns.

6.9 Complete Agreement. This MOU sets forth the sole and complete understanding between the Parties with respect to the subject matter hereof, and supersedes all other prior agreements, arrangements and understandings (oral or written) between the Parties.

6.10 Effect of Contract. If the Contract is executed, then this MOU will be superseded by the Contract. The Parties further agree that if the Contract is executed all work performed under this MOU will be incorporated into the Contract for all purposes, including, without limitation, the standard of performance, general warranties, schedule deadlines, parent guarantees and liquidated damages, if applicable.

6.11 Confidentiality. Each Party agrees to not disclose to any third party and to keep and maintain as confidential for a period of three (3) years from the effective date of this MOU all information received from the other Party and their affiliates in connection with the Project of a technical, business, commercial, financial, or proprietary nature, including (without limitation) all information relating to the Project, provided that a Party may disclose such information to its affiliates, employees, contractors, advisors, officers, directors and employees on a need to know basis in connection with the Project. This restriction will not apply to YEC in connection with the Contract Data, which information will become the property of YEC when received from ABC hereunder. Each Party agrees that an injunction would be an appropriate remedy (but not an exclusive remedy) for breach by a Party of this Section 6.11 and each Party hereby waives any right to challenge the same except on the basis that this Section 6.11 has not been breached. This Section 6.11 will survive after the Termination Date.

TO EVIDENCE THEIR AGREEMENT, the Parties have caused this MOU to be executed by their duly authorized representatives effective the day first written above.

Yukon Energy Corporation		**ABC Co. Ltd.**	
By:	_____	By:	_____
Name:	_____	Name:	_____
Title:	_____	Title:	_____

SCHEDULE A - MOU
CONCEPT DRAWINGS

SCHEDULE B - MOU
PRELIMINARY LIST OF PERMITS

Activity	Authorization Required	Act or Regulation	Party to obtain	Anticipated timing
Water use or deposit of waste in water	Water Use License	*Waters Act, Water Use Regulations*	YEC	
Harmful alteration, disruption or destruction of fish habitat; destruction of fish	Fisheries Act Authorization	*Fisheries Act (Sections 32 and 35(2)); Fishery (General) Regulation*	YEC	
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*	YEC	
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*	YEC	
Temporarily using or occupying Commissioner's Land			YEC	
Construction of a trail or road			YEC	
Clearing or installing a utility right-of-way			YEC	
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*		

Activity	Authorization Required	Act or Regulation	Party to obtain	Anticipated timing
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*	YEC	
Construction of buildings outside a municipality	Building Permit	*Building Standards Act, Building Standards Regulation*	ABC	
Gas Piping	Gas Installation Permit	*Gas Burning Devices Act*	ABC	
Use of propane gas in a gas burning device			ABC	
Electrical work	Electrical Permit	*Electrical Protection Act; Canadian Electrical Code*	ABC	
Plumbing	Plumbing Permit	*Building Standards Act, Building Standards Regulation*	ABC	
On-site sewage disposal system	Permit to install a sewage disposal system	*Public Health and Safety Act, Sewage Disposal Systems Regulation*	ABC	
Operating a food premise	Permit to Operate a Food Premise	*Public Health and Safety Act, Eating or Drinking Places Regulation*	ABC	
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*	ABC	
Operation of a solid waste incinerator	Air Emissions Permit	*Environment Act, Air Emissions Regulations*	ABC	
Handling, disposal, generation or storage of special (hazardous) wastes	Special Waste Permit	*Environment Act, Special Waste Regulations*	ABC	

Activity	Authorization Required	Act or Regulation	Party to obtain	Anticipated timing
Explosives Storage and Use	Permit of Use of Explosives; Explosives Magazine Permit; Blaster's Permit	*Explosives Act*	ABC	
Oversize trucking	Over-dimensional or Over-weight Vehicle Permits (single trip or multiple trip)	*Highways Act, Highways Regulation*	ABC	
Transport of dangerous goods/waste	Permit for transport of dangerous goods	*Dangerous Goods Transportation Act, Dangerous Goods Transportation Regulations*	ABC	
Erect a sign within highway right of way	Sign Permit	*Highways Regulation*	ABC	
Fish Research and Surveys	Fisheries Permit	*Fisheries Act, Fisheries (General) Regulations*	YEC	
Collection of fish	Licence to Collect Fish for Scientific Purposes		YEC	
Search for and research at archaeological and paleontological sites	Archaeological Sites Regulations Permit	*Historic Resources Act, Archaeological Sites Regulation*	YEC	
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*	YEC	
Work within 4 km of aerodrome property	Transport Canada Obstacle Clearance Form	*Canadian Aviation Regulation TP 312 Standards and Recommended Practice*	YEC	

SCHEDULE C- MOU
PRELIMINARY PROJECT SCHEDULE

SCHEDULE D - MOU
DETAILS OF DEVELOPMENT COSTS

Activity	Persons/organization involved	Timescale	Cost	Mark up

APPENDIX B
RECEIPT CONFIRMATION FORM

(to be submitted by any Proponent who wishes to receive an Information DVD)

PROPONENT CONTACT INFORMATION

NAME OF PROPONENT OR OTHER INTERESTED PARTY:

STREET ADDRESS: _____

CITY POSTAL/ZIP CODE: _____

PROVINCE/STATE: _____ COUNTRY: _____

MAILING ADDRESS, IF DIFFERENT:

FAX: (_____) TELEPHONE: (_____)

CONTACT PERSON: _____

E-MAIL ADDRESS: _____

ACKNOWLEDGMENT OF TERMS OF RFP AND CONFIDENTIALITY

The undersigned is a duly authorized representative of the Proponent and has the power and authority to sign this Receipt Confirmation Form on behalf of such Proponent or other interested party and requests the issue of an Information DVD. The Proponent or other interested party hereby acknowledges receipt and review of the RFP and all of the terms and conditions contained therein, including, without limitation, all appendices attached thereto and agrees to comply with all of the terms and conditions set out in the RFP. For greater certainty, the Proponent or other interested party in executing this Receipt Confirmation Form agrees to comply with the confidentiality provisions set out in Section 2.21 of the RFP. On receipt by Yukon Energy Corporation of this Receipt Confirmation Form, a copy of the Information DVD will be sent to the address provided above.

Authorized Representative of the Proponent or other interested party:

Attested to and delivered on behalf of the Proponent_____, 2009 in the presence of:

Name (Please Print) _____

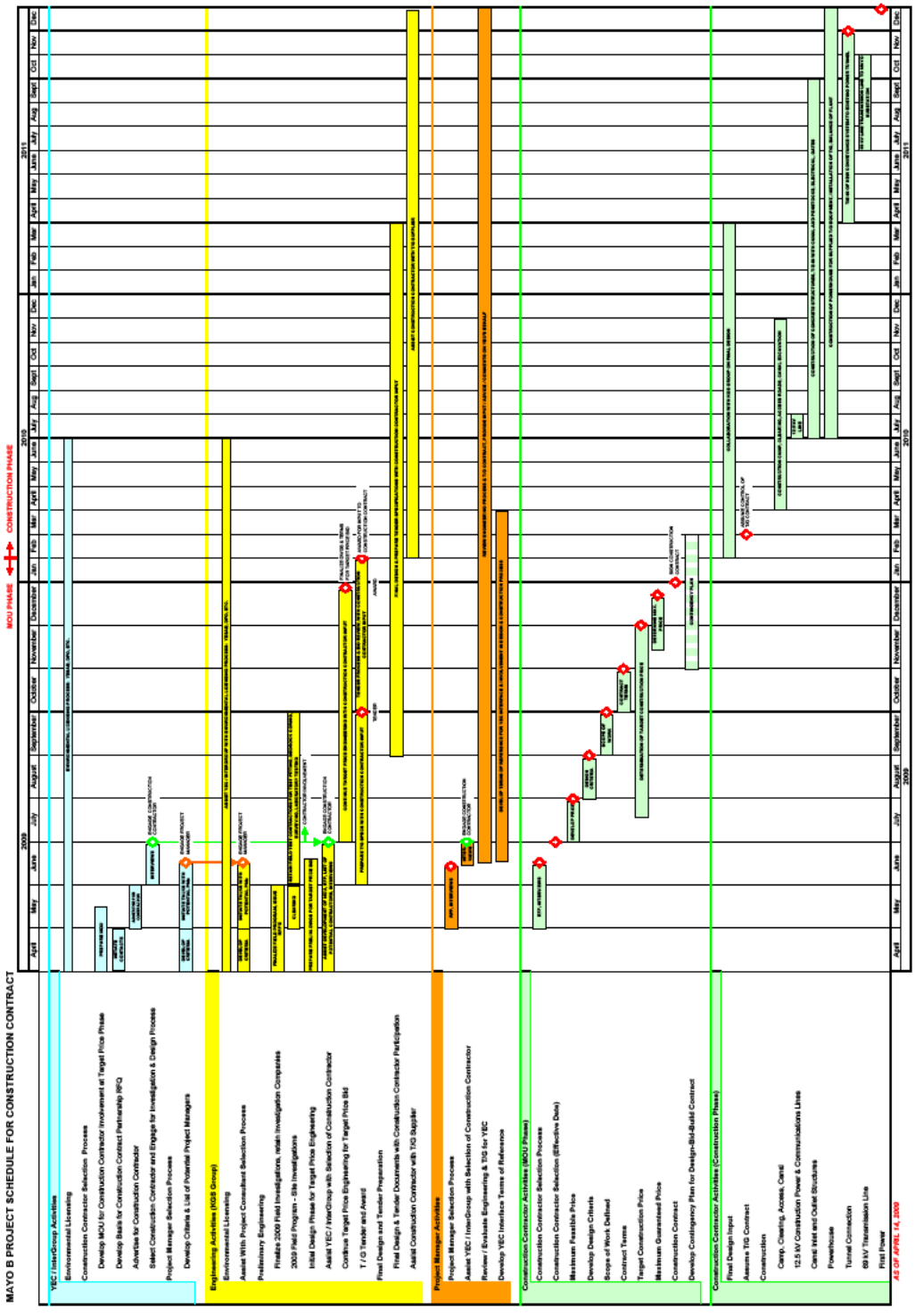
Signature(s): _____

Title (Please Print): _____

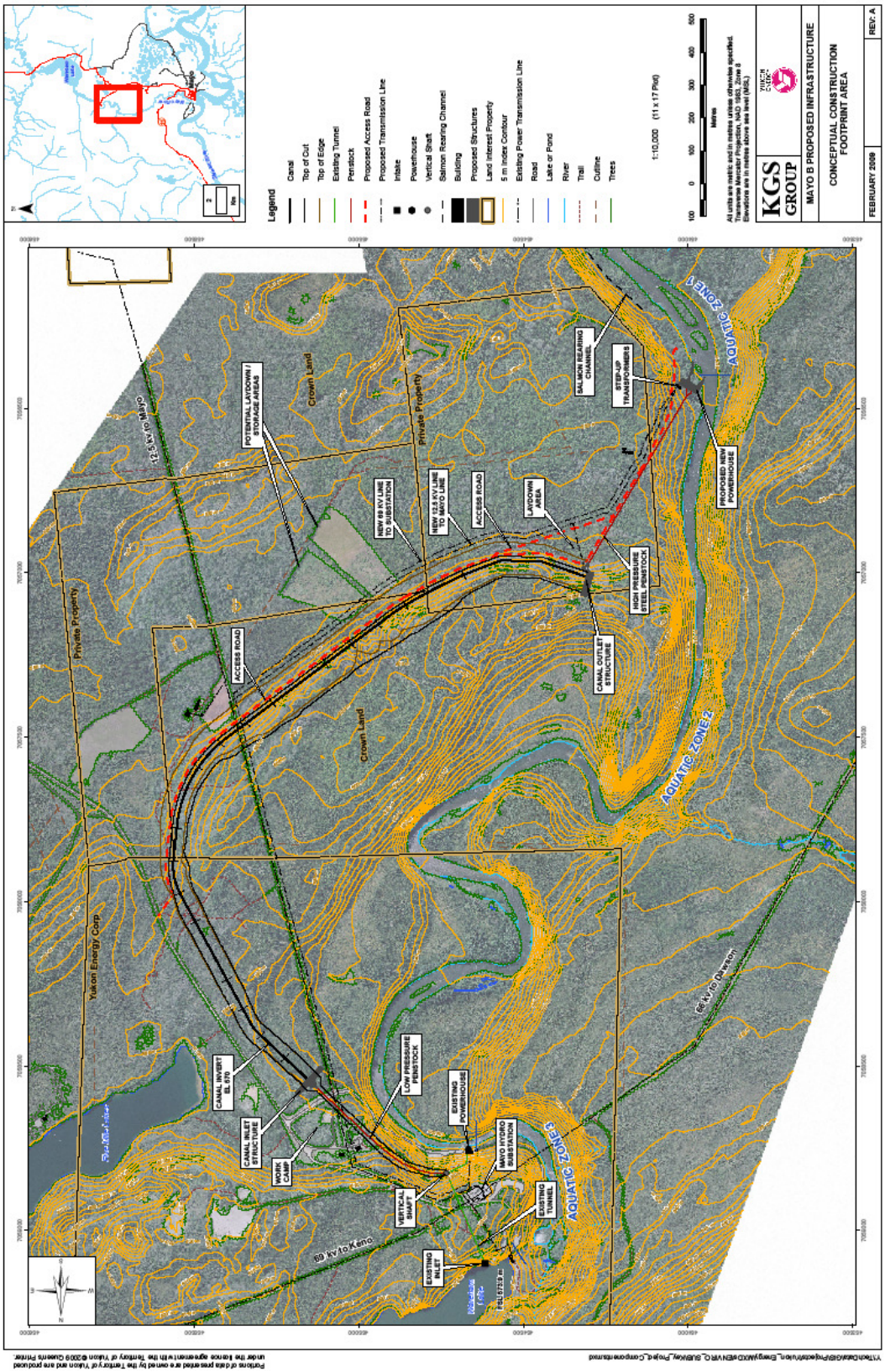
Witness Signature: _____

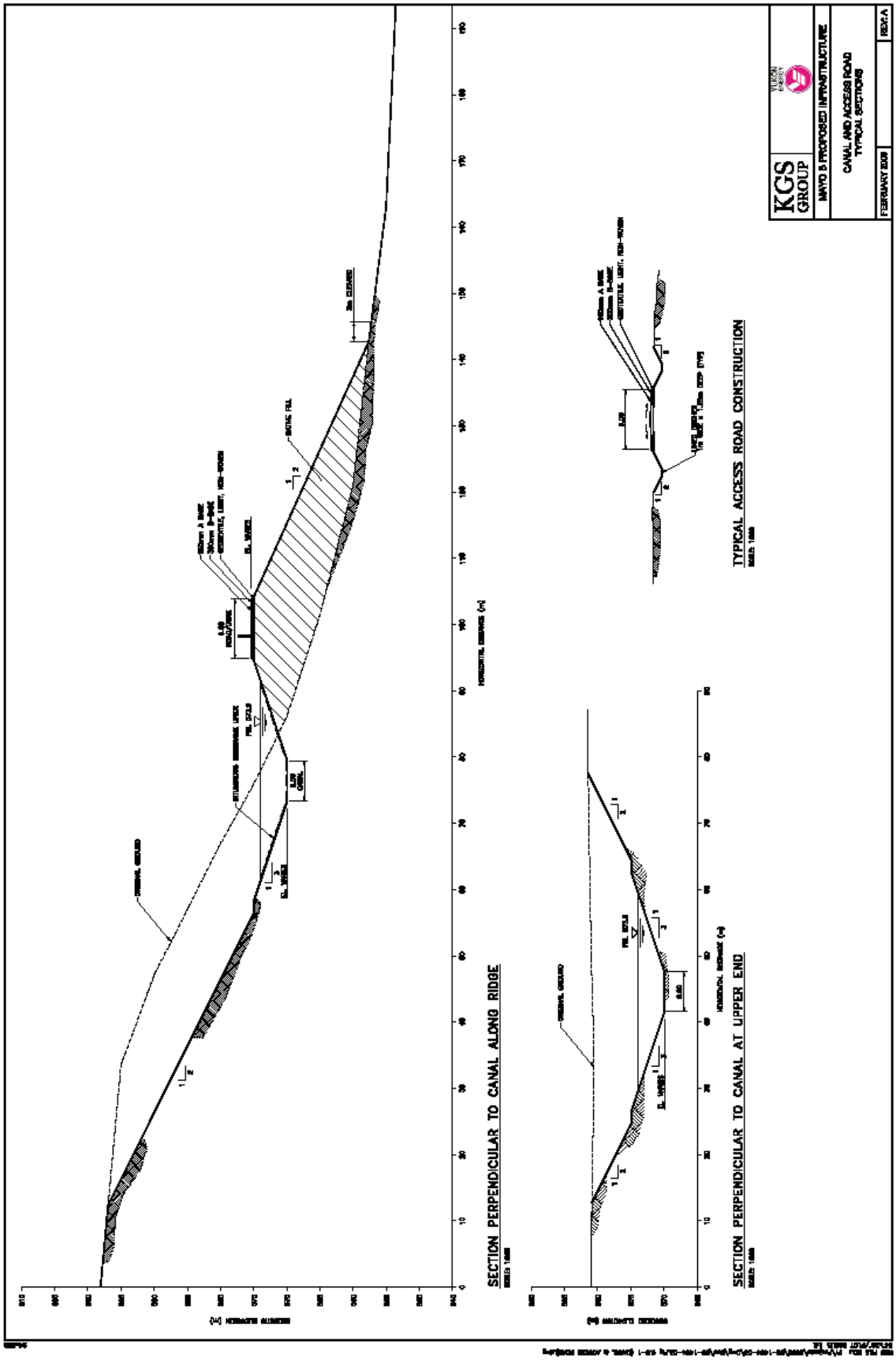
Witness Name (Please Print): _____

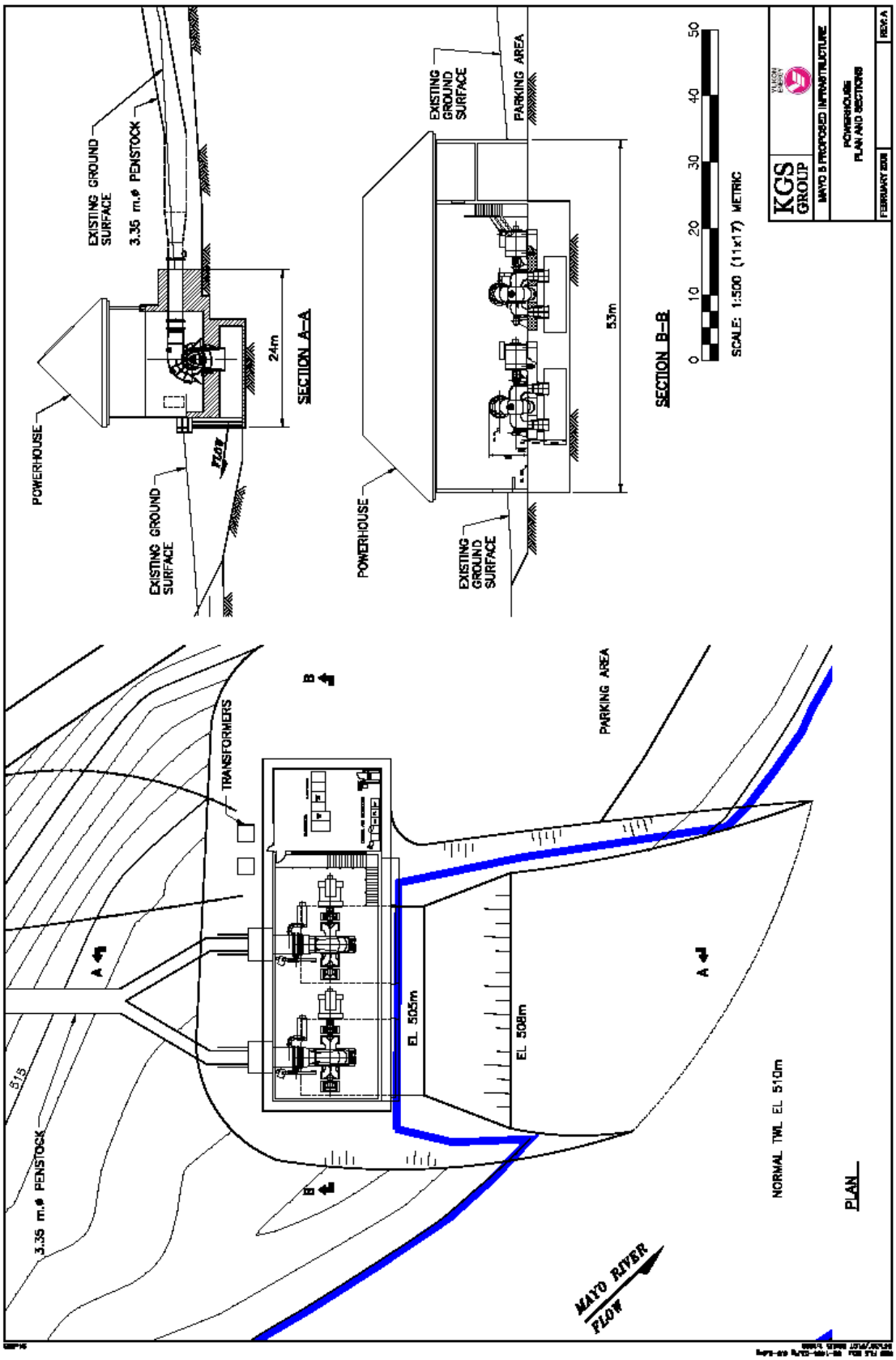
APPENDIX C
PRELIMINARY PROJECT SCHEDULE



APPENDIX D
CONCEPT DRAWINGS FOR THE PROJECT




KGS GROUP
MAYO B PROPOSED INFRASTRUCTURE
CANAL AND ACCESS ROAD
TYPICAL SECTIONS
FEBRUARY 2009
REV: A
TYPICAL ACCESS ROAD CONSTRUCTION
SECTION PERPENDICULAR TO CANAL ALONG RIDGE
SECTION PERPENDICULAR TO CANAL AT UPPER END


EXISTING GROUND SURFACE
3.35 m.ø PENSTOCK
24m
SECTION A-A
POWERHOUSE
EXISTING GROUND SURFACE
EXISTING GROUND SURFACE
PARKING AREA
53m
SECTION B-B
POWERHOUSE
EXISTING GROUND SURFACE
0 10 20 30 40 50
SCALE: 1:500 (11x17) METRIC
KGS GROUP
MAYO B PROPOSED INFRASTRUCTURE
POWERHOUSE PLAN AND SECTIONS
FEBRUARY 2009
REV A
TRANSFORMERS
PARKING AREA
A
B
EL. 505m
EL. 508m
NORMAL TWL EL. 510m
3.35 m.ø PENSTOCK
MAYO RIVER FLOW
PLAN

YUKON ENERGY CORPORATION
REQUEST FOR QUOTATION
2008-023

Date: June 9, 2008

Project Description: Mayo-B Pre-Engineering

Quotation Closing Date: Friday June 13, 2008 4:00 PM Local Yukon time

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Yukon Energy Corporation requires preliminary engineering to be completed on Mayo River development options downstream of the existing hydro plant at Mayo. An investigation was done on this site in the early 1990s and was revisited in 2007. The objective is to complete sufficient engineering to describe the preferred project option for the purpose of developing and filing an environmental impact assessment application with the local Yukon regulator.

BACKGROUND

Yukon Energy owns and operates the bulk of the generation and transmission assets in the Yukon including two hydro-based grids:

The Whitehorse-Aishihik-Faro (WAF) system, including:

- Hydroelectric generating stations: with a combined installed capacity of 70 MW. The 40 MW Whitehorse Rapids GS on the Yukon River and the 30 MW Aishihik Generating Stations in southwest Yukon (Aishihik is planned to be expanded to 37 MW by 2010).
- Other generation stations: Yukon Energy also owns and operates diesel-generating units/plants in Whitehorse (25 MW) and Faro (10 MW), and operates two wind turbines on Haeckel Hill.
- Transmission: The WAF system comprises primarily 138kV transmission connecting Aishihik GS to Whitehorse, Carcross and Faro. New 138 kV transmission north from Carcross to Pelly Crossing, including an interconnection to the Minto mining property, is currently being licensed with planned completion in late 2008.

The Mayo-Dawson system, comprising:

- Hydroelectric generation: located at Mayo, with an installed capacity of 5.4 MW.
- Other generating stations: Standby diesel plants at Mayo and Dawson, for a combined capacity of 7.0 MW.
- Transmission: The Mayo-Dawson system comprises 69 kV transmission connecting the two communities, as well as Stewart Crossing and the former mine site at Keno (east of Mayo).

The company is in the process of connecting these two grids together. Stage 1 of this grid interconnection is expected to be completed by the end of 2008 with the final connection in 20111 or earlier.

Each of the current Yukon Energy systems have surplus hydro. On WAF, the estimated average annual hydro capability is 351 GWh, and there is presently approximately 80 GWh of surplus hydro annually. However, with ongoing domestic load growth (approximately 5 GWh per year) and the new transmission including the new Minto mine load, annual surplus hydro is anticipated to be down to 15 GWh by 2010. On MD, the current estimate of long-term average hydro capability is 42 GWh per year with existing surplus of approximately 14 GWh per year.

Two potential industrial developments (mines), should they proceed, may entirely eliminate this surplus and require material baseload diesel generation. Each of these mines anticipates being fully in-service by 2011

or earlier. One of the mines would be connected to the WAF system. The second would be on MD. In either case, new Yukon Energy hydro generating capability will be required in order to avoid major new diesel generation requirements.

Consequently, Yukon Energy is expeditiously pursuing assessment of options to increase Yukon hydro system output in the range of up to 50 GWh annually through one or a combination of projects.

In terms of possible new hydro generating resources, Mayo B Hydro Project was assessed as the preferred supply option as part of the hydro feasibly work the company conducted in 2007. The existing Mayo generating plant uses two lakes for water storage – Mayo Lake located 50 km north of Mayo and Wareham Lake located 10 km north of the community. The generating plant is located at Wareham Lake and consists of two 2.7 MW generators. The work completed in 2007 identified three development options for the Mayo River downstream of the existing hydro station where approximately 30 meters of head is undeveloped as shown on the attached sketch.

1. Specifications:

Provide preliminary engineering as required by YEC before December 31, 2008 to prepare project descriptions and other information for regulatory filings to secure licenses, permits and approvals for the potential Mayo hydro generation enhancement projects recently examined by KGS (including the Mayo B Project, the Mayo Lake Dam Generation Project, and changes to the licensed lake storage range), including:

1.1 Determine scope and extent, and provide direction for, field geotechnical investigations and drilling work to be carried out as soon as feasible prior to this fall to finalize selection and location of canal, tunnel or penstock option for the Mayo B project;

1.2 Provide project description and analysis as required to finalize the scope and extent of biophysical (physical, aquatic and/or terrestrial) and heritage environmental field studies as required to be done in the summer/fall of 2008 prior to any YESAB or other environmental assessment filing for these projects;

1.3 Determine scope, and direction for, any calibration assessments needed this summer of current water monitoring to confirm estimates of hydraulic capabilities;

1.4 Provide review and analysis of the results of the above investigations, and carry out preliminary engineering and cost estimates as needed to finalize later this year the project description required for regulatory filings for these projects, including selection of the preferred project option and routing where relevant.

1.5 Prepare schedule, costs and work plan for detailed engineering design, tendering and procurement to accommodate the earliest feasible in-service for these projects.

2. Submissions:

2.1 Bidders are requested to provide Company and Individual expertise in this area.

2.2 Bidders are required to forward detailed rates and fees applicable to this type of work.
Bidders are requested to confirm their ability to perform this work during the remainder of 2008

2.3 YEC need not necessarily accept the lowest ranked, the highest ranked, or any quotation or part thereof, and reserves the right to reject or accept any quotation or part thereof and may cancel this Request for Quotation at any time. Quotations may be evaluated at YEC's sole discretion on any of all of the information submitted including clarifications, additional information, modifications and negotiated changes.

2.4 Interested bidders will be asked to conduct an interview at their site during the the week of June 16th to enable the work to be started by July 1 2008

June 9, 2008

2.5 Quotations may be evaluated at YEC's sole discretion on any of all of the information submitted or discussed during the interview including clarifications, additional information, modifications and negotiated changes.

2.6 This Request for Quotation should not be construed as an agreement to purchase goods or services. YEC is not bound to enter into a contract with the vendor that submits the lowest priced quotation ,or with any vendor YEC is under no obligation to receive further information, whether it is oral or written, from any vendor

2.7 Goods and Services Tax (GST) shall be quoted as a separate price to all or any requested pricing items.

2.8 Quotations are requested to be received by fax, e-mail or hand delivered by the quotation closing date marked to the attention of: Rick Rondeau, CPPB Buyer, Yukon Energy Corporation.

2.9 Quotations will be irrevocable for 30 days after the quotation closing date. Vendors may amend or retract their quotation before the quotation closing date by contacting the writer.

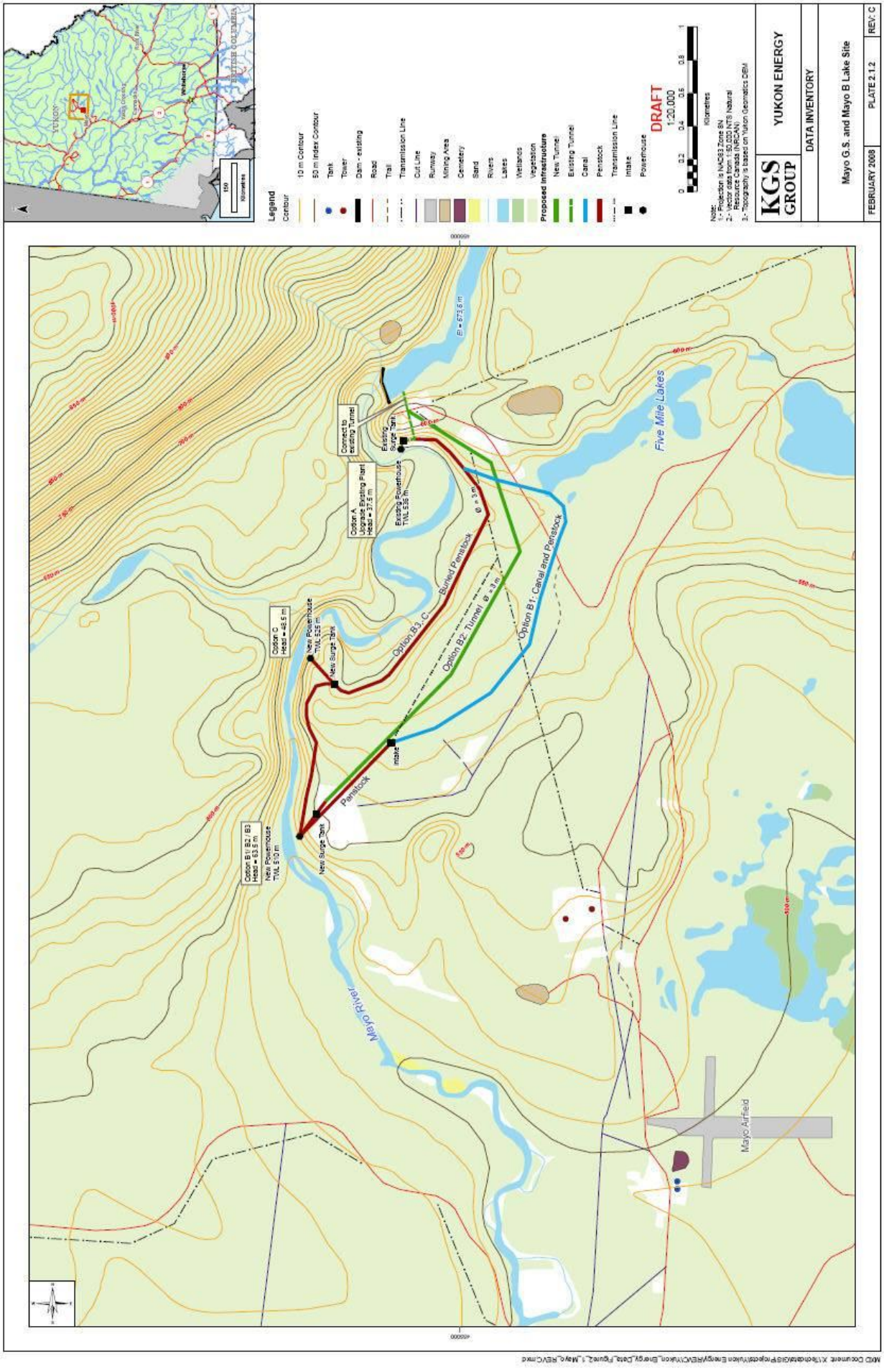
2.10 Vendors are solely responsible for any costs to submit their quotation to YEC.

2.11 For further information or questions regarding this Request for Quotation please contact the writer.

Regards,

Rick Rondeau, CPPB
Buyer, Yukon Energy Corporation
Phone 867 393 5335
Fax 867 393 5301
Email purchasing@yec.yk.ca

June 9, 2008


Legend
Contour
10 m Contour
50 m Index Contour
Tank
Tower
Dam - existing
Road
Trail
Transmission Line
Cut Line
Runway
Mining Area
Cemetery
Sand
Rivers
Lakes
Wetlands
Vegetation
Proposed Infrastructure
New Tunnel
Existing Tunnel
Canal
Penstock
Transmission Line
Intake
Powerhouse
DRAFT
1:20,000
Kilometres
Note:
1:- Projection is NAD83 Zone 8N
2:- Vector data from 1:50,000 NTS Natural Resource Canada (NRCAN)
3:- Topography is based on Yukon Geomatics DEM
KGS GROUP
YUKON ENERGY
DATA INVENTORY
Mayo G.S. and Mayo B Lake Site
FEBRUARY 2008
PLATE 2.1.2
REV: C
Five Mile Lakes
Connect to existing Tunnel
Existing Surge Tank
Existing Powerhouse TWL 536 m
Option A: Existing Plant Head = 37.5 m
Option C Head = 48.5 m
New Powerhouse TWL 525 m
New Surge Tank
Option B3: C...
Buried Penstock
Option B2: Tunnel Ø = 3.5 m
Option B1: Canal and Penstock
Intake
Penstock
Option B1/ B2 / B3 Head = 63.5 m
New Powerhouse TWL 510 m
New Surge Tank
Mayo River
Mayo Airfield

June 9, 2008

YUKON UTILITIES BOARD
(YUB)

TOPIC: "The timing for Mayo B also reflects the opportunity to displace diesel generation energy requirements associated with growing power loads on both grids."

REFERENCE:

YEC Application, page 1

PREAMBLE:

The Board would like to obtain further information about the displaced diesel generation.

QUESTION:

a) Please provide a table listing separately, all diesel generation units and the amount of diesel displaced per unit (in MW.hs), for each year starting when Mayo B is commissioned and then continuing for each of the next 20 years. Please provide all assumptions.

b) Where the displacement in part (a) above is for new load, please show the net generation to service the load, and the assumed line losses for that load from the generation source from the commissioning date and for each of the next 20 years.

ANSWER:

(a) and **(b)**

Please see response to YUB-YEC-1-7(h) for listing of diesel generation capacity at different locations on the integrated grid, and review of why Yukon Energy cannot produce a useful forecast of diesel generation by individual diesel unit or by location. The response to YUB-YEC-1-25(a) provides the forecast diesel energy required each year, based on average water flows.

With respect to line losses, all gross generation requirements are forecast to include line losses (7% for retail loads on WAF and 27% for retail loads on MD, as per the 2009

GRA). Mine loads are forecast inclusive of losses assumed at 12.7% (Minto and Carmacks Copper, where relevant) and 15.2% (Alexco).

TOPIC: YESAB Review

REFERENCE:

YEC Application, page 1

QUESTION:

a) What is the status of the YESAB review to March 1, 2010?

b) Based on the answer to part (a), when does YEC expect to have all approvals from YESAB and other regulatory bodies. Please list the approvals required, the authority providing those approvals, and when each of those approvals are expected. Only list outstanding approvals, not the approvals already received by YEC.

ANSWER:

(a)

The YESAB review is in the screening stage with a draft screening report now expected to be available from YESAB for review before mid-March (at the time that the Application was prepared, as noted at page 16 of the Application, this draft screening report was expected to be available from YESAB by the end of January 2010).

(b)

Generally, 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. Table 2 at Section 6 of the Part III Application lists the specific potential regulatory permit and approval requirements for the Mayo B project that have been identified during the YESAB process.[1] As noted at page 49 of the Application, YEC in addition also requires the Certificates from the

[1] YEC now also knows that the on-site sewage disposal systems requires a Type B Water Use Licence under the Waters Act (Water Use Regulations), and that storage and handling of petroleum products requires a Storage Tank System Permit under Environment Act (Storage Tank Regulations). Many permits and approvals will be the responsibility of the construction contractor. YEC is responsible for any Water Use Licence, Land Use Permit, Fisheries Act Authorization, Navigable Water Protection Act permit, and Application for Land.

Minister of Justice referred to in OIC 2009/220 and approvals required by YDC under OIC 1993/108.

No permits or approvals have been issued that would allow YEC to proceed with construction of the Mayo B project.[2] 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. All of these Decision Bodies must also issue Decision Documents agreeing with the YESAB recommendations before any permits or approvals can proceed.[3] Yukon Energy will also need to apply to the Yukon Water Board in a process subsequent to the YESAB review process.[4]

Yukon Energy will endeavour to obtain all other required permits for construction or operation of the project as soon as possible after decision documents are available. However, in order to start construction as currently planned the following specific permits that YEC is to obtain (the construction contractor will have additional approvals to obtain) are expected (and required) immediately following the issuance of the required Decision Document approvals:

- An Energy Project Certificate, as required under Part 3 of the Public Utilities Act and Order-in-Council 2009/220;

- Any and all approvals required under Order-in-Council 1993/108 for Yukon Development Corporation to allow YEC to proceed with the construction and development of the Project;

- A Land Use Permit for the Project as required under the Territorial Lands (Yukon) Act, Lands Act, Land Use Regulation; and

[2] Under YESAB, a federal agency that is a decision body for a project, or a territorial minister that is a decision body, a territorial agency or municipal government cannot undertake a project, require that it be undertaken or take any action that would enable it to be undertaken until the appropriate decision documents have been issued under section 75, 76 or 77 of the YESAA allowing the project to be undertaken.

[3] See page 52 of the Application for more details on the Decision Bodies and this process.

[4] 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.

- A Type B Water Licence for the camp on-Site sewage disposal system required under the Waters Act.

As noted at page 49 of the Application, YEC has been working concurrently with permitting authorities during the YESAB review process in order to facilitate timely issue of the required permits and approvals following the Decision Document approval for the YESAB recommendation. As reviewed in the Application (pages 16 and 49), the anticipated timeline of the overall permit and approval process is as follows:

- **Land-based Construction Permits** – YEC's schedule assumes the ability to proceed with land-based construction as soon as possible in spring/summer 2010.

- **Permits for Work in Water** – Yukon Energy expects to secure required approvals to commence work in water (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) 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.

TOPIC: Changes to Mayo Lake operating regime

REFERENCE:

YEC Application, page 1

QUESTION:

a) Without any changes to the Mayo Lake operating regime, is the effective capacity of Mayo less than 15 MW? Please explain.

ANSWER:

(a)

Changes related to the additional 1 metre drawdown of Mayo Lake will not affect the effective capacity of Mayo B combined with Mayo A (approximate 15 MW). An enhanced storage potential at Mayo Lake provides the opportunity, in certain high inflow years (largely spring freshet flows), to capture flows that would otherwise be in excess of the storage capacity of the system. These added stored flows can then be used to enhance winter energy generation at Mayo B combined with Mayo A. However, the enhanced storage at Mayo Lake does not modify the planned effective capacity of Mayo B combined with Mayo A. See also response to YUB-YEC-1-23 and YUB-YEC-1-21(a) through (f).

TOPIC: YESAB Review

REFERENCE:

YEC Application, page 2

"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."

QUESTION:

a) Please provide YEC's estimate for the timing of that process. That is, how long does YEC estimate it will take from the day the application is presented to YESAB, to the date a final decision is rendered?

ANSWER:

(a)

Yukon Energy expects to file an application for a Designated Office review of the Mayo Lake Project by August 31, 2010, or as soon thereafter as is feasible. This timing is governed primarily by the completion of 2010 spring/summer field studies and preparation of this application after the conclusion of the Mayo B YESAA process.

Overall, the Designated Office Rules[1] and *Decision Body Time Periods and Consultation Regulations* provide for 69 to 130 total days for the assessment and decisions.

1. **Pre-assessment:** from 5 to 10 days (depending on information requests from Designated Office).

2. **Assessment:** 34 to 90 days (depending on information requests from Designated Office).

[1] The Designated Office Rules are currently in the process of being updated. See http://www.yesab.ca/rules/.

3. **Overall Assessment:** from 39 to 100 days (depending on information requests from the Designated Office).

4. **Decision by Decision Bodies:** 30 days (may be extended by 7 days).

These timelines exclude provision for added time needed for filing and review of any supplemental information.

Following the YESAA process completion, as reviewed at pages 16 and 17 of the Application, YEC will need to secure all required permits and approvals, including amendments to the Mayo Water Licence pursuant to the *Waters Act*.

YEC is targeting to secure all required permits and approvals prior to December 31, 2011, so as 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 capital works at Mayo Lake Control Structure are required to implement this licence change at Mayo Lake.

TOPIC: Timing of application

REFERENCE:

Application, page 2 and Application, page 3

"A Project Proposal Submission to the YESAB Executive Committee was filed February 27, 2009."

"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) with $53.35 million in funding committed to Mayo B through the Federal Contribution Agreement executed on August 31, 2009."

QUESTION:

a) Given that a YESAB application was filed in February, 2009 and the GIF agreement was executed on August 31, 2009, why did YEC wait until December 11, 2009 to file its application for energy project and energy operation certificates with the Minister of Justice?

ANSWER:

(a)

Although the GIF agreement was executed on August 31, 2009 the Yukon Government did not designate Mayo B as a regulated project until November 25, 2009 (OIC 2009/220). YEC worked to complete the Application as quickly as possible, and to include therein the preliminary engineering analysis and costing that was still being carried out at that time.

TOPIC: Generation Planning/Criteria

REFERENCE:

A letter from the Minister of Justice dated December 18, 2009 with accompanying Terms of Reference

PREAMBLE:

The Minister of Justice has requested that, amongst other matters, the YUB report on the capability of existing and currently committed transmission and generation facilities to meet the forecast load requirements, taking into account the new planning criteria as proposed by the YEC and recommended by the YUB.

QUESTION:

a) Provide a statement of the YEC's current generation planning criteria that addresses each criterion, LOLE and N-1.

ANSWER:

(a)

As part of its 20-Year Resource Plan, Yukon Energy established new capacity planning criteria for generation on the WAF and MD grids based upon common utility practice in other regulated jurisdictions in Canada. YEC's current capacity planning criteria is the same as was proposed in its 20-Year Resource Plan. As reviewed in the 20-Year Resource Plan, YEC also plans new generation as required to provide cost effective supply of "energy" requirements, i.e. the baseload energy generation required over the year when the grids are not operating solely at the peak winter capacity.

As requested, the two main components of the capacity planning criteria portion of YEC's generation planning are reviewed below (under YEC's capacity planning criteria, both the LOLE and N-1 criteria must be satisfied):

1. The Loss of Load Expectation ("LOLE") was included in the new criteria and set at two hours per year, i.e., firm customers of all customer classes could be

assured that the generation capacity would be planned so that they would not experience (over the long term average) more than two hours without power per year due to inadequate generating capacity or related transmission required to deliver hydro generation.[1]

Given the changes brought about by the completion of CSTP Stage 2, Yukon Energy does not yet have the capability to model the full integrated grid in a manner that permits calculation of an LOLE value. As part of the five year update to the 2006 Resource Plan, Yukon Energy will be updating the LOLE model later in 2010 to handle the full integrated grid. There is no expectation that the LOLE value upon connection will exceed the 2 hours/year target, particularly as the LOLE calculations typically benefit from increased diversity in the complement of generating units on a system.

2. An emergency N-1 criteria was also included in YEC's new capacity planning criteria to address the seriousness of sustained outages of a critical system component (e.g., on WAF, currently an interruption of the Aishihik transmission) during the period of peak winter loads. Since most industrial loads in Yukon, such as mines, typically have their own on-site diesel generation for limited emergency purposes, the N-1 criteria is calculated to include all firm loads, with the exception of major industrial loads. "Emergency" backup for a mine implies sufficient capability to protect essential systems and camp needs, and would not imply capability to supply power as needed for normal operation. As with LOLE, the N-1 criterion will be reviewed in the near term in light of completion of CSTP Stage 2.

Following is a review of YEC's responses to the YUB recommendation, as regards its review of the 20-Year Resource Plan, that the LOLE criterion be determined without including forecast industrial loads.

YEC's position with regard to calculating the LOLE is that the WAF system (as well as the original Mayo hydro system) was designed at all times in the past to incorporate mine loads, and that the system should continue to be planned to ensure reliable firm

[1] The WAF system is currently designed to incorporate mine loads and the LOLE criteria is based on the principle that the system will be planned to ensure reliable service to all customers, including mines and other industrials. Comparable to criteria used other Canadian grid systems, the LOLE criteria ensures reliable service from the system to all customers, including firm industrial customers such as Minto mine.

service to all customers, including mines and other industrials who pay rates for firm power.[2] Since mines and other major industrials typically have their own on-site diesel generation for extreme emergency situations (to provide critical system backup, even if not full production capability), the N-1 criteria was designed to include only non-industrial loads (those who typically do not have their own backup, such as houses and businesses).

In its report to the Minister regarding Yukon Energy's 20-Year Resource Plan, the Board recommended that, "in order to ensure that no new generating capacity is added for the purposes of ensuring reliable supply to major industrial customers and to ensure consistency with the N-1 criterion, major industrial loads should not be included in the LOLE calculation.[3]" The YUB reiterated this view in Order 2007-5, when it recommended that "in order to ensure that no new generating capacity is added for the purpose of ensuring reliable supply to major industrial customers and to ensure consistency with the N-1 criterion, major industrial loads should not be included in the LOLE calculation." [4]

The capacity planning criteria adopted by Yukon Energy reflects the need to continue to plan the generating and transmission system to reflect reliable supply to industrial customer loads to the extent these loads are firm power. The Firm Mine Rate is premised on provision of firm power to mining customers. Customers served under Rate Schedule 39 (such as the Minto Mine) reasonably expect to pay for firm service that is to be provided at a utility standard (e.g., LOLE of not more than 2 hours/year) for all hours of the year, whether from hydro or from diesel, with interruptions in grid service only for extreme emergency situations.

If the system was not planned in a manner that would ensure reliable supply of power to major industrial customers then, as noted by YEC in earlier proceedings, "the framework for COS assessment and rate design for the major industrial customer class would likely need to be radically changed from past YUB and YEC/YECL practice and the provisions of OIC 1995/90. Among other considerations, classification of generation and

[2] "Firm Power" in this regard means loads that the utility plans and builds its system to meet, including by adding new generation when required. In contrast, "Non-firm Power" is power that is provided as-and-when-available that has no assurances of supply to the customer and would not drive new utility investment in generation or transmission.

[3] See YUB Report to Commissioner in Executive Council re YEC 20-Year Resource Plan – Jan 15/07 at page 10. The YUB was directed to provide a report and recommendations to the Commissioner in Executive Council based on its review of the Resource Plan. This report did not constitute any order to YEC by the Board under the Public Utilities Act.

[4] See, Recommendation #17 at page 27 of the Order.

transmission costs to this customer class would need to be reviewed."[5] Further, the radical departure from past practice inherent in such an approach would "violate the basic premise for providing primary service to industrial customers in Yukon as it has been in place since Yukon Energy was established." It was noted in relation to providing service to Minto Mine, if only interruptible power was available, there would be little basis to proceed with interconnection of the mine and "both parties would be forced to forgo the benefits that will arise under the PPA as negotiated."

To exclude industrial loads from the LOLE calculation would effectively prevent YEC from setting rates that reflect planning its system to ensure that industrial customers receive the same non-emergency firm supply that residential and commercial customers receive, based on inclusion of all such customers in LOLE calculations.

In short, if industrials cannot be assured firm power supplies, then they cannot be charged power at normal firm rates and can only be served at some materially lower rate more akin to secondary power. Without reliable firm power supplies, it is unlikely that Minto or other mines will be prepared to make any investment so as to seek grid power from the system.

[5] See, response to YECL-YEC-1-2(b), (c) and (d).

TOPIC: Generation Planning/Diesel Generation Use

REFERENCE:

A letter from the Minister of Justice dated December 18, 2009 with accompanying Terms of Reference

PREAMBLE:

The Minister of Justice has requested that, amongst other matters, the YUB report on the effect the completion of Mayo B is expected to have on the ongoing use of diesel generation at various locations under reasonable electric load forecasts.

QUESTION:

a) On page 29 of the Application, Figure 2: Mayo B Net Contribution to IS energy supply 2012- 2046 appears. Supply this information in tabular form broken out by existing hydro, Mayo B, and diesel energy supplied.

b) Figure 2 omits the contribution of renewable energy while Figure D-2 includes its contribution. Supply the values for renewable energy that would apply to Figure 2 had they been included originally.

c) On page 30 of the Application, Figure 3: Mayo B Annual Costs and Diesel Savings ($000s) 2012 to 2046 appears. Supply this information in tabular form.

d) Both Figure 2 and Figure 3 assume a Mayo B project configuration with additional drawdown of Mayo Lake. Provide in tabular form the same information for the configuration without the additional drawdown.

e) On page 39, Figure 4: Mayo B Annual Costs and Diesel Savings 2012 to 2046 – No Carmacks Copper appears. Supply this information in tabular form.

f) On page D-5 of Attachment D of the Application, Figure D-2: Energy Supply on Yukon Integrated System without Mayo B, 2012 - 2046 appears. Supply this information in tabular form broken out by existing hydro, renewable, and diesel energy supplies.

g) On page D-6 of Attachment D of the Application, Figure D-3: Diesel Generation Cost without Mayo B, 2012 - 2031 appears. Supply this information in tabular form.

h) With respect to the diesel energy displaced by Mayo B provide in tabular form a comparison of diesel plant use for the period 2009 to 2019 as follows:
   i. by location,
   ii. by annual capacity factor,
   iii. by total number of hours operated each year and,
   iv. by energy produced each year.

   The comparison should address the Mayo B project both with and without additional drawdown of Mayo Lake versus the base load diesel generation operation case. Assume that major industrial loads such as Minto, Alexco, and Carmacks Copper are included in the load forecast.

ANSWER:

(a)

Please see YUB-YEC-1-25(a).

(b)

Figure 2 does not omit the contribution of renewable energy. All existing hydro and Mayo B generation is renewable energy. The only difference between Figure 2 and Figure D-2 is the small contribution of the non-dispatchable generation of Fish Lake Hydro and Wind.

Figure 2 shows how the dispatchable power system in Yukon can meet the full forecast loads that are required to be met from dispatchable resources. Specifically, the loads shown in Figure 2 are the full load forecast less the contribution of Fish Lake and Wind of 9.73 GW.h each year (as set out in footnote 40). In short, Fish Lake and Wind generation are considered the priority (i.e., first run) resources for serving loads, and the more flexible dispatchable resources must then meet the residual loads in each hour of the year.

(c) through **(g)**

Please see YUB-YEC-1-25(a).

(h)

With respect to the diesel energy required each year with and without additional drawdown of Mayo Lake, based on average water flows and the major industrial loads as forecast in the Application, see YUB-YEC-1-25(a).

Yukon Energy cannot produce a useful forecast of diesel generation by individual diesel unit or by location for a number of operational factors. Although a specific unit may be "stacked" to be the first unit dispatched when required based on fuel efficiency and availability of staff resources, there are numerous other conditions that change from time to time which affect the decision of which unit to use. For example, there is a need to consider if particular units which otherwise are not first in the stacking order are in need of being run for some amount of time ("exercised"), or if there is a need to use generation to help "turn over" YEC's fuel inventories to ensure stored fuel is not stale. Also, the considerations as to diesel stacking will be required to consider the full integrated system once CSTP Stage 2 is completed, which also provides the possibility for diesel generation at locations such as Dawson and Faro for overall grid support where such generation may aid in minimizing line losses[1]. With regard to line losses, it is not possible in Yukon to prepare long-term planning load models that differentiate line losses by a particular loading over a period of time (see response to YUB-YEC-1-1 regarding line loss assumptions in the current forecasts).

Diesel capacity factors for Yukon, like any peaking generation resource, even under high load scenarios are very low. For example, in 2013 absent Mayo B, the total quantity of diesel generation is forecast to approximate 64 GW.h. On an installed diesel generation

[1] Under historic conditions, it has been typical for YEC to maintain a stacking order that dispatches the 3.3 MW Caterpillar diesel unit in Whitehorse as the first unit, given its relatively low maintenance costs, it being well suited to both short and long term operation, and its proximity to both staff support (e.g., mechanics) and to major loads (to minimize line losses, depending on system loading at the particular point in time), followed by the similar Caterpillar unit in Faro (reflecting in part the Faro mine loads that were present when these stacking orders were developed). However, with the connection of CSTP Stage 2, and the potential eventual addition of the Minto diesel units to ratebase (assuming these units are not disposed of in the timeframe permitted under the Minto PPA), it will be necessary to consider the potential that specific units that had not previously been able to be included in the stacking order become priority units in future, such as Dawson units or the Minto diesels.

complement for the integrated system of approximately 48 MW,[2] this is approximately a 15% capacity factor.

[2] Approximately 25 MW YEC Whitehorse, 10 MW YEC Faro, 5 MW YEC Dawson, 2 MW YEC Mayo, 6 MW YECL grid connected diesel generation. Does not include the Minto diesels – were these units included the system wide diesel generation capacity factor would be only 13%.

TOPIC: Generation Planning/Alternatives to the Mayo B Project

REFERENCE:

A letter from the Minister of Justice dated December 18, 2009 with accompanying Terms of Reference.

PREAMBLE:

The Minister of Justice has requested that, amongst other matters, the YUB report on what, if any, alternatives to Mayo B might be advisable given reasonable load assumptions and risk assessments.

QUESTION:

a) What alternatives exist to the development of Mayo B that would address the additional energy requirements of the Interconnected System (IS) to 2019 with the major industrial loads included?

b) Without the Mayo B development, what would be the Aishihik plant's ability to produce more energy annually during the 2012 to 2019 period to reduce any additional diesel use given that the Aishihik 3 unit is to be installed by the end of 2010 and given that Aishihik has multi-year storage capability with daily peaking capacity? Explain the reasons for your answer.

c) Are there any operating constraints or other conditions that would prevent the Aishihik plant from providing additional hydro energy to offset diesel use during this period?

d) If there are constraints or conditions what are they, how do they impact the plant's ability to produce more energy annually, what actions would need to be taken to remove those constraints or conditions, and what would be the time frame involved?

e) How much additional energy could the Aishihik plant produce annually to offset diesel use during this period both with and without any constraints or conditions?

f) What additional cost, if any, would be associated with achieving greater annual energy production from the Aishihik plant both with and without any constraints or conditions?

g) What would be the annual capacity factor for this plant if no additional energy were to be produced annually during the 2012 to 2019 time period?

h) What would be the annual capacity factor for this plant if additional energy were able to be produced annually during the 2012 to 2019 time period? Provide the capacity factor for each situation, i.e. both with and without any constraints or conditions.

ANSWER:

(a)

Please see Section 4.1.3 of the Application which discusses renewable resource alternatives to Mayo B as well as Attachment A2 which excerpts the section related to Alternatives and Alternative Configurations provided as part of the February 27, 2009 Mayo Hydro Enhancement Project Proposal filed with YESAB for a discussion of the alternatives to Mayo B (including alternative project configurations) that were considered. As reviewed in response to YUB-YEC-1-41(a), the existing and currently committed new transmission and generation facilities could supply the electric energy necessary to supply the forecast loads to 2019, including major industrial loads, albeit by increasing use of diesel generated energy.

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 in order to continue to meet ongoing requirements to develop renewable generation resources[1]. Projects currently being considered as part of feasibility and planning activities 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

[1] 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. The other generation projects being pursued as part of feasibility and planning work were also discussed in the response to CW-YEC-1-32 filed during the 2008/2009 General Rate Application.

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).

Smaller scale developments such as Altin, Marsh Lake and Gladstone require relatively short construction periods (typically on the order of one year). However, these projects present regulatory and licencing challenges and at this time it is not possible to forecast the licencing periods that may be required to proceed with each project. Larger scale greenfield hydro generation options cannot likely be developed in less than 5-7 years even on an expedited schedule.[2]

As noted during the Yukon Energy 2008/2009 GRA, in the YESAB materials and in the current Application, due to their nature (i.e., timing considerations related to the ability to licence the projects in a timely manner) these projects are not considered alternatives to Mayo B to displace diesel generation starting in 2012. Mayo B was selected as the only project that could be advanced and reasonably completed in order to displace near term Yukon grid generation requirements for baseload diesel.

(b)

The Mayo B Application's assessments of the Mayo B contribution to reduce diesel use assume throughout the full capability of the Aishihik plant, with the 3rd unit, to reduce diesel use. This assumption applies to such assessment with and without the Mayo B project.

The Aishihik plant's enhanced ability with the Aishihik 3rd turbine to produce more energy annually during the 2012 to 2019 period to reduce any additional diesel use was reviewed in the Resource Plan hearing, the CSTP Part 3 hearing and in YEC's 2008/2009 GRA hearing.[3] Excluding added peaking energy benefits (related to

[2] In addition, Yukon Energy continues to consider various supply-side enhancements (SSEs) related to such matters as rerunnering existing units and reduction of electrical losses. Demand side management programs are also under review by the corporation. 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.

[3] Attachment 1 to the YEC 2008/2009 GRA response to UCG-YEC-1-17 provides Exhibit B-9 from the 2007 CSTP Part 3 hearing which indicates net impact of the 3rd turbine on annual peaking and baseload diesel generation from 2010 through the unit's 65 year economic life under various scenarios, including (Table 4A) with both Minto and Carmacks Copper mine loads and the CSTP interconnection.

displacement of peaking diesel generation) at certain lower grid load levels[4], the Aishihik 3rd turbine with the CSTP connection completed and major industrial loads at levels similar to those assumed in the Mayo B Application is estimated to provide an added 5.4 GW.h of annual energy (through enhanced efficiency in the use of the available water). The key factors limiting energy generation at the Aishihik plant are the water available for annual generation and the Fisheries Act Authorization limits on the use of this water, and the 3rd unit has no impact on these limitations, i.e., at relevant load levels the available water is assumed to be fully utilized at the Aishihik plant.

Within the existing parameters for the Aishihik Fisheries Act Authorization, the development of Mayo B does affect (i.e., reduce) the expected output of Aishihik (and similarly Whitehorse) at the loads forecast for the 2012 to 2019 period, as set out at YUB-YEC-1-29. This effect however is modest in relation to the overall plant. For example, at a 468 GW.h load level, the average annual output of Aishihik absent Mayo B totals 116.8 GW.h, and with Mayo B totals 114.3 GW.h. This impact tends to be reduced as interconnected grid loads increase and facilitate more effective overall use of the available grid hydro generation.

In each case (with and without Mayo B), the system relies heavily on Aishihik's storage capability and on the installation of the 3rd turbine which enhances Aishihik's ability to operate to meet peak loads.

(c), **(d)**, **(e)** and **(f)**

As noted in response to (b), the major operating constraints presently faced by the Aishihik plant are the available water and the conditions imposed by the present Fisheries Act Authorization and related approvals under the Water Licence. The Fish Act Authorization in particular is presently under discussion with Yukon Fisheries, DFO and Champagne-Aishihik First Nation, as part of the "adaptive management" regime built into the approvals. While fish stocks in Aishihik Lake (focused on whitefish) are presently healthy, the range of lake licence conditions presently being discussed reflect, at the extremes, variations in the long-term average output of Aishihik Lake exceeding 10 GW.h/year (with the present effective operating regime being in the middle of this range). The licence conditions as they existed in the 1990s reflected output exceeding

[4] As reviewed in Table 4A of Exhibit B-9 from the 2007 CSTP Part 3 hearing, peaking diesel energy savings at up to 7.6 GW.h were estimated in certain years after the mines closed and before non-industrial grid loads increased to levels at which the 3rd turbine was in effect supplying baseload energy.

even the range under discussion today, comprising an approximate 9 foot operating range rather than permutations within only a 7 foot operating range allowed at the present time.

At the time that the present licence and permit conditions were imposed (2002) the WAF system was operating entirely on hydro with substantial surplus hydro generation available, so the practical impact on diesel generation at that time of more onerous Aishihik water management conditions was limited. In contrast, at today's load conditions and with increasing concerns over the cost and environmental impact of diesel generation, additional consideration is required to ensure a more balanced approach to Aishihik Lake management, including consideration of options to protect fish that do not solely rely on water management. The next relicencing of Aishihik Lake is set for 2019, but YEC is continuing before that time to examine options to adjust the current conditions and constraints on Aishihik water use for additional hydro generation to displace diesel generation.

There would be no capital cost or utility operating costs to a more flexible water management regime on Aishihik Lake. There may be added environmental mitigation costs, which currently have not been assessed or quantified.

(g) and **(h)**

Under forecasts both with and without Mayo B, the Aishihik plant operates at approximately a 35% capacity factor (based on a 37 MW installed capacity, i.e., including the Aishihik 3rd turbine). This overall annual average capacity factor would not materially change with variations in the water management regime as noted above (i.e., no more than approximately 2 percentage points).

TOPIC: Generation Planning/Alternatives to the Mayo B Project

REFERENCE:

A letter from the Minister of Justice dated December 18, 2009 with accompanying Terms of Reference

PREAMBLE:

The Minister of Justice has requested that, amongst other matters, the YUB report on what, if any, alternatives to Mayo B might be advisable given reasonable load assumptions and risk assessments.

QUESTION:

a) What role would the 6.4 MW of installed diesel plant at the Minto mine site play during the 2012 to 2019 time period in terms of system supply?

b) Would those resources be available to the system during this time period if the Mayo B project were not to proceed and if additional generation were required in this time frame?

c) Were those additional diesel resources included in the evaluation of the capability of the existing and committed transmission and generation facilities to supply the forecast load requirements through to 2019?

d) If they were not, what effect might their inclusion have on the capability of the existing system to supply the forecast load and the cost to supply that load through to 2019, if the Mayo B project were not to proceed.

ANSWER:

(a), **(b)**, **(c)** and **(d)**

The analysis provided in the Application did not address specifically the role or relevance of the 6.4 MW of installed diesel plant at the Minto mine site during the 2012 to 2019 time frame in terms of system supply. To the extent that these units are retained by YEC

during this period (i.e., YEC currently does not have Board approval to include these units in rate base, and YEC has rights under the PPA at various times to move or dispose of these units), they will provide one element of the overall diesel generation capability available to Yukon Energy on the integrated grid (see response to YUB-YEC-1-7(h) for review of this diesel generation capacity at various locations as well as factors affecting forecast diesel generation through 2019 with and without Mayo B). With or without Mayo B, retention and use of these Minto mine site diesel units will be assessed by Yukon Energy each year based on forecast peak winter capacity planning requirements and options as well as potential baseload diesel energy generation requirements.

- Mayo B will serve to defer the need for new peak winter peaking capability (however, the Application has not attempted to assess the cost savings associated with such deferral).

- As regards baseload diesel energy generation requirements, without Mayo B Yukon Energy has forecast that the system is capable of supplying through 2019 the forecast energy loads (i.e., baseload diesel generation requirements) from existing diesel units even without the Minto mine diesels, and the energy generation cost impact through 2019 of retaining versus not retaining these units has not been assessed at this time (see response to YUB-YEC-1-41).

- In this regard, please also see response to YUB-YEC-1-41(c) (i.e., the main purpose of Mayo B is to provide a source of economical renewable energy to supplant baseload diesel energy generation through 2019 and beyond rather than to provide additional generation capacity for reliability (peak winter capacity) purposes).

TOPIC: Generation Planning/Transmission Matters

REFERENCE:

A letter from the Minister of Justice, dated December 18, 2009, with accompanying Terms of Reference

On page 18 of the Application, in footnote 20, the following statement is made:

"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."

PREAMBLE:

The Minister of Justice has requested that, amongst other matters, the YUB report on the relationship between Mayo B and CSTP Stage 2 completion.

QUESTION:

a) Confirm the currently expected completion date for CSTP Stage 2.

b) What is the currently expected Mayo B powerhouse completion date, in terms of requiring an outage to the existing Mayo plant in order to connect Mayo B to the system?

c) How long might such an outage take?

d) If the completion and commissioning of CSTP Stage 2 were delayed say to the fall of 2011 beyond the point in time when Mayo B was ready to be connected to the system, what would be the additional cost of that delay in terms of the cost of additional diesel generation required when the Mayo plant is shut down for a short period of time?

e) What would be the cost in terms of additional diesel generation required to supply the electric system load as a whole if the Mayo B plant were to be completed on schedule and the CSTP Stage 2 completion were to be delayed to the fall of 2011?

ANSWER:

(a)

February 28, 2011.

(b) and **(c)**

The precise schedule is still being finalized, but the major outage for the intake tie in and tunnel penstock installation works would occur during summer 2011, lasting approximately 12 weeks. A second brief outage would occur in the October 2011 for the final penstock tie in and water up, lasting about two weeks.

(d)

The cost of CSTP Stage 2 delay until the of fall 2011, in terms of the impact of Mayo A plant shutdown during summer 2011 as required for the intake tie in and tunnel penstock installation works, would depend on load and water conditions at the time, but is a maximum of approximately $220,000 per week (based on a loss of no more than approximately 5 MW average Mayo A generation, at approximately 26 cents/kW.h for incremental diesel generation required to supply Mayo Dawson load).

(e)

The Mayo B plant is not scheduled to be completed before approximately year-end 2011, so there would be no effect from such a delay in the CSTP Stage 2 completion to fall of 2011.

TOPIC: Generation Planning/LOLE Analysis

REFERENCE:

The Application

QUESTION:

Provide an analysis of the current system and the Mayo B project that addresses the need for the Mayo B project in terms of the current generation planning criteria including both LOLE and N-1 for the period 2009 to 2019 and that omits major industrial loads such as Minto, Alexco, and Carmacks Copper. The analysis should specifically address each criterion individually both LOLE and N-1 and should be provided in tabular form and should address the following cases:

a) The system without Mayo B with additional diesel resources added as needed.

b) The system with Mayo B both with and without additional Mayo Lake drawdown (enhanced storage).

ANSWER:

(a) and **(b)**

With respect to LOLE on the integrated system, Yukon Energy does not presently have a model that can assess this variable. Please see YEC-YUB-1-6 for a further explanation.

With respect to N-1, Table 1 below sets out the calculations based on the largest contingency event being the Aishihik transmission line, and assuming all current generating complement remains in service, or is refurbished as planned (including the Whitehorse Mirrlees), but excludes the Minto diesels. There is no effect on this analysis due to Mayo Lake storage – this component of the project only affects annual energy generation not capacity.

Table 1 is based off an installed load of 85.7 MW including Mayo B, 75.7 MW excluding Mayo B[1] and excludes industrial loads.

Table 1: N-1 Peak Load Carrying Capability for the Integrated System

	Generation			Peak Loads				
	GW.h			MW				
	total generation	less: industrial	non-industrial load	non-industrial peak	less local Aishihik loads (HJ)	N-1 peak	surplus/(shortfall) with Mayo B (85.7 MW)	surplus/(shortfall) without Mayo B (75.7 MW)
2012	466.13	113.00	353.13	68.93	1	67.93	17.77	7.77
2013	474.90	115.30	359.59	70.19	1	69.19	16.51	6.51
2014	481.48	115.30	366.18	71.48	1	70.48	15.22	5.22
2015	488.19	115.30	372.89	72.79	1	71.79	13.91	3.91
2016	495.03	115.30	379.72	74.12	1	73.12	12.58	2.58
2017	493.92	107.24	386.68	75.48	1	74.48	11.22	1.22
2018	448.99	55.22	393.77	76.86	1	75.86	9.84	-0.16
2019	400.99	0.00	400.99	78.27	1	77.27	8.43	-1.57

[1] This includes 24 MW Whitehorse hydro (winter), 5 MW Mayo A, 10 MW Mayo B, 48 MW diesel, less 1.3 MW for Haines Junction diesel, which is not able to supply integrated system loads in the event of an Aishihik transmission line outage.

TOPIC: Generation Planning/LOLE Analysis

REFERENCE:

The Application

QUESTION:

Provide an analysis of the current system and the Mayo B project that addresses the need for the Mayo B project in terms of the current generation planning criteria including both LOLE and N-1 for the period 2009 to 2019 and that includes major industrial loads such as Minto, Alexco, and Carmacks Copper. The analysis should specifically address each criterion both LOLE and N-1 and should be provided in tabular form and should address the following cases:

a) The system without Mayo B with additional diesel resources added as needed.

b) The system with Mayo B both with and without additional Mayo Lake drawdown (enhanced storage).

ANSWER:

(a) and **(b)**

The analysis of N-1 load carrying capability is set out in YUB-YEC-1-11. There is no effect on this analysis due to Mayo Lake storage – this component of the project only affects annual energy generation not capacity.

The N-1 analysis, pursuant to established practice, does not include industrial loads. As requested, an N-1 analysis that includes industrial loads is set out in Table 1 below. Table 1 is consistent with YUB-YEC-1-11 and is based off an installed load of 85.7 MW including Mayo B, 75.7 MW excluding Mayo B[1] and includes industrial loads:

[1] This includes 24 MW Whitehorse hydro (winter), 5 MW Mayo A, 10 MW Mayo B, 48 MW diesel, less 1.3 MW for Haines Junction diesel, which is not able to supply integrated system loads in the event of an Aishihik transmission line outage.

Table 1: N-1 Peak Load Carrying Capability for the Integrated System

	Generation	Peak Loads				
	GW.h	MW				
	total generation	peak with Industrial	less local Aishihik loads (HJ)	N-1 peak	surplus/(shortfall) with Mayo B (85.7 MW)	surplus/(shortfall) without Mayo B (75.7 MW)
2012	466.13	90.98	1	89.98	-4.28	-14.28
2013	474.90	92.70	1	91.70	-6.00	-16.00
2014	481.48	93.98	1	92.98	-7.28	-17.28
2015	488.19	95.29	1	94.29	-8.59	-18.59
2016	495.03	96.63	1	95.63	-9.93	-19.93
2017	493.92	96.41	1	95.41	-9.71	-19.71
2018	448.99	87.64	1	86.64	-0.94	-10.94
2019	400.99	78.27	1	77.27	8.43	-1.57

With respect to the available LOLE analysis, see YUB-YEC-1-11 and YUB-YEC-1-6. This analysis has yet to be updated for the integrated grid to be in place after 2010 (please see YEC-YUB-1-6 for a further explanation).

As reviewed in the response to YUB-YEC-1-41, the Application has not attempted to estimate the benefit (in dollar values) of Mayo B's contribution of additional generating capacity for reliability purposes, i.e., the main need or purpose for Mayo B is to provide a source of economical renewable energy to supplant diesel generation that would otherwise be required.

TOPIC: Generation Planning/Mayo B Project Energy Output

REFERENCE:

The Application

QUESTION:

Please provide or confirm the following numbers:

a) What is the annual energy output in the near term for the Mayo B project with the additional drawdown of Mayo Lake?

b) What is the annual energy output in the near term for the Mayo B project without the additional drawdown of Mayo Lake?

c) What is the annual energy output in the long term for the Mayo B project for each of the two situations cited above respecting Mayo Lake?

d) How does the annual energy output of Mayo B for the long term with additional drawdown cited as 38.4 GW.h in various parts of the Application, such as in footnote 12 on page 10 relate to the value of 41.4 GW.h cited also for the long term in various other places such as on page 10 of the Application?

e) What value would replace the 41.4 GW.h value cited if the additional drawdown of Mayo Lake were not to proceed?

ANSWER:

(a)

Please see YUB-YEC-1-25(a).

(b)

Please see YUB-YEC-1-25(a).

(d)

The 38.4 GW.h/year value (referenced in footnote 12 from a GRA response) was an estimate prepared in early 2009 prior to the filings with YESAB (February 27, 2009) and the Interrogatories in the YEC 2008/09 GRA (March 9, 2009). This value was the then calculated gross output of the Mayo B plant generation under a 575 GW.h total integrated system load scenario, assuming the added drawdown of Mayo Lake.

YEC's LCOE analysis has typically focused on "net generation" values, which means it considers not only the Mayo complex itself, but the overall grid contribution to determine the Mayo B net benefit in terms of diesel generation displacement (as noted in YUB-YEC-1-29(a)).

Aside from the focus on net generation, two items differ between the earlier 38.4 GW.h value and the 41.4 GW.h number cited:

1. Various features of the project have been refined since the 38.4 GW.h value was generated, which variously has had small positive and negative effects on these estimates. Despite these changes, the current net generation estimate for the same 575 GW.h load case is 38.0 GW.h (see page 28 of Application).

2. The 41.4 GW.h value is the current estimate of practical "maximum net generation" capability, i.e., the capability for a very large load case, as a "terminal" type of value on the contribution of Mayo B (calculated using a theoretical load in excess of 720 GW.h). In contrast, as noted, the earlier 38.4 GW.h value was specifically estimated for a 575 GW.h load case.

(e)

The current estimate of practical "maximum net generation capability" without additional storage at Mayo Lake is 38.6 GW.h. As noted in response to (e) above, this estimate is the capability for a very large load case, as a "terminal" type of value on the contribution of Mayo B (calculated using a theoretical load in excess of 720 GW.h).

TOPIC: Generation Planning/LOLE Criterion

REFERENCE:

The YUB Report to Commissioner in Executive Council re YEC-20 Year Resource Plan – Jan 15/07.

On page 10 of the YUB Report to Commissioner in Executive Council re YEC-20 Year Resource Plan – Jan 15/07, the Board states: "However the definition of the LOLE criterion does not mention exclusion of major industrial loads explicitly and it appears YEC included the major industrial loads in the calculations under certain load forecast scenarios. If this is the case, the Board considers it to be an inconsistent approach, as inclusion of major industrial loads in the LOLE calculation will produce higher LOLE values, possibly above 2 hours per year that would signal a need for new capacity. Therefore, the Board recommends that, in order to ensure that no new generating capacity is added for the purpose of ensuring reliable supply to major industrial customers and to ensure consistency with the N-1 criterion, major industrial loads should not be included in the LOLE calculation." On page 11 of that same report, the Board states: "The Board also notes that major industrial loads are to be excluded when the N-1 criterion is to be used. This is specified in the definition of the N- 1 criterion, which states: Each system (WAF and MD) should be able to carry the forecast peak winter loads (excluding major industrial loads) under the largest single contingency. This is consistent with YEC's testimony that new generating capacity will not be planned, or added to the system, for the purpose of ensuring reliable supply to major industrial loads. The Board expects that the same consistency would be applied under the LOLE criterion, as addressed above."

QUESTION:

a) In the LOLE criterion and calculations does YEC include major industrial loads such as Minto, Alexco, and Carmacks Copper? If not explain the reasons for your answer.

b) If yes explain why they are not omitted as per the Board's recommendation.

ANSWER:

(a) and **(b)**

Please see response to YUB-YEC-1-6.

TOPIC: Generation Planning/Capacity Planning

REFERENCE:

The YUB Report to Commissioner in Executive Council re YEC-20 Year Resource Plan – Jan 15/07

On page 11 of the same report, in footnote 11 at the bottom of that page the following statement appears: "Exhibit B-1, page 3-12 states that no capacity is planned to supply secondary energy sales. At Transcript, pages 86-87, YEC testified that, for capacity planning, industrial customers are treated as if they were secondary sales customers."

QUESTION:

a) Is that quote an accurate statement of YEC's position on capacity planning for industrial customers such as Minto, Alexco and Carmacks Copper? If it is not, explain why it is not an accurate statement.

b) Provide a statement of YEC's position on capacity planning for industrial customers including such customers as Minto, Alexco and Carmacks Copper.

ANSWER:

(a) and **(b)**

For detailed explanation of the capacity planning criteria and YEC's position on capacity planning for industrial customers, please see the response provided to YUB-YEC-1-6. As stated in that response:

- For LOLE capacity planning tests YEC treats industrial customers served at rate Schedule 39 as firm sales customers and not as if they were secondary interruptible sales customers, i.e., under no circumstances is YEC entitled to interrupt such an industrial customer simply because diesel generation is forecast to be required, while YEC is required to interrupt a secondary customer under such conditions; and

- For N-1 capacity planning tests YEC excludes industrial customers served at Rate Schedule 39, for the reasons reviewed in YUB-YEC-1-6, i.e., this test relates to a specific system emergency condition where it is assumed that major industrial customers have the required emergency back-up generation to protect their facilities.

It is noted that the above-noted reference was corrected during the same hearing at page 281 (lines 9-26) to page 282 (lines 1-16) of the transcript as follows:

> MR. LANDRY: And the last item I have, Madam Chair, is that Mr. Morrison would like to make a correction to the record, and my reference is page 87 of the transcript.
>
> A MR. MORRISON: That is correct, Madam Chair. I would just like to clarify, I may have left a wrong impression yesterday when answering a question from Mr. Pinard. It is page 87, and in the first few lines of that page, I had indicated that secondary sales customers and industrial customers are the same. And I just want to be clear that industrial customers are firm customers, they are not secondary sales customers. I was trying to use as an example in terms of backup, but I think I may have kind of lumped them together where I should not have. So in the secondary sales situation, when we reach the capacity in terms of the grid and we have to look at the peak, our practice has been that we have disconnected secondary sales customers if, in fact, to keep them on the system would require us to generate some diesel. So we do not provide any secondary sales if, in fact, we have to go a diesel mode to provide them. In the case of industrial customers, they are firm customers. Now, in terms of an emergency, we have made it clear to the industrial customer, and we have made it clear, I think, yesterday as well, that the industrial customer would have to have its own backup supply on site. But I just wanted to make sure that we were not considering both industrials and secondaries as the same kind of customer.

TOPIC: Project Financing

REFERENCE:

Application, page 3

"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 $31.15 million of this no cost funding assistance will be provided to borrowing costs for the Mayo B Project."

QUESTION:

a) Will any of the borrowing costs or load assumptions with this project have any impact on any existing borrowing agreements with YEC such as the flexible term note? If so please explain in detail.

b) Will the costs of the Mayo B Project and the concomitant borrowings have any affect on YEC's cost of debt? If so, what effect will it have?

c) Based on the YEC response to part (b) above, if there is any impact on the cost of debt, has that effect been included in any cost benefit analysis undertaken by YEC?

ANSWER:

(a), **(b)** and **(c)**

The Mayo B project and the related debt that YEC must borrow do not affect any existing borrowing agreements with YEC such as the flexible term note and will not have any effects on the cost at which YEC borrows.

The above quote, however, is in regards to borrowings by YDC, not YEC. The proceeds of these borrowings (as referenced in the quote) by YDC will be provided to YEC as no cost capital, which has been considered in the YEC cost benefit analysis for the Mayo B

project. As reviewed in the Application, these no cost contributions will reduce YEC's net rate base cost for the project. These YDC borrowings ($30.15 million [note that correct quote is $30.15 million, not $31.15 million][1]) are to be fully funded by an annual Yukon Government payment on the principal and interest, as set out in Attachment F to the Application.

YEC's new long term debt related to the project is 60% of the projected net rate base cost of the project for YEC (at $36.5 million net rate base cost, as set out in Table 1 of the Application). As reviewed in Table 1, this new long term debt is assumed to bear an interest cost of 5.28%/year.

While the Mayo B project itself will not have any effect on YEC's costs for other borrowings, the load assumptions set out in the Application (related to the expanded grid and its related loads) are a factor under the current YEC flexible term debt (the debt formerly known as the "Canada Flexible Term Note") to the extent that loads are one of the variables that determine the interest rate payable on that debt. The particular load forecasts indicate that the maximum interest rate (7.0%) will be charged under this flexible term note. However, any such cost impacts are due to the assumed loads and are not due to Mayo B or its specific borrowing costs.

[1] This $30.15 million is one component of the overall $53.3 million described in Attachment F to the Application.

TOPIC:

REFERENCE:

Application, page 3

"This funding assists Yukon Energy to advance the enhancement of Yukon's renewable energy capability and the reduction of future Yukon diesel generation requirements."

QUESTION:

a) What does YEC mean by "reduction of future Yukon diesel energy requirements"? What timeframe does this refer to?

b) Does the statement above preclude other hydro opportunities identified in YEC's 20 Year Resource Plan such as the Marsh lake Fall/Winter Storage?

ANSWER:

(a)

The quote "reduction of future Yukon diesel energy requirements" means the reduction in the need to use diesel generation to supply energy loads (as distinct from diesel capacity contribution to peak winter capacity planning requirements) that will result from Mayo B's development.

As reviewed in the Application (e.g., Figure 1), the timeframe referred to includes the 65 year assumed economic life of the Mayo B project. See also response to YUB-YEC-1-36 (a) and (b).[1]

[1] See also page 39-40 and Attachment D of the Application for load forecasts and projected diesel energy requirements without Mayo B. Undertaking #28 and CW-YEC-1-31 filed during the Yukon Energy 2008/2009 GRA also provided a review of industrial loads on the system and the underlying factors which have led YEC to undertake feasibility work on projects (including small scale projects such as Gladstone, Atlin, Marsh Lake and larger scale projects such as geothermal and Houle) in order to enhance the compliment of renewable generation projects in Yukon in light of dwindling surplus hydro.

(b)

No. As noted in the Application, Mayo B development does not preclude the need for YEC to continue pursuing other identified hydro development opportunities such as Marsh Lake Fall/Winter Storage. In this regard, the following are noted with regard to near term hydro developments that YEC continues to pursue:

- Marsh Lake Fall/Winter Storage, Atlin and Gladstone are system enhancements that do not require large capital undertakings and would not be competing with Mayo B for no cost contribution funding. For example, the 20-Year Resource Plan notes that Marsh Lake would increase the firm winter capacity of the Whitehorse Rapids hydro facility by about 1.6 MW and increase long-term average hydro energy from this facility by about 7.7 GW.h/year.[2]

- Project such as Marsh Lake, Atlin and Gladstone are required in addition to Mayo B to meet near term and longer term system requirements with renewable generation instead of diesel generation. These projects are not alternatives to Mayo B, and are necessarily being studied and pursued to address the forecast energy requirements.

- Mayo B and CSTP Stage 2 will provide a benefit to these other renewable energy project by providing near-term renewable energy (in addition to the long term renewable energy benefits) that will allow time to develop and permit these other projects in a well-planned manner without incurring significant short term diesel generation costs and emissions.

Challenges to pursuing these other renewable hydro generation projects do not relate to available funding or to providing a need or justification for the added generation based on system capabilities and load requirements – they relate to the ability to complete timely regulatory reviews.[3]

[2] See, Resource Plan Summary of Proposed Actions , page 8 which notes the estimated capital cost for Marsh Lake is made up of the costs for licencing, any required mitigation works and any potential facility modifications.

[3] See discussion in section 4.1.3 of the Application, including at page 32, footnote 55 which reviews YEC's 2008/2009 GRA filings on renewable generation resource developments that YEC is pursuing.

TOPIC: Reduction of Generation at Mayo A

REFERENCE:

Application, page 6

"The 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."

QUESTION:

a) Has this reduced generation from Mayo A been factored into YEC's cost-benefit analysis of the Mayo B project?

b) Please provide all models (in electronic format) showing how this reduced generation has been factored into the total costs of the project.

ANSWER:

(a)

Yes.

(b)

Please see YUB-YEC-1-25(a). This model shows the net hydro production from the entire system for each scenario both:

(a) With Mayo B (including the generation that arises from Mayo A when Mayo B is in service); and

(b) Without Mayo B (including all Mayo A generation).

Also see YUB-YEC-1-21(a).

TOPIC: Generating Capacity

REFERENCE:

Application, page 6

"A new powerhouse of approximately 10 to 12 MW of nameplate generating capacity …"

QUESTION:

a) What capacity did YEC utilize in its economic evaluations?

ANSWER:

(a)

Approximately 10.1 MW.

TOPIC: Generation Planning/Transmission Matters

REFERENCE:

The Application

QUESTION:

a) Confirm that the bulk of the diesel energy displaced by the Mayo B project (located in the MD area) will come from diesel units located in the WAF area during the 2012 to 2019 period.

b) If the transmission line(s) linking the Mayo B project and the MD area to the WAF area is forced out of service how will the energy needs of the three major loads, Minto, Alexco, and Carmacks Copper be served during the line(s) outage?

c) What constraints might be imposed on these customers during such outages?

d) What would be the expected frequency of such outages?

e) In the analysis of diesel cost savings, have the economic costs of the transmission losses that would be incurred in transmitting the displacement energy between the Mayo B project and loads in the WAF area been factored into the economic analysis presented? If not, then explain why not.

f) If yes, explain how the losses and their costs were calculated and how they were factored in.

g) Provide the costs of those losses for each applicable year of the 2009 to 2019 period.

ANSWER:

(a)

Not confirmed. The Mayo B project is being commissioned onto an integrated system where the MD and WAF systems are already connected earlier via CSTP Stage 2. If the

integrated system were required to operate without Mayo B, it is not clear which diesel units, or at what location, would be operated differently. Such decisions would need to be made by system operators in an ongoing manner reflecting loads, particular water conditions, line losses considerations, and other diesel generation related factors (such as unit efficiency and non-fuel costs such as overhauls). It is likely that some portion of the Mayo B benefit will arise as displacing WAF diesel, but no specific values have currently been determined.

(b) and **(c)**

If the CSTP line was forced out of service, service to the noted industrial loads would depend on the particular circumstances. Service to Alexco would come from MD sourced generation. Service to Minto and Carmacks Copper would come from either MD or WAF sources, depending on the precise location of the CSTP outage (e.g., if the outage occurs at Carmacks, then Minto and Carmacks Copper would be connected to the MD system but not WAF; if the outage arises north of Minto Landing, these mines would be connected to WAF).

There are no specific constraints that are expected to be imposed on these customers during CSTP outages, so long as grid service can be made available (i.e., so long as sections of CSTP can be retained in service). In the event one of the systems for some reason experienced generation issues such as inability to carry the full load, then normal load management activities would be required to be implemented for all customers (not specifically the mines) such as rotating supply.

(d)

Yukon Energy has insufficient specific experience with respect to the actual CSTP line outage history to be able to determine outage frequency probabilities based on its own data.

Based on the Canadian Electrical Association data used to determine the Aishihik line unavailability for Yukon Energy's LOLE calculation, a typical line of CSTP-type construction (138 kV wood double pole) would expect 4.28 failures/year with an unavailability of 0.008993 (i.e., a 0.8993% change at any given time that the line is out of service) over a long-term average. These values are not necessarily instructive as to the degree of reliability that may be experienced in any one year.

(e), **(f)** and **(g)**

Line losses are a factor in determining the overall grid generation required under each scenario. However, no incremental losses have been attributed to Mayo B generation as compared to any other source as such detailed analysis is not possible within a planning model. Further, as compared with other YEC major generation, Mayo B generation is either closer to or not notably farther than the major new industrial loads that are included in the load forecast (e.g., Alexco or Carmacks Copper).

TOPIC: Generation Planning/Mayo A Plant

REFERENCE:

The Application

PREAMBLE:

On pages 5 and 6 of the Application, YEC addresses the operation of the existing power plant at Mayo subsequent to the commissioning of the Mayo B project.

QUESTION:

a) Without the Mayo B project, what would be the annual energy production expected from the existing Mayo A units for each year of the period 2009 to 2019?

b) What would be the plant's capacity factor in each year of that period?

c) With the Mayo B project, both with and without the additional Mayo Lake drawdown, what would be the annual energy production expected from the existing Mayo A units for each year of that same period?

d) What would be the plant's capacity factor in each year of that period?

e) For the Mayo B project, both with and without the additional Mayo Lake drawdown what would be the annual energy production expected from the Mayo B units for each year of that same period?

f) What would be the Mayo B plant's capacity factor in each year of that period?

g) What sorts of maintenance outages would require the Mayo B plant to be entirely or partially taken out of service?

h) How frequently would such outages be required? For instance footnote 44 on page 30, dealing with operating and maintenance costs appears to suggest once in 10 years for a major overhaul.

i) Except for maintenance outages, doesn't the Mayo B project render the Mayo A plant virtually redundant given the reduction in energy output at Mayo A with the commissioning of the Mayo B plant? Explain the reasons for your answer.

j) If the Mayo A plant is not redundant, what reduction in its economic value occurs once the Mayo B project is commissioned because the full amount of annual energy it is currently capable of producing is not likely to be produced in the future?

ANSWER:

(a), **(b)**, **(c)**, **(d)**, **(e)** and **(f)**

Modeling for the Mayo B project and the integrated grid is focused on the system following connection of the two current grids (WAF and MD) with the completion of CSTP Stage 2 in 2011 and of Mayo B by the end of 2011. Forecasts of the type requested are available for the period only after 2011.

For 2012 to 2016, firm grid loads as reviewed in the referenced Table 1 as required to be served from dispatchable generation increase from 456 GW.h in 2012 to about 495 GW.h in 2016, and are therefore generally in a range approximating the 468 GW.h grid load level that has been modeled in detail.[1] Accordingly, to address the issues in this question for the period from 2012 to 2016, analysis is provided for the 468 GW.h grid load level.

The gross generation information requested for this load level is presented in Table 1 below for Mayo A and Mayo B firm generation output assuming long term average water flows. It is noted that the overall IS generation model used in the Application addresses generation by the overall system, and by overall plant (i.e, the Mayo plant, for combined Mayo A and Mayo B output) and does not provide assessments broken out separately for Mayo A versus Mayo B. In preparing separately the assessment below, overall Mayo plant generation it is necessary to assign the system wide secondary energy to each individual plant. As a result, while the analysis helps to explain "gross" versus "net" generation and the relative utilization of Mayo A versus Mayo B, the overall plant results

[1] The Application addresses net generation from the Mayo B project at this load level, e.g., at page 27 of the Application, estimated net generation of 28.2 GW.h is shown for this load level. This assessment reflects overall IS model analysis.

are difficult to compare with the Application's IS model net generation assessments without specific reference to both firm and secondary loads.

Table 1: Mayo A and Mayo B output

Mayo A and B plant output (GW.h/year) and Capacity Factor at a 468 GW.h grid load level

	Mayo A generation (GW.h/year)	Capacity factor at 5.4 MW installed capacity	Mayo B generation (GW.h/year)	Capacity factor at 10.1 MW assumed peak capacity
No Mayo B	36.1	76.4%	n/a	n/a
Mayo B (with Mayo Lake Enhanced Storage)	14.7	31.1%	61.9	70.0%
Mayo B - no Mayo Lake Enhanced Storage	14.9	31.4%	58.5	66.1%

After 2016, the forecast load to be served from dispatchable generation drops to a lower load level (439 GW.h in 2018 and 391 GW.h in 2019) due to assumed mine closings. The load level of 417 GW.h was fully modeled and exhibits values very close to those in Table 1 (either very close or lower by no more than approximately 2 GW.h).

(g) and **(h)**

In general terms, the only activities requiring a complete plant outage would be on any equipment that is common to both units such as penstock, trash racks, head gate, unit TIV valves or tailrace. In addition there is some common electrical equipment such as station service system or common bus/switchgear or substation maintenance requiring a full plant outage.

Individual unit outages would be more frequent.

Most outages would be of very short duration in relation to annual energy production (e.g., hours). As noted in footnote 44, major outages (lasting weeks at a time, such as for major overhauls) would typically be very infrequent, such as once every 10 years.

(i) and **(j)**

No. See the response to part (c) of this question. Mayo A remains an important source of generation on the Yukon system even after the commissioning of Mayo B, in large part

because of its ability to use water that would otherwise be required to be spilled for fish and fish habitat protection. Despite a reduced output, Mayo A remains a valuable and low cost source of energy for Yukon, and also provides enhanced overall reliability of generation at the Mayo plant than would occur if only the new Mayo B plant was retained.

TOPIC: Decommissioning costs

REFERENCE:

Application, page 8

QUESTION:

a) What are the forecast reclamation costs for the work camp and lay down area(s)? How are these costs being accounted for?

b) Does the Mayo B project affect the expected service life of Mayo A?

ANSWER:

(a)

The latest estimate for reclamation costs provided by the Contractor provides $88,000 for reclamation, and are accounted for in the required construction costs. These reclamation costs relate to the entire work site (i.e., not only the work camp and lay down areas) and include clean up of rubbish, removal of excess material and temporary structures, repair or replacement of: landscaping features, grading and pavements, buildings and structures, services, and vegetation. All existing vegetated areas disturbed by the Contractor during construction, which are not designated for construction, designated site work roads, or items to be permanently incorporated into the work, will be seeded by the Contractor, with no separate measurement or payment made for this work. The Contractor will also be held to environmental conditions that would include the final conditions of the site.

Such costs are chargeable to YEC and payable to the Contractor when actually incurred by the Contractor during the proper performance of the Work at the Site and will be the actual costs incurred by the Contractor, less all applicable discounts, rebates and salvages actually obtained by Contractor.

(b)

Mayo B project has no significant effect on the expected service life of Mayo A. Many of the Mayo A systems are common to Mayo B thus will be used the same as if there was no Mayo B, such as the Mayo Lake Control Structure, Intake Structure, Wareham Dam and spillway structure. The primary difference would be that normal operation of the Mayo A plant will be one unit instead of both units.

TOPIC:

REFERENCE:

Application, page 9

"Until the Mayo lake licence (sic) change is approved, Mayo B's long term average annual net generation potential will be reduced by about 4 GW.h/yr."

QUESTION:

a) Does this generation potential include the reduction in Mayo A generation?

ANSWER:

(a)

Yes it does. An enhanced storage potential at Mayo Lake provides the opportunity, in certain high inflow years (largely spring freshet flows), to capture flows that would otherwise be in excess of the storage capacity of the system. These added stored flows can then be used for winter generation at Mayo B. In effect, the reduced generation potential arising from not having enhanced Mayo Lake storage is a Mayo B plant output effect, not a Mayo A plant output effect.

TOPIC: Potential Target Price Contract/Turbine – Generator Supplier

REFERENCE:

Application, page 9

QUESTION:

a) How do the MOU contract and the early competitive selection process conform with the recommendations of the Auditor General from the M-D transmission project?

b) Please enter on the record the winning bid for the T-G supplier.

ANSWER:

(a)

The MOU contract and the early competitive selection process of a construction contractor conform with recommendations of the Auditor General from the M-D transmission project regarding competitive and transparent processes for construction-related projects to ensure best value, protection of potential contract options to manage risks (e.g., YEC retained control over the final decision as to which party the engineer would work for in doing final design, and ongoing staged decisions related to the MOU and any final contract award), and the overall approach to ensure that the scope and costs of this major project are adequately defined and identified prior to seeking final approval to proceed.

(b)

ABB Inc. was awarded a Preliminary Agreement with YEC in January 2010.

TOPIC:

REFERENCE:

Application - Section 3.1.2, Project Costs, Financing and Economics

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.

PREAMBLE:

The YUB wishes to glean information in respect of "currently existing or committed grid generation and transmission assets" that underpin YEC's forecast.

QUESTION:

a) Please provide the analysis that supports YEC's LCOE (levelized cost of energy) forecast 6.69 c/kW.h (assuming 1 m added Mayo Lake storage) and 7.59 c/kW.h (assuming no change in Mayo Lake licence).

b) Please explain fully how the "Flexible debt financing with YDC will cap annual net generation costs at 10 to 11 cents/kW.h (2012$)" for electricity customers in the Yukon.

c) Please provide the underlying spreadsheet analysis complete with formula and linkages that supports the Mayo B annual costs and diesel savings portrayed in Figure 1, page 14 of the application.

d) With respect to the analysis portrayed in Figure 1, please provide the base case grid load forecast and forecast assumptions. Please explain whether this base load forecast could be categorized as a low, mid/average or high range forecast.

e) Further, with respect to Figure 1, please provide details into the underlying water conditions that were incorporated into the study, i.e. Extreme Low Water, Median Water and Extreme High Water Conditions, in the areas of Aishihik, Whitehorse and Mayo.

f) Other than the "Minto, and Alexco, and Carmacks Copper mines assumed to be connected in 2012 and shut down (at varying dates) by 2019, please confirm and provide supporting for any additional proxy mine loads that may or may not be included in the assumptions underlying the "Mayo B Annual Costs and Diesel Savings" illustrated in Figure 1.

g) Please provide support for the assertion that a GW.h of hydro generation, when it replaces a GW.h of diesel generation, displaces "700 tonnes of greenhouse gas (GHG) emissions.

h) YEC states that it seeks to "increase hydro generation capacity installed on the Mayo River from approximately 5 MW to approximately 15 MW."[1] Considering seasonal river flows and the biophysical effects described on page 19 of the Application, please explain in detail what can be expected regarding the seasonal average output of Mayo B, i.e. summer and winter.

ANSWER:

(a)

Please see the attached Excel model, which addresses LCOEs for each scenario set out in Table 1 as well as the LCOS values on pages 43-44 of the Application. The file also sets out the underlying data for Figures 1 to 4 in the main Application, and Figures D-1 to D-3 from Attachment D.

(b)

The principle behind the YEC flexible debt financing with YDC is described in section 4.3.3 of the Application (particularly at pages 44 and 45). This YEC debt will be with regard to 60% of the final net rate base for Mayo B (after all no cost capital contributions).

As with previous flexible debt instruments for YEC (e.g., the flexible term note initially with Canada for the WH Unit #4 and the MD flexible debt note), the actual interest rate on the debt will be flexible in any year within certain rules (see below).

- 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 as required in order to enable YDC an opportunity to earn an overall present value return on the loan over its life equal to YDC's long-term borrowing costs when the flexible debt is established.

- In the initial years, the interest rate on the debt will be reduced as required below its face value, based on the IS grid generation load in any given year, 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/kW.h 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.

The specific mechanics of the YDC Flexible Debt instrument for Mayo B, beyond the above principles, have not been further developed to date.

The excel models in YUB-YEC-1-25(a) set out the annual cost of Mayo B absent flexible debt financing near the bottom of each page of analysis, and then provide a comparison to each of a 10 ¢/kW.h benchmark (2012$) and an 11 ¢/kW.h benchmark, to show (where relevant) the approximate range of interest reduction that must be secured in each year.

(c)

Please see YUB-YEC-1-25(a).

(d)

The load forecasts underlying Figure 1 are provided in the response to YUB-YEC-1-25(a). The load forecast and its relative components are addressed in Attachment D to the Application, and the sensitivity/risks related to the forecast are addressed at pages 38-40 of the Application.

The non-industrial forecast used in the Application is for 1.85% growth. This is same load forecast growth used in the 2006-2025 Resource Plan. Since the Resource Plan review every single metric underlying the basis for the 1.85% annual growth has been higher than forecast (see Table D-1 in Attachment D); however, to be conservative, Yukon Energy retained the 1.85% growth value rather than revising it upwards to reflect these factors.

The forecast also includes no industrial loads beyond the three noted (Minto, Alexco and Carmacks Copper) and in each of these cases only includes the industrial load for the specific length of operating forecasts presently announced or expected, with no consideration as to possible (and likely) life extensions due to further ore discoveries, etc.

Overall, the base case forecast in the Application is intended to be in the “mid/average” range rather than “low” or “high”, subject to the specific uncertainties as noted and addressed in the Application related to the Carmacks Copper mine load timing.

(e)

Figure 1 is based on generation for a given load level reflecting the mean of all recorded inflow conditions over the period 1987-2007. Each of these inflow records (as set out in YUB-YEC-1-47(a)) is modeled to illustrate what would happen with this same inflow occurring after the new complement of infrastructure (CSTP Stage 2, Aishihik 3rd turbine, Mayo B etc.) is in place at forecast load levels. In this regard, all water scenarios are taken into account.

(f)

There are no mines included in the analysis in Figure 1 other than Minto, Alexco and Carmacks Copper. Please see YUB-YEC-1-25(a) for the model data underlying the Figure.

(g)

The stationary diesel generations emissions rate of 700 tonnes CO2e per GWh of diesel generation has been used as an approximate equivalency by YEC for many years. The source of this number is a report published in the early 2000's by the Alberta Department of Energy entitled "Full Fuel Cycle Emissions for Existing and Future Electric Power Generation Options in Alberta, Canada, Attachment 4 Diesel Emission Reductions Cradle to Grave Emissions".

This is a conservative estimate of diesel emission rates. The recognized newer emission factor used by Canada is in Annex 12 Table A12-2 of the National Inventory Report 1990-2006 page 597. For electric utility light fuel oil, the emission factor is 2725 grams of CO2e per litre. Methane and Nitrogen Oxide emissions are ignored in this emission factor as they are a very small fraction of 1% of the Carbon Dioxide emissions for diesel fuel. This emission factor can be converted to an emission rate per GWh of generation using the diesel fuel efficiency. Using the three diesel fuel efficiencies in YEC's 2008 GRA on page 2-12 yields the following range of Yukon Energy's GHG emissions expressed in tones of CO2e;

Location	Fuel Efficiency	Emission rate
Whitehorse	3.64 kWh/l	749 tonnes/GWh
Faro	3.55 kWh/l	768 tonnes/GWh
Dawson	3.71 kWh/l	735 tonnes/GWh

(h)

Please see YUB-YEC-1-37(f) for average seasonal output from each of Mayo B and Mayo A under a 468 GW.h load level. Note that in certain water conditions, the output can be either higher or lower than that presented in YUB-YEC-1-37(f), up to 15 MW.

Mayo B (with Mayo Lake added storage and Carmacks Copper) Annual Costs ($000)

Assumed YEC initial ratebase cost: 36.50 million

Assumed cost of capital: Normal
Average 6.56% | Debt 5.28%
(Real) 4.47% | Equity 8.49%
life (yrs) 65 | Inflation 2.00%

			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
year			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Loads																								
Grid Load (GW.h)			456.4	465.2	471.8	478.5	485.3	484.2	439.3	391.3	398.6	406.1	413.7	421.5	429.4	437.5	445.7	454.0	462.6	471.2	480.1	489.1	498.2	507.5
WAF + MD Non-Industrial loads			353.1	359.6	366.2	372.9	379.7	386.7	393.8	401.0	408.3	415.8	423.5	431.2	439.1	447.2	455.4	463.8	472.3	481.0	489.8	498.8	507.9	517.3
MINTO			40.6	40.6	40.6	40.6	40.6	40.6	40.6															
Carmacks Copper			58.6	58.6	58.6	58.6	58.6	58.6	14.7															
Alexco			13.8	16.1	16.1	16.1	16.1	8.1	0.0															
Fish Lake and Wind			-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73
Net Generation Contribution from Mayo B (MW.h)			26,436	27,772	28,716	29,627	30,505	30,366	23,561	14,055	16,125	17,398	18,695	20,183	21,739	23,238	24,680	26,062	27,383	28,641	29,836	30,966	32,030	33,028
PV over 65 years		Net Gen (GW.h.)																						
PV at	4.47%	660,909																						
With Mayo B																								
Existing Hydro			399.3	401.6	403.1	404.6	405.9	405.7	394.1	377.2	379.6	382.1	384.6	387.6	390.7	393.5	396.2	398.7	400.9	403.0	404.9	406.5	408.0	409.2
Mayo B - net benefit to system			26.4	27.8	28.7	29.6	30.5	30.4	23.6	14.1	16.1	17.4	18.7	20.2	21.7	23.2	24.7	26.1	27.4	28.6	29.8	31.0	32.0	33.0
Total Hydro			425.8	429.4	431.9	434.2	436.4	436.0	417.7	391.3	395.8	399.5	403.3	407.8	412.4	416.8	420.9	424.7	428.3	431.7	434.7	437.5	440.0	442.3
Diesel			30.6	35.8	39.9	44.3	48.9	48.2	21.6	0.0	2.9	6.6	10.4	13.7	17.0	20.7	24.8	29.3	34.2	39.6	45.3	51.6	58.2	65.3
Total Dispatchable Generation			456.4	465.2	471.8	478.5	485.3	484.2	439.3	391.3	398.6	406.1	413.7	421.5	429.4	437.5	445.7	454.0	462.6	471.2	480.1	489.1	498.2	507.5
No Mayo B																								
Existing Hydro			399.3	401.6	403.1	404.6	405.9	405.7	394.1	377.2	379.6	382.1	384.6	387.6	390.7	393.5	396.2	398.7	400.9	403.0	404.9	406.5	408.0	409.2
Diesel			57.063	63.568	68.619	73.903	79.425	78.523	45.128	14.055	18.981	23.999	29.109	33.913	38.755	43.940	49.472	55.357	61.601	68.206	75.177	82.517	90.226	98.306
Total			456.4	465.2	471.8	478.5	485.3	484.2	439.3	391.3	398.6	406.1	413.7	421.5	429.4	437.5	445.7	454.0	462.6	471.2	480.1	489.1	498.2	507.5
Mayo B Diesel offset			26.4	27.8	28.7	29.6	30.5	30.4	23.6	14.1	16.1	17.4	18.7	20.2	21.7	23.2	24.7	26.1	27.4	28.6	29.8	31.0	32.0	33.0
Costs																								
O&M costs ($000)		7,917	360	367	375	382	390	397	405	414	422	430	439	448	457	466	475	485	494	504	514	524	535	546
Depreciation ($000s)		8,970	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562
Carbon Credits ($000)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start of yr rate base ($000)			36,500	35,938	35,377	34,815	34,254	33,692	33,131	32,569	32,008	31,446	30,885	30,323	29,762	29,200	28,638	28,077	27,515	26,954	26,392	25,831	25,269	24,708
Mid year rate base ($000)			36,219	35,658	35,096	34,535	33,973	33,412	32,850	32,288	31,727	31,165	30,604	30,042	29,481	28,919	28,358	27,796	27,235	26,673	26,112	25,550	24,988	24,427
Equity Return ($000)		15,330	1,230	1,211	1,192	1,173	1,154	1,135	1,116	1,097	1,077	1,058	1,039	1,020	1,001	982	963	944	925	906	887	868	849	830
Debt Return ($000)		14,301	1,147	1,130	1,112	1,094	1,076	1,058	1,041	1,023	1,005	987	970	952	934	916	898	881	863	845	827	809	792	774
Total Return ($000)		29,631	2,377	2,341	2,304	2,267	2,230	2,193	2,156	2,119	2,083	2,046	2,009	1,972	1,935	1,898	1,861	1,825	1,788	1,751	1,714	1,677	1,640	1,603
Secondary volume enhanced			2000	2000	1949	1855	1759	1774	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1956	1832	1706	1578	1447
Sec price			0.072	0.073	0.075	0.076	0.078	0.079	0.081	0.083	0.084	0.086	0.088	0.090	0.091	0.093	0.095	0.097	0.099	0.101	0.103	0.105	0.107	0.109
Sec revenues		2236.2	144.0	146.9	146.0	141.7	137.1	141.1	162.2	165.4	168.7	172.1	175.5	179.0	182.6	186.3	190.0	193.8	197.7	197.2	188.4	179.0	168.8	157.9
Mayo B Total Costs - Net of Contributions ($000)		44,282	3,155	3,122	3,094	3,069	3,044	3,011	2,961	2,929	2,897	2,865	2,834	2,802	2,771	2,739	2,708	2,677	2,646	2,619	2,601	2,584	2,568	2,553
$/kW.h (net)			0.1193	0.1124	0.1077	0.1036	0.0998	0.0992	0.1257	0.2084	0.1797	0.1647	0.1516	0.1388	0.1274	0.1179	0.1097	0.1027	0.0966	0.0914	0.0872	0.0835	0.0802	0.0773
PV over life	$	44,282																						
levelized $/kW.h	$	0.0670																						
Benefits																								
Diesel Cost			0.264	0.269	0.274	0.280	0.286	0.291	0.297	0.303	0.309	0.315	0.322	0.328	0.335	0.341	0.348	0.355	0.362	0.369	0.377	0.384	0.392	0.400
Total cost to supply same load with diesel			6973.92	7472.66	7881.23	8294.02	8710.55	8844.42	6999.41	4258.90	4984.00	5485.06	6011.73	6620.09	7272.94	7930.09	8590.47	9252.97	9916.42	10579.63	11241.39	11900.46	12555.58	13205.50
Mayo B net costs (sav) to diesel			(3,819)	(4,350)	(4,787)	(5,225)	(5,666)	(5,833)	(4,038)	(1,330)	(2,087)	(2,620)	(3,178)	(3,818)	(4,502)	(5,191)	(5,883)	(6,576)	(7,271)	(7,960)	(8,640)	(9,316)	(9,988)	(10,653)
Total diesel cost without Mayo B			$ 15.1	$ 17.1	$ 18.8	$ 20.7	$ 22.7	$ 22.9	$ 13.4	$ 4.3	$ 5.9	$ 7.6	$ 9.4	$ 11.1	$ 13.0	$ 15.0	$ 17.2	$ 19.7	$ 22.3	$ 25.2	$ 28.3	$ 31.7	$ 35.4	$ 39.3
10 cent index			0.100	0.102	0.104	0.106	0.108	0.110	0.113	0.115	0.117	0.120	0.122	0.124	0.127	0.129	0.132	0.135	0.137	0.140	0.143	0.146	0.149	0.152
11 cent index			0.110	0.112	0.114	0.117	0.119	0.121	0.124	0.126	0.129	0.131	0.134	0.137	0.140	0.142	0.145	0.148	0.151	0.154	0.157	0.160	0.163	0.167
Annual Project costs as compared to 10/11 cent price index ABSENT flexible debt mechanism																								
Mayo B net costs (sav) to 10 c			511	290	106	(75)	(258)	(342)	308	1,315	1,008	786	555	293	14	(267)	(548)	(831)	(1,113)	(1,391)	(1,660)	(1,927)	(2,192)	(2,453)
Mayo B net costs (sav) to 11 c			247	6	(193)	(390)	(588)	(677)	42	1,153	819	578	327	42	(262)	(567)	(874)	(1,182)	(1,489)	(1,792)	(2,086)	(2,378)	(2,668)	(2,954)

Mayo B (with Mayo Lake added storage and Carmacks Copper) Annual Costs ($000)
Assumed YEC initial ratebase cost:

Assumed cost of capital:

			2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
		year	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Loads																								
Grid Load (GW.h)			517.0	526.7	536.6	546.6	556.9	567.3	577.9	588.7	599.7	610.9	622.3	633.9	645.8	657.7	669.9	682.3	694.9	707.8	720.9	734.2	747.8	761.6
WAF + MD Non-Industrial loads			526.8	536.5	546.3	556.4	566.6	577.0	587.6	598.4	609.4	620.6	632.0	643.7	655.5	667.5	679.6	692.0	704.6	717.5	730.6	743.9	757.5	771.4
MINTO																								
Carmacks Copper																								
Alexco																								
Fish Lake and Wind			-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73
Net Generation Contribution from Mayo B (MW.h)			33,958	34,820	35,615	36,343	37,004	37,598	38,068	38,330	38,597	38,869	39,147	39,429	39,717	40,007	40,302	40,603	40,910	41,222	41,400	41,400	41,400	41,400
PV over 65 years		Net Gen (GW.h.)																						
PV at	4.47%	660,909																						
With Mayo B																								
Existing Hydro			410.3	411.1	411.8	412.3	412.6	412.8	412.9	413.1	413.4	413.7	414.0	414.3	414.6	414.9	415.2	415.6	415.9	416.2	416.4	416.4	416.4	416.4
Mayo B - net benefit to system			34.0	34.8	35.6	36.3	37.0	37.6	38.1	38.3	38.6	38.9	39.1	39.4	39.7	40.0	40.3	40.6	40.9	41.2	41.4	41.4	41.4	41.4
Total Hydro			444.2	446.0	447.4	448.7	449.6	450.4	450.9	451.5	452.0	452.6	453.2	453.7	454.3	454.9	455.5	456.2	456.8	457.4	457.8	457.8	457.8	457.8
Diesel			72.8	80.8	89.2	98.0	107.2	116.9	126.9	137.2	147.7	158.3	169.2	180.2	191.5	202.8	214.4	226.1	238.1	250.3	263.1	276.4	290.0	303.8
Total Dispatchable Generation			517.0	526.7	536.6	546.6	556.9	567.3	577.9	588.7	599.7	610.9	622.3	633.9	645.8	657.7	669.9	682.3	694.9	707.8	720.9	734.2	747.8	761.6
No Mayo B																								
Existing Hydro			410.3	411.1	411.8	412.3	412.6	412.8	412.9	413.1	413.4	413.7	414.0	414.3	414.6	414.9	415.2	415.6	415.9	416.2	416.4	416.4	416.4	416.4
Diesel			106.758	115.579	124.768	134.320	144.230	154.491	165.011	175.538	186.261	197.181	208.304	219.633	231.171	242.811	254.666	266.741	279.039	291.564	304.470	317.806	331.388	345.223
Total			517.0	526.7	536.6	546.6	556.9	567.3	577.9	588.7	599.7	610.9	622.3	633.9	645.8	657.7	669.9	682.3	694.9	707.8	720.9	734.2	747.8	761.6
Mayo B Diesel offset			34.0	34.8	35.6	36.3	37.0	37.6	38.1	38.3	38.6	38.9	39.1	39.4	39.7	40.0	40.3	40.6	40.9	41.2	41.4	41.4	41.4	41.4
Costs																								
O&M costs ($000)		7,917	557	568	579	591	602	614	627	639	652	665	678	692	706	720	734	749	764	779	795	811	827	844
Depreciation ($000s)		8,970	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562
Carbon Credits ($000)			0	0	0	0	0	0	0	0														
Start of yr rate base ($000)			24,146	23,585	23,023	22,462	21,900	21,338	20,777	20,215	19,654	19,092	18,531	17,969	17,408	16,846	16,285	15,723	15,162	14,600	14,038	13,477	12,915	12,354
Mid year rate base ($000)			23,865	23,304	22,742	22,181	21,619	21,058	20,496	19,935	19,373	18,812	18,250	17,688	17,127	16,565	16,004	15,442	14,881	14,319	13,758	13,196	12,635	12,073
Equity Return ($000)		15,330	810	791	772	753	734	715	696	677	658	639	620	601	582	563	543	524	505	486	467	448	429	410
Debt Return ($000)		14,301	756	738	720	703	685	667	649	632	614	596	578	560	543	525	507	489	471	454	436	418	400	382
Total Return ($000)		29,631	1,567	1,530	1,493	1,456	1,419	1,382	1,345	1,309	1,272	1,235	1,198	1,161	1,124	1,087	1,050	1,014	977	940	903	866	829	792
Secondary volume enhanced			1314	1178	1040	899	756	610	500	500	500	500	500	500	500	500	500	500	490	178	0	0	0	0
Sec price			0.111	0.114	0.116	0.118	0.120	0.123	0.125	0.128	0.130	0.133	0.136	0.138	0.141	0.144	0.147	0.150	0.153	0.156	0.159	0.162	0.165	0.169
Sec revenues		2236.2	146.2	133.8	120.4	106.2	91.1	74.9	62.7	63.9	65.2	66.5	67.8	69.2	70.6	72.0	73.4	74.9	74.9	27.7	0.0	0.0	0.0	0.0
Mayo B Total Costs - Net of Contributions ($000)		44,282	2,538	2,525	2,513	2,502	2,492	2,483	2,471	2,445	2,420	2,395	2,370	2,345	2,321	2,297	2,273	2,249	2,227	2,253	2,259	2,239	2,218	2,198
$/kW.h (net)			0.0748	0.0725	0.0706	0.0688	0.0673	0.0660	0.0649	0.0638	0.0627	0.0616	0.0605	0.0595	0.0584	0.0574	0.0564	0.0554	0.0544	0.0547	0.0546	0.0541	0.0536	0.0531
PV over life	$	44,282																						
levelized $/kW.h	$	0.0670																						
Benefits																								
Diesel Cost			0.408	0.416	0.424	0.433	0.441	0.450	0.459	0.468	0.478	0.487	0.497	0.507	0.517	0.528	0.538	0.549	0.560	0.571	0.582	0.594	0.606	0.618
Total cost to supply same load with diesel			13848.98	14484.82	15111.85	15728.99	16335.23	16929.69	17483.76	17956.37	18443.21	18944.75	19461.48	19993.90	20542.54	21106.46	21687.61	22286.56	22903.92	23540.29	24114.71	24597.00	25088.94	25590.72
Mayo B net costs (sav) to diesel			(11,311)	(11,960)	(12,599)	(13,227)	(13,843)	(14,446)	(15,013)	(15,511)	(16,023)	(16,550)	(17,091)	(17,648)	(18,222)	(18,810)	(19,415)	(20,037)	(20,676)	(21,287)	(21,855)	(22,358)	(22,871)	(23,393)
Total diesel cost without Mayo B			$ 43.5	$ 48.1	$ 52.9	$ 58.1	$ 63.7	$ 69.6	$ 75.8	$ 82.2	$ 89.0	$ 96.1	$ 103.6	$ 111.4	$ 119.6	$ 128.1	$ 137.0	$ 146.4	$ 156.2	$ 166.5	$ 177.3	$ 188.8	$ 200.8	$ 213.4
10 cent index			0.155	0.158	0.161	0.164	0.167	0.171	0.174	0.178	0.181	0.185	0.188	0.192	0.196	0.200	0.204	0.208	0.212	0.216	0.221	0.225	0.230	0.234
11 cent index			0.170	0.173	0.177	0.180	0.184	0.188	0.192	0.195	0.199	0.203	0.207	0.211	0.216	0.220	0.224	0.229	0.233	0.238	0.243	0.248	0.253	0.258
Annual Project costs as compared to 10/11 cent price index ABSENT flexible debt mechanism																								
Mayo B net costs (sav) to 10 c			(2,711)	(2,966)	(3,216)	(3,461)	(3,700)	(3,934)	(4,157)	(4,361)	(4,571)	(4,787)	(5,007)	(5,234)	(5,466)	(5,704)	(5,948)	(6,199)	(6,455)	(6,671)	(6,882)	(7,086)	(7,293)	(7,503)
Mayo B net costs (sav) to 11 c			(3,236)	(3,515)	(3,788)	(4,057)	(4,320)	(4,576)	(4,819)	(5,042)	(5,270)	(5,505)	(5,745)	(5,992)	(6,245)	(6,504)	(6,770)	(7,044)	(7,323)	(7,563)	(7,796)	(8,018)	(8,244)	(8,473)

Mayo B (with Mayo Lake added storage and Carmacks Copper) Annual Costs ($000)

Assumed YEC initial ratebase cost:

Assumed cost of capital:

			2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076
year			45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65
Loads																							
Grid Load (GW.h)			775.7	790.1	804.7	819.6	834.7	850.2	865.9	881.9	898.2	914.9	931.8	949.0	966.6	984.5	1002.7	1021.2	1040.1	1059.3	1078.9	1098.9	1119.2
WAF + MD Non-Industrial loads			785.4	799.8	814.4	829.3	844.5	859.9	875.6	891.6	908.0	924.6	941.5	958.7	976.3	994.2	1012.4	1030.9	1049.8	1069.1	1088.7	1108.6	1129.0
MINTO																							
Carmacks Copper																							
Alexco																							
Fish Lake and Wind			-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73	-9.73
Net Generation Contribution from Mayo B (MW.h)			41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400	41,400
PV over 65 years		Net Gen (GW.h.)																					
PV at	4.47%	660,909																					
With Mayo B																							
Existing Hydro			416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4
Mayo B - net benefit to system			41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4
Total Hydro			457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8	457.8
Diesel			317.9	332.3	346.9	361.8	376.9	392.4	408.1	424.1	440.4	457.1	474.0	491.2	508.8	526.7	544.9	563.4	582.3	601.5	621.1	641.1	661.4
Total Dispatchable Generation			775.7	790.1	804.7	819.6	834.7	850.2	865.9	881.9	898.2	914.9	931.8	949.0	966.6	984.5	1002.7	1021.2	1040.1	1059.3	1078.9	1098.9	1119.2
No Mayo B																							
Existing Hydro			416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4	416.4
Diesel			359.313	373.663	388.279	403.166	418.328	433.770	449.499	465.518	481.833	498.450	515.375	532.613	550.170	568.051	586.264	604.813	623.705	642.947	662.545	682.506	702.835
Total			775.7	790.1	804.7	819.6	834.7	850.2	865.9	881.9	898.2	914.9	931.8	949.0	966.6	984.5	1002.7	1021.2	1040.1	1059.3	1078.9	1098.9	1119.2
Mayo B Diesel offset			41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4
Costs																							
O&M costs ($000)		7,917	860	878	895	913	931	950	969	988	1008	1028	1049	1070	1091	1113	1135	1158	1181	1205	1229	1253	1279
Depreciation ($000s)		8,970	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562	562
Carbon Credits ($000)																							
Start of yr rate base ($000)			11,792	11,231	10,669	10,108	9,546	8,985	8,423	7,862	7,300	6,738	6,177	5,615	5,054	4,492	3,931	3,369	2,808	2,246	1,685	1,123	562
Mid year rate base ($000)			11,512	10,950	10,388	9,827	9,265	8,704	8,142	7,581	7,019	6,458	5,896	5,335	4,773	4,212	3,650	3,088	2,527	1,965	1,404	842	281
Equity Return ($000)		15,330	391	372	353	334	315	296	277	257	238	219	200	181	162	143	124	105	86	67	48	29	10
Debt Return ($000)		14,301	365	347	329	311	294	276	258	240	222	205	187	169	151	133	116	98	80	62	44	27	9
Total Return ($000)		29,631	756	719	682	645	608	571	534	498	461	424	387	350	313	276	240	203	166	129	92	55	18
Secondary volume enhanced			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sec price			0.172	0.176	0.179	0.183	0.186	0.190	0.194	0.198	0.202	0.206	0.210	0.214	0.218	0.223	0.227	0.232	0.236	0.241	0.246	0.251	0.256
Sec revenues		2236.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mayo B Total Costs - Net of Contributions ($000)		44,282	2,178	2,158	2,139	2,120	2,101	2,083	2,065	2,047	2,030	2,014	1,997	1,982	1,966	1,951	1,936	1,922	1,909	1,895	1,883	1,870	1,859
$/kW.h (net)			0.0526	0.0521	0.0517	0.0512	0.0508	0.0503	0.0499	0.0495	0.0490	0.0486	0.0482	0.0479	0.0475	0.0471	0.0468	0.0464	0.0461	0.0458	0.0455	0.0452	0.0449
PV over life	$	44,282																					
levelized $/kW.h	$	0.0670																					
Benefits																							
Diesel Cost			0.630	0.643	0.656	0.669	0.682	0.696	0.710	0.724	0.739	0.754	0.769	0.784	0.800	0.816	0.832	0.849	0.866	0.883	0.901	0.919	0.937
Total cost to supply same load with diesel			26102.54	26624.59	27157.08	27700.22	28254.22	28819.31	29395.69	29983.61	30583.28	31194.95	31818.84	32455.22	33104.33	33766.41	34441.74	35130.58	35833.19	36549.85	37280.85	38026.46	38786.99
Mayo B net costs (sav) to diesel			(23,925)	(24,467)	(25,018)	(25,581)	(26,153)	(26,736)	(27,331)	(27,936)	(28,553)	(29,181)	(29,821)	(30,474)	(31,138)	(31,815)	(32,505)	(33,208)	(33,925)	(34,655)	(35,398)	(36,156)	(36,928)
Total diesel cost without Mayo B			$ 226.5	$ 240.3	$ 254.7	$ 269.8	$ 285.5	$ 302.0	$ 319.2	$ 337.1	$ 355.9	$ 375.6	$ 396.1	$ 417.5	$ 439.9	$ 463.3	$ 487.7	$ 513.2	$ 539.8	$ 567.6	$ 596.6	$ 626.9	$ 658.5
10 cent index			0.239	0.244	0.249	0.254	0.259	0.264	0.269	0.275	0.280	0.286	0.291	0.297	0.303	0.309	0.315	0.322	0.328	0.335	0.341	0.348	0.355
11 cent index			0.263	0.268	0.274	0.279	0.285	0.290	0.296	0.302	0.308	0.314	0.320	0.327	0.333	0.340	0.347	0.354	0.361	0.368	0.375	0.383	0.391
Annual Project costs as compared to 10/11 cent price index ABSENT flexible debt mechanism																							
Mayo B net costs (sav) to 10 c			(7,717)	(7,935)	(8,156)	(8,381)	(8,609)	(8,842)	(9,078)	(9,319)	(9,563)	(9,812)	(10,064)	(10,321)	(10,583)	(10,849)	(11,120)	(11,395)	(11,675)	(11,960)	(12,250)	(12,545)	(12,845)
Mayo B net costs (sav) to 11 c			(8,707)	(8,944)	(9,185)	(9,431)	(9,680)	(9,934)	(10,193)	(10,455)	(10,722)	(10,994)	(11,270)	(11,552)	(11,838)	(12,129)	(12,425)	(12,727)	(13,033)	(13,345)	(13,663)	(13,986)	(14,315)

TOPIC: Project Costs

REFERENCE:

Application, page 10

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).

QUESTION:

a) Do the estimates provided take into account the economic downturn and therefore reflects lower construction rates for the various trades utilized during the construction?

b) In Board Order 2009-8 Appendix A (Reasons for Decision) at paragraph 196 (page 37) the Board states: To alleviate existing concerns regarding YEC's ability to estimate, the Board directs YEC, in future, to file any Part 3 applications before this Board only when preliminary engineering estimates are available and included as part of the application.

c) In this application, are the estimates provided based on preliminary engineering estimates?

d) Please provide a copy of the Constructions Contractor MOU between YEC and PKS.

e) Please explain what is meant by "resolution of ongoing ES&G treatment for this specific project." Will this project attract the same ES&G rate as all other YEC capital projects?

f) For all regulatory aspects of this project which have been reviewed by this Board or are to be reviewed by this Board, including development costs – have those costs been recorded to the project according to the Board scale of costs?

g) Please provide the business case for this project, including the electronic models, and state all assumptions used in the economic analysis of the business case. Have the business case provide the economic analysis based on the current approved water levels.

h) Please provide the details of your levelized cost of energy calculations as noted in footnote 12 of page 10 of the application.

ANSWER:

(a)

Yes, the estimates reflect economic conditions as projected at the time of the estimate.

(b) and **(c)**

In this instance, the process for this specific project and the timing for the Application has allowed YEC to base the cost estimates on preliminary engineering estimates as well as construction contractor estimates.

(d)

The MOU between YEC and PKS includes provision that it is confidential between the parties.

(e)

The ES&G rate varies for different scale projects. It was necessary for YEC to determine an appropriate ES&G rate for this size and type of project. The ES&G on this project is 0.5%, and is lower than the typical ES&G rates used on other (smaller) YEC capital projects.

(f)

All costs related to Board processes for review of this project will be subject to Board approval and will comply with Board directives.

(g)

The Application provides the business case for the project, as required by OIC 2007/50 and the Minister's terms of reference, including:

- Description of the project;
- Economic analysis (including preliminary engineering estimates);
- Discussion of alternatives and how the chosen options was determined;
- Discussion of the risks of proceeding with the chosen alternative;
- Discussion of the risks of not proceeding with the chosen alternative; and
- Discussion of all assumptions used in the economic analysis of the business case.

Please see the response to YUB-YEC-1-25(a) for relevant electronic models. The water modeling for this project in particular considers a full range of water flows and the mean hydro system output across the full range of flow regimes. With respect to licenced storage, the analysis in the Application includes cases both with and without changes to the current Mayo Lake licenced drawdown levels; however, the Mayo B project in any event requires changes to the approved water regime downstream of the existing Wareham Dam.

(h)

Please see the response to YUB-YEC-1-25(a) for the details of the levelized cost of energy (LCOE) calculations in the Application. These LCOE calculations followed the same procedure as adopted in the Resource Plan and in earlier estimates for the project noted in footnote 12 at page 10 of the Application.

TOPIC: Levelized Cost of Energy

REFERENCE:

Application, pages 11 & 12

QUESTION:

a) Are the B.C. green market power purchase costs, the highest costs for energy in B.C?

b) Please provide, in tabular form, a comparison of the LCOE of existing Yukon hydro generation including the Aishihik 3rd Turbine and other alternatives such as Marsh Lake Fall/Winter Storage, Atlin Winter Storage, Gladstone Diversion and the Aishihik Rewind.

c) Please explain how the target range of 8 to 10 cents per kWh was established. Using the same output assumptions, same forecast operating costs, and financing assumptions what does this range represent in capital expenditures?

d) What would be the LCOE if it was calculated over 35 and 50 years? Please provide the calculations for the LCOE over 35 and 50 years.

ANSWER:

(a)

Yukon Energy is not aware if there are higher costs for energy in B.C. than green market power purchases.

(b)

YEC's information on LCOEs for other alternatives has not been updated from what was provided during YEC's 2008/2009 GRA.[1] Please also see YUB-YEC-1-8(a).

[1] Undertaking #28 as filed by YEC indicated LCOE's ($2007) of about 8 c/kW.h for Gladstone Diversion ($28 million capital cost estimate), about 4 c/kW.h for Atlin winter small storage ($14 million capital cost), and about 1 c/kW.h for Marsh Lake fall/winter storage (capital cost of $1.1 million).

It is not possible to calculate an LCOE for the existing hydro systems as they were constructed many years ago and the required data on original construction cost, annual operating costs, and production by year for the life of the projects is simply not available. To give an indication as to their present costs, the existing hydro system in 2009, based on the joint YEC/YECL cost of service filed as part of the concurrent Phase II Application, indicates hydro costs of approximately $9.8 million in 2009, on generation of approximately 350 GW.h, for a net cost in that year of approximately 2.8 cents/kW.h

(c)

The target range of 8-10 cents/kW.h was based on YEC's knowledge at that time of BC Hydro power acquisitions. The 2006 Call for Tenders resulted in a price of 7.36 cents/kW.h. The current call for clean power supplies in BC is not yet complete, but early indications were that the prices were to be notably above the 2006 levels.

More recent information from BC Hydro indicates they are planning for a new Long Run Marginal Cost or new supply at 12 cents/kW.h in 2010$.[2]

Using the same output assumptions, same forecast operating costs, and financing assumptions as in Figure 1 of the Application, the 8 to 10 c/kW.h range of LCOE represents a range in capital expenditure as follows:

- With enhanced Mayo Lake storage, approximately $44.7 to $57.3 million; and
- Without enhanced Mayo Lake storage, approximately $38.7 to $49.8 million.

(d)

Calculation of LCOE for long-lived projects over 35 to 50 years is not reflective of the benefits hydro projects bring in terms of longevity. Applying shorter timeframes to the project life calculated in YUB-YEC-25(a) derives an LCOE of 7.14 ¢/kW.h for 50 years, and 8.07 ¢/kW.h for 35 years.[3]

[2] BC Hydro Large General Service Rate Application, page 1-10. Dated November 5, 2009.

[3] These calculations assume the project remains depreciated over a 65 year life, consistent with YEC's depreciation parameters and trends in other utilities.

TOPIC: Mayo B Refinements

REFERENCE:

Application, page 12

"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."

QUESTION:

a) What kind of potential increased energy output can YEC expect?

b) Is there a current firm need for the increased output? If not, when does YEC forecast a firm need for the increased output?

c) What is the current rate for secondary sales?

d) For YEC's base assumptions on the Mayo B project, in tabular form, please provide the expected quantity of secondary sales for each of the next 10 years than can be met through the availability of Mayo B's energy output.

ANSWER:

(a) and **(b)**

After further analysis, YEC has decided not to pursue any material change to the power house location (on the grounds that the added costs and cost risks were not justified by the expected energy gains of approximately 3 to 5 GWh/yr). It is not known at present what, if any, other potential increased energy output YEC can expect from final design or other possible refinements, but it is likely to be very much less than the gain being examined with regard to an alternate powerhouse location.

Based on the load forecasts in the Application, there is a current firm need for increased output in the ranges that have been examined for Mayo B. However, in assessing such

potential increased output, YEC continues to be constrained by the overall Mayo B budget and the objective not to increase the net generation LCOE (net of all no cost capital contributions) over the project life.

(c)

The current retail secondary rate used to determine the revenues that YEC and/or YECL book revenues (the "GRA approved" value) is 7.2 cents/kW.h.

The latest quarterly retail rate change was issued February 18, indicating the rate charged for secondary sales is 6.6 cents/kW.h (the difference between this value and the "booked" value is charged or credited to the Rider F account).

(d)

Please see YUB-YEC-1-25(a).

TOPIC: Net Generation

REFERENCE:

Application, page 13

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).

PREAMBLE:

The Board wishes to better understand this statement.

QUESTION:

a) Does the above statement imply that for Mayo B to displace diesel, it must first displace other hydro plants which displace diesel? Please explain.

ANSWER:

(a)

To a small degree, yes - in the sense that the analysis of Mayo B diesel displacement must consider the overall net effect of Mayo B on diesel generation, over the full range of water flow conditions, and after full consideration of what existing hydro facilities would provide with and without Mayo B.

Interactions of Mayo B with other hydro plants in Yukon are elaborated on below.

Any integrated hydro-based grid must be planned and operated to recognize the inherent variability and uncertainty with respect to water inflows. In short, there will be

high water years and low water years, and further it is not necessarily possible to predict when each will occur.

On an isolated grid with no export markets, there can arise situations where a given mix of hydro plants, in very high inflow years, can have the ability to produce more energy that is required on the system, or can have greater spring inflows than the available storage range can hold through to the next winter (when power demands are highest). For example, the existing Yukon dispatchable hydro system,[1] with the interconnection of CSTP Stage 2, can produce an average generation of 402.3 GW.h when the overall system load is 468.1 GW.h/year (leaving 65.7 GW.h to be served from diesel). Notwithstanding these averages, there are certain very high water years where the existing hydro generation assets (absent Mayo B) could produce 452.8 GW.h leaving only 15.3 GW.h served from diesel. Under this load condition, one could develop a generation resource that could produce, for example, up to 40 GW.h every year; however, the net benefit of this resource is not 40 GW.h *on average*, as there are certain years (the high water example) where the TOTAL amount that this new generation could contribute to the grid (i.e., displacing diesel) is a maximum of 15.3 GW.h.

The same situation arises for Mayo B. Under a near infinite load case (e.g., if the Yukon had export markets that would absorb all excess hydro power) Mayo B could contribution as much as 41.4 GWh/year on average. But when loads are not infinite, such that the generating system can only supply so as to meet the power demand in Yukon, there will be times that adding Mayo B will mean the other plants are driven to occasionally spill slightly more water than they might have otherwise. A comprehensive economic assessment of Mayo B therefore needs to consider not only the Mayo B output, but also the consequential effects on the other hydro plants. This is what was done in the analysis in the Application.

[1] Whitehorse, Aishihik and Mayo A, but absent Mayo B.

TOPIC: Displaced diesel/hydro generation

REFERENCE:

Mayo Hydro Enhancement Project (Mayo B) Application; page 13

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 **[Emphasis added].**

PREAMBLE:

The YUB wishes to understand the above quote.

QUESTION:

a) Please provide the study and accompanying analysis that led to the base case forecast, wherein "Mayo B net generation contribution the system 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."

b) Please provide a comparative study and analysis, using the same components that underpin the above study, wherein Mayo B is operated "absent [the] 1 meter drawdown."

c) Please confirm that operationally, Mayo B output may be curtailed as a) it may displace hydro output elsewhere on the IS and b) to minimize line losses?

d) In consideration of the answer to part (c) and using Attachment C-1 as a template, please provide a table with the expected average MW output of Mayo B. For clarity please provide average output using the following table:

	Firm Load Level (GW.h/year)		
Water Conditions	417 GW.h	468 GW.h	575 GW.h
Extreme Low Water			
Median Water			
Extreme High Water			

e) Please explain why in 2012, Mayo B net generation approximates 26.4 GW.h, and then ranges from 14.9 to 41.4 GW.h/yr over the Projects economic life?

ANSWER:

(a) and **(b)**

Please see YUB-YEC-1-25(a) and YUB-YEC-1-30A(a).

(c)

No. Mayo B output would not be "curtailed" in the noted situations. In assessing the generation output of storage-based hydro projects, it is important to consider the overall dispatch order, and the trade-offs that exist in respect of "generate or store" decisions.

The premise for operation of Mayo B is that at any given time, it will be dispatched at the maximum level available so long as there is water remaining in the Mayo system to permit such operation, and all less flexible generation resources have been dispatched (i.e., Fish Lake, Haeckel Hill wind, other required releases such as minimum flows at Aishihik, and the greatest practical output of Whitehorse Hydro at that point in time). In the event there is not sufficient load to permit Mayo B to be dispatched at full output, the plant will be operated as required and any additional flows, to the extent possible, will be added to storage (largely at Mayo Lake).

Despite this operational approach to managing the system, the planning perspective and analysis of Mayo B is required to consider only the economic value arising from displaced diesel generation, and not displaced hydro generation. The Mayo B generation contribution values shown in YUB-YEC-1-25(a) reflect this "net contribution" concept.

(d)

The output of the Mayo B facility as requested (i.e., not net generation, but total output of the single Mayo B facility[1]) for these three generation/flow conditions is shown in Table 1 below.

Table 1: Mayo B Generation in Low, Median and High Water Scenarios

Total Generation of the Mayo B Plant (all output from the new units installed) under the noted conditions
Water conditions noted are to correlate with Table C1 of the YEC Part III filing

	417 GW.h load level		468 GW.h load level		575 GW.h load level	
	Annual Energy GW.h	Annual Average Capacity MW	Annual Energy GW.h	Annual Average Capacity MW	Annual Energy GW.h	Annual Average Capacity MW
Extreme Low Water	38.0	4.3	40.7	4.7	46.2	5.3
Median	59.3	6.8	62.3	7.1	60.6	6.9
Extreme High Water	77.3	8.8	83.0	9.5	86.3	9.9

It is important to note a few major cautions with respect to the data in Table 1:

1) Table 1 above and Table C1 in the Application (page C-4) are not additive. This is because the data requested is for the single Mayo B plant. The above table does not take into account changes that occur to the generation at the other plants on the system (including Mayo A) as they are illustrated in Table C-4 once the Mayo B plant is introduced to the modeling.

2) The results above are the model outputs for a single plant for a single water year. It is typically very hard to fully understand this type of limited extract from larger model outputs without extensive additional analysis. For example, for each load scenario, the highest and lowest Mayo B outputs, as well as the median annual

[1] Note that in focusing only on Mayo and not including Mayo A, this assessment is subject to the same limitations note in YUB-YEC-1-21 (a) through (f), and the results are difficult to compare with the Application's IS model gross and net generation assessments without specific reference to both firm and secondary loads.

output, were used – for the different load scenarios this does not always correspond to the same water year (e.g., for the extreme high water year, the 575 GW.h case is consistent with the 1987 flows, while for the low load case or 417 GW.h, the best output arises from the 2007 flow regime – the year in question can also change based on whether Mayo B is installed (Table 1 above) or not (Table C1 in the Application)). Many complicating relationships can arise by taking such cross-sections of model output that are more readily understood over longer periods of time and over more comprehensive presentation of a full complement of generating plants (as shown in Table C1).

(e)

Please see YUB-YEC-1-25(a).

TOPIC: Displaced diesel/hydro generation

REFERENCE:

Mayo Hydro Enhancement Project (Mayo B) Application; page 13

"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. **[Emphasis added]**

PREAMBLE:

The YUB wishes to understand the above.

QUESTION:

a) Please provide the study, assumption and accompanying analysis that led to the base case forecast, wherein "Mayo B net generation contribution to the system 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."

b) Please provide the base case forecast, i.e. the approximate GW.h in 2012 and the range of output (GW.h) over the Project's assumed 65 year economic life, without Mayo Lake enhanced storage.

c) Please explain what is meant by the statement, "By comparison, gross generation at Mayo B during this same period would be expected to fluctuate considerably less under the same forecast load condition." Please provide an example.

d) YUB notes the statement that:

"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" **[Emphasis added]**

a) Please provide sensitivity analyses wherein the changes to annual grid generation load are within +/- 10% and +/- 5% of the base case generation load forecast.

e) Provide a detailed explanation regarding the water conditions that were used, i.e. extreme low, median water and extreme high water conditions, over the Project's assumed 65-year economic life.

ANSWER:

(a)

The net generation values used in each scenario are provided in the response to YUB-YEC-1-25(a).

Mayo B's "net generation contribution to the system" is in effect the diesel generation that Mayo B is forecast to displace that would otherwise be required on the existing and currently committed system, given the forecast firm grid loads to be served. "Net generation" from Mayo B varies therefore from year to year, as noted, depending on the forecast firm grid load levels. The base case load forecast assumptions and analysis adopted for this assessment are set out in Attachment D of the Application, and explain the varying integrated system loads assumed for 2012, 2019 and the remainder of the assumed 65 year economic life of the Mayo B project.

In order to estimate Mayo B net generation at any specific forecast firm grid load levels, the analysis in YUB-YEC-1-25(a) uses a method of estimating the mean net generation contribution of Mayo B corresponding to each particular load level (with different contribution values depending on whether enhanced storage at Mayo Lake is included in the analysis). The net effect of this analytical approach, which is explained in more detail below, is shown in Figure 1 below. The loads in Figure 1 do not arise from any particular forecast or scenario – they are the comprehensive modeling to show the relationship between load and generation at each load level:

Figure 1: Mean Generation to Serve Loads at Varying Levels

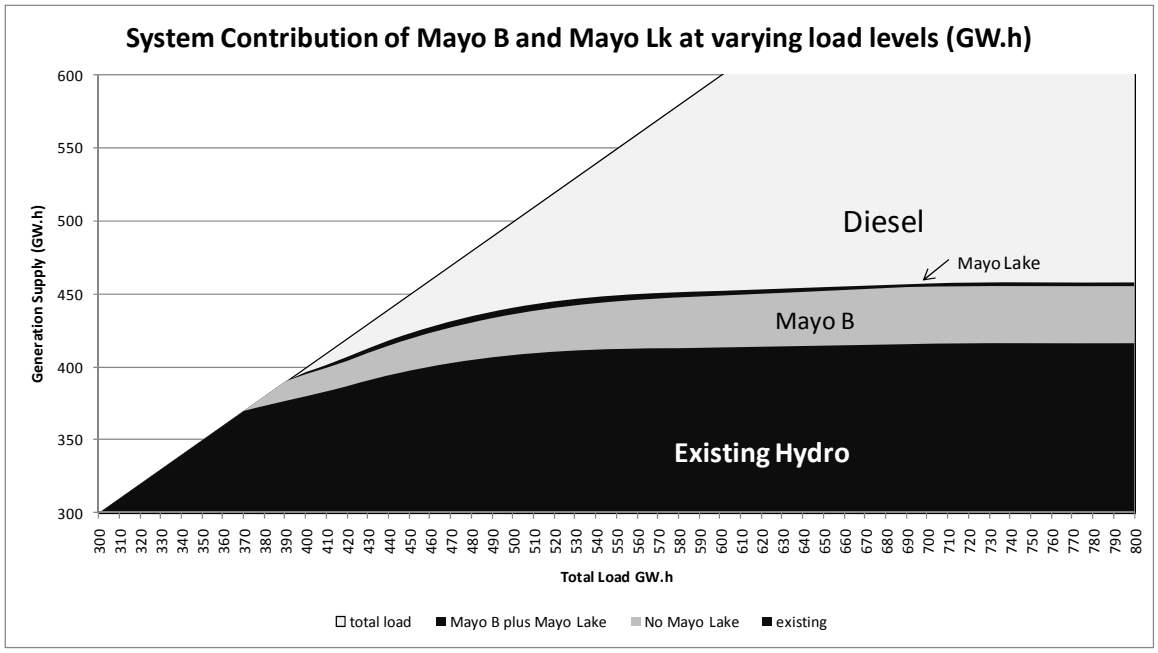


Figure 1 was derived from a detailed hydrologic model that was developed for Yukon Energy. That model considers the full range of potential inflows based on records for each location over the period 1987 to 2007 inclusive. The model runs on a weekly time step and is designed to replicate the dispatch of YEC's hydroelectric stations that would be used in the operation of the integrated system given the specific loads forecast to arise in each week including, for example, the following key modeling aspects:

- Key parameters for each plant such as head losses, efficiency, and maximum peak flows;
- Water licence and fisheries permit conditions for each plant; and
- Peaking constraints, as relevant.

The model produces a full range of possible generation values depending on the water flow and overlapping intra-year effects (such as water in storage at year-end). For economic modeling purposes, the model is used to generate mean output values at

select representative annual firm integrated grid load levels (for example, 417 GW.h, 468 GW.h, and 575 GW.h) for three output variables[1]:

- Hydro generation to serve firm load;
- Diesel generation to serve all residual firm load; and
- Excess hydro generation which can be used to supply secondary loads without affecting the management of water on the system.[2]

Figure 1 represents the interpolation of mean firm generation results for firm load levels between these modeled values, and largely linear extrapolation for values outside this range. To ensure very high load levels are not excessively extrapolated, the maximum generation from the hydro system is capped at the firm plus secondary hydro generation arising in the highest modeled (575 GW.h) load case.[3]

The specific Mayo B assumption used in deriving these values is as follows:

- Maximum Mayo B plant flow of 19 cms, corresponding to 10.1 MW maximum peak;
- Minimum required flows of 5 cms in winter from Mayo A, and in summer 6 cms from Mayo A, with a total 11 cms in summer downstream from Mayo B;

[1] The values were selected to generally represent the approximate near-term grid loads with Minto and Alexco but without Carmacks Copper (417 GW.h), near-term loads with Carmacks Copper (468 GW.h) and a higher load level representative of longer-term loads, or loads in the near term were all 3 of the noted mines to arise, plus approximately an additional 100 GW.h of industrial load (total 575 GW.h).

[2] This value represents only the generation that could have occurred at times when a plant was simultaneously spilling water and was not fully loading all turbines, such that the specific quantity of water could equally be run through the generating station without having to draw down the water in storage.

[3] To be specific, in the 575 GW.h case, there remains certain situations where the model will indicate secondary energy is available which could be generated to displace diesel generation if only there were loads to use this quantity of power. In the case of Mayo B, the 575 GW.h case indicates a net contribution to serve firm loads of 38.0 GW.h, plus a net contribution to secondary power availability of 3.4 GW.h. It is assumed that the absolute maximum net benefit of Mayo B is the sum of these two values (41.4 GW.h) which based on extrapolation would be achieved once loads reach approximately 720 GW.h. This approach may slightly understate the true maximum benefits of Mayo B, as a fully considered load case at the 720 GW.h level may also indicate some water management changes that could be implemented to further increase the net benefit of the plant; however, these load levels are very high and only assumed to occur far into the future, so are of limited consequence to the discounted economic analysis and as such were not individually modeled.

- 1.5% of output of Mayo B is assumed for station service;

- Mayo Lake licenced range as stated for the case (either existing, or with enhanced storage) with a 2.8 cms minimum outflow from Mayo Lake;

- Mayo B generating efficiency of 0.904 at full flow (19 cms);

- Rule curves are implemented for winter generation, to ensure that Mayo Lake is not drawn down so far at a given time during the winter that, should the lowest recorded inflows occur, YEC will not be able to simultaneously meet both the minimum licenced elevation constraint and the minimum outflow constraints for the remainder of the winter; and

- An effective 1% forced outage rate is assumed for Mayo B, only applied to situations where the plant is operating at full load[4]. Other Yukon plants use 3% as the forced outage rate, but the lower value for Mayo B reflects the fact that during forced outages of Mayo B, if there is no ability to store the given water there is the alternative ability to generate using this same water at Mayo A such that the effect of forced outages is of less magnitude than, for example, at Whitehorse in summer (where if the plant is otherwise operating at full load, a forced outage will inevitably lead to increased spill).

(b)

Please see YUB-YEC-1-25(a).

(c)

The statement means that forecast annual gross firm load generation at Mayo B and A (i.e., actual plant generation output) is much less sensitive to grid firm load levels than is the case for this plant's forecast annual net generation (i.e., estimated plant generation that displaces diesel generation that would otherwise have been required on the grids).

[4] At times when operating at partial load, a forced outage would result in the given quantity of water being stored for later use, so no net effect on generation – if operating at full load such later makeup could not be as readily assumed to practically occur.

This statement is explained in large part by the way in which the Mayo plant is assumed to be operated within the overall integrated grid system. The Mayo generation system (comprising Mayo B and Mayo A, as well as Mayo Lake storage) once completed will be one of the more flexible resources on Yukon Energy's system, given the annual storage available, but will not be as flexible as Aishihik which has a storage range that is more of a multi-year nature and a larger relative installed capacity (particularly once the Aishihik 3rd turbine is completed). Consequently in most situations on the new integrated system Mayo generation will be dispatched to a full output level in priority to Aishihik, and to the extent there is excess water on the system under some seasonal or annual situations the spillage would tend to occur at Aishihik (while Mayo's generation would remain near its full potential). The overall result of this mode of operation is that gross generation at the Mayo plant will tend to be maintained through a wide range of load levels, and the impact of grid loads on changes to grid hydro generation will tend to be focused at the Aishihik plant.

By way of example, under the present situation on WAF (e.g., 2009 test year loads), there is typically surplus hydro generation. Were a new wind turbine to be installed, for example, under these load conditions, the "net" contribution to the grid would be basically zero. However given the very inflexible nature of wind generation, the new wind turbine itself would be very high priority in the dispatch order and would typically generate its full "gross" potential, but the "net" effect would solely be to drive increased spillage typically at Aishihik compared to what would have been the case without the new wind turbine.

To use a Mayo B specific example, at the 468 GW.h load level, the response to YUB-YEC-1-21(a) indicates that absent Mayo B, the existing Mayo A plant would generate 36.1 GW.h. With Mayo B under this same scenario, the existing plant would generate 14.7 GW.h and Mayo B would generate 61.9 GW.h for a total 76.6 GW.h from the Mayo complex. This is an increase in generation of 40.5 GW.h. However, due to changes that occur at other hydro plants at this load level, the "net contribution" of Mayo B under this load level is 28.2 GW.h, which underlies the analysis shown in YUB-YEC-1-25(a)[5]. Although Aishihik is the main hydro plant where such net changes will occur related to load levels, some effects will also occur at the Whitehorse hydro plant.

[5] See YUB-YEC-1-21 (a) to (f) where it is noted that, due to different models used, the overall plant results provided in that response (i.e., the 40.5 GW.h noted here) are difficult to compare with the Application's IS model net generation assessments (i.e., the 28.2 GW.h noted here) without specific reference to both firm and secondary loads.

(d)

For YEC's approach to determining the net contribution of Mayo to the system under differing load scenarios, see YUB-YEC-1-30A(a). The LCOEs arising from the requested cases are as follows in Table 1:

Table 1: LCOE sensitivity to variations in load forecast

(throughout the entire 65 year scenario)

Scenario	LCOE (cents/kW.h)
Base Case (with Carmacks Copper and Mayo Lake)	6.69
All loads (including industrial and losses) up by 10% throughout the scenario	5.92
All loads (including industrial and losses) up by 5%	6.24
All loads (including industrial and losses) down by 5%	7.53
All loads (including industrial and losses) down by 10%	8.77

(e)

Please see YUB-YEC-1-30A (a). The range of water conditions was also reviewed in Attachment C to the Application (Table C-1 reviews impacts on existing generation of this range).

TOPIC:

REFERENCE:

Section 3.2, Anticipated Timeline

PREAMBLE:

The YUB wishes to understand the current status of Project planning and design.

QUESTION:

a) Please provide a detailed explanation as to what remains to be done with respect to project planning and design.

b) YEC states "In order to meet the target in-service date, long lead equipment (i.e., the Turbine/Generator [T/G] must be contracted in early 2010 from a supplier selected and committed before the end of 2009." Please confirm that a T/G contractor has been committed to and selected.

c) If the answer to part (b) is yes, please provide "a more definitive target schedule for in service of Mayo B facilities" and updated "expected costs and requirements."

d) Considering that "Mayo B in service is currently planned to occur on, or before, December 31, 2011" and the updated costs estimate provided in part (c), can YEC confirm the accuracy range of the estimate to be within plus 20% minus 10% of final costs?

e) If YEC cannot confirm part (d) please provide a detailed explanation.

ANSWER:

(a)

The key timeline elements and work remaining with respect to project planning and design as at early December were set out in the Application (section 3.2).

Since early December 2009 planning and design have focused on conclusion of the turbine generator contractor selection and related initial agreement, contract negotiation and finalization for the other contract arrangements required for construction (including completion of related engineering specifications), negotiation of the NND Project Agreement, and ongoing responses and discussions as required with YESAB, DFO, Navigable Waters (Transport Canada), Yukon Government permitting authorities and other permitting authorities.

Aside from the current Application and finalizing relevant construction-period contracts as well as the NND Project Agreement, the main Mayo B planning work that remains today relates to YESAB and permitting as required to start construction on target by June 1, 2010; thereafter, additional permitting will remain (e.g., Water Board process to secure Water Licence amendment). Design work is focused on preparation of final design as required for construction.

As noted in the Application, the Mayo Lake Project planning work also remains a priority, with the focus entirely on addressing the required YESAB submission and permitting along the timelines set out in the Application.

(b)

Confirmed. Please see YUB-YEC-1-24(b).

(c)

The target date for in-service of Mayo B remains at December 31, 2011, and the estimated project budget cost remains at $120 million.

(d) and **(e)**

Confirmed that accuracy is within the noted range. YEC is establishing contract arrangements intended to limit overall project costs to the $120 million budget cost.

TOPIC: Cost of Diesel Generation Saved by Mayo B

REFERENCE:

Application, page 14 – Figure 1

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 forecast for Mayo B was to be provided from diesel plants at the assumed diesel price fuel costs (incremental diesel generation fuel and incremental O&M costs at approximately c/kW.h in 2010, increasing by inflation thereafter).

QUESTION:

a) Does the above illustration imply no new hydro generation projects over the 35 year period?

b) Is that a reasonable assumption?

ANSWER:

(a) and **(b)**

No, the illustration does not "imply no new hydro generation projects over the 35 year period" (in the sense that the illustration makes any such forecast).

The analysis assumes, for the specific purpose of assessing the effects of Mayo B relative to the current and committed existing system without Mayo B, that:

a) The net contribution of Mayo B is dependent on the load in each year – in this case the upward sloping line in part reflects that the load is increasing in each year; and

b) The cost of the diesel displaced by Mayo B increases each year with inflation.

The data for Figure 1 is derived from the models presented in YUB-YEC-1-25(a). Were additional new hydro generation to be developed in this time period, as YEC has stated

that it is working to accomplish, each such additional project would similarly be required to be assessed on a "net contribution" to the system as it then exists, and thereby be assessed on the same basis as is presently being undertaken for Mayo B. Accordingly, such analysis will indicate the extent to which each such proposed additional hydro generation project after Mayo B is expected to result in net generation displacement of diesel energy after considering fully the benefits provided by Mayo B (as well as all other then-existing renewable generation facilities).

TOPIC: YESAB Review Process

REFERENCE:

Application, page 15

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 of 2010. Under the MOU, a construction contract is targeted with PKS by the end of 2009. If a PKS contract cannot be successfully concluded, a competitive tender process and award is to be concluded by April 2010.

QUESTION:

a) Is there now a construction contract with PKS in place? If not, has a competitive tender process commenced?

b) If the YESAB review process and any related permitting requirements are affecting the required start of construction, why is a deadline for a report recommendation of March 31, 2010 so urgent versus a May 31, 2020 deadline?

ANSWER:

(a)

The construction contract key commercial terms were resolved in December and the full contract is currently being finalized.

(b)

Yukon Energy has advised all parties for some time (including YESAB and the Yukon Government), based on the advice it has received from it engineering consultants (KGS Group) and from Kiewit, that timing of the commencement of construction by June 1, 2010 is critical to maintaining project timelines (in order to meet the deadlines provided in the Federal Funding Agreement) and to maintain reasonable control over project costs (i.e., the later into summer construction is delayed after June 1, the higher the costs that are required to be incurred in order to maintain the required construction schedule and

complete all work that must be completed in the first construction season to meet the overall project deadlines).

As noted in response to YUB-YEC-1-2, certain specified permits are required to be obtained as soon as possible after the YESAB screening process is concluded and decision document are issued in order for construction to commence. This includes the Energy Project Certificate required from the Minister of Justice, i.e., construction cannot commence absent the issuance of this certificate. Accordingly, assuming that the Yukon Government is to have time to consider the Board's Report and then to prepare and issue the required Energy Project Certificate, a delay in the Board's Report until May 31, 2010 would presumably necessitate material delay in the construction start date beyond the June 1, 2010 date set out above as being required in this instance for the project to proceed with construction in a timely and cost effective manner.

As noted in the Application at page 16, YEC had expected that the YESAB Final Report would be issued by the end of March 2010 or early April 2010 (i.e., within 60 days after the release of the Draft Screening Report which YEC has expected would be released by the end of January 2010), thereby allowing Decision Documents and permits to be available as required by early to mid May. Delays in the issuance of the YESAB Draft Screening Report have shifted these dates – and YEC's concerns have been increased as to protecting June 1, 2010 as the outside date for construction start.

TOPIC: NND Project Agreement

REFERENCE:

Application, page 16

QUESTION:

a) What is the current status of the NND Project Agreement?

ANSWER:

(a)

As of March 1, 2010, the NND Project Agreement is under negotiation and has not been finalized.

TOPIC:

REFERENCE:

Application, Section 4.1.1 Need Based on Opportunity

QUESTION:

a) What is the primary driver for this project? Is it the available funding or does forecast load increased drive the project?

b) For the load component, is there currently enough surplus generation from Mayo A (M-D system) to meet the anticipated load requirements for the mine (Alexco) at Keno?

c) Would the addition of the Aishihik 3rd Turbine satisfy the incremental load requirements for the anticipated mine load at Carmacks?

d) Would the Marsh Lake Fall/Winter Storage and the Aishihik Rewind options enable enough hydro generation to meet load growth (outside of new industrial loads) on the WAF system?

ANSWER:

(a)

Both available funding and forecast load drive the project, and YEC has been clear that it could not proceed at this time without both elements.

The need for the project is described in section 4.1 of the Application which notes:

> 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.

See also response to YUB-YEC-1-41(c).

(b)

No. As noted in the response to YECL-YEC-1-8 Revised filed during the Yukon Energy 2008/2009 GRA and Undertaken #28 filed during that same proceeding, the current Alexco mine development will connect new load to the Mayo Dawson grid in 2010, utilizing surplus hydro on this grid and leading to new diesel generation requirements (over 3 GW/h in each of the first two years of mine operation, increasing to about 10 GW.h/yr thereafter) if no new power resource developments or grid connections are initiated. Timely completion of the CS Stage 2 could potentially assist to displace such near term MD diesel requirements in late 2010 and 2011 through use of any remaining WAF surplus hydro generation.

(c)

No. As noted in YECL-YEC-1-5 Revised filed during the Yukon Energy 2008/2009 GRA and Undertaking #28 filed during that same proceeding, that by 2012 the combined Minto, Carmacks Copper and Keno Hill loads (along with other projected WAF/MD firm loads, including added Faro reclamation loads but excluding secondary loads) would require over 70 GW.h of new generation beyond that which could be provided under long-term average water flows by the current WAF/MD hydro generation capability together with Aishihik Third Turbine and the completed CSTP Stage 2.

(d)

No.

While the Marsh Lake Fall/Winter Storage would increase the firm winter capacity of the Whitehorse Rapids hydro facility by about 1.6 MW and increase long-term average

hydro energy from this facility by about 7.7 GW.h/year, as noted during the Yukon Energy 2008/2009 GRA "smaller generation enhancements, such as a small scale Atlin winter storage project, the Marsh Lake Fall-Winter storage project, or a Gladstone diversion, were also identified as near term options that can be developed at an attractive cost, but earliest feasible in-service dates present specific risks that depend on the timeframes necessary to plan and licence the projects".[1]

Similarly, while re-runnering presents potential to increase mechanical capacity output, significant further work is required to confirm that the electrical system and various physical components (such as wicket gates and turbine bearings) can handle the increase in output."[2] The costs and practical full capabilities of this type of enhancement are yet to be determined with preliminary assessment work ongoing. YECL-YEC-1-26 Revised in the 2008/2009 GRA, noted that re-runnering hydro units is an active opportunity YEC continues to review, and will implement in the event economically feasible.

In any event, retail loads in Yukon have seen sustained growth over many years at 5-7 GW.h/ year on average and there are no indications that the utilities do not need to continue to plan to meet this level of growth into the future.

[1] See response to YUB-YEC-1-10.

[2] See 20-Year Resource Plan page 4-36 to 38; At page 4-38 it notes that re-running the Aishihik units was described as "facility enhancements that are preliminary and likely far too small to address the entire forecast shortfall, and "these supplemental project options have the potential to increase capacity, but are not of a sufficient size to materially address the near term capacity shortfall forecast for WAF."

TOPIC: Generation Planning/Project Need

REFERENCE:

Application, page 22

On page 22 of the Application, in the first full paragraph on that page, YEC makes the following statement:

"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 be added in a timely way to augment winter peak capacity as need to satisfy YEC's capacity planning criteria".

QUESTION:

a) What time period is being addressed in this statement?

b) Does the load forecast referred to in that statement include major industrial loads such as Minto, Alexco, and Carmacks Copper or does the load forecast omit major industrial loads?

c) Does the statement regarding the capabilities of the existing system include the Minto, Alexco and Carmacks Copper industrial loads?

d) Without the Mayo B project, when might additional diesel generation be needed and how much additional capacity would be needed to meet this forecast?

ANSWER:

(a) and **(b)**

There is no specific time period being referenced, beyond the general time periods covered in Figure 1.

Figure 1 at page 14 of the Application sets out the economic benefits of Mayo B by year in terms of avoided diesel costs and indicates that, based on present load forecasts including the major industrial loads as noted (but only to 2018 – no such loads are included beyond then), the project provides economic generation in each year compared to Yukon Energy supplying the same loads with diesel generation. Please see response to YUB-YEC-1-41 for a more detailed review of the underlying basis for these comments regarding the capability of the existing facilities to serve the forecast loads.

(c)

The statement indicates that existing installed generating capacity, supplemented as required by added diesel generation capacity where needed for reliability, can meet the loads as forecast including industrials. This is further explained in YUB-YEC-1-41 and YUB-YEC-1-42. However this can only be achieved using relatively large quantities of expensive diesel fuel to serve base loads.

(d)

As reviewed in YUB-YEC-1-41, Yukon Energy has not yet done a detailed assessment of the capacity planning criteria reflecting the situation with CSTP Stage 2 and Mayo B. One of the two major capacity criteria (the LOLE analysis) has not yet been updated to be able to model the benefits of the integrated grid. At the present time, each system on its own basically meets (WAF)[1] or exceeds (MD) the established planning criteria. The Mayo B project economics have not included any potential benefit from the contribution the plant can make towards deferring the need for installed diesel capacity to meet the capacity planning targets.

[1] Excluding the Minto diesels.

TOPIC:

REFERENCE:

Section 4.1, Need for the Project

Project Costs

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.

PREAMBLE:

The Yukon Utilities Board (YUB) seeks clarification of the assertion contained in the above quote.

QUESTION:

a) Please provide a table that outlines and describes the associated costs with Mayo B, i.e. substation costs, refurbishing of existing Distribution and Transmission lines to carry power to the Mayo Dawson 69 kV line, etc that are included in the Project estimate at this time.

b) Please provide the review(s) of alternative means to carry out the Project as well as alternatives to the Project that lead to the affirmation that "Mayo B, as proposed, is the optimum development for Yukon Energy to proceed with at this time."

c) Does YEC consider industrial customers such as Minto, and Alexco, and Carmacks Copper mines as being part of the baseload diesel generation requirements that will be displaced by Mayo? Please describe in detail.

d) If the answer to part (c) is no please provide a cost benefit analysis wherein industrial customers such as Minto, and Alexco, and Carmacks Copper mines elect to generate their own on-site power with fossil fuel generation rather than connect to the grid.

e) If material federal and YDC "no-cost" funding were not in place, please affirm and provide a detailed explanation that supports the notion that the Project provides "cost effective renewable hydro electric generation supplying all customers on the Yukon grid."

f) The capacity of Mayo B is approximately 15 MW. What is the expected capacity or output availability seasonally?

g) Please provide seasonal loadflow snapshots of the IS using 2009 summer and winter peak loading scenarios that includes the following amendments to the current system:
   a) Aishihik 3rd turbine in operation without Mayo B;
   b) Mayo B in operation without Aishihik 3rd turbine; and
   c) Both Mayo B and Aishihik 3rd turbine operational.

h) Please provide a detailed analysis of each loadflow in part (g).

ANSWER:

(a)

The direct construction costs (excluding clearing and grubbing for these specific elements as well as indirects and contingencies) for the requested associated components are currently estimated as follows:

• Access roads	$0.5 million
• Distribution & Transmission Lines	$1.0 million
• Mayo Substation tie in	$0.6 million
• Total	$2.1 million

The $120 million budget for Mayo B includes provision for all required new access roads, distribution and transmission lines to carry power at 69 kV to the existing Mayo substation (these costs are all part of the Contractor costs) plus an assigned provision of $600,000 for YEC's related minimum required upgrade of the Mayo substation (assumes a simple tap of the Mayo B 69 kV line to the bus, with appropriate disconnects for isolation). The Mayo B budget does not include costs for other activities at the Mayo site that relate to the maintenance, safety and upgrade requirements for the existing facilities independent of Mayo B development, including of Mayo intake gate repair and upgrade of the Mayo A substation.

(b)

Please see discussion provided in the Application at section 4.1.3 as well as Attachment A2 (which provides as an excerpt the discussion of alternative and alternative configurations from the February 27, 2009 Mayo Hydro Enhancement Project Proposal to YESAB).

(c) and **(d)**

Yes.

Industrial customers that are connected to the hydro grid system, such as Minto and Alexco (as well as Carmacks Copper in future forecasts) make up a portion of the grid firm load requirements that Yukon Energy must plan for and serve from utility generation on a non-discriminatory basis[1]. To the extent that the total load on the system exceeds levels that can be provided from renewable generation, and therefore must be met with baseload diesel generation, all loads drive that requirement. Specifically, based on normal principles applicable to the review and approval of rates in Canada for electric utilities, any customer using power at a time when peaking diesel is required contributes to that peak and the requirement for YEC diesel generation, and any customer using power in periods that drive baseload diesel generation similarly contribute to the requirement for YEC to run baseload diesel. Absent Mayo B, these baseload diesel requirements would be higher than they would be with the project.

[1] As is the case in most rate regulated jurisdictions YEC has an obligation to serve all customers that request electrical service within areas presently served by YEC. This includes industrial customers throughout the Yukon which request connection and agree to pay the transmission/distribution capital costs to connect to the existing grid.

The Mayo B economic analysis estimates projected diesel generation that, absent Mayo B, would need to be supplied by YEC. The concept of isolated self-generation by diesel is not relevant to Minto or Alexco – both these operations today are connected to the grid, or have facilities adjacent to the grid. Similarly, it is Yukon Energy's understanding that there is no likely prospect of Carmacks Copper developing or operating their particular operation based on use of on-site diesel generation.

(e)

Yukon Energy has stipulated that material "no cost" funding, sufficient to secure levelized costs of energy (LCOE) to ratepayers over the life of the project within 8 to 10 cents per kW.h range, was required for YEC to proceed with the Mayo B project at this time. As assessed by YEC, this LCOE is based on "net generation" and thereby also considers fully the relevant grid loads and the extent to which Mayo B is expected to displace diesel generation that would otherwise be required with existing and committed generation and transmission resources. (See also response to YUB-YEC-1-35(a).)

With no contributions and a rate base cost of $120 million, the LCOE of Mayo B, given presently forecast loads and assuming enhanced Mayo Lake storage, is approximately 20.04 ¢/kWh (2012$)[2] as set out at page 29 of the Application, and is below the forecast cost of incremental diesel generation (26.38¢/kWh in 2012$).

However, notwithstanding that the project is economic and will provide positive long-term benefits to ratepayers, absent no cost capital contributions the annual Mayo B costs as normally charged to ratepayers would remain above incremental diesel generation costs for close to the first 15 years of operation at the assumed based case loads (reflecting assumed loss of all industrial loads by year 8).[3] With the provision of no cost capital funding as noted, including YDC flexible debt financing commitments as described in section 4.3.3 of the Application, the project will have annual costs to ratepayers that do not exceed 10 to 11 ¢/kW.h (2012$) in any year (as well as LCOE costs to ratepayers

[2] This is calculated in the attachment to YUB-YEC-1-25(a).

[3] Figure 1 as provided in the Application illustrates 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 the project, reflecting normal utility revenues requirements to set rates and assuming Mayo Lake enhanced storage benefits are included. This figure 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, Alexco and Carmacks Copper) assumed to be connected in 2012 and shut down by 2019 (at varying dates).

over the life of the project that are less than 8 cents per kW.h even without enhanced Mayo Lake storage).

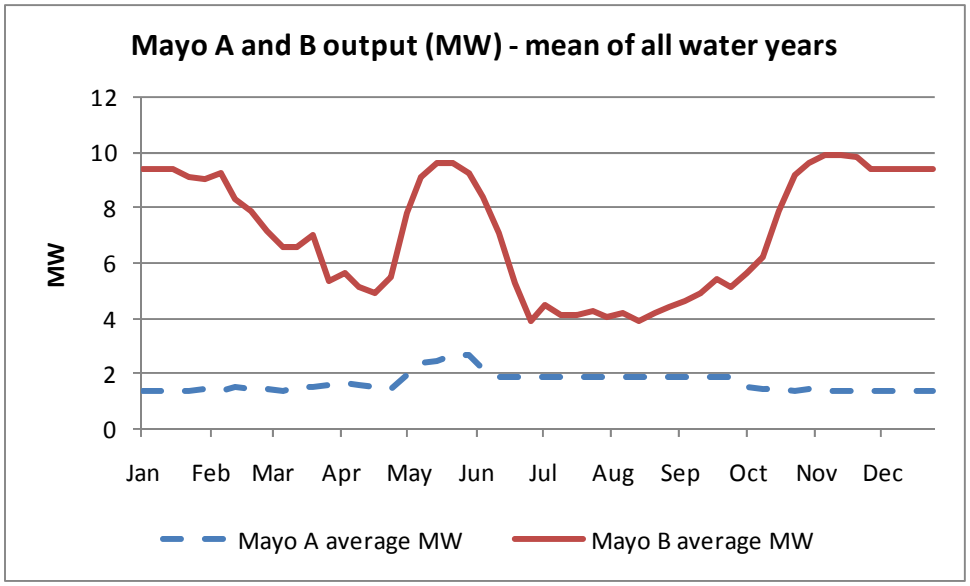
(f)

The precise installed capacity of Mayo B is still being worked out with the Turbine and Generator manufacturer. As noted in YUB-YEC-1-19, the modeled maximum output currently is 10.1 MW. Combined with Mayo A, the capacity of the Mayo facility is approximately 15 MW.

There is no material specific maximum seasonal output limits on Mayo B, outside of installed capacity. As required at any time throughout the year, the combined plants will have the ability to generate approximately 15 MW[4]. On a regular basis the output will be below this level (there is not enough water in the system to sustain this output throughout the year). For example, at the 468 GW.h grid firm load level, Figure 1 shows the average weekly MW output for each of Mayo A and Mayo B. Figure 1 is the mean of all water flow conditions; at high or low water, these values vary from what is shown in Figure 1.

[4] This value varies slightly based on overall river flows, which, if very high, can cause high tailwater levels for Mayo A in particular which reduces its net output to a small degree.

Figure 1: MW Output of Mayo A and Mayo B, by week, at 468 GW.h load level



(g) and **(h)**

The following constraints currently exist in responding to this request:

1) The Aishihik 3rd turbine is a committed resource presently under construction for operation prior to Mayo B in-service; accordingly, no loading scenarios or analysis has been conducted of the integrated system with Mayo B but no Aishihik 3rd turbine;

2) Modeling of energy supplies on the integrated grid does not separate out individual units, consequently the Aishihik 3rd Turbine is not separated from other units at Aishihik; and

3) The integrated system providing for a connection between Mayo B and WAF (where the Aishihik 3rd turbine is located) will not be in service until the winter of 2010/2011, and therefore no loading scenarios or analysis/model work has been done for 2009 circumstances.

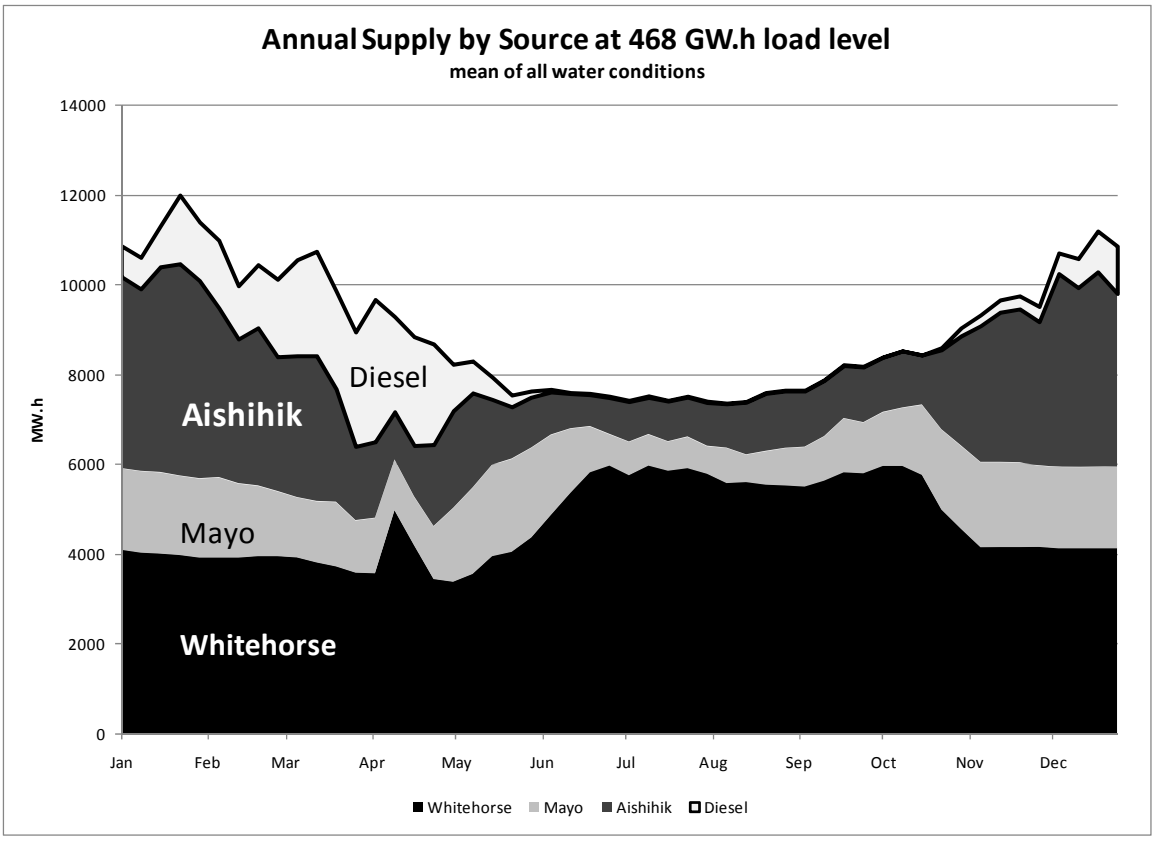
With respect to firm peak load carrying capability, it is known that the Aishihik 3rd turbine does not contribute to the N-1 analysis, and as such makes no present contribution to

the reliability aspects of being able to service the system at winter peak loads. In contrast, Mayo B will contribute directly to the firm peak load carrying capability.

When focusing on seasonal energy requirements, existing information can also be provided to help assess the respective contributions of Aishihik 3rd Turbine and Mayo B as requested. Seasonal energy requirements will be met by a combination of resources on the integrated system, including Mayo B and Aishihik (including the 3rd turbine). Winter energy, as noted in the response to YUB-YEC-1-37(f), is the priority for supply from Mayo B to the extent possible (the winter loads are expected to be sustained near the full installed capacity with summer generation typically lower – the only exception is May/June when freshet flows must be released and it is preferable to generate with these flows as can be accommodated, rather than to spill).

Figure 2 below sets out the seasonal supply by sources based on model work to date for the 468 GW/h IS firm load level with Mayo B. This figure cannot be separated out for Aishihik 3rd turbine versus other Aishihik units, as the units are not modeled individually.

Figure 2: Energy Supply at the 468 GW.h Load Level



TOPIC: Electricity Loads

REFERENCE:

Application, page 24

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.

QUESTION:

a) Does the above quote include production from the Aishihik 3rd Turbine in the analysis?

ANSWER:

(a)

Yes. The above noted excerpt goes on to reference Attachment D and Section 4.1.2 of the Application in support of this statement. Section 4.1.2 notes that project economics included in the Application are considered based in part on the Integrated System (IS) which considers the generation load forecasts for the IS as well as capability of existing and committed IS generation and transmission facilities (discussed in detail in Attachment C). Currently Committed IS generation and transmission facilities discussed in Attachment C (and throughout the Application) include Aishihik 3rd Turbine.

TOPIC: Project Economics

REFERENCE:

Application, page 30 – Figure 3

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.

QUESTION:

a) Could YEC provide an analysis similar to Figure 3 where other hydro generation options (Marsh Lake Fall/Winter Storage, Aishihik Rewind, Gladstone Diversion, or Atlin) are implemented?

ANSWER:

(a)

No.

Three of the noted projects (Marsh Lake, Gladstone, and Atlin) are in the early stages of active planning, but the required information to prepare the underlying analysis akin to Figure 3 has not yet been completed, e.g., likely timing of each project as well as net generation effects (diesel displacement) of each project at various grid load levels.

On Aishihik Rewinds, this project has been completed, and the performance testing of the mechanical components has now been completed. YEC is awaiting reporting on the flow tests to determine next steps, including the potential to re-runner the units to achieve increased potential output.

TOPIC:

REFERENCE:

Application, page 31

In short, even absent any flexible note 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.

QUESTION:

a) Does the above statement imply that by proceeding with this project the economic justifications for other hydro projects changes since diesel displacement cannot be a factor for those projects?

ANSWER:

(a)

No. The statement indicates that under present load forecasts, Mayo B is economic in each year of the analysis.

With respect to other hydro opportunities, Figure 2 in the Application underlines the diesel generation that is forecast to occur with Mayo B in service. Over the noted time frame (35 years), diesel generation continues to be required at average water flows in almost all years (even assuming no industrial loads after 2017), confirming the opportunity for other cost-effective renewable resource generation to displace this diesel.

TOPIC: Generation Planning/Project Need

REFERENCE:

Application, page 31

On page 31 of the Application, in footnote 50 on that page, YEC makes the following statement:

"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 2006 and 2016 to address additional new industrial energy requirements that may commence before 2016." Again on page 31 of the Application, in the third paragraph of Section 4.1.3, YEC makes the following statement: "Following the 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."

QUESTION:

a) Given both those statements, does YEC believe that the existing and currently committed new transmission and generation facilities provide adequate capacity in the reliability sense and in addition could supply the electric energy necessary to supply the forecast load to 2019 including major industrial loads such as Minto, Alexco, and Carmacks Copper albeit by increasing use of diesel generated energy? Explain the reasons for your answer.

b) If major industrial loads were factored out of the requirement to meet the load forecast both in terms of capacity and energy would the existing and currently committed new transmission and generation facilities be adequate in terms of capacity and energy to meet the load forecast to 2019? Explain the reasons for your answer.

c) What is the main purpose or need for the Mayo B project through to 2019 - is it to provide additional generating capacity for reliability purposes or is it to provide a source of economical renewable energy to supplant diesel energy required for major industrial customers through to 2019?

ANSWER:

(a), **(b)** and **(c)**

The main purpose or need for the Mayo B project through to 2019 (as well as beyond that date) as described in the Application is to provide a source of economical renewable energy to supplant baseload diesel energy generation requirements rather than to provide additional generating capacity for reliability (peak winter load) purposes.

The existing and currently committed generation and transmission of the integrated grid, absent Mayo B, can supply the electric energy (kW.h) necessary to supply the forecast load to 2019 with or without the forecast major industrial loads. As reviewed in the response to YUB-YEC-1-7(h), the forecast diesel generation required in 2013 without Mayo B (64 GW.h) and with the forecast industrial loads would equal a capacity factor of only 15% for the existing diesel generation capacity (48 MW without Minto mine diesels), and could similarly supply the 2017 forecast diesel generation of 79 GW.h (after which time the gird load is assumed to decline as mines are assumed to be shut down).

Analysis has not been carried out to confirm the date when added diesel generation capacity would need to be added to the grid system, for peak winter capacity planning purposes (i.e., LOLE or N-1), to serve the loads forecast through to 2019 with or without the forecast industrial loads. Mayo B will serve to defer this requirement – however, no economic benefit for this deferral has been estimated in the Application or included in the economic rationale for Mayo B.

TOPIC: Mayo B is second in dispatchable resource stacking order

REFERENCE:

Application, page 26

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.

QUESTION:

a) Do the dispatch criteria factor in the economics of line losses?

b) Based on the stacking order cited above, is there a reduced need for the refurbishment of the Mirrlees units to satisfy the N-1 criteria (that is, due to reduced output, a lower N-1 contingency is required)?

ANSWER:

(a) and **(b)**

The dispatch criteria for hydro units as used by Yukon Energy does consider line losses to some extent, but far more dominant is the relative flexibility of the plants and the basic economic requirement to use more run of the river (use it or lose it) generation prior to drawing on more flexible storage-based generation.

As noted in footnote 35 in the Application, the stacking order as discussed at page 26 reflects the overall energy stacking over weekly or monthly time periods, and the actual stacking order in any instant may be different than this on an hour by hour basis (e.g., for capacity and load following).

The need for specific diesel unit capacity (including the refurbishment of the Mirrlees units and/or the Minto mine diesel units) to satisfy the peak winter capacity planning criteria (N-1 and LOLE) will be driven each year by the forecast grid load and the options then available to meet the capacity planning criteria. Mayo B will provide added peak

winter capability and thereby defer the need for peak winter capacity that would otherwise be required – however, as reviewed in response to YUB-YEC-1-41, the Application has not attempted to quantify this benefit and no reduced requirement to refurbish the Mirrlees units has been identified.[1]

[1] As noted in earlier filings, the Mirrlees units, absent refurbishment, are basically at end-of-life and would otherwise be required to be removed from the active generation complement no longer than the next few years. Accordingly, although some timing issues may occur for refurbishment of the final unit, it is not considered that the Mayo B development would result in a "reduced need" for such refurbishment.

TOPIC: Plant Configuration

REFERENCE:

Application, page 26 – footnote 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.

QUESTION:

a) Has that analysis concluded? If so, what are the results of that analysis?

ANSWER:

(a)

Some elements of this analysis are concluded and other elements are still ongoing. Please see response to YUB-YEC-1-28 (a) and (b).

TOPIC: Secondary Sales

REFERENCE:

Application, page 29 – footnote 38

QUESTION:

a) When evaluating generation projects, how much weight should be given to secondary sales considerations?

ANSWER:

(a)

Secondary sales are interruptible sales made as an effective by-product of plant that is otherwise installed to serve firm customers. The basic premise of secondary sales is that, at most, very limited investment is made to facilitate the sales (typically almost no investment), and that any such sales are incidental and opportunistic relative to the project's primary objectives. Consequently, secondary sales should be given very little weight in analyzing new generation projects.

However, secondary sales cannot be entirely ignored when they do provide likely economic benefits that can be achieved by new projects. In the case of Mayo B, the modeling assumes no more than 2 GW.h of secondary sales benefit can be credited to Mayo B in any year, and that the value of this benefit decreases with increases in loads. In total, the NPV of secondary revenues attributed to Mayo B is no more than approximately 5% of the NPV cost of the project, as shown in YUB-YEC-1-25(a). These estimates reflect the assumed grid firm load forecasts, and the curtailment of existing secondary sales that would otherwise occur as a result of such increased firm loads.

While secondary sales should not be given significant weighting in evaluating generation projects, they do provide downside protection to all customers in the event that there is a significant reduction in loads on the system. Secondary sales revenues, in these circumstances, would be used to partially offset the loss of firm power sales thus reducing the negative impact of a major firm load reduction that could last weeks, months or years.

TOPIC:

REFERENCE: Application, page 40

PREAMBLE:

...the Minto mine has been connected to the grid with ongoing expansion of its reserves and expected power requirements.

QUESTION:

a) What was the forecast Minto mine load in the YEC's PPA proceeding?

b) What is the current forecast for the Minto mine load?

ANSWER:

(a)

Section 4.1 of the PPA sets out Minto's Electricity purchase requirements that YEC is to deliver, including provision for Minto (on six months prior written notice to YEC), to increase its Mine Firm Electricity requirement from 32.5 GW.h/year to 42 GW.h/year and 5.7 MVA.

(b)

The current forecast for the Minto mine load is provided in Attachment D of the Application at page D-1. 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).

TOPIC:

REFERENCE: **Application, Section 6.2.2**

Quote: 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 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.

QUESTION:

(a) Provide the results of studies that may have been undertaken wherein consideration was given to delaying Mayo B in-service dates by 5 and 10 years.

(b) If such studies were not undertaken, please provide a detailed explanation as to why delay of the Project was not considered, esp. in consideration that the Aishihik 3rd turbine is expected to be operational in the very near term.

ANSWER:

(a) and **(b)**

Delay of the Mayo B project in-service by 5 and 10 years was not considered as a practical option. As reviewed in response to YUB-YEC-1-35(a), critical factors driving the need to pursue this enhancement opportunity at this time include both (a) the availability of key no cost funding at this time (and for this project) to reduce risk and enhance

project benefits to ratepayers and (b) forecast near-term diesel generation requirements without Mayo B (due to load increases, and notwithstanding that the Aishihik 3rd turbine is expected to be operational before the end of 2010). Accordingly, given no other current options are similarly available to address these two key drivers, there was no basis for YEC to consider delay as a viable option for Mayo B.

In this regard, the availability of no cost capital 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.

As noted in Section 4.1.1 of the Mayo B Application, 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 Mayo B 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. 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.

Further, and as noted in materials filed during the 2008/2009 GRA, proceeding with Aishihik 3rd Turbine does not negate the requirement to provide for further renewable generation resources in the near term to displace forecast baseload diesel requirements. See response to YECL-YEC-1-5 Revised and Undertaking #28 in YEC's 2008/2009 GRA, which note that by 2012 the combined Minto, Carmacks Copper and Keno Hill loads (along with other projected WAF/MD firm loads, including added Faro mine reclamation loads but excluding all secondary loads) would require over 70 GWh of new generation beyond that which could be provided under long term average water flows by the current WAF/MD hydro generation capability together with Aishihik 3rd Turbine and the completed CSTP Stage Two.

In summary, as reviewed in detail in response to YUB-YEC-8(b), the Aishihik 3rd Turbine's expected benefits have been reflected throughout the Application's assessment of the Mayo B project, on the assumption that the Aishihik 3rd turbine will be fully operational well before Mayo B in-service occurs. The diesel displacement benefits of Mayo B are estimated after full consideration of Aishihik 3rd turbine benefits with and without Mayo B. Accordingly, consideration that the Aishihik 3rd turbine is expected to be

operational in the very near term provided no basis for YEC to consider any delay in the Mayo B in-service date.

TOPIC:

REFERENCE:

Attachment C

QUESTION:

a) Please provide the annual Firm Load Levels (GW.h/year) for the period from 1989 to 2009. For each of these years, please provide a) the annual Hydro generation and Diesel generation (GW.h/year) that was required to serve the Firm Load Levels and b) a description of the water conditions.

b) With respect to (a) provide a net present value analysis that incorporates but is not limited to cost of diesel displaced, a line loss comparison, and the recouping of initial investment of monies, for each of the three Firm Load Levels; i.e. minimum, average and maximum baseload diesel generation displacement.

ANSWER:

(a)

For the firm load levels, please see Figures 1 (WAF) and 2 (MD) below. These figures are updated versions of those presented in the 2006-2025 Resource Plan document in Tab 2.

Figure 1: WAF Loads and Generation 1967-2009

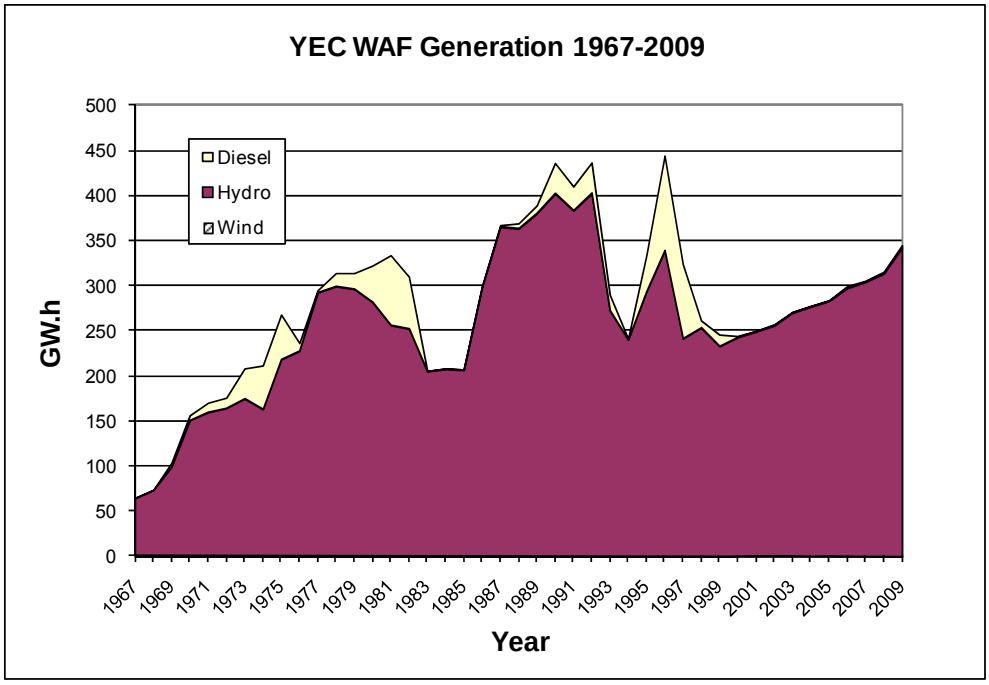
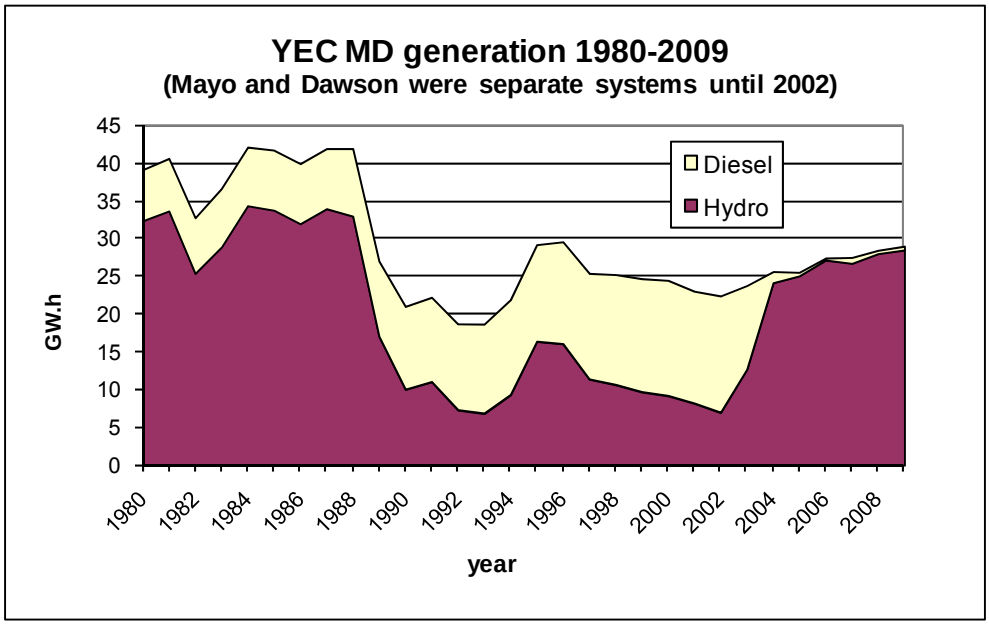


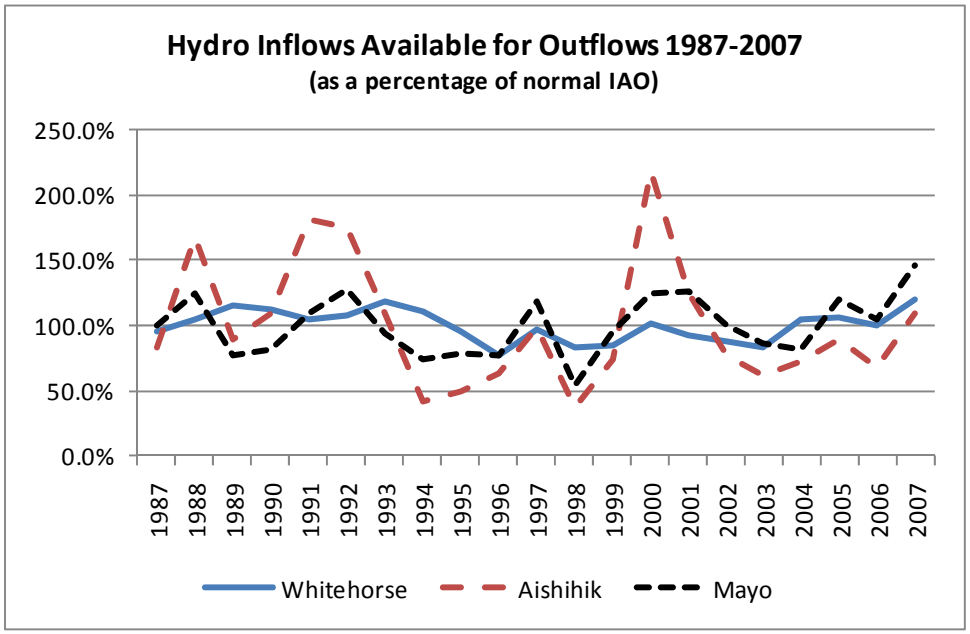
Figure 2: Mayo Dawson Loads and Generation 1980-2009



With respect to "water conditions", Figure 3 below sets out the annual Inflows Available for Outflows (IAO) for each system for 1987-2007 as a percentage of average (later years are not readily available). IAO is a measure of the water coming in to the system

(both inflows and direct inputs, such as rainfall) net of losses (i.e., evaporation). It is a measure of the total quantity of water that can be used for either generation, storage, or meeting other system requirements (such as required releases for licenced minimum flows). The IAO measure also does not address how storage may have been used on the system. For example, with respect to Mayo, part of the IAO arises from the inflows upstream of Wareham Lake (which has very limited storage) and downstream of Mayo Lake (where there is notable storage). This water effectively must be passed in the time period it arises. However a substantial portion of the Mayo inflows arise upstream of Mayo Lake storage, and as such the timing of their inflow in a given year does not necessarily link to an outflow in the same year (which can be in the next spring, or even 1 year later).

Figure 3: Water Conditions on each system 1987-2007



(b)

The NPV analysis is presented in YUB-YEC-1-25(a), including all forecast load levels as supported by the "Mean Capability" set out in Attachment C. Sensitivities arising from variations in loads are set out in YUB-YEC-1-30A(d).

Line losses are not compared between the cases, or in any planning models, as it is not possible in each modeled scenario to determine precisely where and when each load will arise in relation to when each hydraulic condition will arise. Line losses are estimated

in determining the total load to be served, but this load is not then further amended depending on which generation source may be assumed to be serving the overall load in any given scenario or hydraulic condition. To do so on Yukon's systems would be a significant and expensive undertaking and would likely lead to very little improvement in the overall performance or function of the model.