NORTHWEST TERRITORIES POWER CORPORATION

Department of Finance, 4 Capital Drive, Hay River, NT X0E 1G2; Phone (867) 874-5200 Fax (867) 874-5251

August 13, 2009

Mr. Joe Acorn
Chairman
Northwest Territories Public Utilities Board
203-62 Woodland Drive
PO Box 4211
Hay River, NT X0E 0R0

Dear Mr. Acorn,

Re: Application for Major Project Permit – Bluefish Lake Dam Replacement

Attached is an application for a major capital project permit respecting the Bluefish Lake Dam Replacement Project. The total cost of the proposed project is estimated at $18,500,000 and addresses design and construction of a new dam at an alternative location. The Project will allow for the continued safe and reliable operation of Bluefish to the benefit of the Corporation's ratepayers.

This project permit application is a result of an independent engineering study and the Corporation's practice to continually evaluate its capital infrastructure. The Corporation respectfully requests that the Board review this application at its earliest convenience.

In order to assist the review of the application, NTPC is prepared to arrange a site visit for Board members, if requested. NTPC anticipates that a site visit to Bluefish from Yellowknife could be undertaken in an afternoon.

If you require further information regarding this application or have any questions, please contact me at (867) 874-5234.

Sincerely,

Judith Goucher
Director, Finance & CFO

NORTHWEST TERRITORIES POWER CORPORATION

APPLICATION FOR A PROJECT PERMIT

BLUEFISH LAKE DAM REPLACEMENT

August 2009

TABLE OF CONTENTS

1.0 INTRODUCTION AND OVERVIEW

The Northwest Territories Power Corporation ("NTPC" or "Corporation") hereby applies to the Northwest Territories Public Utilities Board pursuant to Sections 23(b) and 54(1) of the *Public Utilities Act*, R.S.N.W.T 1988, c. 24 (Supp) for a project permit and further or other relief as the Board considers advisable respecting the Bluefish Lake Dam Replacement Project (the "Project"). The Corporation is requesting approval for capital costs of the project of up to $18.5 million. NTPC will provide a budget update to the Board once the Project tendering process is complete.

The Project represents a significant capital expenditure over and above normal capital spending. Therefore the Corporation is also requesting approval in principle to borrow up to $18.5 million related to this Project. The Corporation will provide an application for approval of the specific terms of the borrowing following an approval of the capital project permit. Details on the background of the Project, Project rationale and a description of the Project are provided in Section 2 of this Application.

Proceeding with the proposed Project is the lowest cost option for continued supply of power on the Snare/Yellowknife system. Work completed to date has allowed the Corporation to design the Project in a manner that allows for continued hydro-electric generation throughout the construction period. This is a substantial benefit to customers, as continued hydro-electric generation will result in fuel savings estimated at $6 million each year throughout the construction period.

In the event that the dam were to fail, Bluefish Lake would be drained. In addition to causing considerable environmental problems, reconstruction of the facility following a failure would require using diesel generation to replace the lost hydro-electric generation. The estimated cost to replace the dam under these circumstances is approximately $36 million. In the alternative, permanently replacing Bluefish generation with diesel generation on the Snare/Yellowknife system would lead to substantially higher costs for customers – the Project economics analysis suggests more than three-fold higher cost of diesel generation over Bluefish generation over the life of the project. The proposed Project also has substantial environmental benefits, including reduced Greenhouse Gas Emissions. Further details on Project economics and grounds in support of the Application are provided in Sections 3 and 4 of the Application.

The preliminary Project budget includes the following costs:

	($000's)
1. Engineering Cost	$ 2,256
2. Construction Cost	10,853
3. Contingencies	2,194
Sub-total Project Cost	$ 15,303
Overheads	1,530
AFUDC @ 9.674%	1,667
Total Project Cost	**$ 18,500**

Further details on Project costs are provided in Attachment D. Capital costs do not include regulatory costs related to filing the Project permit application. These costs will be included in the Corporation's regulatory deferral account.

Due to the length of time required for construction and the risks associated with a failure at the dam, the Project is being undertaken on an urgent basis. Work undertaken to date has served to mitigate the emergency risks associated with the present condition of the dam such that Bluefish can continue to operate during the construction period. The Project is scheduled to be completed in 2011/12. The Project is the largest capital project ever undertaken by the Corporation and represents an extremely high priority for NTPC. All resources necessary to meet the project timelines will be assigned. The Project will allow for the continued safe and reliable operation of Bluefish for years to come, to the benefit of customers and the Corporation.

2.0 PROJECT DESCRIPTION

2.1 BACKGROUND

Bluefish Dam is the primary dam that impounds a reservoir (Bluefish Lake) for hydroelectric generation and is located on the Yellowknife River approximately 1 kilometer from the outlet into Prosperous Lake. The dam was constructed at the outlet of Bluefish Lake where a waterfall was located prior to construction. The original construction was completed circa 1940. The dam is a timber crib structure buttressed on the upstream and downstream with rock fill. The structure is approximately 6m high and approximately 180m long. The location of the Bluefish facility is illustrated in Attachment A.

The spillway section of the dam that crosses the Yellowknife River is an uncontrolled overflow spillway structure. The spillway section is approximately 1.2m lower than the crest of the dam at the left and right abutments and is approximately 70m wide. The normal life expectancy of a timber crib dam is approximately 40 years; however, upgrades to the dam completed in 1973, 1983 and 2007 extended the dam's life beyond the normal expected period. The Bluefish facility includes a rockfill/timber dam across the outlet of Bluefish Lake, the Duncan Lake Reservoir and control structure, an intake tunnel and penstock leading to two powerhouses on the shore of Prosperous Lake, substation and related facilities.

Table 1 provides a chronology of work completed by NTPC to ensure the integrity of the Bluefish Dam from the time of purchase by NTPC to the present. This work has resulted from the due diligence and internal risk management practices of NTPC with respect to the Bluefish facility.

Prior to the Bluefish purchase, NTPC commissioned a condition assessment of the facility as part of its due diligence process. The condition assessment was performed by AMEC in 2001. The 2001 condition assessment identified deficiencies with the Bluefish Dam and anticipated total replacement of the dam within 10 to 20 years. The proposed Project is consistent with the timeline contemplated in the 2001 condition assessment.

In 2005, NTPC retained an engineering consultant to complete a Dam Safety Review of the Bluefish and Duncan Lake Dams as part of the water license renewal process for Bluefish. During the inspection, the consultant identified deficiencies with the dam, which were recommended to be addressed for continued safe operation of the facility. These deficiencies were addressed in 2006 and 2007. This work included the reconstruction of the rockfill buttress on the downstream side of the overflow section of the dam and establishing an ongoing monitoring program for the Bluefish Dam. A letter from EBA Engineering Consultants Ltd.

("EBA") indicating that NTPC has addressed the critical recommendations from the 2005 Dam Safety Review is included as Attachment F.

Table 1
Chronology of Work Undertaken to Ensure the Integrity of the Bluefish Dam

2001	Condition assessment of the Bluefish facility by AMEC anticipates total replacement of Bluefish Dam within 10 to 20 years.
2003	NTPC purchased the Bluefish generating facility from Miramar Con Mine.
2005	Dam Safety Review completed by EBA.
2006-2007	Reconstruction of the rockfill buttress on the downstream side of the overflow section of the dam completed. Ongoing monitoring program for the Bluefish Dam instituted.
2008	A contingency spillway into the existing overflow spillway was constructed in order to allow for the spilling of high water over the dam while minimizing the hydrostatic pressure on the deteriorated wooden components of the overflow spillway and dam. Improved water management processes implemented by maximizing production and use of the auxiliary stoplog spillway. Dam monitoring intensified by (i) increasing the frequency of operations inspections to twice daily; (ii) implementing periodic engineering inspections both internally and with consultants; and (iii) installation of visual monitoring system. Risk management and public safety plan implemented, by adding specific measures to the workplace safety plan; limiting public access to the areas immediately below the dam; mobilizing materials and equipment to be able to respond to an event to limit environmental impacts. EBA is retained to complete a preliminary engineering study of options for repair or replacement of Bluefish Dam. Study recommends replacement of Bluefish Dam.
2009	NTPC begins the regulatory permitting and approval process for the construction of a new Bluefish Dam. Active water management measures in place. Implemented safety procedures for ingress/egress downstream of the dam.

In January 2008, NTPC operators at Bluefish reported higher than normal flows in the Yellowknife River adjacent to the generating area. These flows were investigated and it was determined that a leak had developed near the left abutment of the dam. It was decided that as soon as the snow and ice melted to expose the dam, a thorough investigation would be carried out. That investigation was performed by NTPC staff and EBA and was completed in June 2008. The investigation yielded the following observations:

1. The leak noted in January 2008, was confirmed by the development of a sinkhole in the upstream mat and the deposit of the material at the toe of the downstream rock fill; and
2. A section of the timber sheeting on the overflow spillway had fallen away and exposed the timber crib beneath. The timber crib was deteriorated to the point of collapse.

In light of risk associated with these observations, it was determined that mitigating measures would be implemented immediately. An Emergency Plan was implemented and emergency work was completed in August 2008. The work undertaken by NTPC to address the identified deficiencies, included:

- Constructing a contingency spillway into the existing overflow spillway in order to allow for the spilling of high water over the dam while minimizing the hydrostatic pressure on the deteriorated wooden components of the overflow spillway and dam;
- Improving water management processes, by maximizing production and use of the auxiliary stoplog spillway;
- Intensifying dam monitoring by (i) increasing the frequency of operations inspections to twice daily; (ii) implementing periodic engineering inspections both internally and with consultants; and (iii) installation of visual monitoring system; and
- Implementing a risk management and public safety plan by: adding specific measures to the workplace safety plan; limiting public access to the areas immediately below the dam; mobilizing materials and equipment to be able to respond to an event to limit environmental impacts.

NTPC is also planning to undertake additional remedial work including adding more rock fill to the dam and maximizing the life of the existing structure until a new facility can be commissioned to ensure ongoing maximum plant capacity.

The 2008 emergency work, concentrated on eliminating the risks associated with the collapsing spillway, was undertaken under Section 17(1) of the Mackenzie Valley Land Use Regulations. The Mackenzie Valley Land and Water Board was notified of the intention to proceed with the emergency work prior to commencing the work.

In the fall of 2008, NTPC retained EBA to undertake an evaluation of dam and spillway concepts for Bluefish. Engineering concept work continued through the fall and winter of 2008 through to early 2009. In early 2009, NTPC initiated environmental regulatory and permitting processes, including the submission of a Project Scope Statement to the Mackenzie Valley Land and Water Board. NTPC continued with engineering, planning and budgeting for the project through the spring and early summer of 2009.

NTPC has reviewed several options for addressing the replacement of the dam. NTPC has had public consultations with the community to provide information related to environmental implications of the Project and discuss environmental concerns. NTPC also conducted a site visit with NUL representatives in summer 2009 and will be meeting with City of Yellowknife in mid-August 2009.

2.2 PROJECT RATIONALE

Bluefish Dam is in an advanced stage of deterioration due primarily to the age of the facility. This is evidenced by the following:

- Increased seepage through the dam due to breakdown of the upstream impermeable barrier installed in 1983. This breakdown appears to be caused by a collapse of the timber crib structure; this is evidenced by settlement in the upstream mat, consistent with the upstream face of the timber crib. This settlement coincided with the formation of the sinkholes; and
- Advanced deterioration and collapse of the overflow spillway. Deterioration of the spillway was suspected and was outlined in previous studies. This was confirmed in 2008 with the delamination of the timber sheeting on the dam. The exposed timber crib structure was completely deteriorated and collapsing.

The emergency remedial measures undertaken to date do not permanently address deficiencies at the dam, but serve to reduce the immediate risk associated with a collapse of the overflow spillway. They will also allow for the continued operation of the facility during the construction period, such that it is anticipated there will be no lost generation.

NTPC anticipates minimal environmental impact associated with this project and is in the process of addressing environmental issues with the Mackenzie Valley Land and Water Board.

Issues being reviewed through the environmental regulatory process include:

- The primary environmental concerns related to the Project are on the aquatic environment of the Yellowknife River in the area of inundation. The Yellowknife River was studied previously in the report prepared by Agra Earth and Environmental for Miramar Con Mine, Ltd. in 1997.[1] The baseline information collected for that report will be utilized in a new study specific to the impacts of the new dam. The Department of Fisheries and Oceans will be invited to provide input into the scope of this study; and
- NTPC will also contact the Prince of Wales Heritage Centre to verify any registered historic sites within 150m of the project area and proposes to undertake a Historic Resources Survey of the project area.

2.2.1 Assessment of Project Options

EBA was retained in August 2008 to assess the alternatives available to NTPC for permanent repair or replacement of Bluefish Dam. The executive summary of the EBA report is included in Attachment C. EBA was requested to examine the following options:

<u>Repair the existing dam</u>

EBA proposed two possible options for the repair of Bluefish Dam:

- Foam Injection – the option involves the deep injection of polyurethane foam into the rock fill to stabilize the rock fill and remaining timber structure; and
- Rock fill with vertical membrane – this alternative would entail trenching through the existing dam, installing a vertical impermeable membrane and backfilling with rock.

Due to the advanced state of deterioration of the existing dam, none of the repair options were considered to offer significant lifespan increases to the structure. A repair of the dam would only be considered a short term measure, delaying the inevitable replacement of the dam. For this reason, although the initial repair costs (estimated at between $2.8 to $4.0 million) would be lower than the full replacement costs (approximately $18.5 million) - the long term cost

[1] Fish Habitat and Flow Conditions Assessment Yellowknife River from Bluefish Hydro Dam to Bluefish Hydro Generators Discharge Prosperous Lake, NWT.

would be much larger due to the fact that if the repair option were implemented, a full replacement would still be required in the relatively near future when compared to the lifespan of a new properly engineered dam.

Replace the existing dam at the present location

The existing location offers some significant advantages with respect to the construction of a new dam. It provides the shortest alignment and lowest elevation. These factors are what led to the dam being constructed in its present location in 1940. However to replace Bluefish Dam in its present location poses some significant challenges:

- The outlet of Bluefish Lake at the location of the existing dam is a natural rock ridge that extends across the outlet. On the lake side of the ridge, the bottom drops from approximately six meters at the dam site to approximately twelve meters within a short distance from the dam. This makes the construction of a coffer dam upstream of the existing dam impractical.
- For this reason, the reconstruction would require significant drawdown of Bluefish Lake. This would for all intents and purposes drain Bluefish Lake. This would have significant impacts on the fish populations in Bluefish Lake. It was determined that this would not be a preferred approach.

Replace the existing dam at a new location

This option essentially entails the construction of a new dam downstream of the existing dam. This option offers some significant advantages over the other options, including:

- This option represented the lowest environmental impacts of all options considered, due to the fact that the other options required the drawdown of Bluefish Lake.
- Construction can proceed to commissioning with essentially no lost generation.
- It offers the least long term cost option for the permanent removal of the risks associated with the existing Bluefish Dam.

After examining each option, it became apparent that the most feasible option was to replace Bluefish Dam at an alternate location downstream.

2.2.2 Assessment of Preferred Options

EBA outlined two potential sites for the construction of a new dam downstream of the existing dam, identified as Site "A" and Site "B". Site "A" is located approximately 421m downstream of the existing dam and site "B" is located approximately 228m downstream of the existing dam. Based on expert engineering advice and a consideration of the relevant merits of each site option, NTPC selected site "A" for the new dam construction. Relevant merits of site "A" include:

- This site is located at a bedrock ridge that forms the end of the plunge pool in Yellowknife river immediately downstream of the existing dam. Preliminary visual reconnaissance of the site indicates continuous exposed bedrock across the proposed dam site;
- Immediately below the site is a natural pool in Yellowknife River that would be effective for dissipation of energy of discharge from the spillway; and
- There are no alluvial deposits (gravel, sand, silt), which would require extensive excavation prior to the construction of the new dam. This would present significant challenges in terms of construction timelines, cost, environmental impacts of construction activities and others.

In the analysis of possible design of a new dam, EBA considered the following proven design options for the new dam:

a. Concrete Gravity Base Dam
b. Rockfill – Asphalt Core Dam
c. Rockfill – Sheet Pile Diaphragm Wall
d. Rockfill – Concrete Diaphragm Wall
e. Rockfill – Geomembrane Liner

The most feasible option as outlined in the EBA report is the Rockfill – Sheet Pile Diaphragm Wall Dam. The primary features of this type of structure are as follows:

- Impermeable core of vertical steel sheet pile with all the seams weld sealed.
- The sheets are keyed into a trench in the bedrock and sealed with concrete.
- Rockfill is placed on the upstream and downstream sides of the diaphragm wall.

This type of structure is particularly suited to the constraints presented by a remote site. Other than a relatively small amount of concrete aggregate for the toe seal it requires the import of very little processed aggregate to site and/or processing on site, greatly reducing the time required and construction costs.

Finally, it is anticipated the Project will allow for increased energy generation at Bluefish. At present, when the water in Bluefish Lake reaches a certain level it spills over the spillway and around the plant without capturing energy generation benefits from the water. The new spillway will allow the facility to hold more water back (.6 m higher, still within operating permits and plant design). It is anticipated this will contribute to higher long-term average water generation potential of approximately 1.2 GWh per year. The net present value of this additional generation could be up to $2.0 million in avoided diesel fuel costs.[2]

[2] Calculated using fuel prices and efficiencies consistent with Scenario 1 in Attachment E. The value of the generation over the life of the Project will depend on system loads as well as operational considerations including the availability of other hydro units.

3.0 ECONOMIC BENEFITS OF THE PROJECT

This section reviews current operating benefits of the Bluefish Hydro station; short-term economics related to the dam replacement project and longer-term economic benefits. NTPC has completed a short-term evaluation of the Project economics relative to other supply options and a longer-term economic analysis of the Bluefish facility including the Bluefish Lake Dam Replacement project.

3.1.1 Operating Benefits

Customers on the Snare/Yellowknife system currently experience significant operational benefits from the facility, including the following:

1. Bluefish provides system diversity and capacity benefits since it is on a different waterway and has separate transmission facilities from the Snare hydro facilities. Replacing the capacity available at Bluefish with diesel engines is estimated to cost approximately $7-$10 million dollars for capital costs, without any consideration of additional diesel fuel requirements;[3]
2. Bluefish provides energy benefits during periods when some generation at the Snare sites is unavailable due to maintenance, capital projects or generation or transmission forced outages;
3. Bluefish also plays an important role in NTPC's water system management. Because of the minimal storage available at Bluefish, it is often dispatched first, allowing the Corporation to store some water at Snare for periods of the year when diesel generation would otherwise be required; and
4. In total, the net present value of benefits to customers of Bluefish from 2004/05 through 2008/09 is $19.6 million ($2002).[4]

3.1.2 Short-term Project Economic Benefits

As noted in section 1, the Corporation has developed the proposed Project to allow hydro-electric generation to continue throughout the construction period. In the event of a dam failure, replacement of the dam in those circumstances is estimated to cost approximately $36 million or nearly double the cost estimate for the current Project.

[3] Assuming 7 MW of capacity at between $1 million to $1.5 million per MW for diesel generation capital costs.
[4] See the schedules in Attachment E.

The proposed Project is expected to achieve a full payback of its capital costs of approximately $18.5 million within the first one to three years of operation:[5]

- On an energy basis only, for the three year period from 2012/13 through 2014/15, the Corporation expects to require average annual generation from Bluefish of 28.357 GWh. Replacing that amount of generation with diesel, at currently forecast diesel prices, would result in diesel fuel expense of approximately $21.651 million, or $3.151 million more than the $18.5 million capital cost of the Project.
- The cost to replace the capacity benefits of Bluefish with additional diesel generation are expected to be approximately $7-$10 million dollars. The balance of the proposed Project's capital costs ($8.5-$11.5 million) would be recovered within one and a half to two years, based on avoided fuel expense savings.

The Project is also expected to have annual operating costs that are substantially lower than replacing the equivalent amount of generation with diesel. Annual amortization expense and return on ratebase related to the Project are estimated at $2.02 million annually.[6] However these costs are substantially lower than the cost of replacing that generation with diesel generation. For example, the estimated fuel expense and non-fuel O&M expenses related to the equivalent amount of diesel generation is estimated at $7.289 million in 2012/13, even without consideration of the replacement cost of additional diesel engine capacity.[7]

Finally, as described in section 2.2.2, it is noted that the design of the Project is expected to allow for increased long-term average generation potential of 1.2 GWh. The net present value of this additional generation is estimated at up to $2.0 million, depending on system load growth. These benefits are in addition to the operating benefits described in section 3.1.1.

3.1.3 Long-Term Project Economic Benefits

NTPC also completed a long-term economic assessment of the Bluefish facility including the proposed Bluefish Lake Dam Replacement Project. Several scenarios were evaluated and the summaries of these scenarios are included in Attachment E. The analyses are consistent with the methods reviewed and tested by the Board during the 2002 project permit application and the 2006/08 Phase I GRA. The analyses are based in 2002 dollars and therefore are directly comparable to the previous analyses reviewed and tested by the Board. It should be noted that the model is a planning model, and does not capture the operational benefits of Bluefish discussed in section 3.1.1. Therefore the long-term project benefits are understated.

[5] At currently load growth, payback would be faster with higher load growth.
[6] At currently approved Return on Ratebase and Amortization rates.
[7] Refer to Appendix E – Scenario 1.

Based on the most recent information available and the model assumptions discussed in Attachment E, Table 2 provides a summary of results of the economic analysis under the three different scenarios.

Table 2
NWT Power Corporation
Bluefish Hydro Economic Analysis Summary

	Scenario 1	Scenario 2	Scenario 3
NPV of Benefits (2002 $ mln)	108.9	108.9	133.7
NPV of Costs (2002 $ mln)	40.4	46.3	46.3
NPV of Benefits to Ratepayers (2002 $ mln)	68.8	62.8	87.8
Benefit-Cost Ratio	2.70	2.35	2.89

Notes:

Scenario 1 Total capital costs include $18.5 million for the proposed Project. Conservative assumptions are used for load growth (long-term annual rate of 1.2%) and inflation (0.5% per annum).

Scenario 2 Total capital costs include $18.5 million for the proposed Project as well as an allowance for potential future capital improvements of $5 million in year 9 and $10 million in year 13. Conservative assumptions are used for load growth (long-term annual rate of 1.2%) and inflation (0.5% per annum).

Scenario 3 Total capital costs include $18.5 million for the proposed Project as well as an allowance for potential future capital improvements of $5 million in year 9 and $10 million in year 13. Load growth is assumed at a higher (though still feasible) rate (long-term annual rate of 2.5%) and inflation is assumed at a more standard inflation target (2.0% per annum).

The current analysis indicates the NPV of benefits is very high under all three scenarios and in each case the project has a benefit-cost ratio of greater than 2. It should be noted that the original analysis prepared for the 2002 project permit application did not provide any credit to the project related to benefits from reduction of greenhouse gas emissions due to the purchase of the Bluefish facility. The current analysis is run on the same basis.

Based on the above summary and the information detailed in Attachment E, the Bluefish facility, including the proposed Project, provides continuous and sustainable benefits to NTPC

ratepayers. Further potential benefits from reduced greenhouse gas emissions and increased ability to serve load growth will only serve to enhance the project benefits.

4.0 GROUNDS IN SUPPORT OF APPLICATION

This section provides NTPC's grounds in support of the application, consistent with the requirements under section 54(4) of the *Public Utilities Act* with respect to the following matters:

A. The impact of the project on rates;
B. The public need for the project; and
C. The reliability of the public utility.

A. Impact of the Project on Rates

The Project represents the least costly project for securing long-term energy and capacity benefits for customers on the Snare/Yellowknife system. There are two credible options for addressing long-term energy and capacity requirements on the Snare/Yellowknife system. These options and their impact on rates can be summarized as follows:

1. Replace the capacity available from Bluefish with a diesel generation plant. This would require an estimated $7-$10 million in diesel generation plant capital, as well as fuel and non-fuel O&M expense of approximately $7.289 million in 2012/13. Fuel expense would increase in each subsequent year due to price inflation.
2. Proceed with the proposed Project. In contrast with option 1, the proposed Project is expected to have return on ratebase plus amortization expense costs of approximately $2.024 million. These costs would decline over time as the capital costs are amortized.

Table 3 provides an illustrative estimate of the relative rate impacts of the two options. It should be noted that the rate impact of replacing Bluefish with a diesel plant is estimated at $8.304 million in the first full year of operation (2012/13). This would be a 30 per cent increase to 2007/08 approved revenue requirements. These costs would go up over time.

Table 3
Estimate of Bluefish Dam Replacement Project Impact on 2007/08 Test Year Revenue Requirement

Category	7MW Diesel Plant Alternative	Bluefish Dam Replacement Project
Mid-Year Ratebase ($000)	8,287[8]	18,241[9]
Return on Ratebase ($000)[10]	802	1,765
Amortization Expense ($000)	213[11]	259[12]
Fuel and Non-fuel O&M Expense ($000)	7,289	0
Total Revenue Requirement ($000)	**8,304**	**2,024**

The estimated rate increase for a TPSP eligible customer consuming 700 KW.h per month is $9.14 at current TPSP rates.[13] However, it should also be noted that the energy rates currently in place will not change until the time of NTPC's next General Rate Application. Therefore, the Project will have no impact on rates until the time of NTPC's next General Rate Application which is presently anticipated for the 2011/12 test year. NTPC is open to discussing deferral accounts or other mechanisms for reducing the rate impact of the Project with stakeholders prior to the next GRA.

The project is expected to continue to offer material savings to NWT ratepayers both in the near-term and long-term, even with the Project included in ratebase. This reflects the benefits of using the Bluefish facility on the Snare-Yellowknife system to:

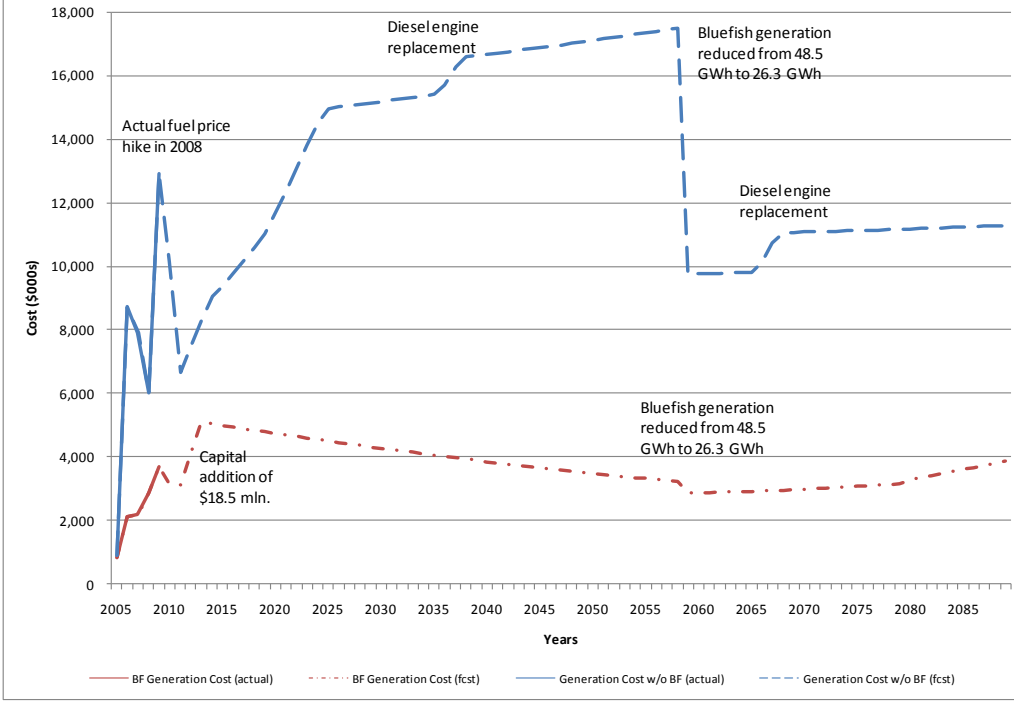
- Reduce the requirements for higher cost diesel generation;
- Meet the load growth in the community;
- Reduce need for diesel capacity (due to almost 7 MW of Bluefish capacity being available as firm capacity under the two planning criteria – both the N-1 and the LOLE calculations – for the Snare-Yellowknife system); and

[8] Assuming the midpoint of capital cost estimates of between $1-$1.5 million/MW of diesel generation for 7 MW.
[9] The change in mid-year ratebase is less than the estimated project cost to account for a half year of amortization expense in the first year the project is brought into service.
[10] Based on approved rate of 9.674% per Board Decision 19-2007.
[11] Total capital cost of $8.5 million amortized over 40 years.
[12] Total capital cost of replacing Bluefish Dam ($18.5 million) amortized at annual rate of 1.40%.
[13] Current TPSP customer bill for 700 KW.h of energy consumption would be $182 (at the current TPSP rate of $0.26/KW.h). With 5 percent increase the bill would be $191.

- Reduce future diesel engine replacements at the Jackfish plant due to lower operating hours and reduced diesel generation.

Figure 1 provides a graphical depiction of the material benefits of Bluefish over time. The figure graphs Bluefish hydro generation costs against the cost of equivalent diesel generation over the life of the project under Scenario 1 assumptions. The graph clearly indicates that the cost of Bluefish generation is always below the cost of diesel generation starting from the very first year of the project. This is unusual for hydro-electric projects, where the early year costs often may exceed the cost of alternative generation sources. Furthermore, the gap between diesel generation costs and Bluefish hydro generation costs widens in the future, reaching five-fold difference before the retirement of one of the Bluefish units. Even with only one of the units in operation and reduced hydro-electric generation, the cost of diesel generation is estimated to be three times higher than the cost of Bluefish generation. Once again this is very unusual for hydro-electric projects due to much higher capital spending required for their implementation relative to a diesel project. This shows that the proposed Project is very beneficial for the Corporation's customers.

Figure 1. Electricity Generation Costs with and without Bluefish Station



B. The Public Need for the Project

As part of the environmental regulatory and water licensing process, NTPC undertook a public consultation process consistent with the Mackenzie Valley Land and Water Board's *Public Involvement Guidelines for Development Applications to the MVLWB.* NTPC facilitated

community consultation meetings to discuss environmental implications of the project with community representatives. These meetings provided the opportunity for the communities to discuss the project and state their concerns with the aim of addressing or mitigating those concerns in the final development where possible. In addition, the Corporation conducted a site visit with NUL representatives in summer 2009 and is planning further discussions with the City of Yellowknife in mid-August 2009.

NTPC conducted consultations with the following stakeholders:

- City of Yellowknife
- Yellowknives Dene First Nation
- NWT Metis First Nation
- Dene Nation
- Cassidy Point Residents Association
- Tli Cho Government
- North Slave Metis Alliance

The consultations were focused on the following objectives:

- To inform stakeholders about the proposed project;
- To provide an opportunity for groups to discuss the project, ask questions and state their concerns related to environmental considerations; and
- To address or mitigate those concerns in the final project development where possible.

The Project is necessary to address the following public interest concerns:

<u>Safety and Environmental concerns</u>

Environmental protection, while ensuring reliable, safe and cost effective power, is a priority for the NTPC. The Project represents the second phase of the emergency action that began in 2008 with the construction of an emergency spillway on Bluefish Dam. The actions undertaken by NTPC in 2008 mitigated immediate risk of collapse of the overflow spillway and will allow further work to be undertaken without loss of hydro generation. However, these works did not address the leakage through the dam, and they did not address the continuing rapid deterioration of the dam.

NTPC analyzed different flow scenarios and possible downstream consequences of a dam failure. As noted in the 2005 Dam Safety Review (DSR) report, in the event of a dam failure, Prosperous Lake acts as a surge basin that levels out the flood wave that enters the lake at the north end. As a result, Prosperous Lake increases only by approximately 0.4 meters. However it should be noted that this is the maximum loss identified in the 2005 DSR when the downstream buttress was not constructed and both Duncan and Bluefish Dams fail. Subsequent to the 2005 DSR, NTPC constructed the downstream buttress. The rock buttress limits the amount of water that could flow over the dam in the event of a failure of the upper wooden spillway. Analyses of the scenarios indicate that downstream consequence of a dam failure is possible only if the wooden spillway is lost to the level of downstream buttress. It should be noted that it is highly unlikely that this scenario would occur due to the emergency spillway that limits the amount of head pressure required to deteriorate the wooden spillway. Attachment B provides some photos of the site and work completed to date.

A further environmental benefit of the project is that it will not increase water levels in order to spill excess water in the lake. The current dam is structured as an overflow dam and excess water spills over the dam. The new dam will not be an overflow dam – water will flow through the spillway. The spillway and gate will be constructed first and when the new dam is complete, the gate will be closed.

The replacement of the old dam is necessary and the project must be completed in the shortest practical timelines in order for NTPC to provide continued supply of energy and in the interest of public health and safety and the environment.

Reliability of power supply

Operation of Bluefish offers material cost savings to the Snare-Yellowknife system. Absent the operation of the Bluefish facility, NTPC would have continued requirements to serve NUL (YK), Behchoko, Dettah, Giant and any other loads that may develop on the Snare-Yellowknife system out of NTPC's other existing hydro plants and the Jackfish diesel plant.

The benefits to NTPC and customers from the operation of the Bluefish facility include the reduced need for diesel capacity due to almost 7 MW of Bluefish capacity being available as firm capacity under the two planning criteria - both the N-1 and the LOLE calculations - for the Snare-Yellowknife system. Absent this capacity, the Snare-Yellowknife system would be into material capacity shortfalls today requiring major capital investment to ensure reliable service to Yellowknife.[14] Implementation of this project will ensure continued operation of the Bluefish

[14] BR.NTPC-9 from Feb 16, 2007; BR.NTPC-29(b) from Feb 16, 2007; HC.NTPC-5 from Feb 16, 2007.

facility offering long-term reliable and cost effective power supply in the Yellowknife service area.

C. The Reliability of the Public Utility

Direct NTPC ownership of the Bluefish facility simplified both the planning and emergency operation of the Snare-Yellowknife system. This has reduced the loss of load expectation on the system. In addition, coordinated dispatch increases stability and power quality on the Snare-Yellowknife system.

The present state of Bluefish Dam represents significant risk to NTPC's ability to provide cost effective reliable power to the Yellowknife service area. Implementation of the project and construction of the new dam will increase the reliability of NTPC by achieving the following objectives:

- Provide a facility that meets the current standard engineering principals and current dam safety guidelines as published by the Canadian Dam Association.
- Provide a facility that provides safe operator control and water management.
- Provide a facility that assures reliable and cost effective power can be provided to the Yellowknife service area. The proposed Project represents the least-cost source of supply for the Snare/Yellowknife system.
- Provide a facility that can operate with minimal risk to the environment.
- Provide a facility that allows the Corporation to achieve substantial Greenhouse Gas savings.

Furthermore, the project will not affect NTPC quality of services, because construction can proceed to commissioning with essentially no lost generation. NTPC has undertaken the planning and development of the project to ensure that hydro-generation at Bluefish can continue throughout the Project. This is a considerable benefit to customers and the Corporation.

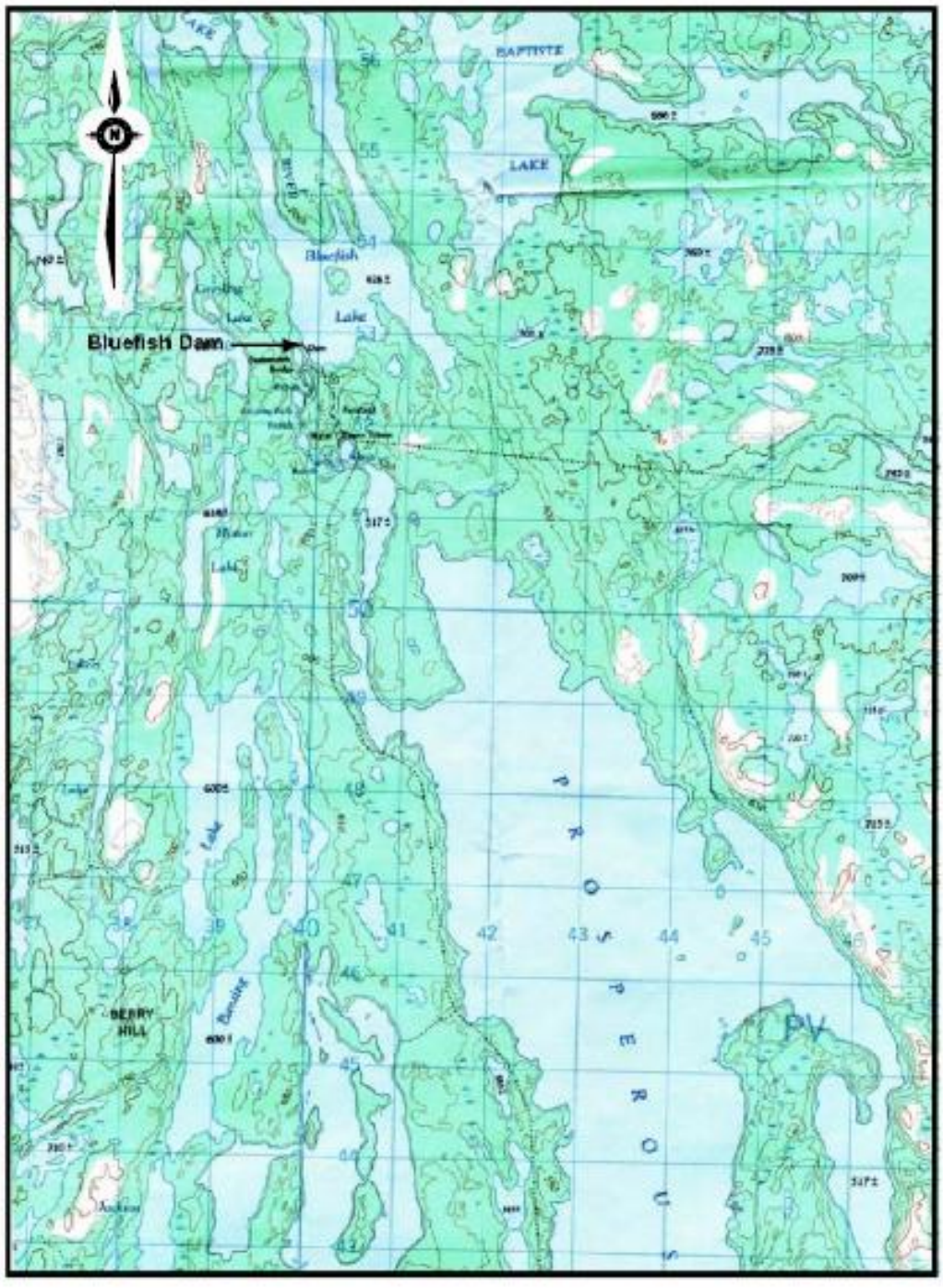
5.0 CONCLUSION

The existing dam is at the end of its useful life and requires replacement. The Proposed Project is the most feasible, economical solution, with the minimal potential environmental risk, to provide sustainable, safe, cost effective and reliable power in the Yellowknife service area. Replacement of the facility in the event of a dam failure or replacing the output of Bluefish with diesel generation would lead to substantially higher costs for customers both in the short-term and the long-term.

Due to the length of time required for construction and the risks associated with a failure at the dam, the Project is being undertaken on an urgent basis. Work undertaken to date has served to mitigate the emergency risks associated with the present condition of the dam such that Bluefish can continue to operate during the construction period. The Corporation will assign all resources necessary to the project to meet the required timeline.

Based on the foregoing, NTPC respectfully requests that the Board approve this Application by issuing a project permit pursuant to Sections 23(b) and 54(1) of the *Public Utilities Act* to replace the Bluefish Dam in an amount of up to **$18.5 million.** The Corporation is also requesting approval in principle to borrow up to $18.5 million related to the Project.

Attachment A
Plant Location



SITE LOCATION MAP

Attachment B

Photo 1
Bluefish Dam – View from West (Spring 2008)

Photo 2
Sinkhole in upstream mat at Bluefish Dam (Spring 2008)

Photo 3
Rock Buttress Completed Before Emergency Spillway added.

Photo 4
Temporary spillway structure constructed (Summer 2008)

Photo 5
Temporary spillway under high flow conditions (Fall 2008)

Photo 6
Visual Monitoring System – Rope is checked twice daily for movement. (Summer 2009)

ATTACHMENT C
EXECUTIVE SUMMARY OF EBA REPORT

Northwest Territories Power Corporation

ISSUED FOR USE

EVALUATION OF DAM/SPILLWAY CONCEPTS
BLUEFISH HYDRO, NT

Y14101066.001

February 2009

EBA Engineering Consultants Ltd.
p. 867.920.2287 • f. 867.873.3324
PO Box 2244 • 201, 4916 - 49 Street • Yellowknife, Northwest Territories X1A 2P7 • CANADA

EXECUTIVE SUMMARY

EBA Engineering Consultants Ltd. (EBA) has been requested by the Northwest Territories Power Corporation (NTPC) to provide a scope of work and cost estimate for an engineering study to evaluate the feasibility of either upgrading Bluefish Dam or constructing a new dam downstream of the existing dam. The results of this study will be used to assist NTPC in their decision on what option will be pursued. EBA has previously estimated high order of magnitude costs for reconstruction at Bluefish Dam at its current location in a report dated April 2006.

NTPC commissioned a topographic survey by Sub-Arctic Survey Ltd. (SAS) of Yellowknife, NT that included portions of the existing dam that had not been surveyed during the 2007 design of the rock fill buttress as well as the Yellowknife River valley and slopes downstream of the dam.

A site reconnaissance and test pitting investigation was conducted in October 2008. In general, the test pits refused on soils that were difficult to excavate at depths approaching, or at, the mechanical limits of the excavator. It was not possible to confirm that if bedrock was not encountered in any of the test pits that did reach refusal, however, it is considered to be unlikely. The test pit logs are presented in Appendix B.

The sandy, gravelly nature of the encountered soils suggests an alluvial deposit as lacustrine deposits are typically predominantly fine sand, silt and clay. Alluvial deposits are typically have lower shear strength and will settle beneath any structures constructed upon them.

Various design concepts were considered by EBA for the proposed new dam. A traditional zoned rock fill dam with earth fill core is not feasible at this site due to the lack of locally available earth fill that could be used for the core. Therefore, the candidate dam replacement design concepts presented herein have been selected based on EBA's understanding of site conditions, the practicality of constructing a dam at a remote site without year-round road access, availability of local materials and to suit the subsurface conditions encountered in the test pitting investigation described herein.

The rock fill - sheet pile dam design concept recommended by EBA for the replacement dam is more suited to a remote site and construction during winter conditions. The recommended approach to rehabilitation of the existing dam is to use foam injection to seal and stabilize the timber crib structure. This could be done in the summer of 2009. Then a vertical membrane, likely sheet piling, should be constructed in the winter of 2010.

The cost estimates prepared for both selected options for replace or rehabilitation are rough order of magnitude (+/-50%), the similarity of the two cost estimates (the rehabilitation option having a lower cost) is such that it is not possible to make a firm decision on what design concepts NTPC should pursue. However, of the two design concepts presented, and based on the assumptions presented herein, with emphasis placed on the assumption that EBA's depth to bedrock assumption is correct, the rock fill dam - sheet pile membrane has the least amount of uncertainty with regard to construction technology. Due to the

limited construction season, delays with innovative technologies could result in significant construction cost over runs and/or delays. Therefore, while the tentatively recommended option has a rough order of magnitude cost that is higher than the rehabilitation option, this extra cost could be viewed to be a conservative choice that accepts a higher potential cost associated with the use of proven technology. It is for this reason that EBA **tentatively** recommends the rock fill sheet pile dam at the Option 2 site.

This decision can only be finalized through a meeting with NTPC senior operations and engineering staff to allow EBA to clearly establish what NTPC's needs are with regard to issues such as year round road access and other matters such as the risk of the bedrock being at greater depths than assumed, NTPC's acceptance of risks associated with innovative technology and the benefits of minimizing the opportunities for regulatory intervention.

Attachment D

Bluefish New Dam - Detailed Cost Breakdown

Task	Fiscal Year 2008/2009	2009/2010	2010/2011	2011/2012	Total Cost
Internal Engineering Cost	$ 22	$ 155	$ 262	$ 91	$ 566
Engineering Cost					
Preliminary Engineering Study	$ 107				$ 107
Archeological Resources Survey		$ 9	$ 40		$ 49
Hydraulics/Hydrology Survey		$ 24			$ 24
Geotechnical Program	$ 236	$ 106			$ 342
Fish Habitat Study		$ 50			$ 50
Detailed Design - Dam		$ 200			$ 200
Detailed Design - Spillway		$ 200			$ 200
Project Management During Construction		$ 76	$ 395	$ 129	$ 600
Surveying Cost	$ 43	$ 75			$ 118
Construction Cost					
Camp Services and Facilities		$ 668	$ 1,022	$ 333	$ 2,023
Dam Construction		$ 1,200	$ 3,500	$ 1,000	$ 5,700
Spillway Construction		$ 400	$ 1,600	$ 500	$ 2,500
Winter Road Construction/Maintenance		$ 80	$ 80		$ 160
Safety Management		$ 65	$ 125	$ 60	$ 250
Insurance		$ 220			$ 220
Contingency on Construction and Engineering (18%)		**$ 611**	**$ 1,217**	**$ 366**	**$ 2,194**
Sub-total Project Cost	**$ 419**	**$ 4,164**	**$ 8,241**	**$ 2,479**	**$ 15,303**
Overhead (10%)	**$ 42**	**$ 416**	**$ 824**	**$ 248**	**$ 1,530**
Sub-total Project Cost	**$ 461**	**$ 4,580**	**$ 9,065**	**$ 2,727**	**$ 16,833**
AFUDC (9.674%)	**$ 22**	**$ 268**	**$ 696**	**$ 680**	**$ 1,667**

Total Estimated Cost	**$ 483**	**$ 4,848**	**$ 9,761**	**$ 3,407**	**$ 18,500**

Attachment E
NORTHWEST TERRITORIES POWER CORPORATION
LONG-TERM ECONOMIC ANALYSIS BLUEFISH HYDRO

Assumptions:

- **Total Capital Cost:** All scenarios include total Bluefish expenditures to date of $22.0 million, and dam replacement capital cost of $18.5 million in year 8 (2011/12 - 12 years from the 2001 condition assessment). Potential capital improvement costs (unrelated to the dam replacement project) of $5.0 million in year 9 (2012/13) and of $10.0 million in year 13 (2016/17) are included for scenarios 2 and 3. No specific projects or commitments have been made to any further potential projects, they are simply included in these scenarios to test the sensitivity of the economic analysis to potential future capital projects.
- **Generation:** NTPC's 2009/10 load forecast indicates that the full 48.5 GWh of Bluefish generation may not be required until year 21 (2024/25). The assumptions used in the analysis may be very conservative. For example, if a new mine were to connect to the system within the next 10-15 years, this would increase the benefits of the project. However, for the purposes of the current analysis, NTPC retained conservative assumptions. It should be noted that this conservative approach does not capture any operational benefits of Bluefish related to system diversity and therefore understates the economic benefits of the Project.
- **Inflation:** For scenario 1 and 2 inflation is assumed at a conservative rate of 0.5% per annum. This is lower than normal long-term inflation targets of between 1-3%, consistent with the Bank of Canada's inflation target. The low inflation rate was chosen to be conservative in the calculation of project benefits related to avoided diesel generation costs. A higher inflation rate would increase the benefits of the Project. This approach is consistent with previous analyses reviewed and tested by the Board. Scenario 3 considers a case with a 2% inflation rate, more consistent with normal long-term inflation forecasts.
- **Yellowknife Load Growth:** Scenarios 1 and 2 use a load growth assumption in Yellowknife at a conservative long-term annual rate of 1.2%. Scenario 3 uses a load growth assumption of 2.5%.
- **Fuel Prices:** The analysis includes actual fuel prices through 2008/09 (year 5). For 2009/10 (year 6) through 2014/15 (year 11) forecast fuel prices are based on NYMEX future prices. Fuel prices for 2015/16 (year 12) and beyond assume an inflation rate of 0.5% for scenarios 1 and 2 and 2% for scenario 3. The drop in fuel

price between year 5 (2008/09) and year 6 (2009/10) is related to extremely high fuel prices experienced in the summer of 2008.

- **Return on Rate Base:** Rate of return on rate base is assumed at the 2007/08 GRA approved rate of 9.674%.

Attachment E

NORTHWEST TERRITORIES POWER CORPORATION - SCENARIO 1
ECONOMIC ANALYSIS BLUEFISH HYDRO - UPDATED TO REFLECT ACTUALS TO 2008/09 AND BLUEFISH DAM REPLACEMENT COSTS

	Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($000)	Variable rate ($ / kW.h)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs $000	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
Actual	2005	1	5,336,000	0.148	788	0	0.025	133	922	182	606	56	844	78	
	2006	2	42,127,789	0.175	7,378	285	0.025	1,058	8,722	689	1,211	231	2,130	6,592	6,091
	2007	3	33,902,321	0.183	6,219	831	0.025	856	7,906	727	1,220	265	2,212	5,694	10,830
	2008	4	16,440,567	0.273	4,486	1,126	0.025	417	6,029	990	1,545	338	2,873	3,156	13,225
	2009	5	34,000,000	0.322	10,948	1,096	0.026	867	12,911	1,410	1,882	405	3,697	9,214	19,606
	2010	6	35,876,000	0.229	8,203	1,066	0.026	920	10,188	741	1,981	427	3,149	7,039	24,053
	2011	7	21,022,946	0.242	5,080	1,036	0.026	542	6,657	756	1,940	427	3,123	3,534	26,090
	2012	8	23,577,309	0.249	5,867	1,006	0.026	610	7,483	771	2,787	557	4,115	3,368	27,861
	2013	9	26,164,341	0.253	6,608	975	0.026	681	8,264	787	3,622	686	5,094	3,170	29,381
	2014	10	28,784,460	0.255	7,351	945	0.026	753	9,049	802	3,555	686	5,044	4,005	31,134
	2015	11	30,121,868	0.255	7,692	915	0.026	792	9,399	818	3,489	686	4,993	4,406	32,892
	2016	12	31,467,896	0.257	8,076	885	0.026	831	9,792	835	3,423	686	4,943	4,849	34,658
	2017	13	32,822,601	0.258	8,466	855	0.027	871	10,192	851	3,356	686	4,894	5,299	36,418
	2018	14	34,186,038	0.259	8,862	825	0.027	912	10,599	868	3,290	686	4,844	5,754	38,161
	2019	15	35,558,263	0.261	9,264	795	0.027	953	11,012	886	3,224	686	4,795	6,216	39,879
	2020	16	37,827,932	0.262	9,904	765	0.027	1,019	11,688	904	3,157	686	4,747	6,941	41,630
	2021	17	40,121,644	0.263	10,557	735	0.027	1,086	12,378	922	3,091	686	4,698	7,680	43,396
	2022	18	42,439,653	0.264	11,223	705	0.027	1,155	13,082	940	3,024	686	4,650	8,432	45,165
	2023	19	44,782,217	0.266	11,902	675	0.027	1,225	13,801	959	2,958	686	4,603	9,198	46,926
	2024	20	47,149,596	0.267	12,594	644	0.027	1,296	14,534	978	2,892	686	4,556	9,978	48,668
	2025	21	48,500,000	0.268	13,019	614	0.028	1,340	14,973	998	2,825	686	4,509	10,464	50,335
	2026	22	48,500,000	0.270	13,084	584	0.028	1,346	15,015	1,018	2,759	686	4,462	10,552	51,869
	2027	23	48,500,000	0.271	13,150	554	0.028	1,353	15,057	1,038	2,693	686	4,416	10,640	53,279
	2028	24	48,500,000	0.272	13,215	524	0.028	1,360	15,099	1,059	2,626	686	4,371	10,728	54,577
	2029	25	48,500,000	0.274	13,281	494	0.028	1,367	15,142	1,080	2,560	686	4,326	10,816	55,770
	2030	26	48,500,000	0.275	13,348	464	0.028	1,374	15,185	1,101	2,493	686	4,281	10,904	56,867
	2031	27	48,500,000	0.277	13,414	434	0.028	1,380	15,229	1,123	2,427	686	4,237	10,992	57,876
	2032	28	48,500,000	0.278	13,482	404	0.029	1,387	15,273	1,146	2,361	686	4,193	11,080	58,804
	2033	29	48,500,000	0.279	13,549	374	0.029	1,394	15,317	1,169	2,294	686	4,149	11,168	59,657
	2034	30	48,500,000	0.281	13,617	343	0.029	1,401	15,361	1,192	2,228	686	4,106	11,255	60,442
	2035	31	48,500,000	0.282	13,685	313	0.029	1,408	15,406	1,216	2,162	686	4,064	11,343	61,163
	2036	32	48,500,000	0.284	13,753	542	0.029	1,415	15,711	1,240	2,095	686	4,022	11,689	61,841
	2037	33	48,500,000	0.285	13,822	1,034	0.029	1,422	16,278	1,265	2,029	686	3,980	12,298	62,492
	2038	34	48,500,000	0.286	13,891	1,265	0.029	1,429	16,585	1,290	1,963	686	3,939	12,646	63,102
	2039	35	48,500,000	0.288	13,961	1,230	0.030	1,437	16,627	1,316	1,896	686	3,898	12,728	63,662
	2040	36	48,500,000	0.289	14,030	1,195	0.030	1,444	16,669	1,343	1,830	686	3,858	12,810	64,177
	2041	37	48,500,000	0.291	14,101	1,160	0.030	1,451	16,711	1,369	1,763	686	3,819	12,892	64,649
	2042	38	48,500,000	0.292	14,171	1,125	0.030	1,458	16,754	1,397	1,697	686	3,780	12,974	65,083
	2043	39	48,500,000	0.294	14,242	1,090	0.030	1,466	16,797	1,425	1,631	686	3,742	13,056	65,481
	2044	40	48,500,000	0.295	14,313	1,055	0.030	1,473	16,841	1,453	1,564	686	3,704	13,137	65,847
	2045	41	48,500,000	0.297	14,385	1,020	0.031	1,480	16,885	1,482	1,498	686	3,666	13,219	66,182
	2046	42	48,500,000	0.298	14,457	985	0.031	1,488	16,929	1,512	1,432	686	3,630	13,300	66,490

Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($000)	Variable rate ($ / kW.h)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs ($)	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
2047	43	48,500,000	0.300	14,529	950	0.031	1,495	16,974	1,542	1,365	686	3,593	13,380	66,725
2048	44	48,500,000	0.301	14,601	915	0.031	1,503	17,019	1,573	1,299	686	3,558	13,461	66,941
2049	45	48,500,000	0.303	14,675	880	0.031	1,510	17,065	1,605	1,233	686	3,523	13,542	67,139
2050	46	48,500,000	0.304	14,748	845	0.031	1,518	17,111	1,637	1,166	686	3,489	13,622	67,321
2051	47	48,500,000	0.306	14,822	810	0.031	1,525	17,157	1,669	1,100	686	3,455	13,702	67,487
2052	48	48,500,000	0.307	14,896	775	0.032	1,533	17,204	1,703	1,033	686	3,422	13,782	67,640
2053	49	48,500,000	0.309	14,970	740	0.032	1,540	17,251	1,737	967	686	3,390	13,861	67,781
2054	50	48,500,000	0.310	15,045	705	0.032	1,548	17,299	1,772	901	686	3,358	13,940	67,910
2055	51	48,500,000	0.312	15,120	670	0.032	1,556	17,347	1,807	834	686	3,327	14,019	68,028
2056	52	48,500,000	0.313	15,196	636	0.032	1,564	17,395	1,843	768	686	3,297	14,098	68,136
2057	53	48,500,000	0.315	15,272	601	0.032	1,572	17,444	1,880	702	686	3,268	14,176	68,235
2058	54	48,500,000	0.316	15,348	566	0.033	1,579	17,493	1,918	635	686	3,239	14,254	68,327
2059	55	26,300,000	0.318	8,364	531	0.033	861	9,756	1,956	585	343	2,884	6,871	68,367
2060	56	26,300,000	0.320	8,406	496	0.033	865	9,767	1,995	552	343	2,890	6,877	68,403
2061	57	26,300,000	0.321	8,448	461	0.033	869	9,778	2,035	519	343	2,897	6,881	68,437
2062	58	26,300,000	0.323	8,491	426	0.033	874	9,790	2,076	486	343	2,905	6,886	68,467
2063	59	26,300,000	0.324	8,533	391	0.033	878	9,802	2,117	453	343	2,913	6,889	68,495
2064	60	26,300,000	0.326	8,576	356	0.034	882	9,814	2,159	420	343	2,922	6,892	68,521
2065	61	26,300,000	0.328	8,619	321	0.034	887	9,826	2,203	386	343	2,932	6,894	68,544
2066	62	26,300,000	0.329	8,662	587	0.034	891	10,140	2,247	353	343	2,943	7,197	68,566
2067	63	26,300,000	0.331	8,705	1,158	0.034	896	10,759	2,292	320	343	2,955	7,804	68,588
2068	64	26,300,000	0.333	8,748	1,426	0.034	900	11,074	2,337	287	343	2,967	8,107	68,608
2069	65	26,300,000	0.334	8,792	1,385	0.034	905	11,082	2,384	254	343	2,981	8,101	68,627
2070	66	26,300,000	0.336	8,836	1,345	0.035	909	11,090	2,432	220	343	2,995	8,095	68,645
2071	67	26,300,000	0.338	8,880	1,304	0.035	914	11,098	2,481	187	343	3,011	8,087	68,660
2072	68	26,300,000	0.339	8,925	1,263	0.035	918	11,107	2,530	154	343	3,027	8,079	68,674
2073	69	26,300,000	0.341	8,969	1,223	0.035	923	11,115	2,581	121	343	3,045	8,070	68,687
2074	70	26,300,000	0.343	9,014	1,182	0.035	928	11,124	2,632	88	343	3,063	8,061	68,699
2075	71	26,300,000	0.344	9,059	1,142	0.035	932	11,133	2,685	55	343	3,083	8,051	68,710
2076	72	26,300,000	0.346	9,105	1,101	0.036	937	11,143	2,739	21	343	3,103	8,039	68,720
2077	73	26,300,000	0.348	9,150	1,060	0.036	942	11,152	2,794	(12)	343	3,125	8,027	68,729
2078	74	26,300,000	0.350	9,196	1,020	0.036	946	11,162	2,849	(45)	343	3,147	8,015	68,737
2079	75	26,300,000	0.351	9,242	979	0.036	951	11,172	2,906	(78)	343	3,171	8,001	68,745
2080	76	26,300,000	0.353	9,288	939	0.036	956	11,182	2,964	(47)	343	3,260	7,922	68,751
2081	77	26,300,000	0.355	9,335	898	0.037	961	11,193	3,024	0	343	3,367	7,826	68,757
2082	78	26,300,000	0.357	9,381	857	0.037	965	11,204	3,084	0	343	3,427	7,777	68,763
2083	79	26,300,000	0.358	9,428	817	0.037	970	11,215	3,146	0	343	3,489	7,726	68,768
2084	80	26,300,000	0.360	9,475	776	0.037	975	11,227	3,209	0	343	3,552	7,675	68,772
2085	81	26,300,000	0.362	9,523	736	0.037	980	11,238	3,273	0	343	3,616	7,622	68,776
2086	82	26,300,000	0.364	9,570	695	0.037	985	11,250	3,339	0	343	3,682	7,569	68,780
2087	83	26,300,000	0.366	9,618	655	0.038	990	11,262	3,405	0	343	3,748	7,514	68,783
2088	84	26,300,000	0.368	9,666	614	0.038	995	11,275	3,473	0	343	3,816	7,458	68,787
2089	85	26,300,000	0.369	9,714	573	0.038	1,000	11,287	3,543	0	343	3,886	7,402	68,789
	SUM of the PRESENT VALUES							**108,904**				**40,374**	**68,789**	
	Benefit-Cost ratio (NPV Total Savings / NPV Revenue Required)							**2.70**						

NORTHWEST TERRITORIES POWER CORPORATION - SCENARIO 2
ECONOMIC ANALYSIS BLUEFISH HYDRO - UPDATED TO REFLECT ACTUALS TO 2008/09 AND BLUEFISH DAM REPLACEMENT COSTS

	Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($000)	Variable rate ($ / kW.h)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs ($)	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
Actual	2005	1	5,336,000	0.148	788	0	0.025	133	922	182	606	56	844	78	
	2006	2	42,127,789	0.175	7,378	285	0.025	1,058	8,722	689	1,211	231	2,130	6,592	6,091
	2007	3	33,902,321	0.183	6,219	831	0.025	856	7,906	727	1,220	265	2,212	5,694	10,830
	2008	4	16,440,567	0.273	4,486	1,126	0.025	417	6,029	990	1,545	338	2,873	3,156	13,225
	2009	5	34,000,000	0.322	10,948	1,096	0.026	867	12,911	1,410	1,882	405	3,697	9,214	19,606
	2010	6	35,876,000	0.229	8,203	1,066	0.026	920	10,188	741	1,981	427	3,149	7,039	24,053
	2011	7	21,022,946	0.242	5,080	1,036	0.026	542	6,657	756	1,940	427	3,123	3,534	26,090
	2012	8	23,577,309	0.249	5,867	1,006	0.026	610	7,483	771	2,787	557	4,115	3,368	27,861
	2013	9	26,164,341	0.253	6,608	975	0.026	681	8,264	787	3,862	721	5,369	2,895	29,249
	2014	10	28,784,460	0.255	7,351	945	0.026	753	9,049	802	4,032	756	5,591	3,458	30,762
	2015	11	30,121,868	0.255	7,692	915	0.026	792	9,399	818	3,959	756	5,534	3,866	32,305
	2016	12	31,467,896	0.257	8,076	885	0.026	831	9,792	835	3,886	756	5,477	4,316	33,877
	2017	13	32,822,601	0.258	8,466	855	0.027	871	10,192	851	4,292	845	5,988	4,204	35,273
	2018	14	34,186,038	0.259	8,862	825	0.027	912	10,599	868	4,690	933	6,492	4,107	36,517
	2019	15	35,558,263	0.261	9,264	795	0.027	953	11,012	886	4,600	933	6,419	4,593	37,787
	2020	16	37,827,932	0.262	9,904	765	0.027	1,019	11,688	904	4,509	933	6,346	5,342	39,134
	2021	17	40,121,644	0.263	10,557	735	0.027	1,086	12,378	922	4,419	933	6,274	6,104	40,538
	2022	18	42,439,653	0.264	11,223	705	0.027	1,155	13,082	940	4,329	933	6,202	6,880	41,982
	2023	19	44,782,217	0.266	11,902	675	0.027	1,225	13,801	959	4,239	933	6,131	7,670	43,450
	2024	20	47,149,596	0.267	12,594	644	0.027	1,296	14,534	978	4,148	933	6,059	8,474	44,930
	2025	21	48,500,000	0.268	13,019	614	0.028	1,340	14,973	998	4,058	933	5,989	8,984	46,361
	2026	22	48,500,000	0.270	13,084	584	0.028	1,346	15,015	1,018	3,968	933	5,918	9,096	47,683
	2027	23	48,500,000	0.271	13,150	554	0.028	1,353	15,057	1,038	3,878	933	5,849	9,208	48,903
	2028	24	48,500,000	0.272	13,215	524	0.028	1,360	15,099	1,059	3,787	933	5,779	9,320	50,031
	2029	25	48,500,000	0.274	13,281	494	0.028	1,367	15,142	1,080	3,697	933	5,710	9,432	51,071
	2030	26	48,500,000	0.275	13,348	464	0.028	1,374	15,185	1,101	3,607	933	5,641	9,544	52,032
	2031	27	48,500,000	0.277	13,414	434	0.028	1,380	15,229	1,123	3,516	933	5,573	9,656	52,918
	2032	28	48,500,000	0.278	13,482	404	0.029	1,387	15,273	1,146	3,426	933	5,505	9,767	53,736
	2033	29	48,500,000	0.279	13,549	374	0.029	1,394	15,317	1,169	3,336	933	5,438	9,879	54,491
	2034	30	48,500,000	0.281	13,617	343	0.029	1,401	15,361	1,192	3,246	933	5,371	9,990	55,187
	2035	31	48,500,000	0.282	13,685	313	0.029	1,408	15,406	1,216	3,155	933	5,305	10,102	55,829
	2036	32	48,500,000	0.284	13,753	542	0.029	1,415	15,711	1,240	3,065	933	5,239	10,472	56,437
	2037	33	48,500,000	0.285	13,822	1,034	0.029	1,422	16,278	1,265	2,975	933	5,173	11,105	57,024
	2038	34	48,500,000	0.286	13,891	1,265	0.029	1,429	16,585	1,290	2,885	933	5,108	11,477	57,578
	2039	35	48,500,000	0.288	13,961	1,230	0.030	1,437	16,627	1,316	2,794	933	5,044	11,583	58,088
	2040	36	48,500,000	0.289	14,030	1,195	0.030	1,444	16,669	1,343	2,704	933	4,980	11,689	58,558
	2041	37	48,500,000	0.291	14,101	1,160	0.030	1,451	16,711	1,369	2,614	933	4,916	11,795	58,990
	2042	38	48,500,000	0.292	14,171	1,125	0.030	1,458	16,754	1,397	2,523	933	4,853	11,901	59,388
	2043	39	48,500,000	0.294	14,242	1,090	0.030	1,466	16,797	1,425	2,433	933	4,791	12,006	59,754
	2044	40	48,500,000	0.295	14,313	1,055	0.030	1,473	16,841	1,453	2,343	933	4,729	12,112	60,091
	2045	41	48,500,000	0.297	14,385	1,020	0.031	1,480	16,885	1,482	2,253	933	4,668	12,217	60,401
	2046	42	48,500,000	0.298	14,457	985	0.031	1,488	16,929	1,512	2,162	933	4,607	12,322	60,686

Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($000)	Variable rate ($ / kW.h)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs ($)	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
2047	43	48,500,000	0.300	14,529	950	0.031	1,495	16,974	1,542	2,072	933	4,547	12,427	60,904
2048	44	48,500,000	0.301	14,601	915	0.031	1,503	17,019	1,573	1,982	933	4,488	12,531	61,105
2049	45	48,500,000	0.303	14,675	880	0.031	1,510	17,065	1,605	1,892	933	4,429	12,636	61,290
2050	46	48,500,000	0.304	14,748	845	0.031	1,518	17,111	1,637	1,801	933	4,371	12,740	61,460
2051	47	48,500,000	0.306	14,822	810	0.031	1,525	17,157	1,669	1,711	933	4,313	12,844	61,616
2052	48	48,500,000	0.307	14,896	775	0.032	1,533	17,204	1,703	1,621	933	4,257	12,947	61,760
2053	49	48,500,000	0.309	14,970	740	0.032	1,540	17,251	1,737	1,530	933	4,200	13,051	61,892
2054	50	48,500,000	0.310	15,045	705	0.032	1,548	17,299	1,772	1,440	933	4,145	13,154	62,014
2055	51	48,500,000	0.312	15,120	670	0.032	1,556	17,347	1,807	1,350	933	4,090	13,257	62,125
2056	52	48,500,000	0.313	15,196	636	0.032	1,564	17,395	1,843	1,260	933	4,036	13,359	62,228
2057	53	48,500,000	0.315	15,272	601	0.032	1,572	17,444	1,880	1,169	933	3,982	13,462	62,322
2058	54	48,500,000	0.316	15,348	566	0.033	1,579	17,493	1,918	1,079	933	3,930	13,563	62,409
2059	55	26,300,000	0.318	8,364	531	0.033	861	9,756	1,956	1,011	467	3,434	6,322	62,446
2060	56	26,300,000	0.320	8,406	496	0.033	865	9,767	1,995	966	467	3,428	6,339	62,480
2061	57	26,300,000	0.321	8,448	461	0.033	869	9,778	2,035	921	467	3,423	6,356	62,511
2062	58	26,300,000	0.323	8,491	426	0.033	874	9,790	2,076	876	467	3,418	6,372	62,539
2063	59	26,300,000	0.324	8,533	391	0.033	878	9,802	2,117	831	467	3,415	6,387	62,565
2064	60	26,300,000	0.326	8,576	356	0.034	882	9,814	2,159	786	467	3,412	6,402	62,588
2065	61	26,300,000	0.328	8,619	321	0.034	887	9,826	2,203	741	467	3,410	6,417	62,610
2066	62	26,300,000	0.329	8,662	587	0.034	891	10,140	2,247	695	467	3,409	6,731	62,631
2067	63	26,300,000	0.331	8,705	1,158	0.034	896	10,759	2,292	650	467	3,408	7,350	62,651
2068	64	26,300,000	0.333	8,748	1,426	0.034	900	11,074	2,337	605	467	3,409	7,665	62,671
2069	65	26,300,000	0.334	8,792	1,385	0.034	905	11,082	2,384	560	467	3,411	7,671	62,689
2070	66	26,300,000	0.336	8,836	1,345	0.035	909	11,090	2,432	515	467	3,413	7,677	62,705
2071	67	26,300,000	0.338	8,880	1,304	0.035	914	11,098	2,481	470	467	3,417	7,681	62,720
2072	68	26,300,000	0.339	8,925	1,263	0.035	918	11,107	2,530	425	467	3,421	7,685	62,733
2073	69	26,300,000	0.341	8,969	1,223	0.035	923	11,115	2,581	379	467	3,427	7,688	62,746
2074	70	26,300,000	0.343	9,014	1,182	0.035	928	11,124	2,632	334	467	3,433	7,691	62,757
2075	71	26,300,000	0.344	9,059	1,142	0.035	932	11,133	2,685	289	467	3,441	7,692	62,767
2076	72	26,300,000	0.346	9,105	1,101	0.036	937	11,143	2,739	244	467	3,449	7,693	62,777
2077	73	26,300,000	0.348	9,150	1,060	0.036	942	11,152	2,794	199	467	3,459	7,693	62,785
2078	74	26,300,000	0.350	9,196	1,020	0.036	946	11,162	2,849	154	467	3,470	7,692	62,793
2079	75	26,300,000	0.351	9,242	979	0.036	951	11,172	2,906	109	467	3,482	7,691	62,800
2080	76	26,300,000	0.353	9,288	939	0.036	956	11,182	2,964	43	467	3,474	7,708	62,807
2081	77	26,300,000	0.355	9,335	898	0.037	961	11,193	3,024	0	467	3,490	7,703	62,813
2082	78	26,300,000	0.357	9,381	857	0.037	965	11,204	3,084	0	467	3,551	7,653	62,818
2083	79	26,300,000	0.358	9,428	817	0.037	970	11,215	3,146	0	467	3,613	7,603	62,823
2084	80	26,300,000	0.360	9,475	776	0.037	975	11,227	3,209	0	467	3,675	7,551	62,828
2085	81	26,300,000	0.362	9,523	736	0.037	980	11,238	3,273	0	467	3,740	7,499	62,832
2086	82	26,300,000	0.364	9,570	695	0.037	985	11,250	3,339	0	467	3,805	7,445	62,835
2087	83	26,300,000	0.366	9,618	655	0.038	990	11,262	3,405	0	467	3,872	7,390	62,839
2088	84	26,300,000	0.368	9,666	614	0.038	995	11,275	3,473	0	467	3,940	7,335	62,842
2089	85	26,300,000	0.369	9,714	573	0.038	1,000	11,287	3,543	0	467	4,009	7,278	62,844
	SUM of the PRESENT VALUES							**108,904**				**46,319**	**62,844**	
	Benefit-Cost ratio (NPV Total Savings / NPV Revenue Required)							**2.35**						

NORTHWEST TERRITORIES POWER CORPORATION - SCENARIO 3
ECONOMIC ANALYSIS BLUEFISH HYDRO - UPDATED TO REFLECT ACTUALS TO 2008/09 AND BLUEFISH DAM REPLACEMENT COSTS

	Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($)	Variable rate ($000)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs ($)	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
Actual	2005	1	5,336,000	0.148	788	0	0.025	133	922	182	606	56	844	78	
	2006	2	42,127,789	0.175	7,378	285	0.026	1,058	8,722	689	1,211	231	2,130	6,592	6,091
	2007	3	33,902,321	0.183	6,219	831	0.026	856	7,906	727	1,220	265	2,212	5,694	10,830
	2008	4	16,440,567	0.273	4,486	1,126	0.027	417	6,029	990	1,545	338	2,873	3,156	13,225
	2009	5	34,000,000	0.322	10,948	1,096	0.027	867	12,911	1,410	1,882	405	3,697	9,214	19,606
	2010	6	35,876,000	0.229	8,203	1,066	0.028	933	10,202	741	1,981	427	3,149	7,053	24,062
	2011	7	23,430,861	0.242	5,662	1,036	0.028	622	7,319	756	1,940	427	3,123	4,196	26,480
	2012	8	28,484,133	0.249	7,088	1,006	0.029	771	8,864	771	2,787	557	4,115	4,750	28,978
	2013	9	33,663,736	0.253	8,502	975	0.029	929	10,407	787	3,862	721	5,369	5,038	31,394
	2014	10	38,972,829	0.255	9,953	945	0.030	1,097	11,995	802	4,032	756	5,591	6,405	34,196
	2015	11	44,414,650	0.255	11,342	915	0.030	1,276	13,533	818	3,959	756	5,534	8,000	37,389
	2016	12	48,500,000	0.260	12,633	885	0.031	1,421	14,939	835	3,886	756	5,477	9,463	40,834
	2017	13	48,500,000	0.266	12,886	855	0.032	1,449	15,190	851	4,292	845	5,988	9,202	43,890
	2018	14	48,500,000	0.271	13,144	825	0.032	1,478	15,447	868	4,690	933	6,492	8,955	46,604
	2019	15	48,500,000	0.276	13,407	795	0.033	1,508	15,709	886	4,600	933	6,419	9,291	49,172
	2020	16	48,500,000	0.282	13,675	765	0.034	1,538	15,977	904	4,509	933	6,346	9,631	51,600
	2021	17	48,500,000	0.288	13,948	735	0.034	1,569	16,252	922	4,419	933	6,274	9,978	53,895
	2022	18	48,500,000	0.293	14,227	705	0.035	1,600	16,532	940	4,329	933	6,202	10,330	56,063
	2023	19	48,500,000	0.299	14,512	675	0.036	1,632	16,818	959	4,239	933	6,131	10,688	58,109
	2024	20	48,500,000	0.305	14,802	644	0.036	1,665	17,111	978	4,148	933	6,059	11,052	60,038
	2025	21	48,500,000	0.311	15,098	614	0.037	1,698	17,410	998	4,058	933	5,989	11,422	61,858
	2026	22	48,500,000	0.318	15,400	584	0.038	1,732	17,716	1,018	3,968	933	5,918	11,798	63,572
	2027	23	48,500,000	0.324	15,708	554	0.039	1,767	18,029	1,038	3,878	933	5,849	12,180	65,187
	2028	24	48,500,000	0.330	16,022	524	0.039	1,802	18,348	1,059	3,787	933	5,779	12,569	66,707
	2029	25	48,500,000	0.337	16,343	494	0.040	1,838	18,675	1,080	3,697	933	5,710	12,965	68,137
	2030	26	48,500,000	0.344	16,669	464	0.041	1,875	19,008	1,101	3,607	933	5,641	13,367	69,482
	2031	27	48,500,000	0.351	17,003	434	0.042	1,912	19,349	1,123	3,516	933	5,573	13,776	70,747
	2032	28	48,500,000	0.358	17,343	404	0.043	1,951	19,697	1,146	3,426	933	5,505	14,192	71,935
	2033	29	48,500,000	0.365	17,690	374	0.044	1,990	20,053	1,169	3,336	933	5,438	14,615	73,052
	2034	30	48,500,000	0.372	18,043	343	0.044	2,029	20,416	1,192	3,246	933	5,371	15,045	74,101
	2035	31	48,500,000	0.379	18,404	313	0.045	2,070	20,788	1,216	3,155	933	5,305	15,483	75,085
	2036	32	48,500,000	0.387	18,772	728	0.046	2,111	21,612	1,240	3,065	933	5,239	16,373	76,035
	2037	33	48,500,000	0.395	19,148	1,591	0.047	2,154	22,892	1,265	2,975	933	5,173	17,719	76,972
	2038	34	48,500,000	0.403	19,531	1,996	0.048	2,197	23,724	1,290	2,885	933	5,108	18,616	77,871
	2039	35	48,500,000	0.411	19,921	1,942	0.049	2,241	24,104	1,316	2,794	933	5,044	19,060	78,710
	2040	36	48,500,000	0.419	20,320	1,887	0.050	2,285	24,493	1,343	2,704	933	4,980	19,513	79,494
	2041	37	48,500,000	0.427	20,726	1,833	0.051	2,331	24,890	1,369	2,614	933	4,916	19,974	80,225
	2042	38	48,500,000	0.436	21,141	1,778	0.052	2,378	25,297	1,397	2,523	933	4,853	20,443	80,909
	2043	39	48,500,000	0.445	21,564	1,724	0.053	2,425	25,713	1,425	2,433	933	4,791	20,922	81,547
	2044	40	48,500,000	0.454	21,995	1,669	0.054	2,474	26,138	1,453	2,343	933	4,729	21,409	82,142
	2045	41	48,500,000	0.463	22,435	1,615	0.055	2,523	26,573	1,482	2,253	933	4,668	21,905	82,698
	2046	42	48,500,000	0.472	22,884	1,560	0.056	2,574	27,018	1,512	2,162	933	4,607	22,410	83,217

Date Year Ending	Year	Average Water Generation (kW.h)	Fuel/lube price ($ / kW.h)	Fuel savings ($000)	New Engine Savings ($000)	Variable rate ($ / kW.h)	Total Variable savings ($)	Total savings ($000)	Total Hydro O&M Costs ($)	Return on Rate Base	Amort.	Revenue Required	Ratepayer (Cost)/Saving	NPV of Payback
2047	43	48,500,000	0.481	23,341	1,506	0.057	2,625	27,472	1,542	2,072	933	4,547	22,925	83,620
2048	44	48,500,000	0.491	23,808	1,451	0.059	2,678	27,937	1,573	1,982	933	4,488	23,449	83,996
2049	45	48,500,000	0.501	24,284	1,397	0.060	2,731	28,412	1,605	1,892	933	4,429	23,983	84,346
2050	46	48,500,000	0.511	24,770	1,342	0.061	2,786	28,898	1,637	1,801	933	4,371	24,527	84,674
2051	47	48,500,000	0.521	25,265	1,288	0.062	2,842	29,395	1,669	1,711	933	4,313	25,081	84,979
2052	48	48,500,000	0.531	25,771	1,233	0.063	2,898	29,902	1,703	1,621	933	4,257	25,646	85,264
2053	49	48,500,000	0.542	26,286	1,179	0.065	2,956	30,421	1,737	1,530	933	4,200	26,221	85,529
2054	50	48,500,000	0.553	26,812	1,124	0.066	3,015	30,951	1,772	1,440	933	4,145	26,807	85,777
2055	51	48,500,000	0.564	27,348	1,070	0.067	3,076	31,493	1,807	1,350	933	4,090	27,403	86,008
2056	52	48,500,000	0.575	27,895	1,015	0.069	3,137	32,047	1,843	1,260	933	4,036	28,012	86,223
2057	53	48,500,000	0.587	28,453	961	0.070	3,200	32,614	1,880	1,169	933	3,982	28,631	86,424
2058	54	48,500,000	0.598	29,022	906	0.071	3,264	33,192	1,918	1,079	933	3,930	29,262	86,611
2059	55	26,300,000	0.610	16,052	852	0.073	1,805	18,709	1,956	1,011	467	3,434	15,276	86,700
2060	56	26,300,000	0.623	16,373	797	0.074	1,841	19,012	1,995	966	467	3,428	15,584	86,783
2061	57	26,300,000	0.635	16,701	743	0.076	1,878	19,322	2,035	921	467	3,423	15,899	86,860
2062	58	26,300,000	0.648	17,035	688	0.077	1,916	19,639	2,076	876	467	3,418	16,221	86,932
2063	59	26,300,000	0.661	17,376	634	0.079	1,954	19,963	2,117	831	467	3,415	16,549	86,999
2064	60	26,300,000	0.674	17,723	579	0.080	1,993	20,296	2,159	786	467	3,412	16,884	87,061
2065	61	26,300,000	0.687	18,078	525	0.082	2,033	20,635	2,203	741	467	3,410	17,226	87,119
2066	62	26,300,000	0.701	18,439	1,276	0.084	2,074	21,789	2,247	695	467	3,409	18,380	87,176
2067	63	26,300,000	0.715	18,808	2,839	0.085	2,115	23,762	2,292	650	467	3,408	20,353	87,233
2068	64	26,300,000	0.729	19,184	3,573	0.087	2,158	24,915	2,337	605	467	3,409	21,506	87,288
2069	65	26,300,000	0.744	19,568	3,475	0.089	2,201	25,243	2,384	560	467	3,411	21,832	87,339
2070	66	26,300,000	0.759	19,959	3,376	0.091	2,245	25,580	2,432	515	467	3,413	22,166	87,386
2071	67	26,300,000	0.774	20,358	3,277	0.092	2,290	25,925	2,481	470	467	3,417	22,508	87,429
2072	68	26,300,000	0.790	20,765	3,178	0.094	2,335	26,279	2,530	425	467	3,421	22,858	87,470
2073	69	26,300,000	0.805	21,181	3,080	0.096	2,382	26,643	2,581	379	467	3,427	23,216	87,507
2074	70	26,300,000	0.821	21,604	2,981	0.098	2,430	27,015	2,632	334	467	3,433	23,582	87,542
2075	71	26,300,000	0.838	22,036	2,882	0.100	2,478	27,397	2,685	289	467	3,441	23,956	87,574
2076	72	26,300,000	0.855	22,477	2,783	0.102	2,528	27,789	2,739	244	467	3,449	24,339	87,604
2077	73	26,300,000	0.872	22,927	2,685	0.104	2,579	28,190	2,794	199	467	3,459	24,731	87,632
2078	74	26,300,000	0.889	23,385	2,586	0.106	2,630	28,601	2,849	154	467	3,470	25,132	87,657
2079	75	26,300,000	0.907	23,853	2,487	0.108	2,683	29,023	2,906	109	467	3,482	25,541	87,681
2080	76	26,300,000	0.925	24,330	2,388	0.110	2,736	29,455	2,964	43	467	3,474	25,981	87,703
2081	77	26,300,000	0.944	24,817	2,290	0.113	2,791	29,897	3,024	0	467	3,490	26,407	87,723
2082	78	26,300,000	0.962	25,313	2,191	0.115	2,847	30,351	3,084	0	467	3,551	26,800	87,742
2083	79	26,300,000	0.982	25,819	2,092	0.117	2,904	30,815	3,146	0	467	3,613	27,203	87,760
2084	80	26,300,000	1.001	26,336	1,993	0.119	2,962	31,291	3,209	0	467	3,675	27,616	87,776
2085	81	26,300,000	1.021	26,862	1,895	0.122	3,021	31,778	3,273	0	467	3,740	28,039	87,791
2086	82	26,300,000	1.042	27,400	1,796	0.124	3,082	32,277	3,339	0	467	3,805	28,472	87,805
2087	83	26,300,000	1.063	27,948	1,697	0.127	3,143	32,788	3,405	0	467	3,872	28,916	87,818
2088	84	26,300,000	1.084	28,506	1,599	0.129	3,206	33,311	3,473	0	467	3,940	29,371	87,830
2089	85	26,300,000	1.106	29,077	1,500	0.132	3,270	33,847	3,543	0	467	4,009	29,837	87,841
	SUM of the PRESENT VALUES							**133,684**				**46,319**	**87,841**	
	Benefit-Cost ratio (NPV Total Savings / NPV Revenue Required)							**2.89**						

ATTACHMENT F
EBA LETTER

August 4, 2009 EBA File: Y14101066.005

Northwest Territories Power Corp. via email: TPittman@ntpc.com
#4 Capital Drive
Hay River, NT X0E 1G2

Attention: Todd Pittman, P.Eng.

Subject: Status of 2005 Dam Safety Review Recommendations

EBA Engineering Consultants Ltd. (EBA) has been providing dam safety and engineering services for Bluefish Dam to the Northwest Territories Power Corporation (NTPC) since 2005 and, before that, for the former owner of the dam since the late 1990s. EBA's scope of services has included, but was not limited to, intermittent dam inspections, the 2005 Dam Safety Review, design of a rock fill buttress to stabilize the overflow spillway section, and currently ongoing design of the replacement dam and spillway.

EBA has been requested by NTPC to provide a letter stating what actions NTPC have taken since 2005 to address the recommendations presented in the 2005 Dam Safety Review report. There were 39 recommendations presented in that report as a function of the various areas of review. In some cases, there was some repetition of recommendations as a function of the different perspectives from which the dam was reviewed.

The critical recommendations that were made for Bluefish Dam encompassed the following:

- Placement of a rock fill buttress downstream of the overflow spillway to stabilize the rotting timber crib structure;
- Lower reservoir levels to improve dam safety (involved re-commissioning Bluefish Auxiliary spillway);
- Improve regular operations monitoring at the dam; and
- Improve public safety management plan

All of these critical recommendations have been addressed. EBA is unaware of the level of documentation that is being conducted to track the various inspections; however, we are aware that the dam is being monitored regularly with frequent updates to NTPC head office in Hay River, NWT with supplemental calls then made to EBA geotechnical and dam safety engineering staff in Yellowknife, NWT or Edmonton, AB. It is understood that a photographic record of the various inspections has been created and that the inspections include the downstream toe, crest, overflow spillway structure and rock fill buttress elements of the dam.

Several recommendations were made in the 2005 Dam Safety report that related to the Emergency Preparedness/Response Plan (referred to as the General Contingency Plan in the 2005 report). The continued deterioration of the dam over the past two years has resulted in NTPC updating and implementing their EPP with the declaration of a dam emergency in the spring of 2009 which includes installation of alarm sirens, notifying the public to stay out of the river channel area between the dam and the powerhouse and constructing a rockfill dyke at the powerhouse site to minimize the potential for the power plant from being impacted by a dam failure flood wave.

What is more important is that since 2005, NTPC have recognized and accepted that the dam is at the end of its life cycle and are aggressively working towards construction of a replacement dam and spillway in the winter of 2010.

We trust that this information is sufficient for NTPC's purposes at this time. Please do not hesitate to contact the undersigned if there any further questions or comments.

Best regards,
EBA Engineering Consultants Ltd.

Chris Gräpel, P.Eng.
Senior Project Engineer
Direct Line: 780.451.2130 x516
cgrapel@eba.ca

Reviewed by:
T. Ed Hoeve, P.Eng.
Project Manager
Direct Line: 867.766.3728 x114
ehoeve@eba.ca

c: Bob Patrick, P.Eng. (BC)

/jmt/ln