

**NORTHWEST TERRITORIES POWER CORPORATION
APPLICATION FOR A MAJOR PROJECT PERMIT
BLUEFISH LAKE DAM REPLACEMENT**

ARGUMENT OF THE CITY OF YELLOWKNIFE

October 1, 2009

**BROWNLEE LLP
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INTRODUCTION

This Argument is submitted on behalf of the City of Yellowknife (the City) with respect to the Bluefish Lake Dam Replacement Project Permit Application of the Northwest Territories Power Corporation (NTPC). The interests of the City and its residents and businesses are materially impacted by the Application as shown in YK-NTPC-6.

NTPC estimates the preliminary capital costs associated with replacing the Bluefish Dam, not including regulatory costs relating to the Application, at \$18.5 million, but that they could total \$36 million including lost hydro electric generation in the event the dam were to fail and Bluefish Lake were to be drained. ¹ NTPC states that it is proceeding with the project on an urgent basis given the risks associated with the failure of the dam. NTPC is concurrently requesting approval in principle to borrow up to \$18.5 million. NTPC states that proceeding with the proposed project is the lowest cost option for continued power supply on the Snare-Yellowknife system and that the continued hydro power supply during construction will result in fuel savings estimated at \$6 million per year.

The City does not oppose the Project Permit Application and request to borrow the funds per se but does have a number of concerns respecting the preliminary design and related cost estimates as discussed in the following sections of Argument.

1. PROJECT RATIONALE

NTPC notes that the Bluefish Dam is in an advanced stage of deterioration primarily due to its age. The dam was originally constructed about 1940 with upgrades in 1973, 1983 and 2007 to extend its life beyond the normal life of 40 years for a timber crib dam. ² Prior to purchasing the dam, a condition assessment by AMEC in 2001 indicated that there was no evidence that the dam had reached an advanced stage of deterioration but

¹ Application, page 1

² Application, page 3

that replacement may be necessary within the next 20 years.³ The Dam Safety Review conducted by EBA Engineering Consultants (EBA) in 2005 indicated the Bluefish spillway and condition of the timbers were in poor to unsatisfactory condition. The EBA Dam Safety Review also indicated that there was significant seepage from the right abutment of the Duncan Lake Dam and that dam was considered to be in poor condition⁴. The Duncan Lake Dam had experienced major failure in 1994.⁵ As noted in YK-NTPC-8(a), repairs were made to the Bluefish Dam in 2006/07 and 2008/09 and to the Duncan Lake Dam in 2007/08. EBA confirmed that NTPC had addressed all the recommendations of the 2005 Dam Safety Review but noted that there had been continued deterioration of the Bluefish Dam since that time.⁶

NTPC retained EBA in the fall of 2008 to undertake an evaluation of dam and spillway concepts for Bluefish. EBA considered several design concepts for a new dam and spillway at two potential new sites, reconstruction of the dam at the current site and repairs to the existing dam.⁷

Reconstruction of the existing dam at the present location was not considered practical due to problems constructing a coffer dam and the significant drawdown of Bluefish Lake during construction. The repairs were considered to be only a short-term option (warranted life of 10 years for foam injection per EBA page 24) as full replacement would still be required in the relatively near future. NTPC concluded that the most feasible option was to replace the Bluefish Dam at an alternate downstream location.⁸

EBA tentatively recommended a rock-fill dam with a sheet-pile membrane based on certain bedrock assumptions and the least amount of uncertainty with regard to construction technology at a site downstream of the existing dam. It appears that NTPC is proceeding with this concept.

³ AMEC Report, page 7, YK-NTPC-2(c)

⁴ 2005 Dam Safety Review, page 5, YK-NTPC-2(d)

⁵ AMEC Report, page 9, YK-NTPC-2(c)

⁶ Application, Appendix F

⁷ EBA Evaluation of Dam/Spillway Concepts, pages 6-26

⁸ Application, pages 8-9

The City of Yellowknife submits that, based on the evidence provided as to the consequences of dam failure, the existing Bluefish Dam requires replacement at a location to be determined downstream of the existing dam site.

2. PROJECT COSTS

By way of background, NTPC purchased the Bluefish Generating Facility from the Miramar Con Mine effective January 1, 2005 at a cost estimated at \$13.35 million including capitalized operating costs and capital improvements during the prior period it had control and operation of the facility. NTPC estimated a further \$9.6 million of future improvements would be required over the first 15 years.⁹ Included in this latter amount was \$8.7 million for “major rebuilding of the older plant and dam/spillway within approximately 15 years.”¹⁰ Although the older plant and the dam/spillway have not yet been rebuilt, NTPC has expended \$22.9 million to date¹¹ which is approximately \$8.6 million above what was estimated in 2002. Details of these expenditures were provided in YK-NTPC-8(a). As noted in BR-NTPC-1(e), NTPC was aware of the condition of the Bluefish dam at the time of the purchase based on a condition assessment performed by AMEC in 2001.

While the dam/spillway replacement is just within the 10-20 year window contemplated in the AMEC Report, replacement is now estimated to cost \$18.5 million as compared to the \$7 million estimated by AMEC in 2001.¹² AMEC also estimated that a complete upgrade of the intake would be in the order of \$500,000¹³ but the actual costs in 2007/08/09 were \$5.031 million.¹⁴ AMEC also estimated the cost to repair the left abutment at the Duncan Lake Control Structure at \$300,000¹⁵ but the actual cost of these

⁹ Attachment “C” attached to BR-NTPC-1

¹⁰ Page 5 of 9, 2002 Project Permit Application.

¹¹ Appendix E

¹² Page 7, AMEC Condition Assessment 2001, YK-NTPC-2(c)

¹³ Page 14 AMEC Condition Assessment 2001, YK-NTPC-2c)

¹⁴ YK-NTPC-8(a)

¹⁵ Page 10, AMEC Condition Assessment, YK=NTPC-2c)

repairs was \$1.936 million. ¹⁶ AMEC further estimated the power tunnel rock refurbishment at \$70,000 but the actual cost was \$233,000. A number of other capital projects which had not been forecast at the time of the purchase have also been undertaken in the 5 years since that time. ¹⁷

The City is concerned with the large increases in capital costs that have been incurred since the purchase of the Bluefish Hydro Facility and the forecast costs to construct the replacement dam. There have been significant cost overruns on the intake structure and Duncan Lake control structure and now the cost of the new Bluefish Dam and Spillway is estimated at \$18.5 million plus regulatory costs or well above the \$7 million originally estimated by AMEC. The City is concerned with two aspects of the estimated \$18.5 million replacement costs; the cost estimates are based on rough order of magnitude estimates of +/-50% and the assumptions regarding depth to bedrock.

EBA indicated that the rough order of magnitude costs of +/-50% were prepared specifically for comparative purposes and should not be used for capital budgeting. ¹⁸ EBA went on to note that a detailed investigation and design would need to be conducted to produce the necessary design drawings and estimated quantities for engineering estimates prior to tendering. There is also an issue with respect to the topographic survey data as noted at page 4 of the EBA Evaluation.

A total of four test pits were excavated, two on each candidate dam alignment. It was not possible to determine whether bedrock had been encountered in any of the test pits, but it was considered unlikely. ¹⁹ The depth of alluvium at the proposed dam sites was much greater than anticipated by EBA in its original proposal. EBA indicated that it would be necessary to establish bedrock at discreet locations, take undisturbed samples, install piezometers to test for groundwater, test for permafrost, drill boreholes into bedrock to assess bedrock quality, assess subsurface conditions along the spillway alignment and

¹⁶ YK-NTPC-8(a)

¹⁷ YK-NTPC-8(a)

¹⁸ EBA Evaluation, page 26, BR-NTPC-7(b)

¹⁹ EBA Evaluation, pages 4-5

conduct a Ground Penetrating Radar and Resistivity survey of the dam/spillway alignment. Drilling would include both sonic and diamond drilling.

NTPC was asked to provide any updated cost estimates since the EBA Report was prepared in February 2009.²⁰ NTPC noted that Appendix D had been refined since the EBA estimates.²¹ It appears that NTPC added internal costs including the emergency work to reduce the risk of a breach, overheads, contingency, AFUDC, ice-road costs, transportation, camp facilities, environmental and fuel, etc.²² but did not update construction quantities nor unit costs. NTPC went on to note that a detailed design will be completed before the tender stage and an updated budget provided following tendering. The City would have expected NTPC to have carried out the additional investigations recommended by EBA as noted in the previous paragraphs.

The City considers that every effort should be made to firm up the respective construction quantities and costs for each of the sites being considered before committing to a project of this magnitude. **The City would prefer that NTPC, without causing any delays to the project, carry out the additional investigations recommended by EBA and update its cost estimates before a Project Permit is issued to ensure that the least cost site is chosen.**

3. PROJECT ECONOMICS

NTPC has provided long-term analyses for the Bluefish Hydro Facility which compares the Bluefish scenario to a diesel scenario and which is essentially an update of the analyses filed in the 2002 Project Permit Application. Three scenarios are presented; \$18.5 million in 2011/12, \$5 million in 2012/13 and \$10 million in 2016/17 along with various scenarios for inflation, load growth and fuel prices. These scenarios result in benefit to cost ratios ranging from 2.35 to 2.89.

²⁰ YK-NTPC-1(a)

²¹ BR-NTPC-5(a)

²² BR-NTPC-5(c), (d) and (e)

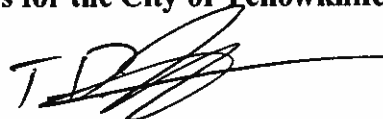
NTPC also provided long-term analyses based on capital costs of +/-50%.²³ At -50%, the benefit to cost ratios range from 2.84 to 3.49 and at +50%, the benefit to cost ratios still range from 2.25 to 2.76. These analyses demonstrate the importance of keeping the Bluefish Facility in service. **However, there are significant differences in benefit to cost ratios between the -50% and the +50% scenarios and therefore the City submits that it is important to ensure that the least cost alternative or site is chosen.**

4. FUTURE RATE IMPACTS

At page 18, NTPC indicated it is open to discussing deferral accounts or other mechanisms for reducing the rate impact of the Project prior to the next GRA. **The City appreciates this opportunity to mitigate the rate impact of what would be a very large addition to NTPC's rate base and reserves the right to address this matter in the first rate case when the Bluefish Dam Replacement is included in rate base.**

All of which is respectively submitted on behalf of the City of Yellowknife this 1st day of October, 2009.

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²³ YK-NTPC-1(b)