

**NORTHWEST TERRITORIES PUBLIC UTILITIES BOARD**

IN THE MATTER OF the *Public Utilities Act*, R.S.N.W.T. 1988,  
c. 24 (Supp.), as amended;

AND IN THE MATTER OF the *Northwest Territories Power  
Corporation Act*, R.S.N.W.T. 1988, c. N-2, as amended;

AND IN THE MATTER OF the Northwest Territories Power  
Corporation's 2009 Application for a Project Permit for the  
Bluefish Lake Dam Replacement.

**WRITTEN ARGUMENT OF THE NORTHWEST  
TERRITORIES POWER CORPORATION**

**September 30, 2009**

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1     **1.     Introduction**

2     By letter dated August 13, 2009, the Northwest Territories Power Corporation (the  
3     “Corporation” or “NTPC”) filed with the Northwest Territories Public Utilities Board (the  
4     “Board” or “PUB”) an application (the “Application”) for a Major Project Permit for the  
5     Bluefish Dam Replacement Project (the “Project”).  
6

7     By letter dated August 21, 2009, the Board indicated that the Application would be dealt with by  
8     written process and established the schedule for that process. On September 8, 2009, NTPC  
9     received information requests from the Board (BR.NTPC-1 through BR.NTPC-7) and from the  
10    City of Yellowknife (the “City”) (YK.NTPC-1 through YK.NTPC-8). No other information  
11    requests were received. NTPC responded to all information requests by letter dated September  
12    21, 2009.  
13

14    In that same September 21, 2009 letter, the Corporation advised that the original Attachment “E”  
15    to the Application contained an error. The Corporation provided a revised Attachment “E” that  
16    corrected the error with the result that all scenarios in fact showed improved benefit to cost  
17    ratios.  
18

19    NTPC files this written argument in support of its application for a project permit for the  
20    Bluefish Dam Replacement Project.  
21

22           **(a)     Requested Relief**

23    The Corporation’s August 13, 2009 Application requests the following relief from the Board:

- 24           a) That the Board approve this Application by issuing a project permit pursuant to Sections  
25           23(b) and 54(1) of the *Public Utilities Act* to replace Bluefish Dam in an amount of up to  
26           \$18.5 million; and  
27  
28           b) Approval in principle to borrow up to \$18.5 million related to the Project.  
29

30           **(b)     The *Public Utilities Act***

31    Section 54(1) of the *Public Utilities Act*<sup>1</sup> (“*PU Act*”) requires the Corporation to apply to the  
32    Board for a project permit before undertaking a major capital project. Section 1 defines a “major  
33    capital project” to mean “a capital project that has a total cost that exceeds \$5,000,000 or 1% of a  
34    public utility’s rate base, as determined by the Board.”  
35

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<sup>1</sup> R.S.N.W.T. 1988, c. 24 (Supp.).

1 **2. The Project as proposed is the optimal solution.**

2 **(a) The Project is being undertaken on an urgent basis.**

3 Bluefish Dam is in an advanced state of deterioration primarily due to the age of the facility.  
 4 While remedial measures, such as buttressing the dam, constructing a contingency spillway and  
 5 intensifying dam monitoring, have been undertaken, these do not permanently address  
 6 deficiencies at the dam.<sup>2</sup> Instead those measures have addressed the immediate risk associated  
 7 with a collapse of the overflow spillway and will allow for continued use of the facility during  
 8 construction.

9  
 10 The Corporation is cognizant of the fact that a dam failure would have significant impacts both  
 11 economically and environmentally. Should the dam fail, Bluefish Lake would suffer significant  
 12 draw-down (on the order of 12 meters or 30-40 feet).<sup>3</sup> Further reconstruction of the dam  
 13 following a failure would require using diesel generation to replace lost hydro generation  
 14 resulting in total project costs in the order of \$30 million, substantially higher than the current  
 15 budgeted cost of \$18.5 million.<sup>4</sup>

16  
 17 **(b) Benefits of proposed Project**

18 The Corporation considered a number of options before proceeding with the Project as currently  
 19 proposed. While the Corporation initially considered various repair options for Bluefish dam,  
 20 none of those options were considered viable either environmentally or economically. Refer also  
 21 to the Board's response to YK.NTPC-4 for further information as to why the repair options were  
 22 not considered feasible.

23  
 24 The Corporation also considered replacement of the dam at the present location. However, due  
 25 to the site characteristics of the lake side of the existing dam location,<sup>5</sup> construction of a coffer  
 26 dam would require more fill than that required to construct a new dam, would take longer and be  
 27 more expensive. It would also require the deposit and subsequent removal of in-stream fill  
 28 potentially resulting in more difficulties in the environmental permitting process.<sup>6</sup> Replacement  
 29 at the existing site was therefore rejected because the construction of a coffer dam was not  
 30 technically feasible. Without a coffer dam in place, replacement of the dam at the existing site  
 31 would result in significant draw-down of Bluefish Lake, an option that was rejected by the

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<sup>2</sup>Application, p. 6, ll. 2-10 and p. 7, ll. 32-35: One such deficiency is the leak in the left abutment of the dam.

<sup>3</sup> BR.NTPC-3 (a).

<sup>4</sup> YK.NTPC-4(b).

<sup>5</sup> Application, p. 9, ll 12-16: Specifically that the bottom drops from approximately six meters at the dam site to twelve meters within a short distance of the dam.

<sup>6</sup> BR.NTPC-3(a).

1 Corporation, in part due to the considerable environmental impacts on aquatic habitat and fish  
 2 populations, and due to the resultant loss of hydro-electric generation at the Bluefish facility.  
 3 Based on forecast system planning assumptions, it is estimated that the energy expected from  
 4 Bluefish would cost in the range of \$19.8 million if it needed to be replaced by diesel generation.  
 5 Additional diesel capacity would also be required at an estimated capital cost of \$7-\$10 million.<sup>7</sup>  
 6

7 The proposed location avoids these costs and allows the existing hydro facility to continue  
 8 operating while construction is ongoing. The proposed Project has also been designed to  
 9 minimize environmental impacts including by allowing for construction without any drawdown  
 10 of Bluefish Lake and by not increasing water levels in order to spill excess water into the lake.<sup>8</sup>  
 11

### 12 (c) Impact on Rates

13 The Bluefish Dam Replacement Project represents the least costly project for securing long term  
 14 energy and capacity benefits for the Corporation's customers on the Snare-Yellowknife system.  
 15 As outlined in the Application, there are only two realistic options available to the Corporation to  
 16 secure that long term energy and capacity, replacing the capacity from Bluefish with a diesel  
 17 generation plant or proceeding with the Project as proposed. The rate impact of replacing  
 18 Bluefish with a diesel plant is estimated at \$8.304 in the first full year of operation (2012/13).  
 19 This is compared to \$2.024 for the Project. As outlined in the Application, the estimated rate  
 20 increase for a TPSP eligible customer consuming 700 KW.h per month is \$9.14 at current TPSP  
 21 rates.<sup>9</sup> However, this is positive rate impact relative to replacing Bluefish generation with diesel  
 22 generation. The Corporation is open to discussing potential deferral account mechanisms with  
 23 interveners at the time of its next General Rate Application.<sup>10</sup>  
 24

### 25 (d) Economic Analysis

26 The Project provides significant operating benefits, substantial short-term economic benefits  
 27 relative to other supply options and analyses of long term operating benefits show a very positive  
 28 benefit to cost ratio. The Project is expected to achieve a full payback of its capital costs within  
 29 three years or less. Using very conservative assumptions, on an energy basis alone replacing the  
 30 average annual generation requirements from Bluefish with diesel generation would result in  
 31 diesel fuel expense of approximately \$21.651 million (over \$3 million more than the estimated  
 32 capital cost of the Project).<sup>11</sup> The cost to replace the capacity benefits at Bluefish with additional

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<sup>7</sup> BR.NTPC-3(b) calculated at an average fuel efficiency of 3.5kW.h/litre and fuel price of \$.86/litre.

<sup>8</sup> Application, p. 21, ll. 16-20.

<sup>9</sup> Application, p. 18, ll. 3-4.

<sup>10</sup> There will be no rate impact of the Project until the next General Rate Application.

<sup>11</sup> For the three years 2012/13-2014/15 at currently forecast diesel prices and average annual generation of 28.357  
 GW.h (Application p. 13, ll. 4-8).

1 diesel generation are also telling (\$7-\$10 million) with the result that the balance of the Project's  
2 capital costs of \$8.5-\$11.5 million would be recovered within one and a half to two years based  
3 on avoided fuel cost savings. Additional short-term economic benefits include substantially  
4 lower annual operating costs relative to replacement with diesel generation.

5  
6 The Corporation included in its Application, at Attachment E, its longer term economic  
7 assessment of the Bluefish facility including the Project.<sup>12</sup> As referred to above, in its September  
8 21, 2009 correspondence to the Board, the Corporation attached a revised Attachment E having  
9 determined that the original Attachment E contained an error that resulted in some fixed asset  
10 amortization costs being double counted and operations and maintenance expense being  
11 overstated. Set out below is a revised Table 2, originally found at page 14 of the Application,  
12 which provides a summary of the results of the economic analysis under the three different  
13 scenarios.

14  

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<sup>12</sup> These analyses are consistent with methods tested by the Board during the 2002 project permit application and the 2006/2008 GRA, are based on 2002 dollars, and do not capture operational benefits of Bluefish and thus are understated (Application, p. 13, ll. 31-34).

**Table 2**  
**NWT Power Corporation**  
**Bluefish Hydro Economic Analysis Summary**

	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>
NPV of Benefits (2002 \$ mln)	108.9	108.9	133.7
NPV of Costs (2002 \$ mln)	37.4	43.4	43.4
NPV of Benefits to Ratepayers (2002 \$ mln)	71.7	65.8	90.8
Benefit-Cost Ratio	2.91	2.51	3.08

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).

2

3

4 **3. Other Matters Arising from Information Requests**

5 **(a) Project Budget**

6 NTPC has prepared a project budget in the amount of \$18.5 million. Both the Board and the  
7 City requested further information about the budget and referenced the plus or minus 50%  
8 accuracy found in the EBA Report. NTPC clarified (see BR.NTPC-5 and YK.NTPC-1) that  
9 while the EBA Report refers to an accuracy of plus or minus 50%, in fact, the budget submitted  
10 by NPTC in the Application has been refined since the EBA estimates. Further, NTPC has

1 committed to providing the Board with updated costs once the tendering process is complete.  
2 NTPC expects to have refined costs estimates at that time, subject to construction contingencies.  
3

4 At present, NTPC is in the planning stages of the Project. The Corporation has reviewed the  
5 costs estimates prepared by the engineering consultants and added internal costs including  
6 emergency work to reduce the risk of a breach, overheads and contingency.<sup>13</sup> The Board  
7 developed its contingency as a management estimate of the construction risks associated with a  
8 project of this nature, selecting 18% as the middle of the 15%-20% range considered reasonable.  
9 Overheads are charged on all capital projects and the 10% overhead rate selected for the Project  
10 is within the range of overheads on capital projects previously reviewed and approved by the  
11 Board.<sup>14</sup>  
12

13 It should be noted that the City requested economic analyses for scenarios 1, 2 and 3 of  
14 Attachment 3 based on capital cost estimates of +50% and -50%. Although NTPC does not  
15 consider the \$18.5 million budget to be subject to variations of plus or minus 50%, even on that  
16 revised analyses with costs of +50%, the Project remains very beneficial with a benefit-cost ratio  
17 of well above 2.<sup>15</sup>  
18

#### 19 **(b) Future Capacity Improvement**

20 The Board requested additional information about the potential for generation capacity  
21 expansion at Bluefish (see BR.NTPC-2). The Corporation confirmed that the Project application  
22 does not contemplate any installed generation capacity changes. Further, the Corporation has  
23 already taken steps to optimize the capacity and energy output at Bluefish but there are natural  
24 limitations to the flows and capacity that can be achieved due to the small size of Bluefish Lake.  
25 It is anticipated that the Project will provide for an additional 1.2 GW.h per year of increased  
26 energy generation through the new spillway which allows the facility to hold more water back.  
27 In addition, future improvements are being considered including replacement of the G1 power  
28 plant, the power tunnel and penstock. However, expanding generation by increasing the size of  
29 the dam and reservoir would present significant challenges including regulatory challenges.  
30 Nonetheless, the Project is consistent with preserving future options for increase capacity and the  
31 Corporation will continue to review and assess options for optimizing the generation resources  
32 on the Snare/Yellowknife system.<sup>16</sup>  
33

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<sup>13</sup> See BR.NTPC-5 page 4 for complete list.

<sup>14</sup> YK.NTPC-1(d).

<sup>15</sup> YK.NTPC-1(b).

<sup>16</sup> BR.NPTC-2.

1           **(c)     Rate Impacts Specific to Yellowknife.**

2     The City requested additional information on the Project's impact on rates in Yellowknife. The  
 3     Corporation confirmed that the energy rates will not change until the time of its next General  
 4     Rate Application. NTPC did however analyze the impact based upon the 2007/2008 test year  
 5     approved revenue requirements. The Corporation was asked by the City to assume that the  
 6     current shortfall riders and stabilization fund riders were retired as contemplated in NTPC's  
 7     August 21, 2009 Rate Stabilization Fund Rider Update. The results showed net decreases in  
 8     rates in both years and both scenarios. The impact of the Project being brought into rates, should  
 9     the Project proceed on the budget and timing outlined in the Application, was a net decrease of  
 10    approximately 1.25 cents per kW.h in the first year and a .70 cent per kW.h decrease in the  
 11    second year. As referred to at 3(a) above, NTPC is of the view that its budget has been refined  
 12    significantly since the EBA report referred to estimate accuracies of plus or minus 50%.  
 13    Nonetheless, as requested by the City, NTPC analyzed the impact upon rates assuming the  
 14    project proceeds at plus 50% the current estimates and timing. Once again the results were a net  
 15    decrease, a .96 cent per kW.h decrease in the first year and a .13 cent per kW.h decrease in the  
 16    second year.<sup>17</sup>

17  
 18           **(d)     Initial Purchase and Status of other Bluefish Facilities**

19    Both the City and the Board requested additional information about the initial purchase of  
 20    Bluefish and the status of other Bluefish facilities. The Corporation noted that at the time of the  
 21    initial purchase, NTPC assigned very little value to the existing dam structure as it had already  
 22    exceeded the normal useful life of such a facility. Further, the initial purchase price was  
 23    negotiated and did not represent the full value of the facility to NTPC and its customers. For  
 24    example, NTPC understands that the G2 powerplant at Bluefish was constructed at a cost of  
 25    approximately \$17.5 million in 1995 and therefore, the unamortized costs of G2 alone exceeded  
 26    the purchase price of the facility.<sup>18</sup>

27  
 28    With respect to other Bluefish facilities, the Corporation confirmed that other than the dam  
 29    structure itself, all other Bluefish facilities will continue to be in use after the Project is  
 30    completed.<sup>19</sup> The Corporation provided access to the 2001 AMEC report that detailed the  
 31    condition of the Duncan Lake control structure, the intake structure/headgate, tunnels, surge  
 32    relief, penstocks and the two powerhouses (G1 and G2) at the time.<sup>20</sup> The Corporation also  
 33    detailed the capital projects undertaken on those facilities. As noted in YK.NTPC-8, the projects  
 34    include total capital additions of approximately \$22.9 million (including acquisition costs of

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<sup>17</sup> YK.NTPC-6 pp. 2 and 3.

<sup>18</sup> BR.NTPC-1(b) and (e).

<sup>19</sup> BR.NTPC-1 (c).

<sup>20</sup> YK.NPTC-2.

1 \$11.8 million) offset by disposals of approximately \$.9 million resulting in the \$22 million  
2 increase to gross plant in service included in the economic analyses in Attachment E.

3  
4 NTPC is currently examining options for the replacement or refurbishment of the original  
5 powerhouse (G1) within the next 10 years and potential changes to the penstock. The  
6 Corporation has included in the Attachment E, Scenarios 2 and 3, capital additions of \$5 million  
7 and \$10 million in years 9 and 13 respectively. Once again, even with those additional potential  
8 capital improvements, the cost-benefit ratio remains well above 2. It must be noted however that  
9 the Corporation is not seeking approval for any additional capital projects at this time. Any such  
10 projects would be assessed on the business case or operating needs at the time and would be the  
11 subject of a future project permit application or included in a rate application.<sup>21</sup>

#### 12 13 **4. Conclusion**

14 For the reasons outlined in its Application, responses to Information Requests and the within  
15 Written Argument, the Corporation believes that the Project is the most feasible, economical  
16 solution to provide sustainable, safe, cost effective and reliable power in the Yellowknife service  
17 area. The Board respectfully requests that it be granted a major project permit for the Bluefish  
18 Lake Dam Replacement Project in an amount up to \$18.5 million and for approval in principle to  
19 borrow up to \$18.5 million for the Project.

20 **ALL OF WHICH** is respectfully submitted this 30<sup>th</sup> day of September, 2009.

21  
22 **Borden Ladner Gervais LLP,**  
23 **Counsel for the Northwest Territories Power**  
24 **Corporation**

25  
26 

27  
28 Per: Karen A. Salmon

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<sup>21</sup> BR.NTPC-4 (f).