



**Mackenzie Valley Land and Water Board**  
**7th Floor - 4910 50th Avenue**  
**P.O. Box 2130**  
**YELLOWKNIFE NT X1A 2P6**  
**Phone (867) 669-0506**  
**FAX (867) 873-6610**

**Staff Report**

<b>Applicant:</b> Northwest Territories Power Corporation	
<b>Location:</b> Bluefish Hydroelectric Facility	<b>Application:</b> MV2011L4-0004
<b>Date Prepared:</b> October 25, 2011	<b>Meeting Date:</b> November 10, 2011
<b>Subject:</b> Quality Assurance/Quality Control Manual	

**1. Purpose/Report Summary**

The purpose of this Staff Report is to present the Quality Assurance/Quality Control Manual (QA/QC Manual) presented by the Northwest Territories Power Corporation (NTPC) to the Mackenzie Valley Land and Water Board (MVLWB) to satisfy Part F, Item 7 of the Bluefish Facility Water Licence MV2009L4-0004.

**2. Background**

- May 31, 2011 – Issuance of MV2009L4-0004 by the MVLWB for the Construction of a new primary impoundment dam and removal of the existing dam on the Yellowknife River for Hydroelectric power undertaking and association uses;
- July 6, 2011 – Ministerial approval of MV2009L4-0004;
- August 5, 2011 – Receipt of the QA/QC Manual;
- August 19, 2011 – QA/QC Manual distributed to reviewers for comments;
- September 9, 2011 – Comment deadline on the QA/QC Manual;
- September 15, 2011 – NTPC responds to reviewer comments;
- October 18, 2011 – Verification of NTPC’s responses by MVLWB Consultant; and
- November 10, 2011 - QA/QC Manual presented to the MVLWB for a decision.

### **3. Discussion**

Part F, Item 7 of MV2009L4-0004 states:

“The Licensee shall submit to the Board for approval, within thirty (30) days of the issuance of this Licence, a Quality Assurance/Quality Control Manual. The manual shall include, but not be limited to, field and laboratory inspection and testing procedures/frequency for concrete strength, air entrainment and aggregate quality; soil and rock fill gradation; composition durability and compaction; bedrock grouting; stainless steel barrier weld testing, stainless steel barrier and reinforcing steel mill certificates and all other material testing appropriate for the site. The Quality Assurance/Quality Control information and results shall be included in the geotechnical engineering as-built report referenced under Part F, Item 9.”

Part F, Item 9 states:

“The Licensee shall, within one hundred and twenty (120) days after Substantial Completion of the New Primary Impoundment Dam, submit to the Board a geotechnical engineering as-built report prepared by an Engineer that shall include as-built drawings, documentation of field decisions that deviate from original plans and the data and engineering rationale used to support these decisions.”

The scope of this QA/QC plan is stated in part 1 as:

“The plan outlines EBA’s roles, methodologies and responsibilities for monitoring the quality of construction on the Bluefish project as outlined in the Issued for Construction (IFC) Technical Specifications (Specifications) dated November 2010. NTPC requested EBA provide Quality Assurance (QA) testing as well as Quality Control (QC) testing for certain aspects of the project. EBA’s performance of these QC tests and inspections in no way relieves the project contractor North America Construction (NAC) of responsibility for the QC requirements relating to the execution of the work in a manner meeting the requirements of the specification. Rather, it is expected that NAC will work closely and cooperatively with EBA such that all QC aspects are met.”

### **4. Review Comments**

Review comments were limited to the comments provided by the Board consultant, Decommission Consulting Services Ltd. (DCSL). DCSL provided two comments on:

- Stainless steel membrane field inspections and testing programs by the senior structural engineer Mr. Adrian Gygax, and
- QA/QC manpower level details on night shift or when skeleton crews are present.

**5. Conclusion**

Board staff concludes, as NTPC has responded to all reviewer comments and concerns that this QA/QC Manual can be approved of at this time.

**6. Recommendation**

Board staff recommends the approval of the attached Quality Assurance/Quality Control Manual as required under Part F, Item 7.

**7. Attachments**

- Comment summary table;
- Quality Assurance/Quality Control Manual;
- Draft Manual approval letter;

Respectfully submitted,



Kathleen Graham  
Regulatory Officer

Reviewer Comment Table - MV2009L4-0004  
Northwest Territories Power Corporation - QA/QC Manual

#	REVIEWER	TOPIC	Reviewer Comment	Reviewer Recommendation	Company Response	Board Staff Recommendation
1	Decommissioning Consulting Services Ltd. (DCSL) - Board Consultant	Stainless steel membrane inspection and testing.	<p>Mr. Adrian Gygax is identified as the senior structural engineer and is also co-author of the 8 August 2011 memorandum on stainless steel membrane selection justification. Mr. Aaron Guest, E.I.T. (Engineer in Training), is identified as the structural design engineer. Section 4.1 of the QA/QC manual assigns various review tasks to Mr. Gygax, but does not specifically mention the stainless steel membrane, the welding of it or on site inspection of its installation. Mr. Guest is assigned numerous tasks, some of which are assumed to be on site, including reference to the stainless steel membrane installation procedures. Reference is made to NTPC engaging the services of the Acuren Group Inc. to complete independent inspection of stainless steel welds. This firm is not retained by EBA or Gygax Engineering Associates Ltd.</p> <p>Further confirmation is requested regarding the role of Mr. Adrian Gygax, as senior structural engineer, with respect to the installation and welding of the stainless steel membrane. Will he be making regular visits to the site to ensure that overall field installation procedures of the stainless steel membrane is satisfactory and that test activities the Acuren Group Inc. are appropriate, such that at the as-built stage of the reporting process he is able to provide assurance of the satisfactory installation of the stainless steel membrane?</p>	That the senior structural engineer complete on site inspections of the field installation and welding of the stainless steel membrane and to coordinate with the independent testing firm to ultimately provide overall approval of the installation of the stainless steel membrane.	<p>In regards to stainless steel inspection and testing, Mr Adrian Gygax will be conducting periodic Structural Field Reviews to assess general compliance of the construction work with the Engineer's designs and drawings. Review of the stainless steel membrane forms a part of those reviews. To date Mr. Gygax has conducted two such field reviews, one on July 16, 2011, the other on September 7, 2011. Review of the stainless steel membrane erection, including welding, was a part of both of those reviews.</p> <p>Daily quality control of the works, including review for ecompleteness and general compliance of welding to the draings and specifiicaiton,k is being handled by NAC and EBA site staff. In addition, NTPC has engaged Acuren to perform approximately seven Quality Assurance reviews of the wlding work as erection proceeds. These reviews entail verifying welding procedures and processes and visual inspection. It is anticipated that these inspections will cover at least 10 to 20 % of the welding on this job. This first such visit was undertaken on 27 and 28 July 2011, the next will take place within the coming two weeks as membrane erection recommences.</p>	DCSL provided the following comments on NTPC's response: The content of the letter, prepared by Mr. Daniel Roberts, has been reviewed and found to satisfactorily respond to all of the questions raised.
2	Decommissioning Consulting Services Ltd. (DCSL) - Board Consultant	Section 9.3 Manpower Levels.	EBA indicates potential concerns with respect to no on site inspection during night shift or when "skeleton" crews are working on the site. No details are provided as to what types of activities would be carried out during these periods and the degree of risk to the project of a lack of QA/QC supervision.	NTPC and EBA further define the activities to be carried out on night shift and when "skeleton" crews are present and evaluate the potential risks. A recommendation should be provided as to what activities warrant and will receive QA/QC inspection and which ones do not.	<p>The following information provides a response in regards to manpower levels during night shift or times when a "skeleton" crew is working at site. Night shift work has been very limited and has been conducted on drilling blast holes works in the spillway during the spring of 2011. This work is now being done on day shift only. The only work that is conducted on night shift at this time is pressure grouting of the blanket and curtain grouting holes. As per the Specifications, the contractor has been required to provide a third party grouting expert to guide their work. this third party expert is Golder Associates and they have a Quality Cotnrol grouting engineer on staff during day shift and night shift. EBA conducts QA review of their work through field checks by our day shift staff and also through QA review of the data produced by Golder through the involvement of one of rock work engineers out of the Vancouver office. This level of QA supplements the round the clock QC work provided by Golder.</p> <p>The initial plans of NAC to have a skeleton crew on site when the bulk of their manpower ws off site ultimately did not change EBA's staffing levels on site. there was enough work going on with the skeleton crew that justified EBA keeping a full compliment of field engineers on site. there was only one week when EBA had no staff on site and this was when NAC sent all their men and subcontractors off site for a week's break. No work was conducted during that week.</p>	DCSL provided the following comments on NTPC's response: The content of the letter, prepared by Mr. Daniel Roberts, has been reviewed and found to satisfactorily respond to all of the questions raised.
3	DFO	General Comments	DFO has no comments or concerns related to NTPC's Bluefish Hydro Replacement Dam "Quality Assurance/Quality Control Manual" for Part F: Item 7 of Water Licence MV2009L4-0004.			