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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File: 3BM-CAP0810/H25

July 7, 2009

Bernie MacIsaac
Director of Operations, Nunavut Regional Office
Indian and Northern Affairs Canada
Building 918, P.O. Box 100
Iqaluit, NU X0A 0H0

By Email: Bernie.MacIsaac@inac-ainc.gc.ca

**Subject: Commissioning of the Hamlet of Cape Dorset “2007 Sewage Disposal Facilities”,
Licence No. 3BM-CAP0810**

Dear Mr. MacIsaac,

The Hamlet of Cape Dorset municipal water and waste disposal facilities are licensed under the Nunavut Water Board (NWB) water licence 3BM-CAP0810. The Licence was renewed March 7, 2008 and contained several conditions with respect to the commissioning of a newly constructed sewage lagoon, referred to in the Licence as the “2007 Sewage Disposal Facilities” (Facility). The conditions with respect to the commissioning of the Facility fall under the following: Part E, Item 5; Part F, Item 1; Part H, Item 7; Part H, Item 8 and Part H, Item 25.

A revised Operations & Maintenance Manual (O&M Manual) was a requirement of Part F, Item 1 (F1) of Licence 3BM-CAP0810, to be submitted within sixty (60) days following the issuance of the Licence to the Hamlet of Cape Dorset on March 7, 2008. This would require the O&M Manual to be submitted by June 5, 2008. The NWB acknowledged the receipt of an O&M Manual¹ submitted with a cover letter on June 17, 2009 from the Department of Community and Government Services, Baffin Region, Government of Nunavut (GN), on behalf of the Hamlet, approximately one year late.

Within the cover letter to the O&M Manual, the Municipal Planning Engineer, Mr. Roy indicated that:

“I believe that by submitting these documents, this new Sewage Lagoon facility is qualified for commissioning at any time now.”

A technical review by NWB staff of the O&M Manual has determined that it is incomplete and does not meet the minimum requirements as set out in Schedule 2 of the Licence. On June 26, 2009, the NWB issued an acknowledgement letter to the GN indicating a rejection of the submission and requested a re-submission. In addition, the NWB requested that fulfillment of other terms and conditions of the licence be addressed, including requirements due prior to commissioning of the Facility, and other general Licence requirements.

¹Operation and Maintenance Manual, Sewage Treatment System Hamlet of Cape Dorset, October 24, 2007. 05-4319-5000, Dillon Consulting Limited.

The Licensee did provide updated record drawings within the revised O&M Manual, specifically, with respect to the submission required by Part E, Item 5². However, drawings that reflect the clarifications and omissions identified through the Licence review, the requirements of Schedule 1 (see attached) were not taken into account, nor were they provided as a separate report.

Regarding thermistor installation, the NWB is in receipt of correspondence³ from the GN indicating that the thermistors were installed in satisfaction of Part H, Item 6⁴. Documentation remains to be submitted to confirm that the installation was carried out to the satisfaction of the Geotechnical Engineer of record, with the minimum installation as stated in the condition.

The NWB has not received thermistor monitoring results required prior to commissioning to validate geothermal analysis assumptions as required by Part H, Item 7⁵ of the Licence.

General items with respect to Licence conditions were also identified as past due, required ninety (90) days following issuance of the Licence or June 5, 2008, having been summarized and provided to the Licensee, included:

- The requirement for the submission of a Plan for Compliance (B6);
- A Water Supply and Solid Waste Disposal O&M Manual (F2);
- Final Abandonment and Restoration Plan for existing/decommissioned facilities (G1);
- An Abandonment and Restoration Plan for all existing facilities (G2);
- A Temperature Monitoring Program and Implementation Plan (H9);
- A QA/QC Plan (H20); and
- A Geotechnical Inspection and Report (F5) to be completed annually in July with a submission date of sixty (60) days following the inspection.

Of particular importance and concern in consideration of the decision to be made, is condition Part H, Item 25⁶ of the Licence, which designates responsibilities to Her Majesty in right of Canada, prior to the commissioning of the new facility, in conjunction with items previously discussed (Part H, Items 6 and 7). The NWB confirms that no official correspondence related to Part H, Item 25 has been received from Her Majesty in right of Canada.

² Water Licence No. 3BM-CAP0810, Part E, Item 5, states:

The Licensee shall, within sixty (60) days of issuance of this Licence, provide a summary report along with revised stamped as-built plans and record drawings of the 2007 Sewage Disposal Facility, to reflect the clarifications and omissions identified through the Licence application review and detailed in the attached Schedule 1.

³ Email - Subject: License 3BM-CAP0810 – Cape Dorset, Nunavut, from Bhabesh Roy, Municipal Planning Engineer, Community and Government Services, Government of Nunavut, to Phyllis Beaulieu, Manager of Licensing, dated November 25, 2008.

⁴ Water Licence No. 3BM-CAP0810, Part H, Item 6, states:

The Licensee shall, within sixty (60) days of issuance of this Licence, provide a summary report along with revised stamped as-built plans and record drawings of the 2007 Sewage Disposal Facility, to reflect the clarifications and omissions identified through the Licence application review and detailed in the attached Schedule 1.

⁵ Water Licence No. 3BM-CAP0810, Part H, Item 7, states:

The results of thermistor monitoring required under Part H, Item 6, shall be submitted to the Board for approval in writing, prior to commissioning of the 2007 Sewage Disposal Facility. The results shall include an Engineer's Report, validating the assumptions of the geothermal analysis through adequate monitoring of the thermal regime for the East and West Berms and downstream foundations.

⁶ Water Licence No. 3BM-CAP0810, Part H, Item 25, states:

Her Majesty in the right of Canada shall:

- i. Monitor the Licensee's installation of thermistors and notify the Board when the installation of thermistors is complete and in compliance with Part H, Item 6;
- ii. Monitor the Licensee's validation of the assumptions of the geothermal analysis through adequate monitoring of the thermal regime for the East and West Berms and downstream foundations under Part H, Item 7, and notify the Board when satisfied the assumptions of the geothermal analysis have been validated; and
- iii. Monitor the 2007 ~~Waste~~ Sewage Disposal Facility and notify the Board immediately if the Project is commissioned prior to the completion of i. and ii., or in contravention of any other condition of the Licence.

On September 11, 2008, the NWB received correspondence⁷ from the Inspector with regard to an inspection carried out on August 16, 2008. This correspondence, along with a copy of the field inspection form, contained information regarding the new Facility.

Within the above noted correspondence, of concern to the NWB prior to making any determination on commissioning of the Facility, are the following statements:

“-in three places around the perimeter of the new lagoon, ground water was entering and pooling within the Lagoon (to a depth of 3 ft in some places) and a flow was noted exiting the berm from the East side and flowing into the lake adjacent to the lagoon. (where I understand you are now saying is a "gushing" of water).”

“As noted in the Water License inspection form completed on August 16th 2008 an Inspector's Direction to address the above will be issued”; and

“I have included a copy of the Cape Dorset Municipal water use inspection form completed on the 16th of August below for the review of the group and suggest that in light of these recent developments the GN should immediately take the necessary steps to prevent a complete failure of the integrity of the Lagoon wall.”

The water use inspection form, of August 16, 2008, indicates that the Licensee will have sixty (60) days to address the issues identified in the Inspector's Direction. The NWB is not in receipt of an Inspector's Direction for any of the sewage facilities at Cape Dorset following this inspection. The NWB is seeking confirmation from INAC on whether a Direction was issued, and if so, when and how it was addressed by the Licensee.

The Hamlet's Annual Report for 2008 provides minimal information on the facilities, however it does indicate action by the licensee where the 'outer berm of Cell 3' was raised two feet to prevent berm collapse in response to INAC concerns. The Annual Report did not specifically address work done to the new Lagoon associated with the concerns expressed by the Inspector on September 11, 2008, with the exception of a brief mention that the thermistors have been installed.

In addition to the Inspection undertaken by INAC, the License requires the Hamlet to undertake a Geotechnical inspection of all engineered facilities related to the management of water and waste (Geotechnical Inspection) annually, with the engineer's report to be submitted to the NWB within sixty (60) days of completion of the inspection. The NWB confirms with some anxiety, that no inspection report has been received. The Board considers this independent inspection to be an integral part of the Licence and commissioning process for the new Facility and a critical component in verifying that the Facility is constructed to the appropriate engineering standards and is capable of operating as designed.

Given the information made available and the concerns expressed within the INAC Inspection summarized above, the NWB sees the provision of a geotechnical inspection, as a critical prerequisite towards the commissioning of the Facility.

The Decision⁸ to issue Licence 3BM-CAP0810 was a particularly difficult one⁹ for the Board and it is the Board's intention to carefully monitor the Licensee's efforts to come into compliance with the Licence¹⁰.

⁷Email from A. Keim, INAC, to B. McQuarrie, Hamlet of Cape Dorset Re: New Sewage Lagoon Berm Compromised with attached field inspection form.

⁸ Record of Proceeding/Reasons for Decision for 3BM-CAP0810, dated March 7, 2008.

⁹ Record of Proceeding/Reasons for Decision for 3BM-CAP0810. Pg. 13.

¹⁰ Record of Proceeding/Reasons for Decision for 3BM-CAP0810. Pg. 19.

Ultimately, commissioning of the Facility is dependent upon compliance to Part H, Item 8¹¹ which required compliance to Part H, Item 6 and Part H, Item 7.

At this point, the Board must be satisfied that the licensee has achieved full compliance¹² with the Licence. The overall integrity of the licensing process and Board's responsibility over the issues raised in this letter, need to be considered in relation to the overall objects of the Board¹³, taking into account the past performance of a licensee.

The Board's concern is in how to proceed with respect to commissioning of the 2007 Sewage Disposal Facilities. Given the Board's expectations¹⁴ of the required documentation as a regulatory prerequisite of the Licensee, the Board is seeking clarification from INAC on the issues identified above, and what might be INAC's recommended course of action.

Your attention to this matter and timely response are greatly appreciated and will assist in the final assessment of the file and the eventual decision on the commissioning of the new Facility.

Should you require additional information or clarification, or wish to discuss further please do not hesitate to contact me.

Yours truly,

Original Signed by

David Hohnstein, C.E.T.
A/Director Technical Services

Attachment: Schedule 1: Conditions Applying to Modifications and Construction, pg 19 of Licence
3BM-CAP0810

Cc: Mr. Peter Kusugak, Manager Field Operations
SAO, Cape Dorset
Distribution list

¹¹ Water Licence No. 3BM-CAP0810, Part H, Item 8, states:

The Licensee shall not commission the 2007 Sewage Disposal Facility until the requirements of Part H, Item 6 and Item 7 have been completed and approved.

¹² Record of Proceeding/Reasons for Decision for 3BM-CAP0810. Pg. 20, states:

When the Hamlet submits an application to renew the Licence in approximately 18 months, the Board expects the Hamlet to be in full compliance with the licence. This short duration also permits the Board to increase its level of confidence that the new facility is operating as it should."

¹³ The NWNSRTA s. 35 states:

The objects of the Board are to provide for the conservation and utilization of waters in Nunavut, except in a national park, in a manner that will provide the optimum benefit from those waters for the residents of Nunavut in particular and Canadians in general.

¹⁴ Record of Proceeding/Reasons for Decision for 3BM-CAP0810. Pg. 20, states:

For the reasons set out in the Decision to Issue above, this short duration is intended to send a clear message to the Hamlet and regulatory authorities that the Board will not passively encourage the Hamlet's failure to comply with the licence conditions and associated legal requirements. The Board fully expects the Hamlet to take immediate steps to come into full compliance with the licence requirements for its existing facilities and to commission and operate the P Lake sewage lagoon in accordance with the Licence.

SCHEDULE 1 CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

List of drawing deficiencies identified by BGC for revision and submission.

Please refer to Technical Memorandum “Cape Dorset Sewage lagoon-Review of Final Submissions, January 8, 2008”, or the final intervention memo dated January 8, 2008 for further clarification.

The record set of drawings fails to include a signature block for AMEC. It was noted that the original design drawings issued by Dillon in the December 21, 2006 design report, revision 5, marked “Issued for Construction” included a signature block “Reviewed by AMEC” on Drawing 111, which is the equivalent of Drawing 112 of the Record Drawings

1. At a minimum, AMEC is to provide a signature block for the following drawings:
 - Drawing 101- shows location of test pits carried out for geotechnical investigations.
 - Drawing 109- shows longitudinal geological sections along cut-off trench.
 - Drawing 110- shows typical earthworks sections for the access road and berm.
 - Drawing 112- shows lagoon berm sections
2. The as-built drawings must identify the areas where field changes were made from the original design drawings, preferably in the form of a revision bubble and a brief note in the revisions section of the title block.

List of Drawing alterations and request for rationale for the change.

Record drawing 100 – the alignment of the access roads between the East and West Berms, on the north and south sides of the lagoon was changed from the original design. The road berms were originally designed to deflect runoff from entering the lagoon.

3. Explanation is required as to the rationale for changing the alignment of the road berms and how the as-built berm details in the drawing prevents runoff from entering the lagoon.

Record Drawing 109 – there is up to 1m of unfrozen fill used to level the ground surface under both the East and West berms. This leveling course of material has not been shown as a separate zone in the berm sections presented in Record Drawing 112.

4. A description for record drawing 112 is required of the material used including grain size gradation curve.

Record Drawing 109 – shows that the berm contours at the north end of the West Berm have been modified from the original design drawings. Crest widened from 4m to 25m to accommodate what appears to be a vehicle turnaround on the downstream side of the berm.

5. Additional as-built cross-sections of this area are to be provided along with geothermal analysis that there is sufficient fill thickness over the abutment to ensure that the GCL tie-in to the cut-off trench remains frozen.

Record Drawing 110 shows typical road sections. On July 30, 2007, the GN CGS provided a revised ditch detail for the road

6. This revised ditch detail is requested as part of the as-built drawing details for Drawing 110

7. Additional information is requested providing further details as to how seepage through the active zone under the berm will be prevented.

The Hamlet of Cape Dorset noted a problem during the October 1, 2007 Technical Meeting/Pre-Hearing, with seepage into the lagoon through the active zone with the as-constructed detail. Record Drawing 112 indicates that the material used to backfill the cut-off trench is a "Sand", the same material as used for the berm.

8. Further clarification is requested on how the issue of seepage is being resolved.

In the original Design Drawing 111, Detail 4 showed the liner embedment longitudinal section in the abutments. This Detail was absent from Record Drawing 112. The cut-off trench must extend sufficient distance into the abutment so that any "end-run" seepage through the active zone is prevented. It is not clear from the as-built information if the extent of the cut-off trench satisfies this criterion.

9. Therefore the as-built liner embedment details for the abutment areas of the East and West Berms are therefore requested to be included for Record Drawing 112.

In Record Drawing 112, the crest detail of the emergency overflow weir section was changed. This change notice was transmitted to the contractor by Dillon on July 21, 2007. The as-built detail shows the geo-web and the GCL in one layer, with no granular or other material between the two. Dillon initiated this modification to address a previous concern raised by BGC that water could seep under the GCL in the emergency spillway and potentially lift the liner. It is still not clear how the above modification prevents this problem from occurring.

10. Design change rationale is requested that provides an explanation as to the change from the original drawing, change to meet BGC's concern and then further change to what appears to be potentially inadequate construction.