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September 10, 2012

Environmental Impact Review Board
107 – Mackenzie Rd. Suite 204
P.O. Box 2120
Inuvik, NT X0E 0T0

Attention: Eli Nasogaluak, Environmental Assessment Coordinator

RE: ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA TECHNICAL SUBMISSION

Dear Eli,

Aboriginal Affairs and Northern Development Canada (AANDC) is providing the Technical Submission to the Environmental Impact Review Board as part of the technical review - environmental assessment process for the Hamlet of Tuktoyaktuk, Town of Inuvik, and the Government of the Northwest Territories' Construction of the Inuvik to Tuktoyaktuk Highway (EIRB 02/10-05).

The Technical Submission outlines the issues that fall under AANDC's mandate and outlines our position. AANDC has relevant specialist/expert information and knowledge to provide and will be presenting the issues that the Department is tracking at the Public Hearings in Inuvik and Tuktoyaktuk. Any questions or concerns that the Board or any other party may have will be addressed by AANDC at that time.

Please note that AANDC's review of the Project, as detailed in this Submission, is limited to the information available on the Public Registry as of August 27, 2012. Questions regarding material submitted after this date at the Public Hearings may or may not be able to be answered by AANDC depending on the availability of adequate time for review. Following the Public Hearing AANDC will provide the Final Technical Submission as requested by the Environmental Impact Review Board which will provide AANDC's conclusions and recommendations.

Should you have any questions or need further information regarding this Technical Submission please contact Conrad Baetz at (867) 777-8901 or Conrad.Baetz@aandc-aadnc.gc.ca.

Regards,

Conrad Baetz
District Manager

ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA

TECHNICAL SUBMISSION

FOR THE INUVIK TO TUKTOYAKTUK HIGHWAY REVIEW

1.0 Mandate

The responsibilities of Aboriginal Affairs and Northern Development Canada in the Inuvialuit Settlement Region is primarily to ensure developer compliance with authorizations issued (land use permits, water licences, land leases/reserves) on Crown land or under Federal Legislation and by agencies authorized to do so (such as the NWT Water Board). This is completed through inspections and a range of options from inspection reports to formal prosecutions.

The Minister of DIAND has the authority to manage and administer all Crown land (including granular resources) in the Northwest Territories pursuant to the DIAND Act (and pertinent Land Claim agreements) such as the IFA. AANDC is further a contributing partner among the Federal Departments involved in meeting our legal obligations related to land and water management.

Linked to our responsibilities to issue Federal regulatory authorizations is our involvement in this process through the Canadian Environmental Assessment Act. This is to ensure adequate review of projects occurs prior to the issuance of land use permits and quarry authorizations through participation in processes such as this substituted panel process.

2.0 Issues

2.1 Water Quality – Borrow Pits; Project Description Report (PDR) pg.52. EIS Pg 83

In the second round of Information Requests, AANDC asked the Proponents to evaluate and quantify the potential for elevated concentrations of nitrogen based compounds in run-off water from borrow pits and to identify monitoring and mitigation strategies that could be implemented in response to increased concentration of nitrogen compounds in runoff water from borrow pits. (IR 97)

Developer Response.

The Developer acknowledges that residual amounts of nitrogen-based compounds such as ammonia may be generated as a result of intermittent blasting activities undertaken at active borrow sites during the winter period. However, as discussed in Developer Response 92.4, pit development plans will be developed for each of the borrow sites to be used for construction of the Highway. These plans will conform to the approving authority's regulations and permitting requirements. Erosion control and plans to control runoff from the borrow sites, including any stockpiles that may be developed, will be addressed in these plans. Site drainage controls, including localized ditching/swales

within the borrow sites and silt fencing will be employed as necessary to ensure that sedimentation contained in meltwaters from ground ice in the aggregate, or site runoff in general, are appropriately managed and are not released into the surrounding watershed. In addition, given the nature of the borrow sites, which typically consist of deposits of relatively porous aggregate material (sand, gravel, rocks/boulders), it would be expected that much of the seasonal meltwater and runoff associated with the borrow sites would likely percolate directly into the shallow active layer that naturally develops each summer in the area.

It is anticipated that any nutrients associated with runoff water that percolates into the active layer and moves off site, will be rapidly taken up by the roots of the surrounding tundra vegetation cover that extend into the active layer. Furthermore, as indicated in the EIS, the Developer is committed to ensuring that borrow sources will not be developed within 50 m of any watercourse and 1 km of the Husky Lakes.

AANDC accepts the Developers response that drainage and erosion control measures, like those suggested in the Information Request Response, are to be developed as part of Pit Development Plans. The PDPs will be reviewed as part of the regulatory process to ensure that waterbodies and watercourses are protected.

2.2 Borrow Material Ice Content – Borrow Pits; EIS 2.6.8.2 Pg 86 pg.

AANDC also asked the Proponents to provide information indicating whether it has considered alternative methods and/or timelines related to quarrying borrow material and its placement in a manner that allows
for drainage to occur prior to embankment construction. Alternatively, the Proponent was asked indicate what borrow volumes would be needed to stockpile sufficient additional material to repair embankment sections that will be at risk of slumping. (IR 98)

Developer Response

In responding to this particular information request, the Developer would initially note that the statement that “observations of slumping...may indicate that granular materials were not properly drained” is not correct. In the Tuktoyaktuk and Inuvik region, road embankment construction projects have occurred in both winter and summer and have employed both thawed (drained) and frozen (undrained) granular materials. Northern road construction experience, such as that gained from the construction of several roads in the Tuktoyaktuk area (including the Tuktoyaktuk to Source 177 Access Road) during the winter period using frozen material placed directly on the frozen tundra has demonstrated that this type of winter construction is typically superior and that there is actually less slumping and subsidence with this type of winter construction. All roads built on permafrost in this region go through periods of subsidence and slumping and need maintenance and attention. For example, the existing road from the Town of Inuvik to the Airport continually subsides and slumps and needs to be repaired every few years. The subsidence and slumping observed on the Source 177 Access Road is simply a natural process that occurs on all roads in the region.

When embankment construction takes place in the winter the “core” of the roadbed remains frozen and this leads to less slumping and subsidence. When road embankments are constructed in the summer there is more slumping and more subsidence as the initial “lifts” of granular materials closest to the permafrost move and settle; this is observed in the section of the road to the existing Tuktoyaktuk sewage lagoon. Normally, treatment

for such slumping would consist of ongoing grade repairs, benching, spot gravelling, and gravel resurfacing in accordance with the existing practices and the Highway Maintenance Manual provisions. After 20-years, placement of reconstruction materials will re-new the cross-section and structural components. As indicated in response to IRs 90.1 and 92, it is expected that normal road maintenance will require stockpiles of gravel to maintain and rehabilitate the road, similar to all roads in the region. The 50-year estimated borrow volumes required for all work, including operations, maintenance, and rehabilitation are 3,355,500 cubic metres of borrow excavation common materials, and 1,216,390 cubic metres of crushed aggregate. Of these volumes, maintenance quantities over a 50-year period will total 68,500 cubic metres of pit-run and 924,750 cubic metres of crushed gravel

AANDC accepts the Proponents clarifications of the efficacy of winter construction methods and the requirement for ongoing maintenance of slumping shoulders. AANDC also acknowledges the information on stockpiles volumes presented in IRR 98.1 and elsewhere.

2.3 Road Embankment Heights – Permafrost Retention; EIS Inuvik Tuk Highway Section 2.6.4

The height of the embankment is a critical component of maintaining permafrost conditions below the road surface. Different embankment heights are specified depending upon the type of terrain being crossed. The proposed embankment thicknesses range from 1.4 m for relatively dry (ice-poor) areas up to 1.8 m for peatlands and areas of ice-rich permafrost. The source of the proposed depths were not provided. The EIS further states that, *"The routing for each Highway alignment option has been largely developed based on terrain observations in an effort to select reasonable topography* ***and avoid ice rich and other sensitive soils*** *that are likely to result in geotechnical challenges. Such challenges can be mitigated through modification of horizontal alignment to avoid ice rich terrain and considering an overall embankment fill design (rather than balancing cut and fill) with minimum embankment height defined based on the nature of the terrain type"*.

The following information was requested to be provided:

1. The source of the selected embankment thicknesses and the rational used in determining that the mitigation measure is adequate.

2. The Proponent provide a detailed evaluation of mitigation measures (beyond increasing embankment thickness or re-routing the alignment) to prevent permafrost thaw in areas where ice-rich terrain cannot be avoided.

Developer Response (1)

The Transportation Association of Canada 2010 publication entitled *Guidelines for Development and Management of Transportation Infrastructure in Permafrost Regions*, provides a process, lessons learned and practical examples relative to embankment design for road infrastructure. The information presented in this guide, combined with experience on similar roadways with similar regional, climate and terrain characteristics (i.e., Red Dog Mine Road in Alaska, Dempster Highway, Alaska Highway, Skakwak

Highway in Yukon and Tuktoyaktuk to Source 177 Access Road) was used to determine embankment requirements by terrain type suitable for the preliminary design.

Developer Response (2)

To prevent permafrost thaw in areas where ice-rich terrain cannot be avoided, the Highway design includes key mitigation features. Mitigation options that will be considered and employed will include:

- Installation of geotextile – the geotextile will assist in maintaining the integrity of the Highway embankment by minimizing the loss of material from the embankment into the underlying terrain.
- Selection of the appropriate embankment height and side slope ratio for the specific terrain type.
- Efficient drainage design - ensuring flow of water, in the spring/summer with defined stream and surface run-off to avoid or minimize standing water (ponding).
- Appropriate selection (i.e., type and size) and installation of drainage structures, including proper end treatments for culverts such as erosion control and drainage aprons.

AANDC is satisfied with this response.

2.4 Permafrost Integrity – Permafrost Retention; EIS Section 2.2.5

An analysis of ice-rich terrain features was conducted for two of the proposed Inuvik to Tuktoyaktuk highway routes during the summer of 2010 by INAC. Aerial photographs and field assessments by helicopter, as well as on the ground examination to verify some areas of ice-rich terrain were completed. Pg 57 of the EIS refers to this work where INAC commented that. "…approximately 10% (or 14 km of 137 km) of the Primary 2009 Route was determined to be located on confirmed or suspected ice-rich terrain and approximately 8% (or 4 km of 45 km) of the Alternative 2 (Upland Route) was located on similar terrain".

The report also indicated that the detection of significant areas of ice-rich terrain that were not identified in the Project Description (of March 3, 2010) indicates that the Proponent needs to conduct more work to delineate ice-rich terrain and terrain hazards along the proposed route.

The proponent was asked to confirm and/or provide a complete evaluation of ice rich terrain occurrences along the proposed Inuvik to Tuk Highway 2009 primary alignment.

Developer Response

A report prepared by KAVIK-STANTEC entitled *Inuvik to Tuktoyaktuk Highway – Baseline Data Acquisition Program: Terrain Evaluation* (Terrain Report) was submitted to the EIRB March 2012, accompanied by a mapbook entitled *Surficial Geology and Terrain Constraints – Inuvik to Tuktoyaktuk Highway*. The Terrain Report and mapbook present the results of detailed mapping of surficial geology, geologic processes, drainage features and permafrost features within a 1 km corridor centered on Alignments 1 and 3. The Terrain Report discusses each of the terrain units present within the study area and comments on the expected ground ice content, based on results of previous published studies in the area. The mapbook, presented at 1:10,000 scale, identifies these terrain units as well as specific locations where historic and active geoprocesses can be attributed to the presence of ground ice.

AANDC accepts the response provided by the developer related to the issue.

2.5 Water Quality – Dust Control; PDR

The PDR indicates that water will be used for dust control during highway operations. It is not clear whether dust control chemicals, such as calcium chloride, are also being contemplated for use on the road.

It was asked that the developer provide whether dust control chemicals may be used for dust control. If so, please identify mitigative measures that are available to minimize potential impacts to the aquatic receiving environment, particularly with respect to sensitive areas such as the Husky Lakes.

Developer Response

As indicated in the EIS, the developer is committed to controlling dust generated in relation to the construction and operation of the Highway through the application of non-toxic dust suppression techniques (water trucks) that comply with the GNWT's *Guideline for Dust Suppression* (GNWT

AANDC accepts the response given by the proponent above as acceptable. This issue was raised during the technical sessions on August 22, 2012 and as committed AANDC has examined the response provided by the developer and is satisfied with their response. During the Technical Session on August 22, 2012 as recorded on the transcript on page 33, line 11-14, as discussed by Rick Hoos with the Developer Group, it should be noted that AANDC needs to be involved in those decisions in addition to the Department of Fisheries and Oceans. As the agency charged with the enforcement and regulatory oversight of the Water Licence as per the Northwest Territories Water Act this particular issue pertains directly to our mandate as well, specifically the use of water for dust control, application of any dust suppressants and the potential affects to water courses and streams at all times of the year.

2.6 Developer response to IR number 11 issued by the EIRB – Use of Environmental Monitors

In responding to the information request relating to Environmental Monitors (EM's), the Developer has made several statements that require clarification. Statements of concern relate to the EM roles in determining compliance with AANDC authorizations as well as NWT Water Board authorizations, and actions presumed to be taken by the EM's in the course of their duties.

It should be noted that AANDC recognizes that EM's are an integral component to project development and delivery in the ISR on both Crown and Inuvialuit Private Lands, as well as within the context of water licences issued by the NWTWB. The ILA Environmental Monitor program that exists today is worthy of being held up as a model to the NWT. It is a program where local knowledge and participation is integrated with environmental protection and regulation programs carried out by Inspectors. On Crown land in the ISR, both programs work in collaboration with each other to ensure environmental impacts of projects such as this remain few.

The developer was requested the following

a. Their understanding of the legislative authorities the ILA Environmental Monitors hold in relation to the authorizations issued by AANDC under the Territorial Land Use Regulations and the NWT Quarry Regulations on Crown Land, and the NWT Waters Act in the ISR.

b. Their understanding of the relationships ILA Monitors and the ILA have with AANDC Inspectors as well as the legislative mandate AANDC Inspectors hold in relation to enforcement and compliance of terms and conditions set out for projects such as this.

c. The understanding of the differences between Environmental Monitors "monitoring" project activities and, "ensuring compliance with authorizations' terms and conditions".

d. The understanding of the reporting relationships the EM's follow in identifying areas of concern to them while monitoring activities on Crown Land, as well as their authority to "take appropriate action" in the context of dealing with critical situations or non-compliance occurrences.

Developer Response (a)

It is the Developer's general understanding that the primary mandate of the ILA Environmental Monitors is to monitor Developer/Contractor compliance with the terms and conditions of authorizations and permits issued by the Inuvialuit Land Administration for activities on Inuvialuit Lands, consistent with the Inuvialuit Final Agreement. However, as stated by AANDC in the preamble to this information request, AANDC recognizes that EMs are an integral component to project development and delivery in the ISR on both Crown and Inuvialuit Private Lands, as well as within the context of water licences issued by the NWTWB. The ILA Environmental Monitor program that exists today is worthy of being held up as a model to the NWT. It is a program where local knowledge and participation is integrated with environmental protection and regulation programs carried out by Inspectors. On Crown land in the ISR, both programs work in collaboration with each other to ensure environmental impacts of projects such as this remain few.

Developer Response (b)

Please see Developer Response (a) above.

Developer Response (c)

As stated in Developer Response (a) above, it is the Developer's general understanding that the primary mandate of the ILA Environmental Monitors is to monitor Developer/Contractor activities and compliance with the terms and conditions of authorizations and permits issued by the Inuvialuit Land Administration for activities on Inuvialuit Lands. It is also the Developers general understanding that AANDC inspectors will play a key role in ensuring compliance with the terms and conditions of AANDC authorizations and permits as well as any water licences issues by the Northwest Territories Water Board.

Developer Response (d)

It is the Developer's general understanding that the primary reporting relationship that the ILA Environmental Monitors will follow while monitoring activities on ILA or Crown Lands will be through the Inuvialuit Lands Administration. However, as indicated by

AANDC in the preamble to this series of questions, it is apparent that on Crown land in the ISR, both programs (ILA and AANDC) work in collaboration with each other to ensure environmental impacts of projects such as this remain few. However, it should be noted that the Developer and its Contractors will be pleased to take direction as appropriate from any inspector(s) assigned to monitor project activities, including matters related to critical situations or non-compliance occurrences.

AANDC will accept this response, however may wish to ensure the understanding of EM's and their role on Crown Lands in the ISR is fully understood by the developer as well as the parties involved in this process as well as the regulatory process should it follow.

3.0 General

3.1Granular Resources

At the Technical Hearings (Inuvik, August 23, 2012), AANDC was asked by EIRB Advisors with to compare the information provided in earlier granular resource studies with information provided by the Proponents. AANDC provided a general description of historical granular inventory reports and the expectation that each subsequent phase of exploration should make use of previous work, to provide improved estimations of the quantity of materials available to meet current demands. It was noted that there have been overlapping assessments, sometimes with different objectives and different needs, and that the user is expected to determine whether any site will meet their requirements in terms of quantity and quality.

3.2 Borrow Access (maintenance and operations)

AANDC has some additional concerns regarding access roads to those borrow sources regarding for ongoing maintenance of the highway. It is unclear whether winter roads will be required (almost) every year of operation to ensure that adequate maintenance supplies are maintained.