Inuvik to Tuktoyaktuk Highway Project
Issues/Questions for the Technical Sessions
Inuvik, August 22-23, 2012

Submitted by: Natural Resources Canada, Earth Sciences Sector (ESS)
Geological Survey of Canada
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Discipline: Biophysical 1. Terrain, Geology, Soils, Permafrost

Question related to response to number of IRs (e.g. 91, 130, 139)
Issue/Question – Monitoring and Management Plans
(TOR 10.1, 13, App A; References EIS Section 3.1, 4.2.1, 4.5.3, 7.1; Response to IR 91, 130, 139; Terrain Evaluation Report and Mapbook)

Description of Issue/Question: The Proponent has indicated areas of slope instability on the alignment maps that were provided in response to IR 130. Many of these are associated rapid movements such as thaw flow slides. Slower gradual downslope movement such as creep and solifluction can also present an issue for roads and bridge abutments at water crossings. Evidence of these movements has been indicated on the alignment sheets. The Proponent provided some information on monitoring programs to be implemented to measure ground movement (response to IR 139, 91). It is unclear whether instrumentation such as slope inclinometers will be installed to monitor downslope movement on ice-rich slopes.

Question: Please indicate if instrumentation such as slope inclinometers will be installed to monitor downslope movement on ice-rich slopes including approaches to water crossings.

Question related to IR 130
Issue/Question: Terrain conditions along the corridor
(TOR 6, 7, 9.1, 10.1, App. A; Reference: EIS 2.1, 2.2, 2.3, 2.4, 3.1, Response to IR 130 Terrain Evaluation Report and Mapbook)

IR Number: 130

Description of Issue/Question – A description of terrain conditions including topography along the proposed corridor is required to assess terrain sensitivity, support engineering design and for the assessment of potential environmental impacts. In response to IR 130, the Proponent provided large scale alignment sheets indicating the terrain types and areas of instability along the corridor. Information on slope was also provided in the terrain type codes (polygon labels). The information provided is helpful. However, a topographic profile along the corridor has not been provided with the alignment sheets. This information would provide reviewers with better information regarding terrain sensitivity and will also support detailed design. The Proponent has also indicated that LIDAR

surveys have been conducted. These surveys along with the detailed air photos could be utilized to map drainage diversions, delineate areas susceptible to ponding and determine where culverts may be required.

Possible Steps to Provide a Resolution of Issue/Question:

1. Provide clarification on whether a detailed topographic profile for the corridor has been prepared and when this could be provided.
2. Provide clarification regarding whether the LIDAR surveys have been utilized in combination with the air photos to map drainage diversions and areas susceptible to ponding and to determine where culverts may be required.

Question related to IR 134
Issue/Question: Design values utilized for stream crossing design
(TOR 6.2, 9.1, 10.4, App. A; Reference: EIS 2.6.6, 3.1, 4.5)

IR Number: 134

Description of Issue/Question: Information on expected water levels and flows is required to determine the potential for erosion, the impact of the environment on the project and to support water crossing and culvert design. The Proponent has not provided any information on the design values to be utilized for stream crossing design. The Proponent has indicated that detailed design for stream crossing has not been done yet. For preliminary design, field observations, topographic and observational evidence of high water limits have been utilized. The Proponent has outlined the next phase of field investigations to support detailed design including hydrology and hydraulics studies (stream flow, water levels, precipitation and flood analysis). It is not clear however, what information is available for the project area, what additional instrumentation will be installed to support characterization of streamflow including extreme events and development of design values for stream crossings. It is also not clear how climate change will be considered in development of design values.

Possible Steps to Provide a Resolution of Issue/Question:
Provide further details regarding additional studies to be conducted to characterize variability of streamflow (including extreme events) to support development of design values for stream crossings. This should also include a description of how climate change will be incorporated into the analysis to support detailed design. Please include details on existing information that will be utilized and additional field investigations required. Provide also a description of how potential uncertainty in the design values will be dealt with.

Question related to IR 135 and 136
Issue/Question: Surficial geology and ground ice conditions
(TOR 6, 9, App. A; Reference: EIS Section 2, 3.1.1, 4.2.1, Terrain Evaluation Report and Map Book)

IR Number: 135

Description of Issue/Question: The Proponent has indicated in the Terrain Evaluation Report (p. 3-8) that that some gently undulating areas mapped as outwash deposits by Rampton (1981, 1988) have been mapped as till as part of their larger scale terrain mapping. Most of these deposits are located in the areas east and northeast of Parsons Lake. The Proponent indicates that some of these deposits could be incorrectly identified as ice-contact deposits due to mapping scale and that a review of the mapping could be conducted if additional field data are made available. This potential over-estimation of the glaciofluvial outwash/ice contact deposits has implications for the ground ice evaluations and embankment design. The Proponent has indicated that further field investigations will be conducted to support final design. However, it is not clear what the plans are for field verification of the surficial geology mapping presented in the Terrain Evaluation Report and Map Book to refine the ground ice evaluation and support detailed design.

Possible Steps to Provide a Resolution of Issue/Question:
Provide information on how the Proponent proposes to verify their own surficial mapping along the highway route to support ground ice evaluations and detailed design.

Question related to IR 137
Issue/Question: Frozen ground
(TOR 6, 9, App. A; Reference: EIS Section 1.2, 2, 3.1.1, 4.2.1)

IR Number: 137

Description of Issue/Question: The proponent has given some details regarding the procedure to be followed to determine whether the ground has frozen back sufficiently prior to the commencement of winter construction activities (including deposition of frozen borrow material). The Proponent has indicated in response to IR 132 that temperature cable installation is anticipated to support final design. Data collected from these cables in the autumn, may be utilized to determine if sufficient freeze-back of the active layer has occurred prior to embankment construction.

Possible Steps to Provide a Resolution of Issue/Question:
Will the Proponent utilize the ground temperature data from the cables they install to determine whether adequate freeze-back has occurred prior to commencement of winter construction activities.

Question related to IR 141
Issue/Question: Borrow materials
(TOR 6, 9, App. A; Reference: EIS Section 2, 3.1.1, 4.2.1, 4.5.1)

IR Number: 141

Description of Issue/Question: The proponent has not fully investigated potential sources of borrow material for road embankment construction. It is not clear if the proponent has considered all available data as part of the borrow material assessment

Possible Steps to Provide a Resolution of Issue/Question:
Provide a full assessment of potential sources of borrow materials for road embankments. This question can be revised once ESS receives the detailed investigation report expected on August 20, 2012 as mentioned at the teleconference on August 2, 2012, Kigiak – EBA Engineering indicated that it will provide information to NRCan.