

IR Number: 2.1.1

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section **IR Number: 1.1.2 – Development Description – Engineering design and the Role of the PEER REVIEW DESIGN TEAM.**

TOR Section: **Development Description and Design Changes.**

Preamble: The decision by the Deh Cho Bridge Corporation to assemble a Peer Review Design Team is an excellent approach to ensure an independent evaluation is conducted for design modification. Hopefully this review will ensure that the many numerous changes made since the inception of this project are in conformity with engineering standards and applicable codes.

Request:

Please provide the Review Board with the following information:

- a) Will the Peer Review Design Team final report be submitted to all parties of the EA?
- b) Will project reports be provided by consulting firms and scientific labs be provided to all parties of the EA?
- c) When will the developer be making a submission on the final design construction plan (ie. DCBC using concrete or steel)?
- d) What cost can the proponent place on the reclamation of the proposed bridge after a 75 year effective life for this structure?
- e) Has the DCBC proposed posting a securities bond for liabilities created by the bridge construction and structure?
- f) Has the developer investigated the need for a median crash-barrier in the bridge design to eliminate risks to vehicles when crossing the proposed bridge?

IR Number: 2.1.2

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section C.11 Modifications (May 24, 2004)

TOR Section: C-11 Modifications

Preamble: The DAR (p.77) states there have been a few conceptual modifications introduced in the bridge design since the submission of the Application for Water License of May 23, 2003.

- The pier foundations originally presented as predrilled concrete caisson have been replaced with cast in place concrete spread footings and pedestals. This modification was introduced to satisfy the actual geotechnical conditions defined by the geotechnical investigation report prepared by EBA Engineering in July 2003.

Request:

Please provide the Review Board with following information:

- a) Did EBA Engineering conduct a geotechnical analysis for Pier Site #6?
- b) If not, will a geotechnical analysis be conducted at this site?
- c) What are DCBC plans for further geotechnical investigations at this site before the bridge design and construction plans are finalized?

IR Number: 2.1.3

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: C.11 Modifications (May 24, 2004)

TOR Section: C-11 Modifications

Preamble: The DAR (p. 77) states there have been a few conceptual modifications introduced in the bridge design since the submission of the Application for Water License of May 23, 2003.

The pier foundations originally presented as predrilled concrete caisson have been replaced with cast in place concrete spread footings and pedestals. This modification was introduced to satisfy the actual geotechnical conditions defined by the geotechnical investigation report prepared by EBA Engineering in July 2003.

Request:

Please provide the Review Board with the following information:

- a) How has the pier foundation design considered the 2 m thick sand lens EBA Engineering's geotechnical investigation revealed within the subsurface at Pier Sites #1 and #2?
- b) What likely effects will the sand lens, 3.7 m below the riverbed (p. 10, EBA Report), have on the proposed sheet pile (5 m) and excavations (4 m) depths?
- c) Will the pier footings and foundations be stable at these sites?

IR Number: 2.1.4
Source: Indian Northern Affairs Canada – Northern Region
To: Deh Cho Bridge Corporation (DCBC)
DAR Section J.4.2 Water Quantity (May 24, 2004)
TOR Section: J-4 Water Quality and Quantity

Preamble: The DAR (p. 114) states changes in river hydrology resulting from bridge construction have been studied and well documented. One example is the Suncor Bridge on the Athabasca River in Northern Alberta (Golder 1996). Prior to development and design, potential effects of the placement of the Deh Cho Bridge on river hydrology and fish habitat were modeled and predicted (Trillium 2002; Golder 2004).

Request:

Please provide the Review Board with the following information:

- a) The Trillium report consistently uses the 100-year event for peak discharge (p. 9), water level (p. 11) and ice jam water level (p. 15) for bridge design purposes. Why is the 50-year maximum upstream ice thickness used for evaluating ice forces?
- b) How many years of data were used to calculate the ice strength used for bridge design?
- c) Is the 100-year event suitable for the life expectancy of this bridge?
- d) Will a worst case scenarios be developed by the proponents for these potential events?

IR Number: 2.1.5
Source: Indian Northern Affairs Canada
To: Deh Cho Bridge Corporation (DCBC)
DAR Section J.4.2 Water Quality (May 24, 2004)
TOR Section: J-4 Water Quality and Quantity

Preamble: The DAR (p. 112) states the main water quality issues related to the bridge project relate to the potential release of sediments or chemicals into the river channel, primarily during construction. Mitigation measures include implementing standard erosion control measures (e.g. rip rap, revegetation), monitoring and follow-up maintenance, and the use of adaptive management practices (as necessary). Additional mitigation measures could include:

- Building coffer dams to isolate abutments during construction and/or complete construction of abutments during winter conditions.

Request:

Please provide the Review Board with the following information:

- a) Will the developer consider these two mitigation measures noted above for abutment excavation and construction?
- b) Has DCBC considered coffer dams for excavation of existing ferry causeways and/or the haul-out area to minimize TSS or contaminates discharges into the Mackenzie River?

IR Number: 2.1.6

Source: Indian Northern Affairs Canada

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: C.6.2 Excavations of material from Reclamation Areas related to removal of existing ferry infrastructure (May 24, 2004)

TOR Section: C-6 Waste Management

Preamble: The DAR (p. 71) states the excavated material is composed of 20,000 cu m granular backfill, 80 cu m structural concrete, 90 cu m structural timber and 30, 000 cu m structural steel. It is possible that the material is contaminated with hydrocarbons or other substances harmful to the fish habitat. In order to establish if any contaminants are present, the GNWT Department of Transportation has commissioned a study with the environmental consultant Dillon Consulting Ltd.

Request:

Please provide the Review Board with the following information:

- a) What is the status of this study and will reports be submitted to reviewers when the final report is completed?
- b) Will the water quality monitoring program include hydrocarbon detection during excavation?

IR Number: 2.1.7
Source: Indian Northern Affairs Canada
To: Deh Cho Bridge Corporation (DCBC)
DAR Section N/A
TOR Section: MVEIRB IR 1.1.5

Preamble: The Review Board indicated that the DAR states bridge design could incorporate features to facilitate spill containment and clean up. DCBC was asked to describe the specific design features that will be incorporated to facilitate spill containment and clean up.

The developer indicated that the design features would direct all rainwater (and potential fuel spill) towards the abutments at both ends of the bridge. From that point the rain water or spill will be directed into open gutters, sloping down the embankments shoulders and ending at the toe of the shoulders some 20m to 25m behind the water line. The gutters will have 12% to 15% longitudinal slopes and will be built of precast concrete elements. The gutters would discharge into containment ditches, parallel to the waterline, where a fuel spill could be managed similar to any spill along the 7km section of highway that extends along the north shore.

Request:

Please provide the Review Board with the following information:

- a) How will the containment ditches be protected from erosion due to the longitudinal gutter slopes?
- b) Have the potential risks of such a design been considered? If containment ditches along banks are full of water or ice, what is the potential for diverted fuel overtopping the ditches and contaminating the soils in and around the approaches? How will the containment ditches prevent the saturation of bridge abutments and soil?
- c) Will the containment ditches be monitored and maintained following an extreme rainfall event?

- d) In the event of a significant fuel spill and fuel release from the containment ditches to soils around the abutments, what would be the impacts on the underlying soils? Would there be any stability issues if the soils were grossly contaminated with fuels, ie, Would soil particles become “lubricated” reducing shear strength?
- e) Would the containment ditches be maintained free of snow and ice in the winter?
- f) Has the design been incorporated and proven effective in other similar bridge designs?
- g) Has a risk-benefit analysis been conducted on this design vs. more conventional spill contingency, ie. Spill response using large scale river spill equipment and material stocked in a readily accessible OSCAR unit?
- h) Will the Peer Review Design Team be analyzing and commenting on this aspect of the bridge design?

IR Number: 2.1.8
Source: Indian Northern Affairs Canada – Northern Region
To: Deh Cho Bridge Corporation (DCBC)
DAR Section DAR pages 71, C.6.2, 75 and 76, C-8
TOR Section: Points 6 and 8 of the Scope of Development Section 4.2, C-8

Preamble: The Scope of Development includes removal and disposal of materials from the existing and temporary ferry landings. Disposal to be in the North and South Borrow Areas of which the South Borrow Area is on Federal Crown Land.

To properly assess the implications from disposal of these materials on Crown land information on quantity of materials designated for each of the two borrow areas, method of contamination assessment, and disposal method are needed. New waste disposal areas on Crown lands are discouraged and requires a pre-authorization.

Request:

Please provide the Review Board with the following information:

- a) What measures will be in place to ensure no contaminated materials, steel or timber are disposed of in the South Borrow Area?
- b) Will an inventory of materials and quantities disposed of at each location be implemented and maintained?

IR Number: 2.1.9

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section DAR page 26, B-2

ToR: Section 4.2, B-2 & C-10

Preamble: This section is silent to the ownership of facilities associated with the Bridge Development. More specifically, facilities related to the administration and collection of toll facilities are not listed.

This information is used to validate the land requirements/components of the project by ownership of the facilities.

Request:

Please provide the Review Board with the following information:

a) Provide details on the ownership of the toll collection facilities.

IR Number: 2.1.10

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: DAR page 77, C-10

ToR: Points 11 & 12 of the Scope of Development Section 4.2, C-10

Preamble: The Scope of Development includes the “location, construction and operation of the toll facilities”, and, “additional infrastructure in support or connected to the bridge.” Which both contribute to the size and configuration of land requirements.

With out knowing the location and details of this development as part of the overall project, we cannot assess impacts to existing land and recreational uses of the area.

Request:

Please provide the Review Board with the following information:

a) Location, type of facilities, and the land requirements for the toll collection facilities.

IR Number: 2.1.11

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: Appendix 2 – Key Correspondence to Environmental Screening Application

ToR:

Preamble: In Andrew Gamble's February 10, 2004, letter to Mr. Ed Hornby, District Manager, DIAND – SMD, Mr. Gamble states that "The majority of user groups have indicated support on this basis". In the July 13, 2004, presentation to the regulatory agencies, DCBC indicated that the toll facility will require an annual operating cost of \$250,000.00

Request:

Please provide the Review Board with the following information:

- a) Which user groups were contacted?
- b) Which user groups supported the toll structure?
- c) Which user groups opposed the toll structure?
- d) Of the user groups opposing the toll structure, what were the concerns being expressed?
- e) Were the user groups aware of the \$250,000.00 annual operating costs during consultations, or is this new information?

IR Number: 2.1.12

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: Appendix 2 – Key Correspondence to Environmental Screening Application

ToR:

Preamble: In Andrew Gamble’s February 10, 2004, letter to Mr. Ed Hornby, District Manager, DIAND – SMD with respect to the proposed benefits of the Project, Mr. Gamble states that “We believe that the result will be a net environmental benefit.

Request:

Please provide the Review Board with the following information:

- a) Has a cost-benefit analysis (CBA) been conducted to support this assumption?
- b) Has a “significant impact analysis” been conducted to identify all possible environmental impacts from the project, both short-term (construction) and long-term (maintenance), and possible bridge failure scenarios?

IR Number: 2.1.13

Source: Indian Northern Affairs Canada – Northern Region

To: Deh Cho Bridge Corporation (DCBC)

DAR Section: Appendix 2 – Key Correspondence to Environmental Screening Application

ToR:

Preamble: In Andrew Gamble’s February 10, 2004, letter to Mr. Ed Hornby, District Manager, DIAND – SMD with respect to the need for a public hearing, Mr. Gamble states that “TD Securities will be financing the construction phase and will have some \$50 million at risk.” In the July 13, 2004, presentation to the regulatory agencies, DCBC indicated that construction costs were now “into the 60’s” (millions).

Request:

Please provide the Review Board with the following information:

- a) What is the financial capacity to cover current and future cost overruns, as well as possible project failure?

IR Number: 2.1.14
Source: Indian Northern Affairs Canada – Northern Region
To: Deh Cho Bridge Corporation (DCBC)
DAR Section: Appendix 2 – Key Correspondence to Environmental Screening Application

ToR:

Preamble: In Jivko Engineering’s February 9, 2004, letter to Mr. Andrew Gable, regarding construction of the pier foundation, Mt. Jivko states that “The water contained in the cofferdam will be pumped out into the river. Prior to the pumping out, the water will be tested for suspended solids and the levels of pH will be adjusted if required. In July 13, 2004, presentation to the regulatory agencies, no details could be provided with respect to how the pH would be adjusted or monitored.

Request:

Please provide the Review Board with the following information:

- a) What will the expected pH levels be within the cofferdam environment, given the presence of curing concrete?
- b) If the cofferdam pH is basic, how will the pH be adjusted ie: by “batch” acidification of the water contained within the cofferdam, or by in-line injection?
- c) How will the pH be monitored during discharge from the coffer dam into the river?

IR Number: 2.1.15

Source: Environment Canada

To: Deh Cho Bridge Corporation

DAR Section: C Development Description

TOR Section: D-1 Description of Effects of the Physical Environment

Preamble: On page 38 of the DAR, the proponent states that the main span of the bridge will be 22m above high water level.

Request:

Please provide the Review Board with the following information:

a) What information was utilized to determine the high water level for the project design?

IR Number: 2.1.16

Source: Environment Canada

To: Deh Cho Bridge Corporation

DAR Section: **J Physical and Biological Environment**
J.1 Air Quality and Climate
(b) Mitigation Measures

TOR Section: J-1 Air Quality and Climate

Preamble: On page 108 of the DAR, the proponent states that applying water or acceptable chemical suppressants to roadways to reduce dust is an appropriate mitigation measure that will minimize the impacts on air quality during the construction phase of the project.

Request:

Please provide the Review Board with the following information:

- a) Describe the type of acceptable chemical suppressant being considered?
- b) How it would be applied, and
- c) Where it would be applied?

IR Number: 2.1.17

Source: Environment Canada

To: Deh Cho Bridge Corporation

DAR Section: J.3 Vegetation and Plant Communities

TOR Section: J-3 Vegetation and Plant Communities

Preamble: On page 111 of the DAR in Table J-1, the proponent quantifies the area of the proposed new clearings for the project as 13.6 ha.

Request:

Please provide the Review Board with the following information:

- a) Provide a comparison between the overall size of the project footprint to the area that is being proposed to be cleared, and
- b) Note the percent increase over the existing cleared area? This will allow for a better understanding on the degree of impact on the vegetation and plant communities in the construction area.

IR Number: 2.1.18

Source: Environment Canada

To: Deh Cho Bridge Corporation

DAR Section: J.6 Wildlife and Wildlife Habitat and
J.7 Species at Risk Act

TOR Section: J-6 Wildlife and Wildlife Habitat
J-7 Species at Risk Act

Preamble: On pages 117 through 119 the proponent describes selected Valued Ecosystem Components, potential effects and Mitigation Measures on wildlife, as well as provides a species list (as per Schedules I-III of the Species At Risk Act); however there does not appear to be a description of the existing wildlife species within the footprint of the construction project. It would appear to be difficult to assess potential effects and mitigation measures on wildlife without having appropriate baseline information.

Request:

Please provide the Review Board with the following information:

- a) Could the proponent describe how baseline studies were conducted and how data was collected on the existing wildlife species within the footprint of the construction project?

IR Number: 2.1.19

Source: Water Survey of Canada Division, Calgary Environment
Canada

To: Deh Cho Bridge Corporation

DAR Section: J.4 Water Quality and Quantity, Page 45-46,

TOR Section: J-4 Water Quality and Quantity

Preamble: DAR's Statement as follows:

“Trillium (2002) discussed potential impacts of the proposed project on hydrotechnical issues (e.g., water flow, water depth, scour, ice flows, ice jams).”

Considering that the environment may undergo significant changes over the next century the proponent should examine the degree of risk posed by these [meteorological, hydrological and other physical factors] on the integrity of the structure over the design life of the project (i.e. 100 years). It does not appear that the project design has adequately considered the effects of long-term climate change on the structure.

Request:

Please provide the Review Board with the following information:

- a) Could the proponent more fully address the effects of long-term climate change on the design of the bridge structure?

IR Number: 2.1.20

Source: Environment Canada

To: Deh Cho Bridge Corporation

DAR Section: Pier Foundation Works, page 49
Table J6 3) Installation of instream piers
Appendix 1, p. 7

TOR Section: J-4 Water Quality and Quantity

Preamble: The project entails a number of earthworks which will cause the release of sediments into the Mackenzie River. These include modification of the north and south approaches, and installation of the instream piers. Installation of the piers will involve removal of 750-800 m³ (or 850 m³, depending on which document is correct) of bed sediments from each pier location, which is proposed to be either disposed of directly into the river (page 49, DAR) or removed for disposal to a gravel pit (Table J6). Dewatering from within the cofferdams will be required (1900 m³ per cofferdam), and this is proposed to be done directly to the river. Table J6 5) states that water will be tested and treated as necessary for pH before release to the river.

Water containing high levels of suspended sediments may be considered deleterious, and as such, have an unacceptable impact on receiving waters. The proponent proposes to use timing to minimize exposure to migrating fish species, and to use water sampling to determine the rate of release of sediments to the river.

Request:

Please provide the Review Board with the following information:

- a) Clarify the means of disposal for river bottom spoils. Environment Canada has concerns with disposal to the river, and would ask that the proponent provide a strong rationale for not removing the sediments to a gravel pit for disposal.

b) Water from within the cofferdams will have to be of a quality that is acceptable for release to the Mackenzie River, i.e. be non-deleterious. The main parameters of concern will be suspended solids, pH, and possibly ammonia. Please note that (contrary to what is stated in the DAR Table J6 and in Appendix D of the Golder Report) ammonia becomes more (not less) toxic under basic pH conditions. Please advise how it will be confirmed that the water is non-deleterious prior to release, and provide details of any treatment proposed.

c) Alternative disposal means should be identified in the event water quality is not acceptable for release (i.e. does not meet the provisions of Section 36(3) of the Fisheries Act).

IR Number: 2.1.21
Source: Environment Canada
To: Deh Cho Bridge Corporation
DAR Section: K.1 Cumulative Impacts
TOR Section: K Cumulative Impacts

Preamble: The proponent adequately describes the bridge within the context of the overall transportation corridor and history of development of the highway. However the proponent does not provide enough detail on existing resource use activities within the study area. The proponent could, but is not limited to include in it's cumulative effects assessment: the community of Fort Providence, existing quarries (in use or abandoned), existing roadways, trails, personal use cabins, docking facilities, airstrips (in use or abandoned), the proposed toll facilities and any new areas of disturbance related to the project.

Request:

Please provide the Review Board with the following information:

- a) Provide a broader review of and more definitive conclusions of the potential cumulative environmental effects. Consider utilizing one of the approaches outlined in the following documents, in order to conduct your review of cumulative effects:

Addressing Cumulative Environmental Effects in Environmental Assessments under the Mackenzie Valley Resource Management Act. Interim Guide, September 2000.

Cumulative Effects Assessment Practitioners Guide February 1999. Prepared for: Canadian Environmental Assessment Agency. Prepared by: The Cumulative Effects Assessment Working Group and AXYS Environmental Consulting Ltd.

Operational Policy Statement, March 1999 OPS-EPO/3- 1999, Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act.

A Reference Guide for the Canadian Environmental Assessment Act: Addressing Cumulative Environmental Effects . November 1994.

Cumulative Effects in the Inuvialuit Settlement Region: A guide for proponents.

b) The developer's cumulative effects assessment should include the following categories:

- Scoping
- Analysis
- Mitigation
- Determining Significance
- Follow-up

b) The developer's cumulative effects assessment should also address:

Spatial boundaries – may extend beyond a development's immediate site to include the area likely to be affected;

Temporal boundaries - may extend beyond the timing of construction and operation to include the period of occurrence of the effects.

As described in the MVEIRB's Interim Guide, September 2000 the proponent's analysis should include an assessment of:

1. the status of the receiving environment, including its important characteristics and other stressors (e.g. how have past developments and activities affected or stressed the environment)?
2. the cumulative environmental effects of the development, including, interactions among effects the development may cause in the environment, such as those between effects on water quality and effects on fish resulting from sedimentation and destruction of the shoreline vegetation cover
3. interactions among any effects on: health and socio-economic conditions; physical and cultural heritage; current use of lands and resources for traditional purposes by aboriginal persons; any structure, site or thing that is of historical, archaeological, palaeontological or architectural significance, caused by changes in the environment; and interactions among changes to the development caused by the environment.

d) The developer's cumulative effects assessment should consider all types of existing information such as, but not limited to:

- federal, provincial and municipal government departments and agencies, especially
land use planners and environmental staff;
- the public registry on the MVEIRB web site;
- registries or files of environmental assessments maintained by provincial departments and/or agencies;
- development owners and/or operators;
- local academic and research institutions;
- local residents and community and environmental groups;
- environmental reports;
- land use maps, air photos, and satellite images;
- records of official plan or zoning by-laws;
- fire insurance maps;
- local chambers of commerce;
- assessment records; and
- industrial directories.