Developer Response to Health Canada

The Developer (Hamlet of Tuktoyaktuk, Town of Inuvik and GNWT Department of Transportation) is pleased to provide the following responses to the conformity review comments provided in Health Canada's letter dated June 27, 2011.

This document is provided in addition to the Addendum to the Environmental Impact Statement submitted to the Environmental Impact Review Board (EIRB) in response to the EIRB's letter dated July 15, 2011: *Conformity Statement and Board Direction Regarding the Draft Environmental Impact Statement for the Hamlet of Tuktoyaktuk, Town of Inuvik and GNWT – Construction of the Inuvik to Tuktoyaktuk Highway, Northwest Territories* [02/10-05].

1. GENERAL COMMENTS

Reviewer's Comments:

Health Canada (HC) has noted that the draft EIS for the Tuktoyaktuk to Inuvik Highway provides minimal detail on the location and nature of potential human receptors within the regional study area for the EA. HC is aware that with the exception of the town of Inuvik and the hamlet of Tuktoyaktuk, the proposed highway routes are in areas with limited human activity (i.e. residential and traditional land use). However, HC advises identifying human receptors, even if temporary use (i.e., humans using campsites; fishing or hunting cabins; berry picking areas), as this information would better inform HC's review of the project's human health effects (noise, air quality, water quality, contamination of country foods).

HC suggests that Figure 4.3.8-1 Existing Land Uses (draft EIS - p.600) may be a useful place for providing further detail of the location and nature of human receptors as residential leases are identified. HC suggests clarifying the current/likely future human use at these residential leases. There are also several numbered points on this map. Please clarify if there is human use occurring in these areas. It may be useful to provide a table with details about human receptors and the distance to the proposed routes.

Developer's Response:

The proposed Highway is located in an area with limited or temporary human activity. The primary human receptors are located within the Town of Inuvik and Hamlet of Tuktoyaktuk. The area between Inuvik and Tuktoyaktuk is used for recreation and traditional land use. In particular, the Husky Lakes and Mackenzie River are used for fishing, hunting and trapping.

Figure 4.3.8-1 (in Section 4.3.8 Harvesting) of the EIS identifies the location of residential leases issued by the Inuvialuit Land Administration. Residential leases are typically cabins used during the late fall and early spring months (when there is daylight), for intermittent periods, for recreation and traditional purposes. The leases are most accessible during the snow-covered period when residents

may travel by snowmachine. This is evidenced by the snowmachine trails shown on Figure 4.3.8-1. The Developer is unaware of permanent residents occupying the residential leases.

Pending approval of this Project, the GNWT Department of Transportation currently anticipates purchasing a right-of-way on Inuvialuit-owned lands and securing land tenure on Crown lands.

The proposed Highway will not interfere with future use of the leases; rather, the Highway may create easier, year-round access to residential leases located in the Husky Lakes area. Potential increased use of the western portion of the Husky Lakes may result from the Highway.

Several residential leases, as identified in Figure 4.3.8-1 of the EIS, are located within the RSA (i.e., 15 km from the proposed Highway) (Table 1). One lease is located along the alignment, near KM 2, just north of Navy Road. Since most residential leases are located near the Husky Lakes, the route alternative located closest to the Husky Lakes (Primary 2009 Route) would potentially affect the greatest number of leaseholders, while Alternative 2 (Upland Route, located furthest from the Husky Lakes), would affect the least number of leaseholders.

Based on the considerations identified in Section 2.1.2 (Alignments Considered in the Current Stage of Project Development) and Section 2.2 (Comparison of Alignment Options), Alternative 2 (Upland Route) is no longer considered by the Developer to be a viable route option due to the more rugged terrain encountered, increased volume of granular material quantities required, and substantially increased cost to construct and maintain. For the Technical Review, the Developer would recommend that the Primary 2009 route, with incorporation of the Alternative 3 minor realignment, be considered as the preferred route for the proposed Highway.

TABLE 1: PROXIMITY OF RESIDENTIAL LEASES TO ROUTE ALIGNMENTS

	Number of Residential Leases			
	<1 km from Alignment	**1-5 km from Alignment**	**5-10 km from Alignment**	**10-15 km from Alignment**
Primary 2009 Route	2	33	46	21
Alternative 1 (2009 Minor Realignment)	2	33	46	21
*Alternative 2 (Upland Route)	1	12	31	36
Alternative 3 (2010 Minor Realignment	2	19	51	26

Note: * Alternative 2 (Upland Route) is no longer being considered by the Developer as a viable route option.

The numbered locations on Figure 4.3.8-1 relate to the borrow source identification number.

2. TERMS OF REFERENCE - SECTION 10.1.2-A

Reviewer's Comments:

HC notes that the draft EIS includes baseline information about air quality and a qualitative discussion on potential changes in air quality due to project activities; however the EIS does not discuss how these changes in air quality could impact human health. HC suggests including a discussion of potential human health effects resulting from changes to air quality to support the conclusion that "no residual effects in terms of substances are anticipated" (p. 482).

Developer's Response:

The Air Quality effects section (Section 4.2) of the EIS addresses the potential effects of Highway construction and operation for the key indicators in the context of the applicable standards and guidelines. The potential human health concerns associated with various parameters are discussed in Section 3.1.3.4 (Air Quality Monitoring Stations – Parameters Monitored). In the case of human receptors, the primary emission of concern during construction and operation is dust.

Dust emissions are anticipated to remain primarily in the LSA. Dust, in the form of fine ($PM_{2.5}$) and coarse (PM_{10}) particulate matter and total suspended particulates, is expected to be emitted during the construction and operations phases. The review of scientific literature identified consistent factors that affect dust deposition behaviour and include the deposition load, duration, frequency, and chemical properties of the dust. Particle size also plays a role in determining how far away from a source dust effects can be expected to occur. The effects of road dust on vegetation have been detectable 100 m away (Auerbach et al. 1997), 200 m away (Santelmann and Gorham 1988; Angold 1997), and up to 400 m away from a source (Lamprecht and Graber 1996). These distances are consistent with United States Environmental Protection Agency (US EPA 1995) observations of the deposition properties of particles with various aerodynamic diameters (under more "typical" conditions).

Larger dust particles (e.g., with aerodynamic diameters more than 100 μm) typically settle within 10 m of a source, while particles with aerodynamic diameters between 30 to 100 μm settle out within 100 m. Smaller particles than these are less susceptible to gravitational settling and can be transported over greater distances (US EPA 1995). It is anticipated that the largest effects to vegetation ecosystems and plants from fugitive dust will occur within 100 m of a dust source.

Seasonal variations may affect dust deposition as patterns of dust deposition on vegetation are a function of various factors including wind and ambient moisture. During periods of rain, snow, or freezing temperatures, dust is not expected to be generated by Project activities during construction and operations. Dust previously deposited on vegetation is also expected to be reduced following heavier rain events in particular. However, if dust is generated, dust may be deposited further from the Highway during periods of wind.

As discussed previously, permanent residences are located in Inuvik and Tuktoyaktuk. Some residential leases in the Husky Lakes area, used intermittently for recreation and traditional land use, are located relatively close to the proposed Highway. Table 1 (shown above) shows the number of residential leases located near the proposed Highway alignments.

One to two residential leases are located within 1,000 m of the Highway, depending on the route. As described in the previous paragraphs, dust deposition is expected to primarily occur within 100 m, but may occur up to 400 m from the Highway in less quantity. However, based on the anticipated concentrations, amount of time spent at the lease, minimal effects are anticipated.

In 2009, the average monthly concentrations of $PM_{2.5}$in Inuvik were 5 $\mu g/m^3$, with only two exceedances of the NWT 24-hour standard (30 $\mu g/m^3$) for $PM_{2.5}$. The exceedances were attributed to the long distance transport of smoke from forest fires burning in Alaska and the Yukon at that time (GNWT ENR 2009f).

In 2009, the monthly concentrations of PM_{10} in Inuvik ranged between 6-35 $\mu g/m^3$. Although there is no NWT standard or objective for PM_{10}, the NWT reports 10 exceedances of an 'adopted' 24-hour standard (50$\mu g/m^3$), which generally occurred in the snow-free months. Similar to previous years, the spring-time levels were elevated and were representative of the typical 'spring-time dust event' associated with residual winter gravel and from local construction activities (GNWT ENR 2009f).

During the extended winter periods, when the Highway is typically frozen and covered with snow and ice, fugitive dust emissions from traffic on the Highway are typically not expected to occur. Dust will be mainly generated during the snow-free period, and dust suppression will be used to minimize possible effects.

Maximum concentrations for $PM_{2.5}$ are provided under the NWT Ambient Air Quality Standards and Canada-wide Standards, while the maximum concentration for Total Suspended Particulates is provided under the National Ambient Air Quality Objectives. Particulate matter concentrations for $PM_{2.5}$ and PM_{10} are monitored in Inuvik.

No residual effects to humans are anticipated due to:

- the limited distance that particulate matter is transported, typically within 100 m but up to approximately 400 m from the Highway depending on particulate size;
- the seasonal, snow-free period during which time dust may be generated; and
- the use of dust suppression (water) to minimize dust.

Other emissions that may be generated during construction and operation of the Highway are anticipated to be minimal, with air quality parameters remaining within the accepted standards and guidelines, as discussed in the EIS.

References:

Angold, P.G. 1997. The Impact of a Road Upon Adjacent Heathland Vegetation: Effects on Plant Species Composition. Journal of Applied Ecology, 34: 409-417.

Auerbach, N.A., Walker, M.D., and Walker, D.A. 1997. Effects of Roadside Disturbance on Substrate and Vegetation Properties in Arctic Tundra. Ecological Applications, 7 (1), 218-235.

Government of the Northwest Territories, Department of Environment and Natural Resources (GNWT ENR). 2009f. Keeping an Eye on Our Air: 2009 Northwest Territories Air Quality Report Summary. Retrieved January 6, 2011 from: http://www.enr.gov.nt.ca/_live/documents/content/2009_Keeping_an_Eye_on_Air_Report.pdf

Lamprecht, R., and Graber, W. 1996. Modeling Dry Deposition of Dust Along the Dalton Highway. In (Eds) J.F. Reynolds and J. D. Tenhunen Landscape Function and Disturbance in Arctic Tundra, Ecological Studies Volume 120, 325-346. New York, NY: Springer-Verlag Publishers.

Santelmann, M. V., and Gorham, E. 1988. The Influence of Airborne Road Dust on the Chemistry of Sphagnum Mosses. Journal of Ecology 76, 1219-1231.

3. TERMS OF REFERENCE - SECTION 10.1.2-B

Reviewer's Comments:

Sections 3.1.3 Air Quality (draft EIS - p. 126) and 4.2.2.1 Applicable Standards, Objectives and Guidelines (draft EIS - p. 471) do not provide a clear link between the standards/ guidelines and their use in relation to each phase of the Project (i.e. construction, operation, etc.) as requested in the ToR (p. 30). HC suggests discussing air quality effects by project phase and comparing them to the relevant air quality guidelines / standards in order to better understand potential air quality effects by project activity.

Developer's Response:

Sections 3.1.3 (Air Quality) and 4.2.2.1 (Applicable Standards, Objectives and Guidelines) discuss the relevant territorial, provincial and federal air quality standards and guidelines. It is assumed that the standards and guidelines are applicable during all phases of the Project, particularly construction and operation. In particular, Section 4.2.2.5 (Potential Effects) describes the average concentrations monitored compared to the applicable standard/ guideline, and identifies any exceedances. The purpose of this description is to identify the rationale for the concentrations and to identify any potential effects related to the construction and operation of the Highway.

The structure of the Air Quality effects section (Section 4.2) of the EIS is largely determined by the ToR and its requirements. The entire Section 4.2 should be considered when assessing the effects of each parameter in reference to the Project phase. However, potential emission sources per Project phase are discussed in Section 4.2.2.3. Emissions of concern are also described per Project phase in Section 4.2.2.4 and Table 4.2.2-1.

The effects of construction and operation on air quality parameters may be monitored using data from Inuvik. The parameters monitored in Inuvik are described in Table 3.1.3-2; monitoring data are available on the GNWT Environment and Natural Resource (ENR) air quality website and are reported annually by GNWT ENR in the NWT Air Quality Report.

4. TERMS OF REFERENCE - SECTION 10.1.4

Reviewer's Comments:

HC notes that the draft EIS includes baseline information about water quality and water treatment facilities' details in the EA regional study areas; and provides a qualitative assessment of the project's potential effects on water quality and quantity. However, the ToR indicates that the EIS should include a consideration of changes to "drinking water quality for humans..." (p. 31). There appears to be no specific discussion of the potential effects on drinking water quality. HC suggests including this discussion, and referencing the location of drinking water treatment facilities in proximity to water bodies that may be affected by project activities.

Developer's Response:

The potential effects of the Project on water quality are discussed in Section 4.2.4 (Water Quality and Quantity) of the EIS. As noted in this section, with the application of available mitigation measures, the relatively short-term construction and long-term operation of the Highway is not expected to result in residual effects on water quality. Any potential effects that could occur (e.g., siltation of a stream or waterbody) are anticipated to be of a short-term and rapidly reversible duration.

The Developer acknowledges that potential effects of the Project on drinking water quality for humans are not specifically discussed in the EIS. However, it is understood that the public is generally aware of the risks associated with drinking water from a remote source on the land, including any of the small lakes located in the vicinity of the proposed Highway or the small streams to be crossed by the Highway.

Regarding water treatment, existing community water supply treatment facilities are only located in Inuvik and Tuktoyaktuk. All potable water needed for the construction phase of the Highway Project will be transported to the construction camps by water trucks. During the operations phase, it is anticipated that the general public driving the highway would most likely bring along their own bottled drinking water and other beverages for their typical 2-3 hour one-way trip, picnics, berry picking or other activities.

5. TERMS OF REFERENCE - SECTION 10.1.19, 10.2.6, 10.2.8-A

Reviewer's Comments:

The ToR suggests that the EIS contain a discussion of country foods in a separate section (ToR – p. 35) in the EIS which does not currently appear to be included. HC suggests including this section as proposed as it would facilitate the readers' understanding of country foods issues overall; rather than referring to terrestrial mammals, fish, avian species, and vegetation section; and harvesting sections.

The discussion of baseline country food consumption in Sections 3.2.6.4 and 3.2.6.5 was useful and indicated the species consumed and provided some indication of the amount of country foods consumed. HC also notes within the existing environment discussion, the sections on Fish and Fish Habitat; Wildlife and Wildlife Habitat, Birds and Habitat; and Vegetation include some baseline information on the current status of some contaminants in these consumed species. However, there appears to be no discussion of how project activities may potentially affect contaminant levels in different species, and, subsequently affect human health if consumed.

Developer's Response:

A separate discussion regarding the effects of the Project on country foods is not included in the EIS as the Developer identifies potential country foods in the baseline section (Section 3.1.9.13 – Contaminants and Wildlife and Section 3.2.6.5 – Country Foods) and discusses the potential contamination of these country foods in various applicable sections of the effects section. However, for the benefit of Health Canada and the EIRB, a summary of key points related to the potential contamination of country foods and linkages to other biophysical components are provided in the following paragraphs.

Baseline Summary

Modern day contaminant products and by-products are detected in the Arctic, often far from the source of the pollution. Once in the Arctic, contaminants accumulate in the plants and animals of the region, which are used by Aboriginal peoples for nourishment (Lambden et al. 2007).

Levels of organochlorines (OCs), metals and radionuclides are described in the Canadian Arctic Contaminants and Health Assessment Report (INAC 2003). Metal data samples were taken from the kidneys and livers of caribou in the 1990s from a total of 15 herds across the Canadian Arctic. The report showed that the Bluenose caribou herd, located closest to the proposed Highway, has lower levels of mercury and cadmium compared to other Canadian Arctic locations. Since that report, there has been very little data generated for terrestrial mammals as the levels of contaminants were considered to be very low (INAC 2003).

Specific levels of contaminants for other mammals occupying the region surrounding the proposed Highway were not available. In general, terrestrial mammals in the NWT are found to have lower concentrations of pollutants than animals from more southern species or marine species (GNWT ENR NDa).

Similar to terrestrial wildlife, levels of organochlorines (OCs) and metals in Canadian Arctic vegetation is minimal, therefore few studies have been conducted and few data exist on the subject.

Overall, approximately 40-60% of people living in small NWT communities rely on country food for at least 75% of their meat and fish (GNWT ENR NDa). The Inuit Health Survey reported the most commonly consumed country food in the ISR (Figure 3.2.6-10). Fresh caribou meat was the most commonly consumed food, followed by berries and dried caribou meat. The Inuit Health Survey also documented the average daily intake of country food for each participant (Figure 3.2.6-11). Char was consumed in the greatest amounts (116.0 g/day) followed by fresh caribou meat (66.7 g/day) and dried caribou meat (30.2 g/day) (Egeland 2010).

Lambden et al. (2007) surveyed Yukon First Nations, Dene/Metis and Inuit women in 44 Arctic communities on recent changes in the quality or health of traditional plants or harvested wildlife. Between 10% and 38% of participants (depending on the community) reported noticing change in the quality of the traditional food species.

Specific changes were noted by 10% to 27% of participants. These changes included physical deformities such as "fish scales looking funny" and "caribou liver and lungs being stuck to their ribs"; decreased accessibility; contamination of traditional foods; reduced animal size; and change in taste and other sensory changes such as "the fish flesh is not as firm as it used to be" and "the fish don't taste the same" (Lambden et. al. 2007).

Project and Biophysical Components Related to Country Foods

The abundance of country foods is dependent on the species population, habitat availability, and ongoing tradition of hunting/ trapping/ fishing. A discussion regarding key species population and habitat is located in Section 3.1.7 to 3.1.10 (Fish and Fish Habitat, Vegetation, Wildlife and Wildlife Habitat, Birds and Bird Habitat) and discussion of the current and historic levels of hunting/trapping/ fishing is located in Section 3.2.8 (Harvesting) of this EIS. The Project may affect the abundance of country foods through habitat loss and/or wildlife avoidance of the Highway, as discussed in the wildlife and wildlife habitat effects section (Section 4.2.7). However, the presence of the Highway will also create year-round access to harvesting areas that were previously accessible only during certain seasons. Increased access could result in increased harvesting activities, which may provide increased access to country foods, increased food security, and reduced cost of living through less reliance on store-bought food.

The quality of country foods is affected by a variety of biophysical components, such as air quality and water quality, which could become degraded in areas adjacent to the Highway as a result of deposition of dust and contaminants. This could result in the avoidance or contamination of wildlife.

Dust deposition from construction of the Highway, excavation of the borrow sources, and Highway traffic during operations can temporarily and intermittently cover vegetation and decrease the abundance of forage. Dust created by Highway traffic during the summer months is expected to settle within 100 m of roads. This represents 2,740 ha (0.007%) of caribou winter range. However, the quantity of dust is unlikely to have a major effect on vegetation and food availability.

Dust effects may also be more prevalent on plant groups that are more sensitive to disturbance, such as lichens and some moss species, such as *Sphagnum* (Spatt and Miller 1981). Lichens, in particular, are often used as indicators of air quality conditions due to their sensitivity to environmental pollutants (Tyler 1989; Markert 1993). Lichens often accumulate substances such as sulphur, nitrogen, and metals from atmospheric sources better than vascular plants (Blett et al. 2003). Local lichen populations may be negatively affected by regular dust deposition. *Sphagnum* moss species are often indicative of nutrient poor and low pH conditions, which could change with regular dust deposition as well.

To avoid and minimize potential effects related to dust, dust suppression methods as described in the NWT Guideline for Dust Suppression (GNWT 1998) will be employed to minimize potential issues associated with dust.

Nitrous oxides and sulphur dioxide emitted from power generators and construction equipment are potential sources of contaminants. Air emissions associated with the Project are unlikely to affect feeding habitats for wildlife. Air quality effects associated with particular Project activities and local meteorological conditions will be minimal and temporary.

The accidental spillage of fuel, lubricants, and/or anti-freeze at a work site or during the construction phase represents a potential hazard for contamination to vegetation, fish, and wildlife. Spill contingency plans will be prepared prior to the start of the Project and, in the event of a spill, clean-up measures will be implemented immediately. All spills greater than 5 litres will be reported to the GNWT Spill Line and other appropriate agencies.

Contamination of country foods may also occur if wildlife consume garbage. A key mitigation measure is to ensure proper storage, transportation and disposal of wastes.

Mitigation Measures

Mitigation measures to avoid or minimize these potential effects are provided in the air quality, water quality, fish, and wildlife effects sections.

References:

Blett, T., Geiser, L., and Porter, E. 2003. Air Pollution-Related Lichen Monitoring in National Parks, Forests, and Refuges: Guidelines for Studies Intended for Regulatory and Management Purposes. Colorado and Oregon: U.S. Department of the Interior and U.S. Department of Agriculture.

Egeland, G.M. 2010. Inuit Health Survey 2007 – 2008. Retrieved December 23, 2010 from http://www.irc.inuvialuit.com/publications/pdf/ihs-report-final.pdf

Government of the Northwest Territories (GNWT). 1998. Guideline for Dust Suppression. Retrieved from http://www.enr.gov.nt.ca/library/pdf/eps/dustsupression.pdf

Government of the Northwest Territories, Department of Environment and Natural Resources (GNWT ENR). NDa. State of the Environment Report. Retrieved December 20, 2010 from http://www.enr.gov.nt.ca/_live/pages/wpPages/soe_conservation_sustainable_use.aspx#top

Indian and Northern Affairs Canada (INAC). 2003. Canadian Arctic Contaminant Assessment Report – Phase II (CACAR –II). Retrieved from http://www.ainc-inac.gc.ca/nth/ct/ncp/pub-eng.asp#ncp

Lambden, J., Receveur, O. and Kuhnlein, H. 2007. Traditional Food Attributes Must Be Included in Studies of Food Security in the Canadian Arctic. Centre for Indigenous Peoples' Nutrition and Environment and School of Dietetics and Human Nutrition, McGill University.

Markert, B (Ed). 1993. Plants as Biomonitors: indicators for heavy metals in the terrestrial environment. New York and Weinheim: VCH Publishers Inc. and VCH Verlagsgesellschaft.

Spatt, P.D., and Miller, M.C. 1981. Growth conditions and vitality of Sphagnum in a tundra community along the Alaska Pipeline Haul Road. Arctic 34(1), 48-54.

Tyler, G. 1989. Uptake, retention and toxicity of heavy metals in lichens, a brief review. Effects of Heavy Metals in Forest Ecosystems. Water, Air and Soil Pollution 47 (3-4), 321-333. Kluwer Academic Publishers.

6. TERMS OF REFERENCE - SECTION 10.1.19, 10.2.6, 10.2.8-B

Reviewer's Comments:

For highway development scenarios in remote areas with light traffic and limited industrial traffic, the greatest potential for human exposure to contaminated country foods would likely result from deposition of particulate matter associated with construction activities and from vehicular emissions (particularly diesel). The EIS states that highway may facilitate access to berry picking areas:

Tuktoyaktuk have limited areas to pick berries due to the difficulty in traveling on the land during the summer months. In 2010, personal communications between the Project Team and a number of Tuktoyaktuk residents revealed that due to the new all-weather access road between Tuktoyaktuk and Source 177 (which is the north terminus of this Project), the residents were able to pick many berries during the summer months, adding to their traditional food source. The addition of the proposed Highway would allow local residents in Tuktoyaktuk and Inuvik to access additional berry picking areas. (p. 598).

Due to the potential for increased access to berry picking areas; HC suggests that the EIS include a discussion of the potential for contamination of berries due to project activities along with any proposed mitigation measures, if necessary.

Developer's Response:

The potential for contamination of berries along the proposed Highway alignment would likely result from deposition of particulate matter associated with construction activities and from vehicular emissions within 100 m of the Highway (as per Section 4.2.2 Air Quality) and only during snow-free periods.

During construction, the public will not be permitted to access active construction areas, which would mitigate concerns related to berry picking during the construction phase. During operation of the Highway, dust deposition from Highway traffic during operations can cover vegetation, could decrease the abundance of forage (for wildlife) and could possibly affect berry production. Dust created by Highway traffic during the summer months is expected to settle within 100 m of roads. Dust suppression methods, as described in the NWT Guideline for Dust Suppression (GNWT 1998), will be employed to minimize potential issues associated with dust.

However, the quantity of dust is unlikely to have a major effect on vegetation and food availability due to the limited project footprint and anticipated deposition area, and the temporary, intermittent and reversible nature of dust deposition.

Seasonal variations may affect dust deposition as patterns of dust deposition on vegetation are a function of various factors including wind and ambient moisture. During periods of rain, snow, or freezing temperatures, dust is not expected to be generated by any Project activities during construction and operations. Dust previously deposited on vegetation is also expected to be reduced following heavier rain events in particular. However, if dust is generated, dust may be deposited further from the Highway during periods of wind.

Exposure to diesel engine emissions comes from both on road and off road engine exhaust. The most common pathway for exposure is through inhalation, which may contribute to human health risk (US EPA 2011). According to US EPA (2011) the type and severity of health effects depends upon the amount of chemical exposed to and the length of time exposed.

According to Section 4.2.6.5 (Contaminants in Plants) of the EIS, levels of organochlorines (OCs) and metals in Canadian Arctic vegetation is minimal therefore few studies have been conducted and little data exists on the subject. As with any harvested foods, safe and proper food handling (i.e., washing berries) prior to consumption is suggested.

Reference:

Government of the Northwest Territories (GNWT). 1998. Guideline for Dust Suppression. Retrieved from http://www.enr.gov.nt.ca/library/pdf/eps/dustsupression.pdf

United States Environmental Protection Agency (US EPA). 2011. Diesel Particulate Matter. Retrieved July 11, 2011 from http://www.epa.gov/region1/eco/airtox/diesel.html

7. TERMS OF REFERENCE - SECTION 10.1.3

Reviewer's Comments:

The ToR indicates that:

- *The Developer shall describe and evaluate the potential impacts of Project-related noise, including a consideration of:*
  - *Project components or activities that could produce noise levels of concern, including source location, timing and duration.*
  - *Disturbance of harvest and recreational activities, including tourism.*
  - *Potential impacts to harvesting activities.*
  - *Impacts to communities.*
- *The Developer shall provide an assessment of the potential health impacts related to Project-related changes in noise levels, including potential impacts of sleep disturbance and annoyance. Describe the proximity of the Project to sensitive receptors (e.g., human residences/cabins, camps, harvesting areas) and environmental elements (e.g., Husky Lakes, identified VCs)*
- *The Developer will provide a comparison of anticipated noise levels along the highway with current industrial, municipal or ambient noise levels.*

HC notes that the only assessment of potential health impacts related to Project-related changes in noise levels is:

Since most activities will occur more than 8 km from the residential centres of Inuvik and Tuktoyaktuk, effects from noise on the general public are expected to be negligible (p. 483), and because the noise emissions will be temporary and intermittent there are no anticipated residual negative effects impacting traditional or recreational use of the area (p. 484).

HC acknowledges that the 8 km distance from residential centres would reduce the likelihood of noise-related health related impacts. However the proximity of other receptor locations such as hunting cabins, temporary residences to the proposed route(s) do not appear to be discussed and this information is important when making a conclusion about human health effects due to noise. Even short-term and intermittent noise can have human health effects depending on the sound noise level and proximity to receptors. Therefore HC suggests clearly identifying human receptors present in the project area that are less than 8 km and in close proximity to the proposed route alignments.

Developer's Response:

Several residential leases, as identified in Figure 4.3.8-1, are located within the RSA (i.e., 15 km from the proposed Highway) (see Table 1 shown above). One lease is located along the alignment, near KM 2, just north of Navy Road. Since most residential leases are located near the Husky Lakes, the route alternative located closest to the Husky Lakes (Primary 2009 Route) would potentially affect the greatest number of leaseholders, while Alternative 2 (Upland Route, located furthest from the Husky Lakes), would affect the least number of leaseholders.

8. TERMS OF REFERENCE - SECTION 3.1.4.2

Reviewer's Comments:

Section 3.1.4.2 of the EIS (p. 140) states that:

Health Canada is legally required to provide expert advice on the health effects of environmental noise to environmental assessments involving other federal departments.

Health Canada requests that the above text be removed from this document and not be included in any subsequent document because it is a legal opinion regarding an external organization and it is not appropriate to include in an EIS.

Developer's Response:

The Developer agrees that this comment should be considered stricken from the EIS.