1831

Northwest Territories Transportation

February 7, 2011

Land Use Permit Application N7L1-1731 – Shell Canada Energy – Sump Remediation.

In response to your request for comments with respect to the above-mentioned Land Use Permit Application request, the Department of Transportation (DOT) has the following comments:

- If the proponent plans to access the project area via the Inuvik-Tuktoyaktuk Winter Road, the proponent will be required to comply with the Department of Transportation's ice road restrictions and load limits.

- An access permit will be required if the proponent plans to construct a winter road from the Inuvik-Tuktoyaktuk Winter Road to the project area.

Please direct your response and any further inquiries to Gurdev Jagpal, Regional Superintendent in Inuvik at (867) 777-7348. Alternatively, I can be reached at (867) 920-8920.

Sincerely,

Robt D. Thom

Rob Thom
Transportation Planner
Planning, Policy & Environment Division
Department of Transportation

1831

Northwest Territories Transportation

Mike Harlow
Executive Director
Northwest Territories Water Board
P.O. Box 2531
Inuvik, NT X0E 0T0

February 10, 2011

Water Licence Application N7L1-1831 – Shell Canada Energy – Sump Remediation.

In response to your request for comments with respect to the above-mentioned Water Licence Application request, the Department of Transportation (DOT) has the following comments:

- If the proponent plans to access the project area via the Inuvik-Tuktoyaktuk Winter Road, the proponent will be required to comply with the Department of Transportation's ice road restrictions and load limits.

- An access permit will be required if the proponent plans to construct a winter road from the Inuvik-Tuktoyaktuk Winter Road to the project area.

Please direct your response and any further inquiries to Gurdev Jagpal, Regional Superintendent in Inuvik at (867) 777-7348. Alternatively, I can be reached at (867) 920-8920.

Sincerely,

Robt D. Thom

Rob Thom
Transportation Planner
Planning, Policy & Environment Division
Department of Transportation

1831

Environment Canada | Environnement Canada

Environmental Protection Operations
Prairie and Northern
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT, X1A 2P7

December 8, 2010

Our File No.: 4709 001 046 002
Your File No.: EISC 2010-11-14

Christine Inglangasuk
Environmental Assessment Coordinator
Environmental Impact Screening Committee
Joint Secretariat-Inuvialuit Settlement Region
107 Mackenzie Road, Suite 204, PO Box 2120
Inuvik, NT, X0E 0T0

Via Email at eisc@jointsec.nt.ca

Dear Ms. Inglangasuk,

RE: EISC 2010-11-14 – IEG Consultants for Shell Canada Energy – Unipkat I-22 Sump Remediation Project

Environment Canada (EC) has reviewed the information submitted with the above-mentioned application. The following specialist advice is provided pursuant to EC's mandated responsibilities arising from the *Canadian Environmental Protection Act* (CEPA), Section 36(3) of the *Fisheries Act*, the *Migratory Birds Convention Act,* and the *Species at Risk Act* (SARA).

It is our understanding that IEG Consultants, the consultant for Shell Energy Canada (the Proponent) has submitted a Project Description with the Environmental Impact Screening Committee (EISC 2010-11-14). The Proponent is proposing to conduct a sump remediation program at their former wellsite, Unipkat I-22 between January and April, 2010. Unipkat I-22 is located within the Inuvialuit Settlement Region, along the eastern bank of the Arvoknar Channel, southwest of the Kendall Island Bird Sanctuary. The sump remediation program would involve the following activities:

- Building an ice road to access the site and mobilize heavy machinery, fuel, and camp accommodations;
- Clean soil stripping, stockpiling, and soil excavation;
- Trucking contaminated soil to Inuvik for containment and future de-watering for disposal (at southern landfill) of drilling waste;
- Soil testing on the sidewalls and base of the excavation as well as stockpiled soils;
- Partial site backfill and re-contouring of excavation within local topography; and
- Demobilization from site of all infrastructure and generated waste (page i of the Project Description).

EC offers the following recommendations and comments for the proposed project:

<u>General:</u>

1. All mitigation measures identified by the Proponent, and the additional measures suggested herein, should be strictly adhered to in conducting project activities. This will require awareness on the part of the Proponents' representatives (including contractors) conducting operations in the field. EC recommends that all field operations staff be made

aware of the Proponents' commitments to these mitigation measures and provided with appropriate advice / training on how to implement these measures.

2. Section 5.2 *Previous Work* of the Project Description indicates that 5 000 m^3 of contaminated soil is present, but that only 3000m^3 will be excavated (Section 5.3.5 *Soil Excavation*). The Proponent should clarify why they only plan to remove 60% of the contaminated soil. In addition, although the "majority" of contamination is said to be in and around the sumps, this indicates that there is other contamination elsewhere, although no details are provided in this regard. EC requests that the Proponent provide details on the other areas of suspected contamination.

3. The delineation was done using CCME industrial land use standards; however EC recommends that agricultural land use criteria be applied to natural / wild lands particularly in the Arctic, where ecosystems are more fragile and known to have more linear, shorter food-webs (Swanson, 2007). If no guidelines are available from the Northwest Territories, and the proponent chooses not to use the CCME Canada Wide Standard for Petroleum Hydrocarbons in Soil (2008) guidance, the proponent may consider adapting the Alberta Tier 1 guidance for petroleum hydrocarbon contaminated soil for a natural area land use.

4. The contaminants of concern (COCs) at the site are noted to include petroleum hydrocarbons, potassium chloride, and total barium. Infrastructure and activities at the site may have contributed to other contaminants of concern at the site. Although it is not mentioned in this report, the Proponent should ensure that total metals are accounted for, and if burning was undertaken, dioxins and furans as well as polyaromatic hydrocarbons (PAHs) may be a concern at the site. In addition, the CCME guidelines for petroleum hydrocarbons are split amongst different hydrocarbon fractions, F1 – F4; comparison to these standards will require proper chemical assessment for each fraction.

5. Permafrost is identified in table 10-2 *Record of Consultation* (first Response / Comment by Shell on page 28) as a barrier employed as a berm. Permafrost may not be the most reliable barrier; especially if the excavated area is expected to be flooded this could create an even more unstable permafrost zone. In addition, studies have shown that melt water may continue to flow beneath permafrost in discontinuous permafrost zones. For that reason, thermisters used to monitor the integrity of the barrier should extend below the depth of impacted soil.

Water Quality

6. Section 5.3.5 *Soil Excavation* states that the flare pit and camp sump have been partially eroded by the river. As such, EC would like to remind the Proponent that meeting the requirements of the *Fisheries Act* is mandatory, irrespective of any other regulatory or permitting system. Section 36(3) of the *Fisheries Act* specifies that unless authorized by federal regulation, no person shall deposit or permit the deposit of deleterious substances of any type in water frequented by fish, or in any place under any conditions where the deleterious substance, or any other deleterious substance that results from the deposit of the deleterious substance, may enter any such water. The legal definition of deleterious substance provided in section 34(1) of the *Fisheries Act*, in conjunction with court rulings, provides a very broad interpretation of deleterious and includes any substance with a potentially harmful chemical, physical or biological effect on fish or fish habitat.

7. The Proponent is advised that environmental soil quality guidelines do not apply within 10m of a surface water body. Contamination that is present within 10m of a surface water body must be dealt with on a site-specific basis to develop criteria which are protective of aquatic life such that no deleterious impacts to fish or sediment occur.

8. Although the Project Description mentions that groundwater monitoring wells and thermisters will be maintained, this presumes that groundwater, or perhaps more appropriately, permafrost meltwater, is a potentially active pathway for the transport of contaminants. However, the Project Description does not refer to any plans to address contaminated sub-surface water, nor does it present evidence that it is not a contaminated media. In particular given the low-land topography of the site and predicted future flooding and erosion, it is important that all potentially operable contaminant pathways are delineated and addressed to prevent migration of contaminants from soil in to groundwater and surface water.

9. If the Proponent requires a watercourse crossing to access the site for the ice road, EC recommends that the following measures be implemented at all watercourse crossings:
    - Winter stream crossings should be located to minimize approach grades and be constructed entirely of ice and snow materials;
    - The banks of any watercourse should be protected using suitable erosion control measures;
    - Mechanized clearing should not be done immediately adjacent to any watercourse; and
    - Water crossings should be at right angles to streams and stream crossings shall be removed or notched prior to spring break-up.

Fuel / Spill Contingency

10. Please note that any spill of fuel or hazardous / deleterious materials, adjacent to or into a water body, **regardless of quantity** must be reported immediately to the NWT / NU 24-hour Spill Line, **(867) 920-8130**. EC will be notified through this process.

11. A dedicated area should be used for refuelling equipment with measures taken to ensure capture and containment of drips and potential spills. Secondary containment or a surface liner (drip pans, etc.) should be used when refuelling any equipment on site and should also be used at all tent / cabin fuel drum locations. An appropriate spill kit with absorbent material should be located at all fuel storage and transfer sites and at drill sites
    - Spill kits, shovels, barrels, sorbents, pumps, etc. should be consistently maintained and readily available.

12. According to the Project Description the Proponent intends on storing fuel on-site (section 5.6 *Fuel Storage*). Please note the new CEPA *Storage Tank System for Petroleum Products and Allied Petroleum Products Regulations* that came into force on June 12, 2008. These regulations apply to both outside, aboveground and underground storage tank systems (including the piping and other tank associated equipment) under federal jurisdiction containing petroleum and allied petroleum products that have a capacity greater than 230 litres. This includes tanks located on federal or Aboriginal lands. Exceptions are pressurized tanks, mobile tanks, tanks regulated by the National Energy Board, and outdoor, aboveground storage tank systems that have a total combined capacity of 2500 litres or less and are connected to a heating appliance or emergency generator. All storage

tank system owners must identify their tank systems to EC and installation of new systems must comply with the regulation's design requirements. Further information on these regulations can be found at www.ec.gc.ca/st-rs.

Waste Treatment

13. The Proponents soil management plans consist of landfilling and leachate containment for the hydrocarbon-impacted soil. EC recommends that a more active land farming approach be considered as it may result in a more successful soil remediation program that may be useful for more than landfill cover. Land farming can be conducted in cold climates, and if this option is considered, the proponent may refer to EC guidance on land farm construction and operation.

    If a landfarm is selected as a remedial option operating, generic, site-specific remediation limits as per the CCME Environmental Quality Guidelines (EQGs) or Canadian Wide Standards for Petroleum Hydrocarbons in Soil (CWS-PHC) should be used to monitor the extent to which the soil has been remediated to acceptable levels. The parameters analyzed during the environmental site assessment should be evaluated using these guidelines to determine chemicals of concern (COCs) and those identified should be tracked during the remediation process.

Wildlife

14. EC recommends that food, domestic wastes, and petroleum-based chemicals (e.g., greases, gasoline, glycol-based antifreeze) be made inaccessible to wildlife at all times. Such items can attract predators of migratory birds such as foxes, ravens, gulls, and bears. Although these animals may initially be attracted to the novel food sources, they often will also eat eggs and young birds in the area. These predators can have significant negative effects on the local bird populations.

15. Section 5.1 of the *Migratory Birds Convention Act* prohibits persons from depositing substances harmful to migratory birds in waters or areas frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

16. The following comments are pursuant to the SARA, which came into full effect on June 1, 2004. Section 79 (2) of SARA, states that during an assessment of effects of a project, the adverse effects of the project on listed wildlife species and its critical habitat must be identified, that measures are taken to avoid or lessen those effects, and that the effects need to be monitored. This section applies to all species listed on Schedule 1 of SARA. However, as a matter of best practice, EC suggests that species on other Schedules of SARA and under consideration for listing on SARA, including those designated as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), be considered during an environmental assessment in a similar manner.

    EC recommends:

    - Species at Risk that could be encountered or affected by the project should be identified and any potential adverse effects of the project to the species, its habitat, and/or its residence noted. All direct, indirect, and cumulative effects should be considered. Refer to species status reports and other information on the Species at Risk registry at www.sararegistry.gc.ca for information on specific species as well as

the booklet "Species at Risk in the Northwest Territories" (2010 Edition) available at http://www.enr.gov.nt.ca/_live/pages/wpPages/Species_at_Risk.aspx.

- If Species at Risk are encountered or affected, the primary mitigation measure should be avoidance. The Proponent should avoid contact with or disturbance to each species, its habitat and/or its residence.
- Monitoring should be undertaken by the Proponent to determine the effectiveness of mitigation and/or identify where further mitigation is required. As a minimum, this monitoring should include recording the locations and dates of any observations of Species at Risk, behaviour or actions taken by the animals when project activities were encountered, and any actions taken by the Proponent to avoid contact or disturbance to the species, its habitat, and/or its residence. This information should be submitted to the appropriate regulators and organizations with management responsibility for that species, as requested.
- For species primarily managed by the Territorial Government, the Territorial Government should be consulted to identify other appropriate mitigation and/or monitoring measures to minimize effects to these species from the project.
- Mitigation and monitoring measures must be taken in a way that is consistent with applicable recovery strategies and action/management plans.

17. EC would like to remind the Proponent that they would need to apply for a permit if any project activities are likely to enter or use existing facilities within the Kendall Island Bird Sanctuary (e.g. Camp Farewell).

18. Implementation of these measures may help to reduce or eliminate some effects of the project on migratory birds and Species at Risk, but will not necessarily ensure that the Proponent remains in compliance with the *Migratory Birds Convention Act, Migratory Birds Regulations,* and the SARA. The Proponent must ensure they remain in compliance during all phases and in all undertakings related to the project.

If there are any changes in the project proposal or more information is available, EC should be notified, as further review may be necessary. Please do not hesitate to contact me at (867) 669-4748 or Stacey.Lambert@ec.gc.ca with any questions concerning the above points.

Yours truly,

Stacey Lambert
Environmental Assessment Coordinator, EPO

cc: Randall Warren (Shell Canada Energy)
Carey Ogilvie (Head, Environmental Assessment North, EPO)
Lisa Perry (Sr. Environmental Assessment Coordinator, EPO)
James Hodson (Environmental Assessment Coordinator, CWS)
Jody Klassen (Head, Contaminated Sites, EPO)

References:

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil Technical Supplement.* CCME, Winnipeg, Manitoba. (http://www.ccme.ca)

Cold Climate Bioremediation: A Review of Field Case Histories. Pamela Rogers, Research Assistant, Department of Civil & Environmental Engineering, University of Alberta, July 2005

Swanson, H. (2007). The Effect of Anadromous Arctic Charr (Salvelinus alpinus) on Food Web Structure and Contaminant Concentrations in Coastal Arctic Lakes. *Arctic, 60*(4), 452-455. Retrieved from Academic Search Premier database.

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Environment Division
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Northwest Territories Environment and Natural Resources

December 10, 2010

Ms. Barb Chalmers
Environmental Assessment Coordinator
Environmental Impact Screening Committee
107 Mackenzie Road, Suite 204
PO Box 2120
Inuvik, NT
X0E 0T0

Dear Ms. Chalmers:

Re: Shell Canada Energy
11/10-01
Unipkat I-22 Sump Remediation Project
Request for Comments

The Department of Environment and Natural Resources (ENR) has reviewed the above application based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act* and the *Wildlife Act* and provides the following comments and recommendations for consideration.

ENR understands the intent of proposed project is the excavation and removal of contaminated soil from a historic oil and gas disposal sump at the Shell Unipkat site, in order to prevent this material from entering the Mackenzie River via riverbank erosion. Due to the imminent risk of the sump material eroding into the Mackenzie River, ENR agrees with the intent of the proposed work and that every reasonable effort should be made to this affect.

ENR notes however, that the Project Description (PD) refers to the proposed activities as "site remediation"[1]. ENR understands the proposed activities only address the remediation of a single sump, and do not constitute a full site assessment, nor absolve Shell from fully assessing and remediating the remainder of the Unipkat site.

1. CCME Steps for Approach to Contaminated Sites

1.1. General Concerns and Project Context

[1] Page 1, Executive Summary. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010.

ENR understands the Proponent asserts the application is to "conduct a sump remediation program"[2]. However, ENR is unaware of a Phase II or III ESA being completed to delineate the sump, to establish effective remedial actions, and submitted to any stakeholder for review.

The overall process in dealing with contaminated sites on Federal Lands, including those for Phase I, II, and III, should follow the guidance offered in the *National Guidelines for Decommissioning Industrial Sites (CCME 1991)*. This process should also include integration of the 10 steps identified by CCME for dealing with contaminated sites, as defined in CCME *Federal Approach to Contaminated Sites*, 1999. The latter document, and a quick reference to the 10 steps, can also be found online at www.ec.gc.ca/etad/csmwg/pub/fed_aprch/en/c2_e.htm). In the absence of these steps being taken, ENR lacks confidence with respect to the nature, quantity, location and extent of the contamination in the subject sump, as well as the remainder of the site.

1.2. Recommendation

ENR recommends that any authorization granted to the Proponent be for the sole purpose of removing identified contamination likely to enter the Mackenzie River on the basis of urgency and for completing a Phase II ESA. Upon submission of the Phase II ESA, it should be submitted for review and comment by stakeholders, and modified accordingly. Following this, ENR expects the Proponent will use this information to then draft a Remedial Action Plan (RAP) which will also be submitted for review and comment by stakeholders. Once the RAP has been approved, then ENR recommends the Proponent can apply for new authorizations for the purpose of implementing the specific measures agreed to in the RAP.

2. Volume of contaminated material

With respect to the volume of identified PHC contaminated soil, the Project Description (PD) provides volumes based on the CCME Guideline *Petroleum Hydrocarbons in Soil*, industrial criteria[3]. ENR is concerned that applying the industrial criteria for PHC in soils at this site will not provide an adequate level of protection for the environment, wildlife, and potential users of this site. ENR is of the opinion that any delineation of contaminants use, at minimum, the CCME PHC in soil parkland criteria with consideration of the applicable soil texture.

With respect to the supplied contaminated soil estimates the PD states,

- approximately 5000 m^3 of PHC contaminated soil onsite above CCME Industrial guidelines for PHC (page 6, Section 5.2 – Previous Work)
- 1600 m^3 of sump contents (page 9, section 5.3.5 – Soil Excavation)
- 1400 m^3 of PHC contaminated soil around the sump (page 9, section 5.3.5 – Soil Excavation)

[2] Page 1, Executive Summary. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.
[3] Page 6, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

- Approximately 6500 m^3 of PHC affected material above guideline. (Presentation attached to application)

ENR notes the PD provides inconsistent totals of PHC contaminated soil (5000 m^3 and 6500m^3) and there is a discrepancy between the total volume of contaminated soil as compared to the total volume of material to be excavated, 3000 m^3.

Further assessment by ENR casts additional doubt on the delineation of this site. The PD indicates that in September 2007, 82 boreholes were drilled and that they did not fully delineate the site[4]. Moreover, the PD indicates that in 2010 an additional18 holes were drilled to work towards fully delineating the site[5]. However, the PD does not state whether this additional work did indeed fully delineate the site.

ENR has additional concerns that other areas of contamination may exist on the site which have not been investigated. The PD makes reference to a Camp Sump and Flare Pit which are actively eroding into the Mackenzie River[6]. These sites have the potential for contamination and should be investigated as part of a Phase II ESA.

2.1. Recommendation

- ENR recommends that any delineation of contamination of PHC use the CCME Parkland criteria and take into account the appropriate soil texture.
- For sites likely to erode into the Mackenzie River, ENR recommends that site specific criteria be developed through a phased ESA process as outlined in section 1.
- ENR recommends clarification is provided regarding the total volume of identified contaminated material exceeding CCME industrial criteria for PHC in soil.
- ENR recommends clarification is provided regarding the volume of material proposed for excavation as compared to the volume of material identified as exceeding CCME industrial criteria for Petroleum Hydrocarbons (PHC) in soil.
- ENR recommends that additional areas of contamination are investigated, such as, but not limited to, the Camp Sump and Flare Pit.

3. Contaminants of concern

The Proponent states, "Soils affected by PHC, potassium chloride, and total barium are of primary concern."[7] ENR is concerned that there may be other contaminants present due to the nature of oil and gas activities at the time the sump was put in place and related activities that may have occurred at the site. Of primary concern are total metals, and if flaring or burning/incineration occurred on site, then the

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[4] Page 5, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[5] Page 6, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[6] Page 10, Section 5.3.5 Soil Excavation. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[7] Page 6, Section 5.3 Sump Remediation Program: Project Scope. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010

presence of polycyclic aromatic hydrocarbons (PAHs) and dioxins and furans must also be considered and assessed.

3.1. Recommendation

ENR recommends that a phased ESA process is undertaken which investigates, but is not limited to, the presence of total metals, PAHs, and dioxins and furans.

4. Regulatory Approvals

The Environment Division (ED) of ENR tracks the movement of contaminated soils as a hazardous waste in the NWT. The Department of Environment and Natural Resources (ENR) is not listed as an agency for the registration of the storage facility of contaminated soils in the Inuvik Industrial Area in Table 3-1[8]. Shell Canada Energy is a registered generator with the Environment Division and was issued the following generator number NTG000408.

4.1. Requirement

- Due to the volume and nature of potential contaminants in the sump material ENR requires Shell Canada Energy to contact the Environment Division and register the storage facility in Inuvik as per section 3.3 and 3.4 of the Guideline for the General Management of Hazardous Waste in the NWT prior to the movement of any contaminated soil into Inuvik.

5. Contaminated material treatment

The PD states, "In October 2010, a lined containment cell was built in Inuvik..."[9] for the purposes of temporarily storing the drilling sump contents and treating PHC contaminated soil. The PD indicates that the sump contents and PHC contaminated soil will be allowed to be dewatered in the containment cell and the collected water (leachate) will be treated and disposed of in the Inuvik lagoon[10].

With respect to containment cell, ENR references Alberta Environment's CODE OF PRACTICE FOR LAND TREATMENT OF SOIL CONTAINING HYDROCARBONS (2008)[11] for the registration of contaminated soil treatment facilities in conjunction with section 3.3 and 3.4 of the Guideline for the General Management of Hazardous

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[8] Page 2 Section 3 Regulatory Approvals. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[9] Page 11, Section 5.3.7 Soil Containment in Inuvik. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

[10] Page 11, Section 5.3.7 Soil Containment in Inuvik. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

[11] Also available online at: http://www.qp.alberta.ca/documents/codes/HYDROCARBONS.pdf

Waste in the NWT[12]. The code of practice will be referenced, where applicable, to determine the capacity of the containment cell to treat excavated soils.

With respect to the leachate, ENR notes the details of the water treatment technology and effluent quality criteria are not provided. Further, ENR notes that the Inuvik lagoon is designed for Municipal effluent, not industrial leachate sourced from industrial activities on Federal Lands.

5.1. Requirement

- Provide as built drawings of the containment cell to the Environment Division including, but not limited to, the specific location.
- Provide to the Environment Division any testing done on the contaminated soils in the containment cell for the purpose of determining if appropriate remedial criteria have been met for any proposed use of this material.

5.2. Recommendation

ENR recommends that alternate disposal options are considered for the disposal of leachate collected from the lined containment cell, such as water treatment methods that meets discharge criteria to allow discharge to the natural environment, or shipping to an approved facility capable of treating the leachate.

6. Treated Soil as backfill

The PD states that, "Once the treated soil meets applicable CCME guidelines it will be available for use as backfill material at sites in Inuvik."

ENR is concerned that soils in the containment cell treated to industrial standards and subsequently removed may be transferred to another party who is not accountable for the ultimate use of the treated soil.

ENR does not have a regulatory tracking mechanism that ensures that once contaminated soils are treated to industrial standards and given to a third party for industrial use as back fill that the remediated soil does not get redistributed as backfill in non industrial areas

6.1. Requirement

- The Proponent provide evidence of how they will ensure that soil removed from the containment cell is used only on lands suitable for the criteria to which it has been remediated to.

7. Tracking of contaminated material

[12] GNWT February 1998, Guideline for the General Management of Hazardous Waste in the NWT. Also available online at: http://www.enr.gov.nt.ca/_live/documents/content/General_management.pdf

The PD states that the sump remediation program will be, "allowing sump material to de-water in Inuvik and disposal (at southern landfill) of the drilling waste."[13]

Shell Canada Energy is a registered generator with the Environment Division and is required to track the movement of hazardous waste to registered receiving facilities.

7.1. Requirement

- The proponent utilizes movement documents to track the movement of all contaminated material out of the containment cell.

7.2. Recommendation

The proponent utilizes scales to quantify the weight of each load of contaminated material entering the containment facility until accurate estimates can be made. Further, the proponent utilizes scales to determine the weight of each load of contaminated material and water leaving the containment facility.

8. Camp Waste Management

The Project Description states that "All solid waste (garbage) will be collected and removed from the site and transported to Inuvik for disposal at an approved landfill site at the end of the Project."[14] And "all grey water and wastewater....disposed at the wastewater processing facility in Inuvik."[15]

ENR notes the Proponent has not provided information on onsite waste treatment, storage or segregation, or information on mitigation measures to minimize animal attraction. Further, the Proponent has not provided estimates of the quantity of waste they will generate or any indication that the Town of Inuvik has consented to the proposed use of Inuvik's waste management infrastructure.

Further, ENR is concerned with the Proponent's use of the term "wastewater processing facility" to describe Inuvik's waste water treatment system. Inuvik contains a natural lagoon system designed for municipal wastewater effluent generated from Inuvik. ENR is not aware of any "processing", other than those naturally occurring in a lagoon, hence, the level of treatment offered by Inuvik's lagoon may not meet the expectations of the Proponent or be appropriate for the waste streams proposed.

8.1. Recommendation

ENR recommends that the Proponent prepare and submit for approval, a **Project-Specific Waste Management Plan,** which includes any contaminated soil or sump contents. This Plan must address and/or contain, at a minimum:

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[13] Page 7, Section 5.3.Sump Remediation Program: Project Scope. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010.

[14] Page 16, Section 5.8 Waste Management and Wastewater Treatment and Disposal. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

[15] Page 16, Section 5.8 Waste Management and Wastewater Treatment and Disposal. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

- The identification of hazardous (or any wastes of special concern) and non-hazardous waste types and volumes expected to be produced, and a detailed listing of storage, treatment and disposal locations for these wastes.

- This waste listing must include an identification of odourous wastes that may attract wildlife, and the identification of its storage and transport mitigative measures to prevent wildlife attraction. Whether odourous waste is stored for the purpose of on-site or off-site disposal (i.e. road or air transport), it must be stored in an airtight sealed container to prevent wildlife from being attracted to odours.

- Listed hazardous wastes (or any wastes of special concern) must also include and demonstrate that the disposal of contaminated materials that may result from accidents and malfunctions (including spills) has been prepared for. This information should be cross-referenced to and included in the Spill Contingency Plan associated with the Project.

- In the case that community facilities are proposed for use in disposal, alternate disposal and transport options must be provided in the case that the referenced community's waste handling facility cannot accommodate the proposed and estimated waste types and quantities listed.

- Should the Proponent propose incineration as a waste management option, details on the incineration must be provided prior to site operations, and annually thereafter. ENR refers the Proponent to Environment Canada's Technical Document for Batch Waste Incineration (www.ec.gc.ca/drgd-wrmd/default.asp?lang=En&n=82401EC7-1). The Information should include but not be limited to the following:

    - Incineration technology selected;
    - Waste audit -- amount and types and mix of waste incinerated;
    - Operational and maintenance records;
    - Operator training;
    - Incineration ash disposal, year round.

- If incinerator bottom and/or fly ash are targeted for disposal in the NWT, it must be tested prior to disposal to ensure that it meets the criteria specified in the *NWT Environmental Guideline for Industrial Waste Discharges*[16]. Incineration ash can be contaminated with toxic compounds and should therefore be tested to ensure that it is disposed of in an appropriate and approved manner.

Topic: Wildlife Impacts

[16] http://www.enr.gov.nt.ca/library/pdf/eps/industrialwastedischarges.pdf

Comment(s)

The proponent states... While there is small potential for wildlife harm (i.e. human protection from problem wildlife), training of all staff in operational procedures will be used to minimize this potential. This issue as well as other safety concerns, policies and incident management are addressed in the Emergency Response Plans (see Appendix I).

Desired End Result: To increase the protection of wildlife and wildlife habitat, maximize safety of field personnel and acquire wildlife distribution data in the project area

Project Specific Concerns and Context:

The *Species at Risk Act (SARA)* states that adverse effects on listed species must be identified and assessed, and regardless of significance, mitigated and monitored (Section 79). It is ENR's view that the treatment of those species listed under the Act should be consistent with the treatment of species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The following SARA-listed species have the potential to occur in the project area:

- Peregrine Falcon *anatum subspecies,* (Threatened)

The following COSEWIC-assessed species have the potential to occur in the project area:

- Grizzly Bear *Ursus arctos,* (Special Concern)
- Polar Bear *Ursus maritimus* (Special Concern)
- NWT Wolverine *Gulo gulo* - Western population (Special Concern)

Barren-ground caribou herds in the area have declined significantly since 2000 and harvest management actions have been taken to protect the herds. ENR suggest that caribou be avoided during operations.

ENR reminds the proponent that aircraft over-flights can disturb wildlife and decrease available habitat increasing stress levels to the animals and potentially affecting their overall health and condition. ENR comments the proponent for their commitment to adhere to recommended flight altitudes. The EISC Minimum Flight Altitudes Guidelines and Flying Low Brochure are attached for the proponent's convenience.

ENR reminds the proponent that wildlife is protected under NWT law. Section 38 of the *NWT Wildlife Act* protects wildlife by making it illegal to disturb or harass wildlife. ENR also considers the chasing or stalking of wildlife for photography or during eco-tourism to be harassment. No wildlife should be disturbed, chased, or harassed by human beings on foot, in a motorized vehicle, or by aircraft. Flying close enough to an animal that it runs away is flying too close. ENR commends the proponent for

hiring a wildlife monitor to provide advice to prevent wildlife harassment and provide bear protection on the ground.

Recommendation(s)

Term or Condition(s)

1. Follow ENR's Bear Encounter Response Guidelines (attached).

2. Avoid raptors including observed Peregrine Falcon nesting sites by a minimum distance of 1000 meters horizontally and 760 meters vertically from April 15th to September 15th.

3. Avoid any Species at Risk that are encountered during the course of field operations and minimize all activity so as to not disturb these animals.

4. Keep an up-to-date record of wildlife sightings (including GPS location data and animal response if possible) that is to be submitted to the Environment and Natural Resources office in Inuvik upon completion of the project. This information will provide distribution information and may be used to improve mitigation measures in the future.

Topic: Bear Encounter Checklist

If the proponent observes bears on the ground near the sampling site prior to landing, ENR assumes the site will be deferred until the bear leaves the area.
If the field crew encounters a bear while on the ground, ENR assumes the field crew will leave the area. If this is not possible the helicopter can be used to deter the bear in order to defend life or property; however, only to the extent necessary. Having a Wildlife monitor with firearms on site to watch for bears while on the ground and deter any that approach helps to ensure the safety of field crews. The Bear Encounter Response Guidelines have been attached for the proponent's convenience.

Recommendation(s)

The proponent is requested to report bear occurrences ASAP using the attached checklist. The proponent is reminded that in the event that they encounter bears and kill a bear in defence of life and property, they will be required to:

1) Report the kill to Department of Environment and Natural Resources, as soon as possible.

2) Skin the bear, leaving the claws and penis attached (if applicable), and preserve the hide by freezing or salting it and storing it in a cool place. Be generous with the salt.

3) Turn in the hide, the skull, and any other biological samples requested to a Department of Environment and Natural Resources Renewable Resource Officer.

As per section 54.(4) of the NWT Wildlife Act, no person may retain any part of a bear killed in defence of life or property.

Comments and recommendations were provided by ENR technical experts in the Inuvik Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM).

If you have any questions or concerns, please do not hesitate to contact me at 920-6591 or email at patrick_clancy@gov.nt.ca.

Sincerely,

Environmental Regulatory Analyst
Environmental Assessment and Monitoring
Environment and Natural Resources

Attached: Bear Encounter Response Guidelines
EISC Minimum Flight Altitudes
Flying Low Brochure

1831

Environment Division
Environmental Assessment and Monitoring
Environment and Natural Resources
PO BOX 1320
Yellowknife NT X1A 2L9
Telephone (867) 920 -6591
Fax (867) 873-4021

Northwest Territories Environment and Natural Resources

February 15, 2011

Veronique D'Amours Gauthier
Science and Regulatory Officer
NWT Water Board
PO Box 2531
Inuvik, NT
X0E 0T0

Dear Ms. D'Amours Gauthier:

Re: Shell Canada Energy Ltd.
N7L1-1831
Unipkat I-22 Sump Remediation Project
Request for Comments

The Department of Environment and Natural Resources (ENR) has reviewed the above application based on its mandated responsibilities under the *Environmental Protection Act,* the *Forest Management Act*, the *Forest Protection Act* and the *Wildlife Act* and provides the following comments and recommendations for consideration.

ENR understands the intent of proposed project is the excavation and removal of contaminated soil from a historic oil and gas disposal sump at the Shell Unipkat site, in order to prevent this material from entering the Mackenzie River via riverbank erosion. Due to the imminent risk of the sump material eroding into the Mackenzie River, ENR agrees with the intent of the proposed work and that every reasonable effort should be made to this affect.

ENR notices that the Proponent has included with the Water Licence application information that proposes contaminated material and waste will be transported from the sump site to Inuvik for treatment and disposal. Please note that ENR understands that aspects of these parts of the operation will need additional and separate regulatory approvals. Also, ENR is in direct contact with Shell regarding hazardous waste transport and the construction of the treatment pad within community limits.

Also, ENR would like to advise there may be additional issues associated with the town of Inuvik Water Licence that will need amendment to accommodate these plans, and/or a Water Licence for the Shell operation itself may be required.

Project Specific Comments

ENR understands the intent of proposed project is the excavation and removal of contaminated soil from a historic oil and gas disposal sump at the Shell Unipkat site, in order to prevent this material from entering the Mackenzie River via riverbank erosion. Due to the imminent risk of the sump material eroding into the Mackenzie River, ENR agrees with the intent of the proposed work and that every reasonable effort should be made to this affect.

ENR notes however, that the Project Description (PD) refers to the proposed activities as "site remediation"[1]. ENR understands the proposed activities only address the remediation of a single sump, and do not constitute a full site assessment, nor absolve Shell from fully assessing and remediating the remainder of the Unipkat site.

1. CCME Steps for Approach to Contaminated Sites

1.1. General Concerns and Project Context

ENR understands the Proponent asserts the application is to "conduct a sump remediation program"[2]. However, ENR is unaware of a Phase II or III ESA being completed to delineate the sump, to establish effective remedial actions, and submitted to any stakeholder for review.

The overall process in dealing with contaminated sites on Federal Lands, including those for Phase I, II, and III, should follow the guidance offered in the *National Guidelines for Decommissioning Industrial Sites (CCME 1991)*. This process should also include integration of the 10 steps identified by CCME for dealing with contaminated sites, as defined in CCME *Federal Approach to Contaminated Sites*, 1999. The latter document, and a quick reference to the 10 steps, can also be found online at www.ec.gc.ca/etad/csmwg/pub/fed_aprch/en/c2_e.htm). In the absence of these steps being taken, ENR lacks confidence with respect to the nature, quantity, location and extent of the contamination in the subject sump, as well as the remainder of the site.

1.2. Recommendation

ENR recommends that any authorization granted to the Proponent be for the sole purpose of removing identified contamination likely to enter the Mackenzie River on the basis of urgency and for completing a Phase II ESA. Upon submission of the Phase II ESA, it should be submitted for review and comment by stakeholders, and modified accordingly. Following this, ENR expects the Proponent will use this

[1] Page 1, Executive Summary. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010.
[2] Page 1, Executive Summary. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010.

information to then draft a Remedial Action Plan (RAP) which will also be submitted for review and comment by stakeholders. Once the RAP has been approved, then ENR recommends the Proponent can apply for new authorizations for the purpose of implementing the specific measures agreed to in the RAP.

2. Volume of Contaminated Material

With respect to the volume of identified PHC contaminated soil, the Project Description (PD) provides volumes based on the CCME Guideline *Petroleum Hydrocarbons in Soil*, industrial criteria[3]. ENR is concerned that applying the industrial criteria for PHC in soils at this site will not provide an adequate level of protection for the environment, wildlife, and potential users of this site. ENR is of the opinion that any delineation of contaminants use, at minimum, the CCME PHC in soil parkland criteria with consideration of the applicable soil texture.

With respect to the supplied contaminated soil estimates the PD states:

- approximately 5000 m^3 of PHC contaminated soil onsite above CCME Industrial guidelines for PHC (page 6, Section 5.2 – Previous Work)
- 1600 m^3 of sump contents (page 9, section 5.3.5 – Soil Excavation)
- 1400 m^3 of PHC contaminated soil around the sump (page 9, section 5.3.5 – Soil Excavation)
- Approximately 6500 m^3 of PHC affected material above guideline. (Presentation attached to application)

ENR notes the PD provides inconsistent totals of PHC contaminated soil (5000 m^3 and 6500m^3) and there is a discrepancy between the total volume of contaminated soil as compared to the total volume of material to be excavated, 3000 m^3.

ENR has concerns with respect to the delineation of this site as described in the PD. The PD indicates that in September 2007, 82 boreholes were drilled and that they did not fully delineate the site[4]. Moreover, the PD indicates that in 2010 an additional18 holes were drilled to work towards fully delineating the site[5]. However, the PD does not state whether this additional work did fully delineate the site.

ENR has additional concerns that other areas of contamination may exist on the site which have not been investigated. The PD makes reference to a Camp Sump and Flare Pit which are actively eroding into the Mackenzie River[6]. These sites have the potential for contamination and should be investigated as part of a Phase II ESA.

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[3] Page 6, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

[4] Page 5, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[5] Page 6, Section 5.2 Previous Work. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

[6] Page 10, Section 5.3.5 Soil Excavation. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

2.1. Recommendation

- ENR recommends that any delineation of contamination of PHC use the CCME Parkland criteria and should also take into account the appropriate soil texture.
- For sites likely to erode into the Mackenzie River, ENR recommends that site specific criteria be developed through a phased ESA process as previously outlined in section 1.
- ENR recommends clarification is provided regarding the total volume of identified contaminated material exceeding CCME industrial criteria for PHC in soil.
- ENR recommends clarification is provided regarding the volume of material proposed for excavation as compared to the volume of material the PD identified as exceeding CCME industrial criteria for Petroleum Hydrocarbons (PHC) in soil.
- ENR recommends that additional areas of contamination should be investigated, such as, but not limited to, the Camp Sump and Flare Pit.

3. Contaminants of Concern

The Proponent states, "Soils affected by PHC, potassium chloride, and total barium are of primary concern."[7] ENR is concerned that there may be other contaminants present due to the nature of oil and gas activities at the time the sump was put in place and related activities that may have occurred at the site. For example, total metals, and if flaring or burning/incineration occurred on site, then the presence of polycyclic aromatic hydrocarbons (PAHs) and dioxins and furans should be considered and assessed.

3.1. Recommendation

ENR recommends that a phased ESA process is undertaken which investigates, but is not limited to, the presence of total metals, PAHs, and dioxins and furans.

4. ENR Regulatory Requirements

The Environment Division (ED) of Department of Environment and Natural Resources (ENR) tracks the movement of contaminated soils as hazardous waste in the NWT. (ENR) is not listed as an agency for the registration of the storage facility of contaminated soils in the Inuvik Industrial Area in Table 3-1[8]. Shell Canada

[7] Page 6, Section 5.3 Sump Remediation Program: Project Scope. Shell Canada Energy. Unip kat I-22 Sump Remediation Project Description. Nov 12, 2010

[8] Page 2 Section 3 Regulatory Approvals. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010

Energy is a registered generator with ED and was issued the following generator number - NTG000408.

5. Camp Waste Management

The Project Description states that "All solid waste (garbage) will be collected and removed from the site and transported to Inuvik for disposal at an approved landfill site at the end of the Project."[9] And "all grey water and wastewater....disposed at the wastewater processing facility in Inuvik."[10]

ENR notes the Proponent has not provided information on onsite waste treatment, storage or segregation, or information on mitigation measures to minimize animal attraction. Further, the Proponent has not provided estimates of the quantity of waste they will generate or any indication that the Town of Inuvik has consented to the proposed use of Inuvik's waste management infrastructure.

Further, ENR is concerned with the Proponent's use of the term "wastewater processing facility" to describe Inuvik's waste water treatment system. Inuvik contains a natural lagoon system designed for municipal wastewater effluent generated from Inuvik. ENR is not aware of any "processing", other than those naturally occurring in a lagoon, hence, the level of treatment offered by Inuvik's lagoon may not meet the expectations of the Proponent or be appropriate for the waste streams proposed.

5.1. Recommendation

ENR recommends that the Proponent prepare and submit for approval, a **Project-Specific Waste Management Plan,** which includes any contaminated soil or sump contents. This Plan must address and/or contain, at a minimum:

- The identification of hazardous (or any wastes of special concern) and non-hazardous waste types and volumes expected to be produced, and a detailed listing of storage, treatment and disposal locations for these wastes.

- This waste listing must include an identification of odourous wastes that may attract wildlife, and the identification of its storage and transport mitigative measures to prevent wildlife attraction. Whether odourous waste is stored for the purpose of on-site or off-site disposal (i.e. road or air transport), it must be stored in an airtight sealed container to prevent wildlife from being attracted to odours;

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[9] Page 16, Section 5.8 Waste Management and Wastewater Treatment and Disposal. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

[10] Page 16, Section 5.8 Waste Management and Wastewater Treatment and Disposal. Shell Canada Energy. Unipkat I-22 Sump Remediation Project Description. Nov 12, 2010.

- Listed hazardous wastes (or any wastes of special concern) must also include and demonstrate that the disposal of contaminated materials that may result from accidents and malfunctions (including spills) has been prepared for. This information should be cross-referenced to and included in the Spill Contingency Plan associated with the Project.

- In the case that community facilities are proposed for use in disposal, alternate disposal and transport options must be provided in the case that the referenced community's waste handling facility cannot accommodate the proposed and estimated waste types and quantities listed.

- Should the Proponent propose incineration as a waste management option, details on the incineration must be provided prior to site operations, and annually thereafter. ENR refers the Proponent to Environment Canada's Technical Document for Batch Waste Incineration (www.ec.gc.ca/drgd-wrmd/default.asp?lang=En&n=82401EC7-1). The Information should include but not be limited to the following:

    - Incineration technology selected;
    - Waste audit -- amount and types and mix of waste incinerated;
    - Operational and maintenance records;
    - Operator training;
    - Incineration ash disposal, year round.

- If incinerator bottom and/or fly ash are targeted for disposal in the NWT, it must be tested prior to disposal to ensure that it meets the criteria specified in the *NWT Environmental Guideline for Industrial Waste Discharges*[11]. Incineration ash can be contaminated with toxic compounds and should therefore be tested to ensure that it is disposed of in an appropriate and approved manner.

Topic: Wildlife Impacts

Comment(s)

The proponent states... While there is small potential for wildlife harm (i.e. human protection from problem wildlife), training of all staff in operational procedures will be used to minimize this potential. This issue as well as other safety concerns, policies and incident management are addressed in the Emergency Response Plans (see Appendix I).

Desired End Result: To increase the protection of wildlife and wildlife habitat, maximize safety of field personnel and acquire wildlife distribution data in the project area

[11] http://www.enr.gov.nt.ca/library/pdf/eps/industrialwastedischarges.pdf

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The *Species at Risk Act (SARA)* states that adverse effects on listed species must be identified and assessed, and regardless of significance, mitigated and monitored (Section 79). It is ENR's view that the treatment of those species listed under the Act should be consistent with the treatment of species assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

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Recommendation(s)

Term or Condition(s)

1. Follow ENR's Bear Encounter Response Guidelines (attached).
2. Avoid raptors including observed Peregrine Falcon nesting sites by a minimum distance of 1000 meters horizontally and 760 meters vertically from April 15th to September 15th.

3. Avoid any Species at Risk that are encountered during the course of field operations and minimize all activity so as to not disturb these animals.

4. Keep an up-to-date record of wildlife sightings (including GPS location data and animal response if possible) that is to be submitted to the Environment and Natural Resources office in Inuvik upon completion of the project. This information will provide distribution information and may be used to improve mitigation measures in the future.

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Recommendation(s)

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1) Report the kill to Department of Environment and Natural Resources, as soon as possible.

2) Skin the bear, leaving the claws and penis attached (if applicable), and preserve the hide by freezing or salting it and storing it in a cool place. Be generous with the salt.

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As per section 54.(4) of the NWT Wildlife Act, no person may retain any part of a bear killed in defence of life or property.

Comments and recommendations were provided by ENR technical experts in the Environment Division and the Inuvik Region and were coordinated and collated by the Environmental Assessment and Monitoring Section (EAM).

If you have any questions or concerns, please do not hesitate to contact me at 920-6591 or email at patrick_clancy@gov.nt.ca.

Sincerely,

Environmental Regulatory Analyst
Environmental Assessment and Monitoring
Environment and Natural Resources

Attached: Bear Encounter Response Guidelines
EISC Minimum Flight Altitudes
Flying Low Brochure

APPENDIX I

Summary of Advice Received by EISC from the Co-management Groups for Recommended Environmentally Acceptable Minimum Flight Altitudes

Aircraft Type	Species / Situation	Recommended Altitude	Source
Not specified	Over areas likely to have birds	>650 m (2100 ft)	CWS [WMAC(NWT)]
Not specified	Over areas where birds are known to concentrate (Sanctuaries, colonies, moulting areas)	>1100 m (3500 ft)	CWS [WMAC(NWT)]
Subsonic Aircraft	Over large mammals during ferry flights	>300 m (975 ft)	DRWED [WMAC(NWT)]
Subsonic Aircraft	During wildlife surveys	>100 m (325 ft)	DRWED [WMAC(NWT)]
Subsonic Aircraft	Aeromagnetic surveys in areas with large mammals	Timing should be restricted rather than altitude	DRWED [WMAC(NWT)]
Not specified	When flying point to point in vicinity of caribou and other wildlife species	>610 m (2000 ft)	Transport Canada [WMAC(NS)]
Not specified	Over parks, reserves, and refuges	>610 m (2000 ft)	Transport Canada
Not specified	Over areas where there are belugas and bowhead whales	>300 m (975 ft)	FJMC
Not specified	Zone 1	>760 m (2500 ft)	Tourism Guidelines Beluga Management Plan [FJMC]
Not specified	Zone 2	>610 m (2000 ft)	Tourism Guidelines Beluga Management Plan [FJMC]

General Advice

- Minimize the number of flights whenever possible
- Fly at times when few birds are present (e.g., early spring, late fall, winter)
- Avoid large concentrations of birds (e.g., Migratory Bird Sanctuaries, breeding colonies, moulting areas)
- Avoid especially sensitive areas such as seabird colonies and raptor nesting sites
- Plan routes that minimize flights over habitats likely to have birds
- Use small aircraft rather than large aircraft whenever possible
- Use fixed-wing aircraft rather than helicopters whenever possible
- Inform pilots of these recommendations and areas known to have birds
- Hovering or circling may greatly increase disturbance and must be avoided.
- Caribou calving grounds should be avoided whenever possible.
- Aeromagnetic surveys should be controlled to prevent disturbance to large mammals by restricting the timing of the surveys rather than the elevation. These surveys should not take place near or on calving and post-calving areas during the period of May 25 to July 15. After July 15 they should avoid any areas know to have large aggregations of caribou.
- Animals reactions will depend on a variety of situations including aircraft type, noise levels, speed of travel, overflight frequency, and animal activity (e.g., loafing, feeding, traveling) and its surroundings (water depth and clarity, substrate). The EISC may have to consider the circumstance of the activity on a case by case basis.
- DFO often recommends a minimum altitude of 400 m (1200 ft) for flights over marine mammal habitat in this region. Recommended or required minimum altitudes may be higher in areas of particularly intense aircraft activity, and in cases where flights are over marine mammal concentrations areas, or at particularly sensitive times of their lift cycle.
- Exceptions to these recommendations may be warranted for scientific studies (e.g., wildlife surveys) in which the benefits for conservation clearly outweigh the risks and should be evaluated on a case by case basis.

Please:

- do not fly below 1,000 feet;
- obey Transport Canada regulations;
- find out where outfitter camps are located and avoid them during hunting season;
- avoid barren-ground caribou calving grounds during calving season;
- do not take-off or land in a calving area during calving season;
- do not chase or harass wildlife by flying too close; and
- respect our wildlife - keep to a safe altitude.

**Remember,
flying close enough
to an animal
so that it runs away
is too close!**

If geological survey or mineral exploration work is planned at any time, but especially during outfitting or calving seasons, please contact the regional office of Environment and Natural Resources for information before flying.

Mackenzie Mountains and Mackenzie Valley:

Sahtu Region .....(867) 587-3500
Dehcho Region .....(867) 695-7450
South Slave Region .....(867) 872-6400

Tundra:

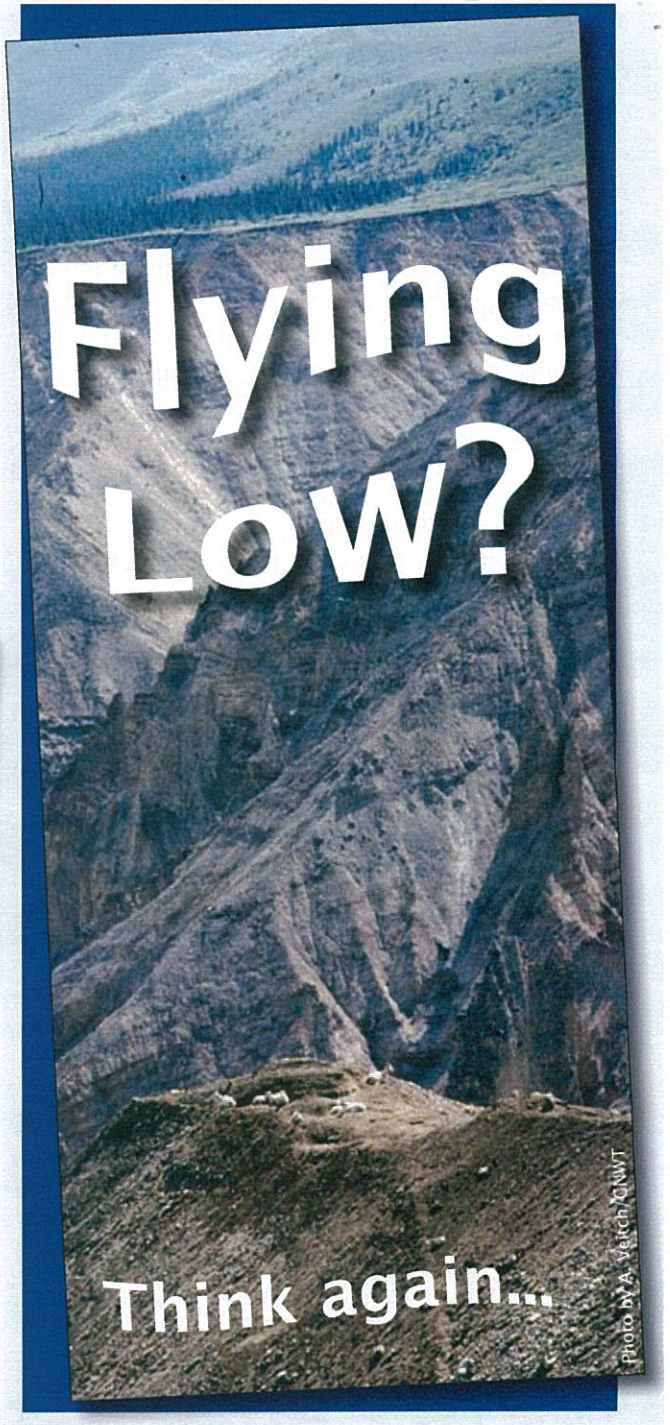
Inuvik Region.....(867) 777-7308
North Slave Region.....(867) 873-7184
South Slave Region .....(867) 872-7450

Visit the Wildlife Division web site
of Environment and Natural Resources
at http://wildlife.enr.gov.nt.ca.

Northwest Territories Environment and Natural Resources

June 2007

Flying Low?



A variety of wildlife, quality guides and outfitters, spectacular scenery and solitude that only a location away from human habitation can offer...

The Northwest Territories is a popular destination for big game hunters and eco-tourists alike. But their experience can be ruined by low-flying aircraft that disturb wildlife.

Increased exploration and development throughout the NWT also means increased air traffic. Pilot encounters with wildlife are becoming more frequent. If you are a fixed wing or rotary pilot, please respect our wildlife and keep to an elevation that does not disturb them.

Wildlife are Protected Under NWT Law

Section 38 of the NWT *Wildlife Act* protects wildlife by making it illegal to disturb or harass wildlife. Flying close enough to an animal that it runs away is flying too close!

Please keep your aircraft at a safe elevation so animals are not disturbed.

In the Mackenzie Mountains

Big game hunters pay sizable fees for the chance to take home a trophy animal from the Mackenzie Mountains. Much of the hunting in this area is done on foot or on horseback and it is a time consuming process. Sound is amplified by the mountains and low flyovers can frighten an animal into flight, causing hours, or even days, of stalking to be wasted.

Wildlife that are affected by low level flyovers in the Mackenzie Mountains include Dall's sheep, mountain goat, mountain caribou and moose.

During the mid-July to end of September hunting season, please be cautious and avoid outfitter areas.

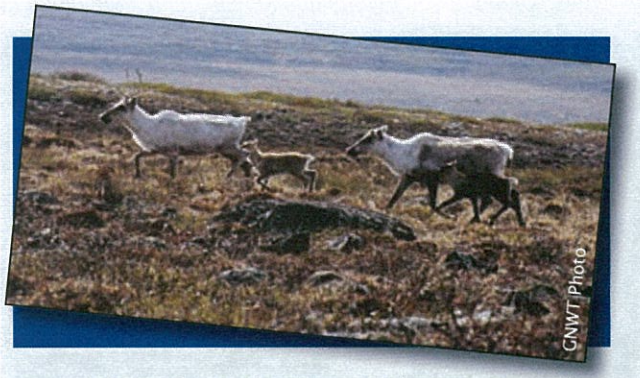
In the Mackenzie Valley

Boreal caribou are a threatened species found throughout the Mackenzie Mountains. Unlike barren-ground caribou, during the May calving period, boreal caribou go into hiding to have their calves. Low flying is especially harmful, stressing the female, which can cause separation from calves and lead to calf death. If electromagnetic surveys are going to be conducted in April or May, please contact the regional ENR office for information.

On the Tundra

During Hunting Season

Hunters also pay large fees for a hunting experience on the tundra. In late summer and



early fall, outfitters have active barren-ground caribou sport hunting camps. Aircraft must remain at least 1,000 feet above ground.

During the mid-August to end of October hunting season, please be cautious and avoid outfitter areas.

During Calving Season

Caribou are a valuable resource to the people of the Northwest Territories. From the end of May to the end of June, female barren-ground caribou come together at herd-specific locations on the tundra to give birth to their calves. Low flyovers, take-offs and landings in these areas are especially harmful as they can stress the cows, which can cause separation from calves and increased calf mortality.

Avoid barren-ground calving grounds from mid-May to early July. This is especially important during times of low barren-ground caribou numbers. Please contact the regional office of Environment and Natural Resources in your area.

Other Wildlife

Grizzly bears, pelicans, whooping cranes, polar bears, muskoxen, black bears, eagles and other wildlife are also disturbed by low flying aircraft. Please respect our wildlife and keep to a safe altitude.

Northwest Territories Inuvik Region

Department of Environment and Natural Resources
Bag Service #1 Inuvik, NT X0E 0T0

Bear Encounter Response Guidelines

I. PRINCIPLES:

1. Protection of Life and Property
2. Conservation

II. OPERATIONAL GUIDELINES:

A. Deterrence
B. Re-locate, if feasible
C. Destroy

III. OPERATIONAL PROCEDURES:

Contacts:

Initial contact during regular hours:
Environment and Natural Resources Inuvik office at (867) 678-6650

Initial contact after regular hours and weekends:
Renewable Resource Officer on call
Cell: (867) 777 -1185
Fax: (867) 678 -6659

Response Personnel:

The following personnel can be available for responding to problem bear situations:

Tobias Halle	Inuvik	(867) 678-6681
Ian Ellsworth	Inuvik	(867) 678-6680
Kevin Allen	Inuvik	(867) 678-6683
Paul Voudrach	Inuvik	(867) 678-6652
Ian McLeod	Aklavik	(867) 978-2248
Lila Voudrach	Tuktoyaktuk	(867) 977-2350

Initial Contact:

1. The complainant should complete the attached checklist prior to calling Department of Environment and Natural Resources. It is critical that as much information as possible be provided at this point in order to determine the appropriate response.

IV. RESPONSE

Wildlife Monitors will be the initial responders to problem bears. It is imperative that they have a sufficient supply of approved deterrents at their disposal. All bear sightings and encounters shall be reported to the ENR office closest to the area of operation.

The potential responses will be considered in the following order:

a) Camps

1. Wildlife Monitors will employ conventional means of deterring problem bears that threaten public safety or property. This may involve chasing a bear out of the camp with a vehicle or snowmobile, or using noise makers and rubber bullets. If these methods prove ineffective, and where a helicopter is available or can be obtained in the area, the bear may be chased from camp. Pilots must be careful not to over stress the bear during this flight and must back off when the bear is a sufficient distance from the camp and keeps running in the desired location. If circumstances allow, a Renewable Resource Officer (RRO) should be contacted prior to using aircraft to deter bears. Undue harassment is illegal and must be avoided. **All incidents involving any means of deterrence should be reported to a Renewable Resource Officer as soon as possible.**

2. Should for some reason, the Wildlife Monitor be unable to deter a bear, and where the bear does not pose an immediate threat to public safety or property, the Department of Environment and Natural Resources (DENR) may send a deterrent or capture team to the site.

b) Denning bears

If a bear is located in, at or near a den site, work in the area must halt. All employees should safely retreat from the area and report the occurrence to the Site Supervisor, Wildlife Monitor, and the Renewable Resource Officer in your area as soon as possible. Staff from DENR will be required to assess the site and may implement measures to ensure bears are not unduly disturbed. This may include the establishment of an exclusion zone of 300 meters around the den in which no work will be permitted. Work inside the exclusion zone will remain stalled until after den emergence.

c) Free ranging bears

Prior to active deterrence of free ranging bears, and where public safety or property is not in immediate danger, the Wildlife monitor will assess the situation. The monitor should determine if the bear has been disturbed from a den or if it is denning in close proximity. Bears in the vicinity of a den should not be deterred and work should cease until DENR has assessed the site. If the Wildlife Monitor has determined that the bear is in fact free ranging, and not lingering around a den site, then active deterrence may commence.

d) Destruction of the bear

Instructions to destroy the bear will be given when deterrent actions have failed, when additional deterrent actions are not possible, and when it is determined that capture and relocation cannot be conducted or is unlikely to be successful.

The bear can be destroyed if human life or property is in immanent danger.

If a bear is killed, you will be required to:
1) Report the kill to Department of Environment and Natural Resources, as soon as possible.
2) Skin the bear, leaving the claws and penis (if applicable) attached, and preserve the hide by freezing or salting it and storing it in a cool place. Be generous with the salt.
3) Turn in the hide, the skull, and any other biological samples requested to a Department of Environment and Natural Resources Renewable Resource Officer.

As per the NWT Wildlife Act, no person may retain any part of a bear killed in defence of life or property.

V. FOLLOW-UP

After response measures are completed, the situation will be reviewed with the camp operator and corrective actions identified. These may include a wide array of actions aimed at avoiding future bear problems and ensuring that the operator is made aware of legal obligations. The need for conservation and the vulnerability of bear populations to over harvest is to be stressed.

Northwest Territories Inuvik Region

Department of Environment and Natural Resources
Bag Service #1 Inuvik, NT X0E 0T0
FAX (867) 678-6659

Bear Complaint Checklist

1. Complainant Details:

Date/Time of Report: _____
Complainants Name: _____
Affiliation/Location of Complainant: _____
Contact Number for Complainant: _____
Other on Site Contacts: _____
Wildlife Monitors Name: _____

2. Camp Details:

Location of Complaint: _____
Latitude/Longitude: _____
Type of Camp- Permanent/ Mobile: _____
Number of People in Camp: _____
How Long has Camp Been Here (if Mobile): _____
Are there any Aircraft on site? If yes, Type: _____

3. History of the Problem:

Date/Time Bear First Sighted: _____
Type of Bear: Grizzly_____ Polar _____ Black _____
Sex of Bear: Male _____ Female _____ Unknown _____
Age of Bear: Cub _____ Juvenile _____ Adult _____
Has Bear Been Observed Before: _____
Den site found (description)? _____
What was the Bear Attracted To: _____
Did the Bear Obtain Food: _____
Behaviour of Bear: Fearful _____ Not Fearful _____ Aggressive_____
Damage By Bear: _____

4. Deterrent Action:

Was the Bear Deterred? Yes_____ No _____
If Yes, Type of Deterrent Used: _____
_____
Present Status of Bear: _____
_____

5. Other Information:

Reporters Name/Title: _____
Weather on Site at Time of Report: _____
Checklist Forwarded to: _____