Indian and Northern Affairs Canada
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September 25, 2007

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Re: Comments – Shell Camp Farewell Phase II Assessment and Interim A&R Plan

The Water Resources Division (WRD) and North Mackenzie District (NMD) of Indian and Northern Affairs Canada reviewed Shell Camp Farewell Phase II Assessment and Interim Abandonment and Restoration Plan, submitted December 11, 2006, to the Northwest Territories Water Board (NWTWB).

The following items of concern regarding the Interim Abandonment and Restoration Plan have been identified:

- INAC has released new guidelines for mine sites reclamation in the NWT. These guidelines, titled the Mine Site Reclamation Guidelines for the Northwest Territories released in January 2007, provide a general outline for a well balanced and structured reclamation plan that can be applicable to other industrial developments in the NWT. It is recommended that the proposed Abandonment and Reclamation Plan (Closure and Reclamation Plan – as per the guidelines) follow this type of format. Furthermore, these guidelines highlight specific details which tend to be missing from the proposed plan. Such information and detail should be provided in the plan. Examples of such detail include:
  - Overall Closure Goal
  - Closure Objectives on a Component Basis
  - Closure Options and Alternatives
  - Closure Criteria
  - Progressive Reclamation

- Shell's Reclamation Plan as proposed does not discuss the closure of the airstrip, docking/staging location and road access within the Camp Farewell site.

- Shell's site assessments at the Camp Farewell to date have discovered large amounts of contaminated sediments at the site. The assessment in 2006 identified groundwater contamination as well. The plan briefly discusses the potential for progressive

reclamation of soil and groundwater. INAC-WRD agrees the potential for progressive reclamation exists particularly in the areas of highest contaminate concentrations. It is recommended that the proponent conduct pilot reclamation project(s) to address the hydrocarbon contamination or in some manner conduct reclamation research at the site. Because of the contamination levels and the extent of contamination at the site, some form of progressive reclamation activity must occur at the site. Will Shell Canada commit to conducting pilot tests and progressive reclamation research at the site, particularly in areas of highest contamination? In association with this will Shell prepare a timeline for the "near term site remediation" activities as discussed in Section 7.2?

- It is noted, Shell Canada has identified a few options for the remediation of contaminated sediments and soils. However, no timeline is presented for any of this work or the assessment of options. How will the final option for reclamation be determined and when will the assessment of these options take place? It is likely that the process to identify the final closure options, determining the closure objective and measurable closure criteria will be lengthy and require consultation with local Aboriginal groups and regulatory authorities.

- Shell's reclamation plan involves leaving the current urethane and gravel layers of the base pad in place. However, Shell states that the gravel layer is contaminated with barium as these soils were originally mixed with drilling mud products to establish good gravel adhesion and compaction. In addition, it was seen that at Stockpile #2, in an earlier site assessment, when a free portion of the insulation liner was squeezed it produced an apparent mixture of water and hydrocarbon. Furthermore, Shell is uncertain if the liner is one complete layer or a series of pads. Shell has stated that leaving the urethane liner in place will provide an effective impermeable layer to prevent contamination of underlying soils and groundwater. Does Shell anticipate any lateral movement of contaminants, particularly when the extent of the gravel pad is larger than the extent of the liner? What other options exist for reclamation at the site which could include the removal of the urethane layer, as the physical condition and extent of the liner has not been defined?

- Shell has committed to inventorying the equipment and materials at the site and to conducting an audit of this material during closure and reclamation. However, as years pass and different users utilize the site, the type and number of material and equipment at the site may change. A complete inventory of the equipment and materials stored at the site should be prepared and kept up to date to ensure items can be accounted for during final closure of the site. Further to this, a survey of the potential hazardous materials at the site should also be inventoried and kept current for this purpose.

- It is understood that the sewage lagoon onsite is used as a contingency during start-up (2-4 weeks), system upset, and shutdown and that the sewage lagoon is used as storage during this period. Prior to discharge of lagoon water, the water within the lagoon must meet the acceptable effluent quality criteria specified in the current Water Licence or Closure Licence. As well, the sediments from within the lagoon must meet acceptable

limits prior to infilling the lagoon or removing these sediments for use in other areas of reclamation at the site.

- Table D in Section 7.2.3 does not quantify the primary TPH concentration (mg/kg), it only references the NWT 2003. Is this a typo or is Shell referring to NWT Guidelines?

- What alternatives are proposed to treat or remediate base pad soils containing salts, basic materials (elevated pH) or barite above Industrial criteria and or site criteria, estimated to be in the order of less than 150 m^3, as identified in Section 7.2.3?

- Section 7.2.5 identifies approximately 1,155 m^3 of hydrocarbon contaminated soils that exist outside of the gravel pad. What will be done with these areas as natural vegetation exists and any disturbance may potentially influence their wellbeing, which may cause problems with revegetation? It is recommended that further investigations occur off the lease site to determine the furthest extent of possible contaminant migration (see additional investigation and monitoring discussion below).

The following items and recommendations are proposed regarding the Environmental Site Assessment:

- It is unclear given the location of some background or reference stations (proximity to site infrastructure) whether they represent actual background conditions. In future site assessment and or monitoring events additional background or reference site samples should be taken further away from the site. Potentially, information from other areas of the delta in the vicinity of Camp Farewell could be included as part of the comparison.

- It is recommended that Shell also conduct sampling for contaminant migration from the site to the shoreline of the Mackenzie River and if possible water quality samples from near the shoreline in future monitoring and or assessment events. The potential exists for hydrocarbon and sewage contamination near the shore of the River.

- As it has been over twenty years since the spill (800,000 L in 1980-81), the condition of the hydrocarbons (i.e. fractions) may have changed naturally as part of natural degradation, migration and evaporation. As well, the extent of the spills migration may not be confined to the original spill path. Additional research should be conducted on the extent of the spill and the condition of the hydrocarbon fractions at the site. It is understood that the potential exist for natural conditions to exhibit the same hydrocarbon fractions as what is being detected. This is of particular importance when detecting the extent of contaminant migration off the gravel pad and the site lease.

- The size, shape and physical condition of the urethane liner should be determined in future site assessments.

- Additional soil and groundwater monitoring should continue on an annual basis to further determine the complexity of contamination and groundwater movement at the

site. This monitoring should include the continued delineation of contaminant migration off the site lease to determine the maximum extent of contamination movement.

We hope that the above comments are useful. Any questions or clarifications regarding the items above can be directed to Nathen Richea at richean@inac-ainc.gc.ca or Jan Davies at daviesj@inac.gc.ca .

Sincerely,

for Kathleen Racher, Ph. D.
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