GENERAL INFORMATION

The Water License application is being submitted to the NWB on May 27, 2010 for the period of June 2010 to December 2015.

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The specifications for this contract have not yet been awarded. Once the contract is awarded, all contact information will be provided.

TECHNICAL INFORMATION

Site Assessment Considerations

1. **Detailed topographic site survey diagrams, maps and aerial photos** are provided in the drawing package included with the project submission.
    a. **Soil, fuel and chemical storage locations:** The contractor will store soil, fuel and chemicals, as required to complete the work. The project specifications outline suitable requirements for the storage of these materials, including conformance with all applicable environmental laws, regulations and requirements of Federal, Territorial and other regional authorities.
    b. **Soil Landfarm active treatment location:** Landfill site shown on the drawings.
    c. **Site drainage patterns:** Shown on the drawings.
    d. **Adjacent surface water bodies that could be affected by the proposed undertaking:** Shown on the drawings.
    e. **Facility site access routes:** Shown on the drawings.
    f. **Surface and subsurface environmental monitoring sites:** Locations of monitoring stations are shown on the drawings.
    g. **Traditional land use areas:** Sylvia Grinnell Territorial Park, the oldest of Nunavut's territorial parks borders the site to the north-western extent. Sylvia Grinnell Park is divided in two by the Sylvia Grinnell River. The park plays a vital role in the community of Iqaluit by providing an important fishing ground for Arctic Char. During the site clean up activities, the contractor would be responsible for site security relative to construction activities.

2. **Slope of land underlying the Facility:** The project area is characterized by rolling terrain that slopes towards the Sylvia Grinnell River. The bedrock over which the metal debris was dumped is approximately 30 m above the River valley. Local terrain consists mainly of bare rocky outcrops with a thin layer of glacial and marine sediments in low lying areas between outcrops.

    The elevation of the landfill site is approximately 20 to 30 metres above sea level (m asl) and the Sylvia Grinnell River is at approximately 0 to 5 m asl (http://atlas.nrcan.gc.ca).

3. **Hydrological / Climatic Assessment of the Site:**
    a. **Precipitation and temperature profiles for the area:** Iqaluit is located within an arctic climatic zone despite being well outside of the Arctic Circle. The average daily temperature range is -28oC to 7.7 oC. The area is characterized by very cold winters and short summers that permit the growth of very small, stunted trees. The average monthly temperature is below freezing for eight months of the year. The average annual precipitation is 412.1 mm, which is much wetter than many other localities in the Canadian Arctic islands. There is 198.3 mm annual rainfall and 235.8 mm annual snowfall (www.climate.weatheroffice.ec.gc.ca). Climate Normals, Environment Canada) and summarized in the following table.
    b. **Details of the local drainage basin:** The Sylvia Grinnell River is the principal drainage system in the region which discharges into Frobisher Bay. The river is influenced by the tidal action of the ocean which has some of the largest tides in Canada. The river is a major migratory route for Arctic Char. The natural drainage around the study area is influenced by the bedrock structure and numerous small, elongated ponds that have formed along fault lines and joints. The ponds are shallow (approximately less than 0.5 m deep), and are poorly drained. The high ratio of sediment surface to pond volume allows maximal exchange between the sediment and the water. In the winter, the ponds are frozen to the bottom. There are four large ponds and two smaller ponds. There are small intermittent drainages that join these water bodies (See **Figure 2** in drawings).
    c. **Likelihood of flood events:** Project site is located in an area that will not be affected by flood events. It is located out of the flood zone of watercourses.

4. **A description of the soil underlying the site:**
    a. **The physical and chemical characteristics of the soil underlying the facility:** The surficial geology in the region has been described as a thin layer of silty sand with trace to some gravel. The soil is dark brown to black with a high organic content and the presence of rootlets. Bedrock was encountered between 0.8 to 1.6 m bgs (Area 1); 0.1 m bgs (Area 2); between 0.1 and 0.4 m bgs (Area 3); and between 0.3 to 0.8 m bgs (Area 4). Logs for the test pits completed by FRANZ are provided in **Appendix A, Tables A-1 and A-2**. Grain size analysis was completed on soils and sediments in various locations across the site during the 2008 field investigation. Results of the grain size analysis indicate that both soils and sediments are considered course grained, with the majority of particle size falling in the 2.0mm - 0.063mm range. Detailed grain size data are provided in **Appendix A, Table A-3**.
    b. **Depth of the permafrost active layer:** Permafrost was encountered at 1.6 to 1.7 m bgs.
    c. **Permafrost characteristics that may impact the construction and operation of the Facility:** will be Excavation of active layer is to be minimized to reduce the risk of thaw settlement of the underlying permafrost.
    d. **Municipal Zoning or Land Use Planning Ordinances:** The Project Site remains undeveloped and part of Transport Canada's inventory of sites. No land claims have been made on the subject property.

SOIL STORAGE AND LANDFARM TREATMENT DESIGN CONSIDERATIONS

1. **Details of Design and Construction of Soil Storage and Landfarm Treatment Facility:**

    No Soil Storage and Landfarm Treatment Facility will be constructed.

    a. **Retaining Structures:** N/A
    b. **Geosynthetic liners:** N/A
    c. **Devices used to manage excess runoff water and/or leachate;** N/A
    d. **Existing and proposed drainage modifications:** N/A
    e. **Water quality and environmental monitoring stations:** N/A

2. **Installation of barriers to prevent access to the site:** The contractor would be responsible for site security relative to construction activities.

3. **Placement of the Facility in relation to water bodies:** N/A

4. **Flood risks/maximum probably precipitation events in regards to the Facility placement and design:** N/A

5. **Alternative methods of soil storage or remediation, in the event that circumstances are not suitable, for example because of environmental constraints, available human resources, etc.:** All hydrocarbon contaminated soil would be to containerize and provide offsite disposal.

OPERATIONS AND MAINTENANCE CONSIDERATIONS

1. **Procedures to determine if soils may be accepted at the Landfarm:**
    a. **Chemical, physical and biological characterization of the soils and the associated hydrocarbon and metal contaminant concentrations:** N/A
    b. **Treatibility studies, to determine the viability of landfarm treatment:** N/A
    c. **Sampling frequency and number of samples per volume of soil accepted:** N/A

2. **Procedures to be utilized during active landfarming operations in the active treatment cells:** N/A
    a. **Treatment cell development and material placement therein:** N/A
    b. **Contaminated soil thickness in treatment cells:** N/A
    c. **Method of mechanical aeration in treatment cells:** N/A
    d. **Oversize material management:** N/A
    e. **Surface water management, leachate containment and/or treatment, and site grade planning:** N/A
    f. **Process water management and treatment prior to discharge:** N/A
    g. **Site volume and operational monitoring programs:** N/A
    h. **Dust control programs:** N/A
    i. **Staff operational training programs:** All activities involving the handling and treatment of hydrocarbon contaminated soil, shall be directly supervised by Construction Contractor's personnel who have successfully completed a 40 hour training course for Hazardous Waste Activities in compliance with OSHA 29 CFR 1910.120 or other approved equivalent training courses such as the Canadian Hazardous Waste Workers Program. It is the responsibility of the Contractor to provide suitable training for operational staff.

3. **Soil Quality Remediation Objective:** The project outcome will be measured by the state of the soil quality at the sampling sites located at the project area at the Iqaluit Airport, compared to the applicable regulatory criteria. The regulatory criteria that apply are: the Canada Wide Standard for Petroleum Hydrocarbons in Soil (industrial land use criteria), and the Canadian Council of Ministers of the Environment Canadian Environmental Quality Guidelines for soil and groundwater. Final soil and groundwater analytical results will be compared to said criteria as a performance outcome measurement for this project in future years to demonstrate a downward trend in contaminate levels to demonstrate the capping has been successful in lowering/eliminating the chemicals of concern.

4. **Conceptual Decommissioning and Reclamation plan:**
    a. **Details regarding the ultimate deposition of any treated soils:** N/A
    b. **Disposal plan for soils contaminated with bioremediation unsuitable compounds, or for soils that do not respond well to the proposed landfarming treatment**:: N/A

SURFACE AND GROUNDWATER MONITORING PROGRAMS

1. **Locations of all proposed Monitoring Stations;** The proposed locations of the sampling sites are shown on the drawings. All locations are to be field confirmed by the Engineer. The sampling sites will be surveyed after remediation efforts are complete.

2. **Chemical, physical and biological parameters to be monitored:** A typical soil and groundwater monitoring program will be established, which would include accredited lab testing for applicable regulatory criteria.

3. **Sampling frequency;** A typical soil and groundwater monitoring program would include annual sampling and testing from sample sites. The samples would be taken at maximum thaw (Late August or September) during active soil treatment operations.

4. **Baseline Monitoring Programs:** Geotechnical and environmental investigations of the project site were conducted in 2008. The area covered by the Vehicle Dump and Community Landfill site is extensive, but environmental impacts present in 2008 were associated with disposal of metallic debris, disposal of items containing hydrocarbons (i.e, drums), disposal of PCB containing electronic equipment, disposal of pesticide containing containers. Whereas hydrocarbon, PCB, and pesticide impacts were localized to small areas near their original sources, apparent contamination from metals was more widespread and largely associated with metalloid dissolution and distribution along surface water flow pathways.

5. **QA/QC Programs to be implemented as part of the Monitoring Program:** A long-term monitoring program would be established to ensure that present and future risks are negligible and that monitoring could be terminated with confidence, based on findings of no risk and no depreciation of site environmental status. The program would be developed specifically to:
    - Inspect and monitor surface water integrity, flow rates, channelling and physical conditions;
    - Monitor, evaluate and analyze for metals in surface waters over time; and
    - Ensure the protection of human health and environment from exposure to chemicals of concern.

    Both passive and active monitoring would be undertaken at the property. A site inspection program (passive monitoring) would be conducted to observe the physical condition of the surface water bodies. An active surface water monitoring program would be developed upon which future risk management decisions could be based. This plan would effectively provide an early warning system that could be implemented in association with a Contingency Plan and could provide the decision criteria for termination.