Nunavut Water Board
Water License Application

From:

Transport Canada
344-3rd Floor Edmonton Street
Winnipeg, Manitoba
R3C 0P6

Iqaluit, Nunavut Airport Projects:

Bitumen Drum Cache
&
Sea Can Drum Cache

March 5, 2007

Mike Molinski
Environment Officer
Ph: 204.984.0440
Fax: 204.983.5048
e-mail: molinsm@tc.gc.ca

Nunavut Water Board Water License Application Executive Summary

BITUMEN STORAGE DRUM CACHE IQALUIT AIRPORT

Works under this proposal cover the removal of all bitumen storage drums, associated contaminated soil, associated asphalt tar grit cylinders and confirmatory soil sampling. A final report will be prepared and submitted after the work is completed.

The storage compound is located approximately 100m northeast of Apron I and 300 m east of Runway 18-36. The compound is a developed area used for airport operations miscellaneous storage. The compound is fenced and located airside with access through Gate 10 with permission and security clearance from the Nunavut Airport. The area impacted is approximately 65m X 25m. The site is graded with crushed gravel for vehicle travel and storage requirements. There is some vegetation in areas that does not have regular usage, however, no natural vegetation exists in the area discussed. The topography is generally flat with no water bodies or watercourses in the surrounding location.

The compound contains approximately 1600 – 205L metal drums containing bitumen used to resurface the runway and associated apron and taxiways. The drums have been stored at this location for an undetermined length of time. The drums have been stored horizontally in rows and stacked in some locations two to three high. Over time many of the drums have leaked their contents. It is estimated 20% of the drums are full, 70% are empty (leaked all contents), and 10% are partially full. It is estimated 30% of the area impacted was covered by bitumen that has leaked from the drums and reached a depth of 10 – 100 mm. The bitumen has remained on the surface due to its viscosity and not migrated into lower depths of the soil. Transport Canada assessed the area in August 2006 (see attached photos) by digging two test pits to a depth of 300 mm and taking two confirmatory samples of the bitumen (laboratory results attached). As a result of the leaking bitumen, a crushed gravel berm was pushed against the drums on the east and west sides of the rows to contain the material. The berm is approximately 500 mm in height and 500 mm wide.

In addition to the bitumen drums there are approximately 300 asphalt grit cylinders containing aggregate material approximately 750 mm X 450 mm and weighing 45 kg each. It is assumed the cylinders were used as an additive to the bitumen for paving. The cylinders are stored in 15 wire mesh containers with several cylinders stored loosely on wooden pallets. There is also approximately 35 nearly empty drums that contained Lorcon Foam Compound located in the compound.

All waste material (metal drums, bitumen, contaminated soil and grit cylinders) will be removed and sent outside of Nunavut for proper disposal at a licensed facility.

ABANDONED SEA CAN AND ASSOCIATED DRUM CACHE IQALUIT AIRPORT

Works under this proposal cover the removal of a sea can containing several drums of waste oil and empty storage containers. In addition, there are several metal drums containing waste oil, batteries and miscellaneous construction material including wood pallets, wood debris and several batteries. There are several locations at the site that have surface staining adjacent to the metal drums. All contaminated soil encountered will be removed and placed in the NWB Licensed Land Treatment Unit. A confirmatory soil sampling program will be conducted to ensure all contamination has been removed.

The sea can and drums are located adjacent to the northwest corner of Apron I at the Iqaluit airport. The area is located airside and secured by a fence with access through Gate 10 requiring airport permission and security clearance. The location is adjacent to a newly constructed Land Treatment Unit (LTU) in 2006. The area is a developed site that has been used as the location of a previously decommissioned LTU. The site has a crushed gravel base and graded for vehicle access. The topography is generally flat and graded slightly higher than the surrounding area. Sparse vegetation exists at the location where areas do not receive regular traffic, however, no natural vegetation exists due to the development of this site in the past.

The area that is impacted is approximately 20m X 13m. An abandoned sea can containing 4 PCB metal storage drums each containing a 205L metal drum with waste oil. There are also 2 Enviropac storage containers with waste oil inside the sea can. In addition, there are 3 metal storage containers that are empty located inside the sea can.

Outside the sea can there are approximately 100 – 205L drums containing waste oil stored on wooden pallets standing upright. At several locations surface staining is evident indicating the drums have partially leaked their contents. It is estimated there is approximately 300 m^3 of contaminated soil. The hauling distance to the LTU from the impacted site is 100m. Transport Canada investigated the site in 2006 taking samples of the waste oil in the sea can marked with PCB storage and the drums outside the sea can. The laboratory results indicated no PCB's are present.

In addition, there are approximately 50 batteries of various sizes on site and 8 empty green Enviropac storage containers designated of PCB storage. These containers were also swabbed and tested for the presence of PCB's with the laboratory results negative.

The site also contains 5 wooden timbers, approximately 10 wooden pallets, 2-15 kg gas cylinders and some small pieces of scattered metal debris.

All metal storage containers, 205L metal storge drums and waste oil will be sent outside of Nunavut for proper disposal to a licensed facility. Waste oil contaminated soil will be placed in the newly constructed LTU approved by Nunavut Water Board in 2006 (see attached license).

ᓄᓇᕗᑦᒥ ᐃᒪᓕᕆᔾᑯᓐᓂᒃ ᓚᐃᓐᓯᑖᕈᒪᔪᓂᒃ ᓯᕗᓕᖅᑎᓄᑦ ᐅᓂᒃᑳᑦ ᓇᐃᓈᖅᓯᒪᔪᑦ

BITUMEN ᖃᑦᑕᐅᔭᖅ ᙳᖅᑲᐃᕙᐅᓯᒪᔪᖅ ᐃᖃᓗᐃᑦ ᒥᑦᑕᖅᕕᖕᖑᓐᓂ

ᑖᓐᓇ ᑐᒃᓯᕋᐅᑦ ᐱᖃᐅᓯᔾᔨᓯᒪᔪᑦ ᓅᑕᐅᒥᐊᖅᑲᖅᓂᖕᒋᓐᓂᒃ ᖃᑦᑕᐅᔭᑦ ᙳᖅᑲᐃᕙᐅᕙᒃᑐᑦ, ᐃᔾᔪᒥᒃ ᓱᕐᕋᖅᓯᒪᔪᓂᒃ ᙳᖅᑲᐃᕚᑦ, ᖁᐊᖅᑎᑕᐅᒃᓴᑦ ᑖᓚᓖᑦ ᓴᕙᕋᔭᑦ ᐊᒻᒪ ᐃᔾᔪᒥᒃ ᖃᐅᔨᓴᕐᓴᓂᒃᑕᒥᓃᑦ. ᑭᖑᓪᓕᖅᐸᖅᓯᐅᒻᒥᑦ ᐅᓂᒃᑲᓂᒃ ᐋᖅᑭᒃᓯᐃᔪᖃᖅᓂᐊᖅᑐᖅ ᑐᓂᐅᖅᑲᖅᑕᐅᓂᐊᖅᑐᑎᓪᓗ ᐱᔭᕇᖅᑕᐅᑐᐊᖅᐸᑕ.

ᙳᖅᑲᐃᕚᑦ ᖃᑦᑕᐅᔭᑦ ᐃᓂᖃᖅᕖᖑᓪᓚᑦ ᐃᒪᖃ 100m ᒦᑕᓂᒃ ᐅᖓᓯᓐᓂᓕᒃ ᒥᑦᑕᖅᕕᐅᑉ Apron I ᖃᓂᖏᔭᓂ ᐊᒻᒪ 300 m ᒦᑦᑕᓂᒃ ᐅᖓᓯᓐᓂᓕᒃ ᑲᓇᓐᓇᖑᓂᒃ ᒥᙵᕕᐅᑉ 18-36. ᑖᓐᓇ ᐃᓂᖓ ᐋᖅᑭᒃᑕᐅᓚᐅᖅᓯᒪᔪᖅ ᒥᑦᑕᖅᕕᐅᑉ ᑭᓯᑐᐃᓐᓇᖅᓂᑦ ᑐᖅᑯᕆᐊᓕᓐᓂᒃ ᐱᖃᓯᐅᔾᔨᓯᒪᖁᓪᓗᒋᑦ. ᐃᓂᖓ ᓴᐃᓘᓕᖅᓯᒪᔪᖅ ᐊᒻᒪ ᐊᑐᐃᓐᓇᐅᓪᓗᓂ ᐅᐸᖑᕆᐅᓪᓗᓂ ᐃᓯᖅᕕᖑᒍᑦ 10 ᐊᖏᖅᑕᐅᓯᒪᓕᐊᖃᖅᑐᑎᒃ ᐊᒻᒪ ᐅᐊᕐᓯᒍᑦ ᐃᓯᖅᑎᑕᐅᕆᐊᖃᖅᑐᑎᒃ ᓄᓇᕗᑦ ᒥᑦᑕᖅᕕᖕᖑᓐᓂ. ᐊᒃᑐᖅᑕᐅᓂᖃᖅᑐᖅ ᐃᓂᖓ ᐊᖏᑎᒋᓪᓗᐊᖅᑐᖅ ᐃᒫᒃ 65m X 25m. ᐃᓂᖓ ᒪᓂᖅᑲᖅᓴᖅᓯᒪᔪᖅ ᑐᐊᐸᖑᑦ ᓄᓇᓯᐅᑎᓄᑦ ᐅᐸᒃᑕᐅᔪᓐᓇᖅᓂᐊᕐᒪᑦ ᑐᖅᑯᐃᕙᐅᓂᖓᓗ. ᐃᓚᖓᒍᑦ ᐱᕈᖅᑐᓪᓖᓪᓗᓂ ᑭᓯᐊᓂᓕ ᐊᑐᑦᑕᐅᖏᓐᓇᖅᑲᑦᑕᕋᓂ, ᑭᓯᐊᓂᓕ, ᑕᒥᓂ ᐱᕈᖅᖄᖅᓂᑯᓐᓂᒃ ᐱᑕᖃᕈᓐᓃᖅᑐᖅ. ᓄᓇᖓ ᒪᓂᕋᐅᓪᓗᓂ ᐃᒪᖅᑕᖃᕋᓂᓗ ᐅᕝᕙᓘᓐᓂᑦ ᑯᓚᓛᒃᕖᖃᕋᓂ ᐊᕙᓗᐊᓂ.

ᐃᓂᖓ ᐃᒪᖃ 1600ᓂᒃ 205ᒪᓄᑦ ᖃᑦᑕᐅᔭᖅᑕᓕᒃ ᓴᕖᕋᔭᓂᒃ ᐃᓗᓕᖅᑲᐅᖅᑐᑦ bitumenᒥᒃ ᐊᑐᖅᑕᐅᕙᒃᑐᖅ ᒥᑦᑕᖅᕕᐅᑉ ᖁᐊᖅᑎᑕᖓᑕ ᖃᓕᐸᐱᐊᒃᓴᖑᓂᒃ ᐊᒻᒪ ᒥᑭᑦᑕᖅᕕᐅᑉ ᐊᖅᑯᑎᖏᓐᓂᒃ ᓴᓂᕋᓄᑦ ᐃᓯᖅᕕᖏᓐᓂᒃ ᐊᐅᓪᓚᑎᐊᖅᑐᕕᖏᓐᓂᓪᓗ. ᖃᑦᑕᐅᔭᑦ ᑐᖅᑯᖅᑕᐅᓯᒪᔪᑦ ᐃᓂᖓᓂ ᓇᓗᓇᐃᖅᓯᒪᓚᐅᑎᒃ ᖃᓄᑎᒋ ᑕᐅᕙᓃᓐᓂᐊᖅᒪᖔᑕ. ᖃᑦᑕᐅᔭᑦ ᑐᖅᑯᖅᑕᐅᓯᒪᔪᑦ ᑐᑭᓕᕆᓕᑎᑕᐅᓯᒪᕋᓯᐊᖅᑐᑦ ᓯᐊᒃᑐᑎᒃ ᐊᒻᒪ ᖁᓕᕆᓕᖅᑎᑕᐅᓪᓗᑎᒃ 2 ᐊᒻᒪ 3 ᐃᓯᒐᓪᓗᐊᑦ ᖁᒻᒧᑦ. ᐃᒻᒪᑐᖃᐅᓕᕐᒪᑦ ᖃᑦᑕᐅᔭᑦ ᕿᕋᖅᑲᑦᑕᕐᓂᑰᓕᖕᖑᑦ. ᒥᒃᓴᐅᓴᐅᓯᒪᔪᑦ ᐃᒻᒪᖃ 20ᐳᓴᑦ ᖃᑦᑕᐅᔭᑦ ᑕᑕᑎᒥᓂᖏᑦ, 70ᐳᓴᑎᖏᑦ ᐃᒪᖃᓐᖏᑦᑐᑦ (ᕿᕋᖅᑐᐃᓐᓇᐅᓯᒪᔪᑦ), ᐊᒻᒪ 10ᐳᓴᑎᖏᑦ ᑕᑕᐸᓗᒃᑐᓗᐊᑦ. ᒥᒃᓴᐅᓴᐅᓯᒪᔪᑦ 30ᐳᓴᑎᖓ ᓄᓇᖓᑕ ᕿᓪᓚᕿᕕᐅᓂᑯᑦ bitumenᒥᒃ ᖁᐊᖅᑎᕐᓯᒍᑎᒥᓂᕐᓂᑦ ᖃᑦᑕᐅᔭᓂᒃ ᐊᒻᒪ ᓄᓇᐅᑉ ᐃᑭᐊᖑᓄᐊᕐᓯᒪᓪᓗᑎᒃ ᐃᒻᒪᖃ 10ᒥᓕᒦᑕᒥᒃ 100 ᒥᓕᒦᑕᒧᑦ ᐊᒻᒧᑦ ᓄᓇᒧᑦ. ᑖᒃᑯᐊ ᖁᐊᕐᑎᕐᓯᒍᑎᒥᓃᑦ ᖃᖓᓃᖏᓐᓇᕐᒪᑕ ᐅᐱᓐᓇᕋᓂ ᑕᖏᖅᑲᕐᓂᖏᓐᓄᑦ ᓄᓇᐅᑉ ᐃᑭᐊᖑᓅᕈᓐᓇᓐᖏᓪᓚᑦ ᑖᓚᕈᔫᓂᖏᓐᓄᑦ. ᑲᓇᑕᐅᑉ ᐃᖏᕋᔪᓕᕆᔾᔪᑎᖏᑦ ᖃᐅᔨᓴᕐᓂᓚᐅᕐᑐᑦ ᐋᒍᓯ 2006ᖑᑎᓪᓗᒍ (ᑕᑯᓕᑦ ᐊᔾᔨᙳᐊᑦ) ᓂᐅᖅᑐᐃᓪᓗᑎᒃ ᒪᕈᐃᓕᖓᔫᓐᓂ ᐃᓯᖅᓴᓕᐅᕐᓂᓚᐅᕐᑐᑦ ᐊᒻᒧᑦ 300 ᒥᓕᒦᑕᒧᑦ ᐊᒻᒪ ᒪᕈᐋᓐᓂᒃ ᖃᐅᔨᓴᕐᓴᓂᓚᐅᕐᑐᑦ ᖁᐊᕐᑎᑕᐅᓴᓕᒻᒥᒃ bitumenᒥᒃ (ᖃᐅᔨᓴᕐᕕᐅᑉ ᖃᐅᔨᔭᐅᓂᑯᑦ ᐱᖃᓯᐅᔾᔭᐅᓯᒪᔪᑦ ᑖᒃᑯᓄᖓ). ᕿᓪᓚᖃᑦᑕᕐᓂᖏᓐᓄᑦ ᖃᑦᑕᐅᔭᑦ, ᑐᐊᐸᓕᕐᓯᐃᓚᐅᕐᑐᑦ ᓯᖃᓪᓕᓯᒪᔪᒥᒃ ᐊᕙᑎᖏᑦ ᖃᑦᑕᐅᔭᑦ ᑲᓇᓐᓇᖑᓂ ᐱᓇᓐᓇᖑᓂᓗ ᓯᐊᒃᓯᒪᔪᑦ ᑖᒃᑯᐊ ᕿᓪᓚᐸᓪᓕᐊᔪᑦ ᐊᓯᐊᓅᒃᑕᐃᓕᕐᑯᓪᓗᒋᑦ. ᑖᒃᑯᐊ ᑐᐊᐸᓕᕐᑐᖅᑕᐅᔪᑦ ᓴᐃᒎᖏᑦ ᐃᒻᒪᖃ ᐃᔾᔪᑎᒥᓂᖅᑐᑦ 500 ᒥᓕᒦᑕᒥᒃ.

ᓯᓕᒃᑲᓐᓂᖅ bitumenᑕᓖᑦ ᖃᑦᑕᐅᔭᑦ ᐃᒻᒪᖃ 300ᓂᒃ ᖁᐊᖅᑎᑕᐅᓕᐅᕈᑎᓄᑦ ᓴᕖᔭᖃᐅᕐᑐᑦ ᑭᑉᐸᖓᒃᑐᓂᒃ ᐊᖏᑎᒋᔪᑦ 750 mm ᒥᓕᒦᑕᑦ X 450 mm ᒥᓕᒦᑕᑦ ᐊᒻᒪ ᐅᖁᒪᐃᓐᓂᓖᑦ 45 ᑭᓗᒍᕋᒻᓴᓂᒃ ᐊᑐᓂ. ᐃᓯᒪᒋᔭᐅᓯᒪᓪᓗᑦ ᓯᓪᓗᓖᑦ ᐊᑐᖅᑕᐅᓚᐅᖕᖑᑦ ᐱᖃᓯᐅᔾᔭᐅᖁᔭᐅᓪᓗᑎᒃ ᖁᐊᖅᑎᑕᐅᕐᓄᑦ bitumenᒥᒃ. ᓯᓪᓗᓖᑦ ᑐᖅᑯᖅᑕᐅᓯᒪᔪᑦ 15ᓂ ᐅᐊᔭᖅᑐᓂ ᙳᖅᑲᐃᕙᓐᓂᒃ ᓯᓪᓗᓕᑯᑖᓂ ᑐᖅᑯᖅᑕᐅᓯᒪᓪᓗᑎᒃ ᕿᔪᑦ ᖃᖓᓃᕈᔫᔭᑐᐃᓐᓇᕐᑐᑦ. ᐃᒻᒪᖃ 35ᖑᒻᒪᑕ ᐃᒪᖃᖏᑦᑐᑦ/ᐃᓗᓕᖃᓐᖏᑦᑐᑦ ᖃᑦᑕᐅᔭᑦ ᓗᐊᑲᓐᖃᑐᑦ ᐃᑭᐊᕐᑎᒃᓴᔭ ᑎᒻᒦᒃᑳᖅ (Lorcon Foam) ᑕᐃᒪᐃᒃᑐᒃᑯᕕᒥᓂᖅ ᐃᓂᖓᓂ.

ᐊᑦᑕᑯᓕᒦᑦ (ᓴᕖᔭ ᖃᑦᑕᐅᔭᑦ, ᖁᐊᖅᑎᕐᓯᔾᔪᑏᑦ (bitumen), ᓱᕐᕋᖅᓯᒪᔪᑦ ᐃᔾᔪᑦ ᐊᒻᒪ ᓴᕖᔭᑦ ᐳᑐᕐᖠᑦ ᖁᐊᖅᑎᕐᓯᒍᑎᑦ) ᓅᑕᐅᓂᐊᖅᑐᑦ ᐊᐅᓪᓚᕐᑎᑕᐅᓗᑎᓪᓗ ᓄᓇᕗᑦ ᓯᓚᑖᓄᑦ ᑲᒪᒋᔭᐅᕐᓯᐊᕐᓂᐊᕐᖓᑕ ᓚᐃᓴᓐᓯᖅᑐᒥ ᓯᕐᕋᑎᓇᕕᒻᒥ.

ᕿᒪᒃᑯ ᑕᕆᐅᕐᒥ ᖃᑦᑕᐅᔭᑦ ᐊᒻᒪ ᖃᑦᑕᐅᔭᑦ ᐹᖅᑲᐃᕕᐅᕗᒃᑐᑦ ᓱᓇᑐᐃᓐᓇᕐᓂᑦ ᐃᖅᑲᓗᐃᑦ ᒥᑦᑕᕐᕕᖓᓂ

ᑐᒃᓯᕋᐅᑎᒃᑯᑦ ᓈᑕᐅᓂᖏᑦ ᑕᕆᐅᕐᒥ ᖃᑦᑕᐅᔭᐅᕙᒃᑐᑦ ᐊᒥᓱᑦᑕᐅᓪᓗᑕ ᐅᖅᓱᐊᓗᒋᑦ ᐊᒻᒪ ᐃᒪᖅᑲᓐᖏᑦᑐᑦ ᖃᑦᑕᐅᔭᑦ. ᓯᓚᒃᑲᓂᖅ, ᖃᑦᓯᑲᑦᑕᐅᓪᓗᑕ ᓴᕕᖃᔭᑦ ᖃᑦᑕᐅᔭᒋᑦ ᐅᖅᓱᐊᓗᒋᑦ, ᕿᑦᑎᒥᓂᒋᑦ ᐊᓯᖏᓐᓂᑦᑐ ᐃᑦᑐᓕᐅᕐᑎᓄᑦ ᓴᓇᔪᑎᒥᓂᕐᓂᑦ ᐱᖃᓯᐅᑎᓯᒪᔪᑦ ᕿᔪᑦ ᑐᓐᖓᕕᒥᓃᑦ, ᕿᔪᑦ ᓴᓂᕐᓗᒃᑯᑦ ᐊᒻᒪ ᖃᑦᓯᑲᑦᑕᑦ ᕿᑦᑎᒥᓃᑦ. ᖃᑦᓯᑲᑦᑕᐅᓪᓗᑦ ᐃᓂᑕᐊᕐᖑᓯᒪᔪᑦ ᒥᑦᑕᕐᕕᐅᑉ ᖃᓂᕐᒋᔭᓂ ᓄᓇᐅᑉ ᖃᓐᖓ ᓯᕐᕿᓯᒪᓪᓗᑎᒃ ᖃᓂᕐᒋᔭᓂᒃᑐᑦ ᖃᑦᑕᐅᔭᑦ. ᐃᓘᓐᓇᓂ ᓯᕐᕿᓯᒪᔪᖅ ᐃᔾᔪ ᖃᐅᔨᔭᐅᒃᐸᑦ ᓈᑕᐅᓂᐊᕐᑐᑦ ᐊᒻᒪ ᐹᖅᑕᐅᓗᑎᒃ ᐹᖅᑲᐃᕕᓐᓄᑦ ᓄᓇᕗᕐᒥ ᐃᒪᓕᕆᔭᒃᑯᑦ ᑲᑎᒪᔨᖏᑦᑕ ᓚᐃᓴᓐᓯᖃᕐᑎᑕᖏᓐᓄᑦ ᓄᓇᒥᒃ ᓴᓗᒪᖅᓴᐃᔨᓄᑦ. ᐃᔾᔪᒥᒃ ᖃᐅᔨᓴᕐᓴᓂᒎᑎᒃᓴᓂᒃ ᐱᑕᕐᔪᑎᑕᖅᖑᓪᓗᑦ ᖃᐅᔨᓴᕐᓴᓂᕐᕕᐅᓂᐊᕐᑐᑦ ᓯᕐᕿᓇᕐᑐᒥᒃ ᓈᑕᐅᔭᕆᐊᖅᑐᖅᑲᕐᒪᖔᑦ ᑕᐅᕙᓐᖓᑦ.

ᑕᕆᐅᕐᒥᑦ ᖃᑦᑕᐅᔭᒋᑦ ᖃᑦᑕᐅᔭᓗ ᖃᓄᕐᕕᓃᑦᑐᑦ ᒥᑦᑕᕐᕕᐅᑉ ᐅᐊᓇᖓᑕ ᐱᓇᓇᖓᓂ ᑎᑎᕋᐊᓂ Apron I ᐃᖅᑲᓗᐃᑦ ᒥᑦᑕᕐᕕᖓᑕ ᓴᓂᐊᓂ. ᑖᒃᑯᐊ ᐃᓂᖓᑦ ᒥᑦᑕᕐᕕᓪᓚᑳᖓᑕ ᓴᓂᕐᒌᑦᑐᑦ ᐊᒻᒪ ᓴᐃᓘᓕᖅᑐᐃᓯᒪᓪᓗᑎᒃ ᐃᓯᕆᐊᕐᕕᖓᑕ 10ᒍᑦ ᑎᑭᑦᑐᒍ ᒥᑦᑕᕐᕕᒻᒥᐅᓄᑦ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ ᐅᐊᓯᒪᓪᓗ ᐃᓯᖅᑎᑕᐅᓯᒪᔪᑦ. ᐃᓂᖓ ᓅᑦᒥᓪᓗᑦ ᓄᓇᒥ ᓴᓗᒪᓇᐊᓪᓚᓄᑦ ᐃᓂᒃᓴᓪᓚᐅᔪᑕᐅᑦᒥ (LTU) 2006ᖑᑎᓪᓗᒍ. ᑖᓐᓇ ᐊᖅᑭᒃᓯᖅᑕᐅᓯᒪᔪᖅ ᐃᓂᖓ ᐊᑐᕐᓂᖅᑕᐅᔪᕐᒥᓂᖅ ᐅᐊᓯᐊᕈ ᑕᐃᒪᐃᒃᑐᓂᒃ ᐊᑐᖅᑕᐅᖃᕋᕐᑐᖅ. ᓄᓇᖓ ᒪᓂᕿᓪᓗᑦ ᐊᒻᒪ ᑐᐊᐸᓪᓯᕐᓯᒪᔾᔪᑎᒃᑐᖅ ᕐᑯᑦᓯᓂᖅᓴᓪᓚᕐᒍᓪᓗᓂ ᐊᕙᑎᐊᓃᒃᑐᓂᒃ. ᐱᕈᕐᕕᕿᖅᔪᑎᓂ ᓄᓇᓯᐅᑎᖅᑲᖅᑲᖓᓂᖏᑦ, ᑭᓯᐊᓂᓪᓗ, ᐱᕈᖅᑲᓪᓚᐅᕐᓯᒪᔪᑦ ᑖᒪᓂ ᐱᑦᖃᕈᓂᕐᑐᑦ ᓄᓇᖓ ᓴᓇᔭᐅᓯᒪᓂᖓᓄᑦ.

ᐊᑐᖅᑕᐅᓂᖃᓂᐊᕐᑐᖅ ᐊᖏᓂᖓ 20m ᒦᑦᑕ X 13m ᒦᑦᑕ. ᕿᒪᒃᑯ ᑕᕆᐅᕐᒥᑦ ᐹᖅᑲᐃᕕᐅᓯᒪᔪᖅ ᖃᑦᑕᐅᔭᒋᖅ ᑎᓴᒪᐅᓪᓗᑦ ᐲᔾᐱᖅᑲᖅᑐᑦ ᓴᕕᖃᔭᑦ ᖃᑦᑕᐅᔭᑦ ᐅᖅᑯᒪᐃᓐᓂᒋᑦ 4 205L ᒋᑦᑕᓂᒃ ᖃᑦᑕᐅᔭᒋᑦ ᐅᖅᓱᐊᓗᕈᔪᒃᑕᒋᑦ. ᒪᕿᓪᒥᔫᒃ (Enviropac)ᒥᒃ ᑐᖅᑯᐃᕖᑦ ᐅᖅᓱᐊᓗᕈᔪᒥᓂᕐᒥᑦ ᑕᕆᐅᕐᒦᑦᑐᓇᕐᑐᑦ ᖃᑦᑕᐅᔭᒋᖏᓐᓄᐊᕐᓯᒪᔪᑦ. ᓯᓚᒃᑲᓂᖅ, ᐱᖓᓱᓪᓚᑕ ᖃᑦᑕᐅᔭᑦ ᐃᒪᖅᑲᓐᖏᑦᑐᑦ ᐃᓗᓕᖅᑲᓐᖏᑦᑐᓪᓗ ᐱᖃᓯᐅᔾᔭᐅᓯᒪᔪᑦ ᑕᕆᐅᕐᒦᓯᑦ ᖃᑦᑕᐅᔭᒃᑯᕕᖓᓐᓂ.

ᐊᓯᐊᓂ ᑕᕆᐅᕐᒦᑦᑐᓇᕐᑐᑦ ᖃᑦᑕᐅᔭᑦ ᐃᒻᒪᖅ ᐅᖅᑯᒪᐃᓐᓂᒋᑦ 100 - 205L ᒋᑦᑕᓂᒃ ᖃᑦᑕᐅᔭᓂᒃ ᐅᖅᓱᕈᔪᒃᑕᒋᑦ ᕿᔪᒥᑦ ᐊᑖᒍᕈᑎᖅᑲᖅᑐᑎᒃ ᓇᐸᑦᑐᐊᕐᑐᓂᒃ. ᖃᑦᓯᑲᑦᑕᑦ ᐃᓂᖏᑦᑕ ᖄᖏᑦ ᓇᓗᓇᕈᓐᓂᕐᖓᑕ ᐃᑦᑕᒃᓯᒪᔪᑦ ᑕᑯᑦᑐᒥᑦ ᖃᑦᑕᐅᔭᑦ ᕿᕐᑳᕐᓯᒪᓂᖏᑦ. ᒥᒃᓴᐅᓴᐅᓯᒪᔪᑦ ᐃᒻᒪᖅ 300 m³ ᒦᑦᑕᓂᒃ ᓯᕈᕐᓯᒪᒋᐊᖓ ᐃᔾᔪᖓ ᓄᓇᖓ. ᓈᑕᐅᓂᖏᑦ ᓯᕈᕐᓇᕐᑐᓂᒃ ᑐᖅᑯᐃᕖᒍᑦ ᐅᖓᓯᓐᓂᖅᑲᔭᕐᑐᖅ 100m ᒦᑦᑕᓂᒃ. ᑲᓇᑕᐅᑉ ᐃᖏᕐᖃᔪᑎᓂᐊᒃᑯᖏᑦ ᖃᐅᔨᓴᑕᐅᕐᖓᑕ ᐃᓂᖓᓂᒃ 2006ᖑᑎᓪᓗᒍ ᖃᐅᔨᓴᖅᓴᓂᕐᕕᐅᑎᓗᓂ ᓄᓇᖓᓂᒃ ᐅᖅᓯᕈᔪᒃ ᑕᕆᐅᕐᒦᑦᑐᓇᕐᑐᒥ ᖃᑦᑕᐅᔭᒦᑦᑐᑦ ᓇᓗᓇᐃᕐᑕᐅᓯᒪᓪᓗᑎᒃ ᐲᔾᐲᒥᒃ ᐃᓗᑎᖅᑲᓇᐊᖏᑦ ᐊᒻᒪ ᖃᑦᑕᐅᔭᑦ ᓯᓚᑖᓂᑦ. ᖃᐅᔨᓴᖅᑕᐅᓚᐅᕐᑎᓪᓗᒋᑦ ᐃᓗᐊᓃᒃᑐᑦ ᐲᔾᐲᖅᑲᓐᖏᑦᑐᓘᖅ.

ᓯᓚᒃᑲᓂᖅ, ᐃᒻᒪᖅ 50ᖑᒻᒪᑕ ᒫᑦᑎᒥᓃᑦ ᐊᔾᔨᖏᑦᑐᑕᐅᓪᓗᑎᒃ ᐊᖏᓕᕇᑦ ᐃᓂᖓᓂ ᐊᒻᒪ 8ᖑᒻᒪᑕ ᐃᒪᖅᑲᓐᖏᑦᑐᑦ ᓴᓗᒪᖅᓴᐃᑏᑦ (Enviropac)ᒥᒃ ᐹᖅᑲᐃᕖᑦ ᐲᔾᐱᒍᑦ ᐹᖅᑲᐃᕕᐅᕙᒦᕐᓂᐊᕐᑐᑦ. ᑖᒃᑯᐊ ᐹᖅᑲᐃᕖᑦ ᖃᐅᔨᓴᖅᓴᓂᕐᕕᐅᓚᐅᕐᒥᔪᑦ ᐊᒻᒪ ᐆᒃᑐᖅᑕᐅᓪᓗᑎᒃ ᐲᔾᐲᖅᑲᓐᖏᒃᑲᓗᐊᕐᒪᖔᑕ ᐊᒻᒪ ᖃᐅᔨᒋᐊᕐᑕᐅᓚᐅᕐᑐᑎᒃ ᑐᑭᓯᔭᐅᓚᐅᕐᒥᔪᖅ ᐱᑕᖃᓐᖏᒋᐊᖓ.

ᐃᓂᖓ ᑕᓪᓕᒪᓂᒃ ᕿᔪᒃᑕᖃᐅᕐᒥᔪᖅ ᓇᐸᕐᑐᒥᓂᕐᓂᑦ, ᐃᒻᒪᖅ ᖁᓕᑦ ᐅᒥᐊᕐᔪᐊᒃᑯᑦ ᐅᓯᖃᑦᑕᓂᒃ ᐃᓂᖃᕐᕕᒥᓃᑦ ᕿᔪᑦ, 2ᒥᒃ 15ᓄᑦ ᑭᓗᒍᕋᒻᒥᒃ ᐅᖅᑯᒪᐃᓐᓂᒋᑦ ᐅᖅᓱᐊᓗᒻᒧᑦ ᓯᑦᑐᒋᑦ ᐊᒻᒪ ᒥᑭᑦᑐᑎᑯᓗᐃᑦ ᓯᐊᒃᓯᒪᔪᑦ ᓴᕕᖃᔭᒥᓃᑦ.

ᐃᓘᓐᓇᑎᑦ ᓴᕕᖃᔭᒃ ᐹᒃᓴᔭᑦ, 205L ᒋᑦᑕᓂᒃ ᐹᖅᑲᐃᕕᐅᔪᓐᓇᕐᑐᑦ ᓴᕕᖃᔭᑦ ᖃᑦᑕᐅᔭᒋᑦ ᐊᒻᒪ ᐅᖅᓱᐊᓗᒻᒥᓂᕐᓂᑦ ᖃᑦᑕᐅᔭᑦ ᐊᐅᓪᓚᕐᑎᑕᐅᓂᐊᕐᑐᑦ ᓄᓇᕗᑦ ᓯᓚᑖᓄᑦ ᐃᑭᑕᐅᕐᓯᐊᓂᐊᕐᖓᑕ ᓚᐃᓴᓐᓯᓕᓐᓄᑦ ᓴᓗᒪᖅᓴᐃᔨᓄᑦ. ᐅᖅᓱᐊᓗᒥᓂᒋᑦ ᓯᕈᕐᓯᒪᔪᑦ ᓄᑦᑑᕐᑕᐅᓂᐊᕐᑐᑦ ᓴᓂᕐᕙᐃᕕᒻᒧᑦ (LTU) ᐊᖏᖅᑕᐅᓯᒪᔪᒥᒃ ᓄᓇᕗᕐᒥ ᐃᒪᓕᕆᔭᒃᑯᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ 2006ᖑᑎᓪᓗᒍ (ᑕᑯᓗᒍ ᓚᐃᓴᓐᓯ ᑕᕝᕙᖓ ᐱᖃᓯᐅᑎᓯᒪᔪᖅ).

Effective June 16, 2006

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

kNK5 wmoEp5 vtmpq
NUNAVUT IMALIRIYIN KATIMAYINGI
NUNAVUT WATER BOARD
OFFICE DES EAUX DU NUNAVUT

WATER LICENCE
APPLICATION FORM

Application for: (check one)

☒ **New** ☐ **Renewal** ☐ **Amendment** ☐ **Assignment** ☐ **Cancellation**

LICENCE NO: (for NWB use only)

1. NAME AND MAILING ADDRESS OF APPLICANT/LICENSEE

TRANSPORT CANADA
344 EDMONTON ST.
WPG, MB
Phone: 204.984.0440
Fax: 204.983.5048
e-mail: molinsm@tc.gc.ca

2. ADDRESS OF CORPORATE OFFICE IN CANADA (if applicable)

CONTACT NAME:
MIKE MOLINSKI
ENVIRONMENT OFFICER
Phone:
Fax:
e-mail:

3. LOCATION OF UNDERTAKING (describe and attach a topographical map, indicating the main components of the Undertaking)

IQALUIT, NUNAVUT AIRPORT

Latitude: (63°44'53" N) Longitude: (68°32'57" W)
NTS Map Sheet No. _____ Scale: _____

4. DESCRIPTION OF UNDERTAKING (attach plans and drawings)

① REMOVAL OF APPROX 1600-205L metal storage drums CONTAINING BITUMEN ② REMOVAL OF APPROX 100-205L metal storage drums containing waste oil (See attached)

5. TYPE OF PRIMARY UNDERTAKING (A supplementary questionnaire must be submitted with the application for undertakings listed in "bold")

☐ **Industrial**
☐ **Mining and Milling**(includes exploration/drilling)
☐ **Municipal** (includes camps/lodges)
☐ Power
☐ Agricultural
☐ **Conservation**
☐ Recreational
☒ **Miscellaneous** (describe below):

→ SEE ATTACHED: ① PROJECT DESCRIPTION.
② LOCATION MAPS.
③ PHOTOS.
④ LAB RESULTS.
⑤ e-mail & Letter from NIRB.

See Schedule II of *Northwest Territories Waters Regulations* for Description of Undertakings

6. WATER USE

- ☐ To obtain water
- ☐ To cross a watercourse
- ☐ To modify the bed or bank of a watercourse
- ☐ Flood control
- ☐ To divert a watercourse
- ☐ To alter the flow of, or store, water
- ☐ Other (describe): → NO WATER USE.

7. QUANTITY OF WATER INVOLVED (cubic metres per day including both quantity to be used and quality to be returned to source)

Water use
- ☐ 100m³/day or less
- ☐ Greater than 100m³/day; if greater, indicate quantities to be used for each purpose (camp, drilling, etc.)

Water returned to source
____ m³/day → NO WATER USE.

8. WASTE (for each type of waste describe: composition, quantity (cubic metres per day), methods of treatment and disposal, etc.) → contaminated soil (approx 300m³) with waste oil.

- ☐ Sewage
- ☐ Solid Waste
- ☐ Hazardous
- ☐ Bulky Items/Scrap Metal
- ☒ Waste oil
- ☐ Greywater
- ☐ Sludges
- ☐ Other describe):

9. OTHER PERSONS OR PROPERTIES AFFECTED BY THIS UNDERTAKING (give name, mailing address and location; attach if necessary)

Land Use Permit

DIAND	☐ Yes	☒ No	If no, date expected N/A.
Regional Inuit Association	☐ Yes	☒ No	If no, date expected N/A
Commissioner	☐ Yes	☒ No	If no, date expected N/A

10. PREDICTED ENVIRONMENTAL IMPACTS OF UNDERTAKING AND PROPOSED MITIGATION MEASURES (direct, indirect, cumulative impacts, etc.)
→ see attached.

NIRB Screening ☐ Yes ☒ No If no, date expected N/A → see attached letter

11. INUIT WATER RIGHTS

Will the project or activity substantially affect the quality, quantity, or flow of water flowing through Inuit Owned Lands and the rights of Inuit under Article 20 of the Nunavut Land Claims Agreement?

No.

If yes, has the applicant entered into an agreement with the Designated Inuit organization to pay compensation for any loss or damage that may be caused by the alteration. If no compensation agreement has been made, how will compensation be determined?

12. **CONTRACTORS AND SUB-CONTRACTORS** (name, address and functions)

N/A.

13. **STUDIES UNDERTAKEN TO DATE** (list and attach copies of studies, reports, research, etc.)

– see attached photos / lab results.

14. **THE FOLLOWING DOCUMENTS MUST BE INCLUDED WITH THE APPLICATION FOR THE REGULATORY PROCESS TO BEGIN**

Supplementary Questionnaire (where applicable: see section 5) ☐ Yes ☐ No If no, date expected ____

Inuktitut and/or Inuinnaqtun/English Summary of Project ☒ Yes ☐ No If no, date expected ____

Application fee of $30.00 (Payee Receiver General for Canada) ☐ Yes ☒ No If no, date expected N/A.

Water Use fee of $30.00 (unless otherwise indicated in Section 9 of the *NWT Waters Regulations;* Payee Receiver General for Canada)

☐ Yes ☒ No If no, date expected N/A.

15. **PROPOSED TIME SCHEDULE** (unless otherwise indicated, the NWB will consider the application for a five (5) year term)

☒ One year or less (or) ☐ Multi Year

Start Date: SUMMER 2007 Completion Date: SUMMER 2007

MIKE MOLINSKI	ENVIRONMENT OFFICER		MARCH 5/07.
Name (Print)	**Title (Print)**	**Signature**	**Date**

For Nunavut Water Board office use only

APPLICATION FEE	**Amount: $____**	**Pay ID No.: ____**
WATER USE DEPOSIT	**Amount: $____**	**Pay ID No.: ____**

ABANDONED SEA CAN AND ASSOCIATED DRUM CACHE

Works under this proposal is for the removal of a sea can containing several drums of waste oil and empty storage containers. In addition, there are several metal drums containing waste oil, batteries and miscellaneous construction material including wood pallets, wood debris and several batteries. There are several locations at the site that have surface staining adjacent to the metal drums. All contaminated soil encountered will be removed and placed in the LTU. A confirmatory soil sampling program will be conducted to ensure all contamination has been removed. A final report will be prepared and submitted after the work is completed.

The sea can and drums are located adjacent to the northwest corner of Apron I at the Iqaluit airport. The area is located airside and secured by a fence with access through Gate 10 requiring airport permission and security clearance. The location is adjacent to a newly constructed Land Treatment Unit (LTU) in 2006. The area is a developed site that has been used as the location of a previously decommissioned LTU. The site has a crushed gravel base and graded for vehicle access. The topography is generally flat and graded slightly higher than the surrounding area. Sparse vegetation exists at the location where areas do not receive regular traffic, however, no natural vegetation exists due to the development of this site in the past.

The area that is impacted is approximately 20m X 13m. An abandoned sea can containing 4 PCB metal storage drums each containing a 205L metal drum with waste oil. There are also 2 Enviropac storage containers with waste oil inside the sea can. In addition, there are 3 metal storage containers that are empty located inside the sea can.

Outside the sea can there are approximately 100 – 205L drums containing waste oil stored on wooden pallets standing upright. At several locations surface staining is evident indicating the drums have partially leaked their contents. It is estimated there is 300 m^3 of contaminated soil. The hauling distance to the LTU from the impacted site is 100m. Transport Canada investigated the site in 2006 taking samples of the waste oil in the sea can marked with PCB storage and the drums outside the sea can. The laboratory results indicated no PCB's are present.

In addition, there are approximately 50 batteries of various sizes on site and 8 empty green Enviropac storage containers designated of PCB storage. These containers were also swabbed and tested for the presence of PCB's with the laboratory results negative.

The site also contains 5 wooden timbers, approximately 10 wooden pallets, 2-15 kg gas cylinders and some small pieces of scattered metal debris.

1.0 Scope of Work

The work in the proposal will include:

1. The provision of all approvals, permits, labour and equipment necessary for the removal and disposal of all 205L metal drums and the disposal of their contents. The drums will be shipped outside of Nunavut south to a licensed facility that accepts this metal waste. The waste oil will be shipped outside of Nunavut to a licensed facility for proper disposal. The requirements for storage and shipping all material will comply with *Transportation of Dangerous Goods Act.*

2. Removal and disposal of all batteries outside of Nunavut south to a licensed facility. The requirements for storage and shipping all material will comply with *Transportation of Dangerous Goods Act.*

3. Removal and disposal of the 3 metal containers inside the sea can, 8 green metal containers, 1 sea can, 4 PCB metal storage drums, 2 gas cylinders and 2 Enviropac containers.

4. All hydrocarbon-contaminated soil encountered is to be taken to the LTU constructed adjacent to the impacted area on the Iqaluit Airport, at a site agreed to by the project manager.

5. Removal and disposal of all wooden pallets, timbers and metal debris. This material will be deposed of at the local landfill in Iqaluit.

6. Once all contaminated soil has been removed, the site will be back filled and compacted with clean fill material that is of acceptable quality to the Project Manager.

7. A soil and groundwater sampling program must also be included that will be comprehensive enough to ensure that all contamination has been removed prior to backfilling of the sites. At a minimum, the sampling program must ensure enough samples are taken to meet with Nunavut environmental guidelines.

8. Preparation of a final report.

9. The estimated time frame of the work to be completed is two (2) weeks, based on a seven (7) day workweek. Works to commence in the summer of 2007.

2.0 Methodology

2.1 Removal of Drums, Metal Containers, batteries and Wood Debris

The provision of all approvals, permits, labour and equipment necessary for the removal and disposal of all 205L metal drums and the disposal of their contents. The drums will be shipped outside of Nunavut south to a licensed facility that accepts this metal waste. The waste oil will be sent outside of Nunavut to a licensed facility for proper disposal. The requirements for storage and shipping all material will comply with *Transportation of Dangerous Goods Act.*

Removal and disposal of all batteries outside of Nunavut south to a licensed facility. The requirements for storage and shipping all material will comply with *Transportation of Dangerous Goods Act.* Removal and disposal of all wooden pallets, timbers and metal debris at the local landfill. Removal and disposal of the 3 metal containers inside the sea can, 8 green metal containers, 1 sea can, 4

PCB metal storage drums, 2 gas cylinders and 2 Enviropac containers to a facility outside Nunavut.

2.2 Soil Hydrocarbon Contamination Remediation

Excavate contaminated soil encountered will be placed in the Land Treatment Unit. The remaining soil should not exceed the CCME Level III remediation criteria for commercial/industrial zoned sites unless the excavation of this material negatively affects the structural integrity of any nearby buildings. The Project Manager must approve in writing if any further contaminated soil is to remain due to structural integrity concerns. The excavation area will be back filled with approved common fill and graded to match the surrounding area.

2.3 Sampling Requirements for Hydrocarbon Contaminated Sites

Collect a minimum of six (4) soil samples from the bottom and four walls of each of the excavations and submit to a certified laboratory (CAEAL/Standards Council of Canada) for analysis of Benzene, Toluene, Ethyl benzene, Xylene (BTEX), lead, and 2001 CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil (PHC) for Fractions 1to 4 Tier 1 criteria. If groundwater is encountered, the contractor will collect a minimum of four (4) water samples from each of the excavations for submission to a certified laboratory for analysis of BTEX and lead. The soil and water samples will be compared to the most current GN and CCME criteria for industrial sites, including the 2001 CCME Canada Wide Standards for Petroleum Hydrocarbons for the Eco Soil Contact criteria for the applicable soils (surface and subsoil). The results will be presented in a table format and submitted to Transport Canada in a final report upon completion of the project.

If groundwater sampling indicates hydrocarbon contamination, the consultant/contractor will use its previously approved groundwater treatment program. A unit cost per 100 Litres of recovered water will be provided in the bid.

2.4 Back Filling of Excavated Sites

Do not begin back filling or filling operations until Project Manager has approved the extent of excavation. Any excavations taken below previously authorized depths will not be paid for. Only clean fill that has come from a source approved by the Project Manager can be used as back fill. Results must be inspected and approved by Project Manager. The back filled area must match the general landscape and local drainage patterns to ensure water pooling does not occur. Project Manager may confirm Proctor test results at their discretion.

2.5 Protection of Buried Infrastructure

The **contractor/consultant** is responsible for locating all underground services prior to commencing work. Any costs incurred for doing this work are the responsibility of the consultant. While the work is in progress, the consultant/contractor will protect all utility lines and buried services, water, sewer, gas, electric, telephone, and other utilities and structures encountered. If any

utilities are damaged, the consultant/contractor will restore them to original or better condition unless directed otherwise. If any previously unknown underground services are damaged during this project, report the find to the Project Manager and discuss on how to proceed.

2.6 Protection of Existing Site Conditions/Site

1. Prevent movement, settlement or damage of adjacent services, paving, adjacent grades and parts of existing buildings. Provide bracing, shoring, and underpinning as required. Repair damage caused by excavation as directed by Project Manager.
2. Contractor is responsible to ensure that all paved areas are maintained free of soil or debris at all times.
3. Support affected structures and if safety of structure appears to be endangered, take preventative measures and then cease operations and notify Project Manager.
4. Prevent debris from blocking surface drainage system, mechanical, and electrical systems which must remain in operation.
5. Ensure that excavation work does not adversely affect adjacent watercourses, groundwater, and wildlife, or contribute to excess air and noise pollution.
6. Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during excavation work.
7. Fires and burning of rubbish on site not permitted.
8. Do not bury rubbish and waste materials on site.
9. Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
10. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
11. Protect trees and plants on site and adjacent properties.
12. Minimize stripping of topsoil and vegetation.
13. Restrict tree removal to areas indicated or designated by Project manager.
14. Do not operate construction equipment in Waterways.
15. Do not use waterway beds for borrow material.
16. Do not dump excavated fill, waste material or debris in waterways.
17. Do not construct temporary crossings over waterways.
18. Do not skid logs or construction materials across waterways
19. Maintain temporary erosion and pollution control features installed under this contract.
20. Control emissions from equipment and plant to local authorities emission requirements.
21. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

3.0 Regulatory Framework

The consultant/contractor shall observe all applicable Federal, Provincial, and Municipal legislation, regulations, guidelines and codes of practice including but not limited to the following:

- Canadian Environmental Protection Act;
- Transport of Dangerous Goods Act;
- National Fire Code, 1995;
- Underwriters' Laboratories of Canada;
- National Building Code, 1995 (with all current amendments);
- CCME Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites, 1993, Volume I and II;
- Work Site Hazardous Material Information System Regulation (WHMIS);
- CCME Petroleum Hydrocarbons in Soil – Canada Wide Standard, 2001;
- CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites;
- CCME Recommended Canadian Soil Quality Guidelines, 1997;
- GN Environmental Protection Act;
- GN Guideline for Contaminated Site Remediation, 1998; and
- The regulations and standards of other local governing agencies.

In case of conflict or discrepancy, the more stringent requirement shall apply. The consultant/contractor shall meet or exceed requirements of contract documents, specified standards, codes and referenced documents. The contractor/consultant will ensure that all on-site personnel are familiar with the mitigation measures included in the contractor Health and Safety Plan should a spill on-site occur.

1.0 Handling and Transportation of Dangerous Goods

The consultant/contractor will observe and enforce all Acts, Regulations, and Guidelines required by the regulatory agencies of the federal, territorial, and potentially provincial governments including but not limited to Environment Canada, Department of Environment and Transport Canada Transportation of Dangerous Goods Act and Regulations. In the case of conflict, the more stringent requirements will apply. The consultant/contractor will maintain complete records, including Bills of Lading, Manifests, and descriptions of any actions undertaken under the handling and transportation of dangerous goods.

2.0 Quality Assurance

The consultant/contractor agency, in addition to the individual site supervisor assigned to the project, shall have a minimum of five (5) years prior experience in the field of contaminated soils remediation.

The laboratory commissioned to conduct the required soil and groundwater analysis shall be a CAEAL accredited lab. The consultant/contractor must provide details of the field and laboratory QA/QC program for review in the final report.

3.0 Permits and Related Paperwork

The consultant/contractor shall be responsible for paying all costs associated with obtaining permits to complete the work specified under this contract. The consultant/contractor will also have the following paperwork available on-site at all times:

- Contract;
- Addenda;
- Change orders;
- Other modifications to Contract;
- Copy of Contractors' Health and Safety Plan; and
- Permits, licenses, and land use regulations.
- TDG Certification.

The consultant/contractor will also record all off-site removal of materials and provide the following information regarding these materials to the Project Manager:

- Time and date of removal;
- Type of material;
- Head space hydrocarbon vapour monitoring results;
- Weights and quantity of materials;
- Final destination of materials; and,
- All bills of lading concerning the material taken off site.

4.0 Site Supervision

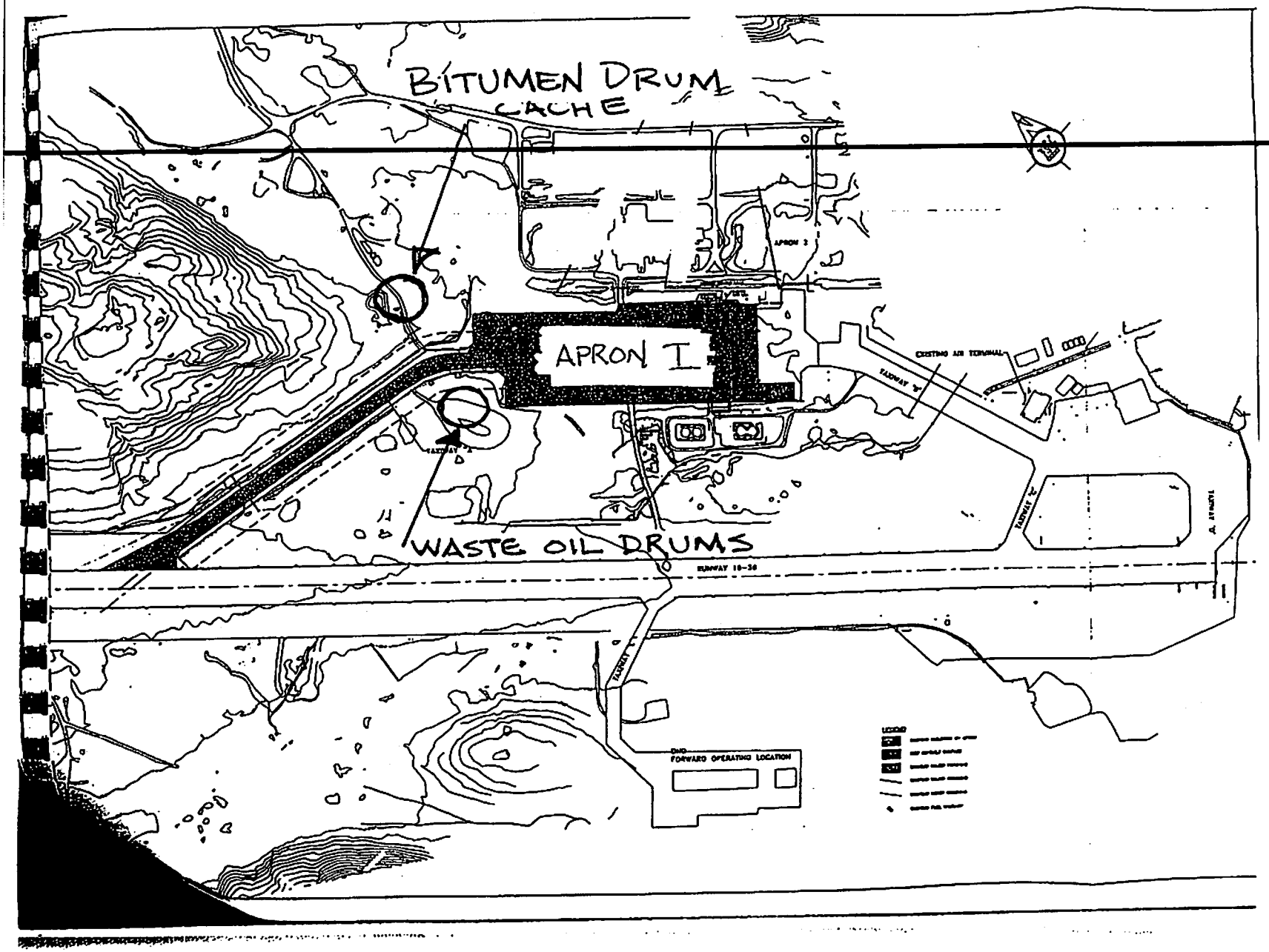
Consultant/contractor will designate a competent and qualified site supervisor to be on-site at all times during work, who has authority to oversee all aspects of the work, including but not limited to, estimating and negotiation of changes to the contract, update of submission requirements, scheduling, manpower and equipment requirements, and direct communication and co-ordination with the Project manager.

Do not replace supervisory personnel without written approval from the Project Manager.

Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Project Manager.

5.0 Confidentiality

All information data, material, etc. gathered as part of this project shall be treated as confidential, the property of Transport Canada and shall only be discussed with the Project Manager and Transport Canada personnel unless otherwise directed and authorized by the Project Manager.


BITUMEN DRUM
CACHE
APRON I
WASTE OIL DRUMS
RUNWAY 18-36
FORWARD OPERATING LOCATION

BITUMEN STORAGE DRUM CACHE

Works under this project description is for the removal of all bitumen storage drums, associated contaminated soil, associated asphalt tar grit cylinders and confirmatory soil sampling. A final report will be prepared and submitted after the work is completed.

The storage compound is located approximately 100m northeast of Apron I and 300 m east of Runway 18-36. The compound is a developed area used for airport operations miscellaneous storage. The compound is fenced and located airside with access through Gate 10 with permission and security clearance from the Nunavut Airport. The area impacted is approximately 65m X 25m. The site is graded with crushed gravel for vehicle travel and storage requirements. There is some vegetation in areas that does not have regular usage, however, no natural vegetation exists in the area discussed. The topography is generally flat with no water bodies or watercourses in the surrounding location.

The compound contains approximately 1600 – 205L metal drums containing bitumen used to resurface the runway and associated apron and taxiways. The drums have been stored at this location for an undetermined length of time. The drums have been stored horizontally in rows and stacked in some locations two to three high. Over time many of the drums have leaked their contents. It is estimated 20% of the drums are full, 70% are empty (leaked all contents), and 10% are partially full. It is estimated 30% of the area impacted was covered by bitumen that has leaked from the drums and reached a depth of 10 – 100 mm. The bitumen has remained on the surface due to its viscosity and not migrated into lower depths of the soil. Transport Canada assessed the area in August 2006 (see attached photos) by digging two test pits to a depth of 300 mm and taking two confirmatory samples of the bitumen (laboratory results attached). As a result of the leaking bitumen, a crushed gravel berm was pushed against the drums on the east and west sides of the rows to contain the material. The berm is approximately 500 mm in height and 500 mm wide.

In addition to the bitumen drums there are approximately 300 asphalt grit cylinders containing aggregate material approximately 750 mm X 450 mm and weighing 45 kg each. It is assumed the cylinders were used as an additive to the bitumen for paving. The cylinders are stored in 15 wire mesh containers with several cylinders stored loosely on wooden pallets. There is also approximately 35 nearly empty drums that contained Lorcon Foam Compound located in the compound.

1.0 Scope of Work

The work in the proposal will include:

1. The provision of all approvals, permits, labour and equipment necessary for the removal of approximately 1600 – 205L leaking metal storage drums used to store bitumen. The material will be sent south of Nunavut to a licensed disposal facility.

2. Removal of all bitumen and associated contaminated soil/gravel outside of Nunavut to a licensed facility.

3. Removal of approximately 300 cylinders of asphalt tar grit additive and associated wire storage cages (approximately 15).

4. Once all contaminated soil has been removed, the sites will be back filled and compacted with clean fill material that is of acceptable quality to the Project Manager.

5. A soil and groundwater sampling program must also be included that will be comprehensive enough to ensure that all contamination has been removed prior to backfilling of the sites. At a minimum, the sampling program must ensure enough samples are taken to meet with Nunavut environmental guidelines.

6. Preparation of a final report.

7. The estimated time frame of the work to be completed is two (2) weeks, based on a seven (7) day workweek. Works to commence in the summer of 2007.

4.0 Methodology

4.1 Removal of Metal Storage Drums

The location of the storage compound is in a developed area airside approximately 200m northeast of Apron I. The area impacted is 65m X 25m and contains approximately 1600 – 205L metal drums leaking that contain bitumen used for paving the runway. It is estimated that 20% of the drums are full, 70% are empty and 10% are partially full. There are also approximately 35 nearly empty drums that contained Lorcon Foam Compound. All drums will be shipped outside of Nunavut to a licensed waste management facility. The drums will be placed in a container that will provide secondary containment that is appropriate for shipping cargo outside of Nunavut. The requirements for storage and shipping all material will comply with *Transportation of Dangerous Goods Act.*

4.2 Bitumen Contamination Remediation

Excavate all bitumen that has leaked and associated contaminated soil /gravel encountered. The material will be removed from Nunavut and sent to a licensed facility south. The material will need to be shipped in appropriate sealed approved cargo containers. In addition, there are approximately 300 cylinders of asphalt tar grit additive approximately 45 kg each measuring 750 mm X 450 mm. These will also be shipped south outside of Nunavut to a licensed facility and associate wire storage containers (approx 15). The requirements for storage and shipping all material will comply with the *Transportation of Dangerous Goods Act.*

4.3 Sampling Requirements for Hydrocarbon Contaminated Sites

Collect a minimum of six (6) soil samples from the bottom and four walls of each of the excavations and submit to a certified laboratory (CAEAL/Standards Council of Canada) for analysis of Benzene, Toluene, Ethyl benzene, Xylene

(BTEX), and 2001 CCME Canada Wide Standards for Petroleum Hydrocarbons in Soil (PHC) for Fractions 1 to 4 Tier 1 criteria. If groundwater is encountered, the contractor will collect a minimum of four (4) water samples from each of the excavations for submission to a certified laboratory for analysis of BTEX and lead. The soil and water samples will be compared to the most current GN and CCME criteria for industrial sites, including the 2001 CCME Canada Wide Standards for Petroleum Hydrocarbons for the Eco Soil Contact criteria for the applicable soils (surface and subsoil). The results will be presented in a table format and submitted to Transport Canada in a final report upon completion of the project.

If groundwater sampling indicates hydrocarbon contamination, the consultant/contractor will use its previously approved groundwater treatment program.

4.4 Back Filling of Excavated Sites

Do not begin back filling or filling operations until Project Manager has approved the extent of excavation. Any excavations taken below previously authorized depths will not be paid for. Only clean fill that has come from a source approved by the Project Manager can be used as back fill. Results must be inspected and approved by Project Manager. The back filled area must match the general landscape and local drainage patterns to ensure water pooling does not occur.

4.5 Protection of Buried Infrastructure

The **contractor/consultant** is responsible for locating all underground services prior to commencing work. Any costs incurred for doing this work are the responsibility of the consultant. While the work is in progress, the consultant/contractor will protect all utility lines and buried services, water, sewer, gas, electric, telephone, and other utilities and structures encountered. If any utilities are damaged, the consultant/contractor will restore them to original or better condition unless directed otherwise. If any previously unknown underground services are damaged during this project, report the find to the Project Manager and discuss on how to proceed.

4.6 Protection of Existing Site Conditions/Site

1. Prevent movement, settlement or damage of adjacent services, paving, adjacent grades and parts of existing buildings. Provide bracing, shoring, and underpinning as required. Repair damage caused by excavation as directed by Project Manager.
2. Contractor is responsible to ensure that all paved areas are maintained free of soil or debris at all times.
3. Support affected structures and if safety of structure appears to be endangered, take preventative measures and then cease operations and notify Project Manager.
4. Prevent debris from blocking surface drainage system, mechanical, and electrical systems which must remain in operation.
5. Ensure that excavation work does not adversely affect adjacent watercourses, groundwater, and wildlife, or contribute to excess air and noise pollution.
6. Protect trees, plants, and foliage on-site and adjacent properties where indicated.

7. Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during excavation work.
8. Fires and burning of rubbish on site not permitted.
9. Do not bury rubbish and waste materials on site.
10. Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
11. Do not pump water containing suspended materials into waterways, sewer or drainage systems.
12. Protect trees and plants on site and adjacent properties.
13. Minimize stripping of topsoil and vegetation.
14. Restrict tree removal to areas indicated or designated by Project manager.
15. Do not operate construction equipment in Waterways.
16. Do not use waterway beds for borrow material.
17. Do not dump excavated fill, waste material or debris in waterways.
18. Do not construct temporary crossings over waterways.
19. Do not skid logs or construction materials across waterways
20. Maintain temporary erosion and pollution control features installed under this contract.
21. Control emissions from equipment and plant to local authorities emission requirements.
22. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

5.0 Regulatory Framework

The consultant/contractor shall observe all applicable Federal, Provincial, and Municipal legislation, regulations, guidelines and codes of practice including but not limited to the following:

- Canadian Environmental Protection Act;
- Transport of Dangerous Goods Act;
- National Fire Code, 1995;
- Underwriters' Laboratories of Canada;
- National Building Code, 1995 (with all current amendments);
- CCME Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites, 1993, Volume I and II;
- Work Site Hazardous Material Information System Regulation (WHMIS);
- CCME Petroleum Hydrocarbons in Soil – Canada Wide Standard, 2001;
- CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites;
- CCME Recommended Canadian Soil Quality Guidelines, 1997;
- GN Environmental Protection Act;
- GN Guideline for Contaminated Site Remediation, 1998; and
- The regulations and standards of other local governing agencies.

In case of conflict or discrepancy, the more stringent requirement shall apply. The consultant/contractor shall meet or exceed requirements of contract documents, specified standards, codes and referenced documents. The contractor/consultant will ensure that all on-site personnel are familiar with the mitigation measures included in the contractor Health and Safety Plan should a spill on-site occur.

6.0 Handling and Transportation of Dangerous Goods

The consultant/contractor will observe and enforce all Acts, Regulations, and Guidelines required by the regulatory agencies of the federal, territorial, and potentially provincial governments including but not limited to Environment Canada, Department of Environment and Transport Canada Transportation of Dangerous Goods Act and Regulations. In the case of conflict, the more stringent requirements will apply. The consultant/contractor will maintain complete records, including Bills of Lading, Manifests, and descriptions of any actions undertaken under the handling and transportation of dangerous goods.

7.0 Quality Assurance

The consultant/contractor agency, in addition to the individual site supervisor assigned to the project, shall have a minimum of five (5) years prior experience in the field of contaminated soils remediation.

The laboratory commissioned to conduct the required soil and groundwater analysis shall be a CAEAL accredited lab. The consultant/contractor must provide details of the field and laboratory QA/QC program for review in the final report.

8.0 Permits and Related Paperwork

The consultant/contractor shall be responsible for paying all costs associated with obtaining permits to complete the work specified under this contract. The consultant/contractor will also have the following paperwork available on-site at all times:

- Contract;
- Addenda;
- Change orders;
- Other modifications to Contract;
- Copy of Contractors' Health and Safety Plan; and
- Permits, licenses, and land use regulations.
- TDG Certification.

The consultant/contractor will also record all off-site removal of materials and provide the following information regarding these materials to the Project Manager:

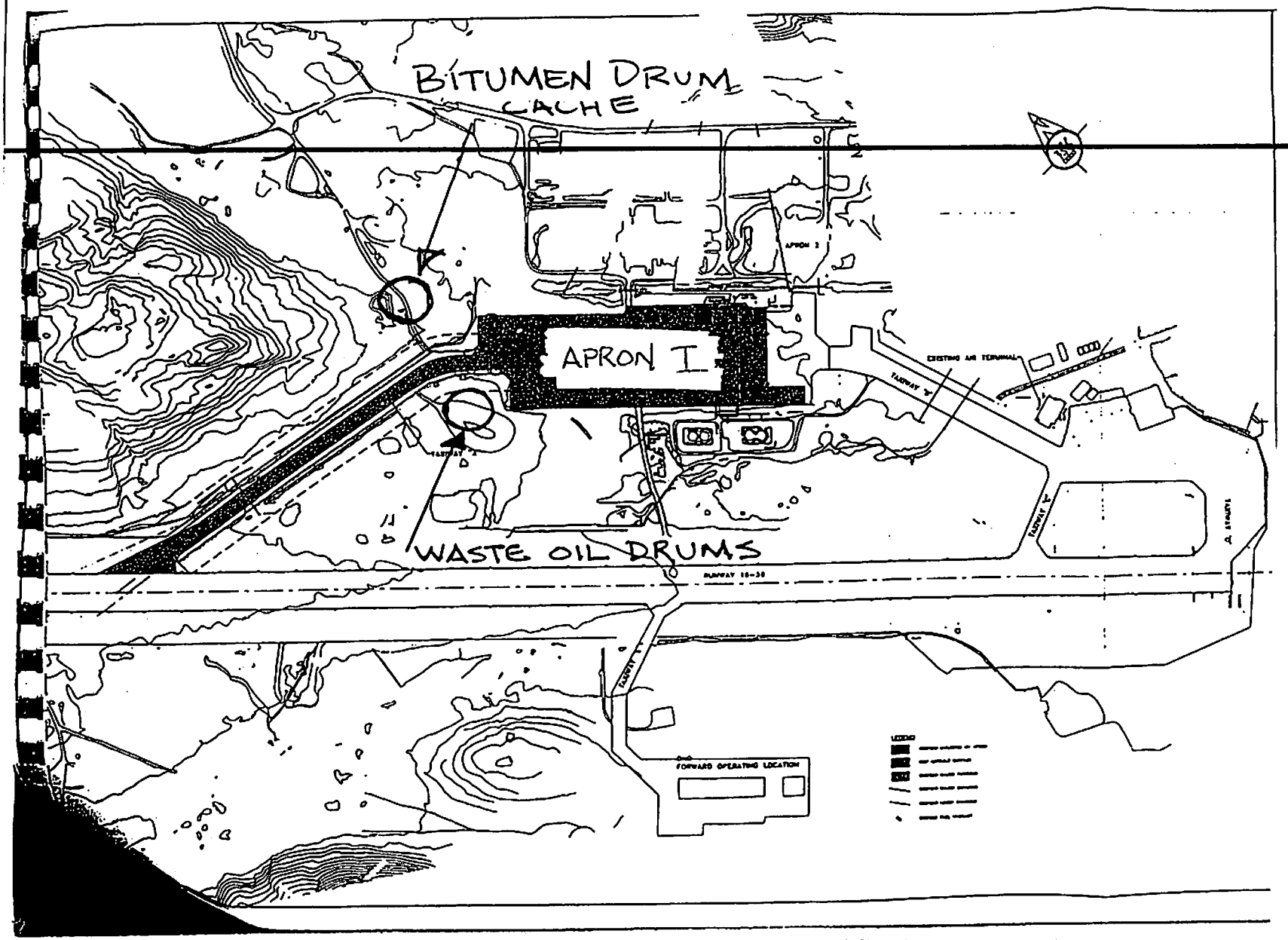
- Time and date of removal;
- Type of material;
- Head space hydrocarbon vapour monitoring results;
- Weights and quantity of materials;
- Final destination of materials; and,
- All bills of lading concerning the material taken off site.

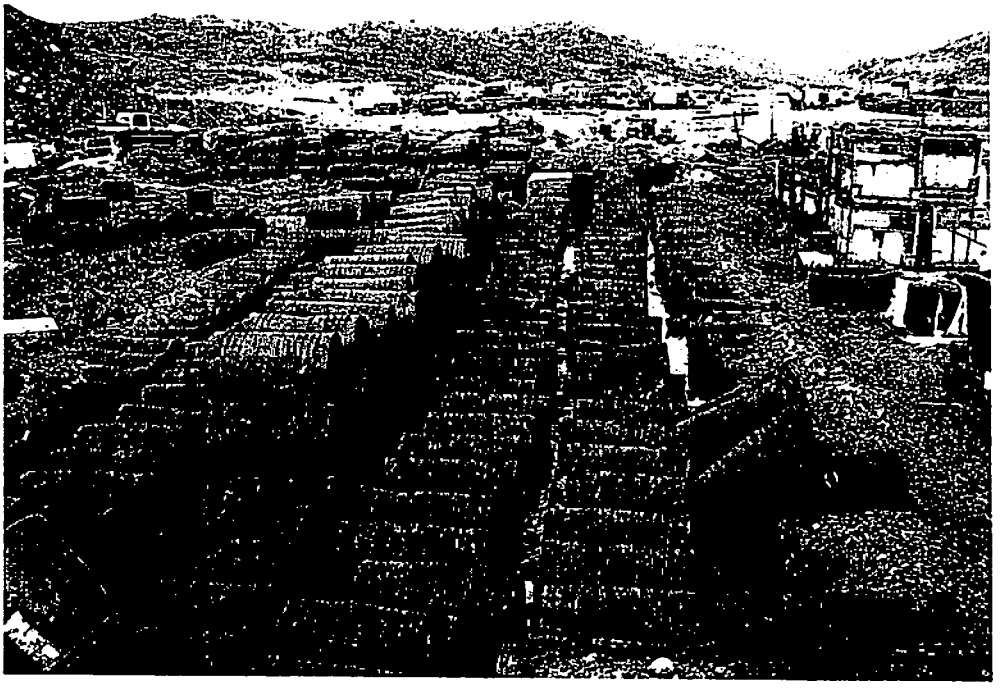
9.0 Site Supervision

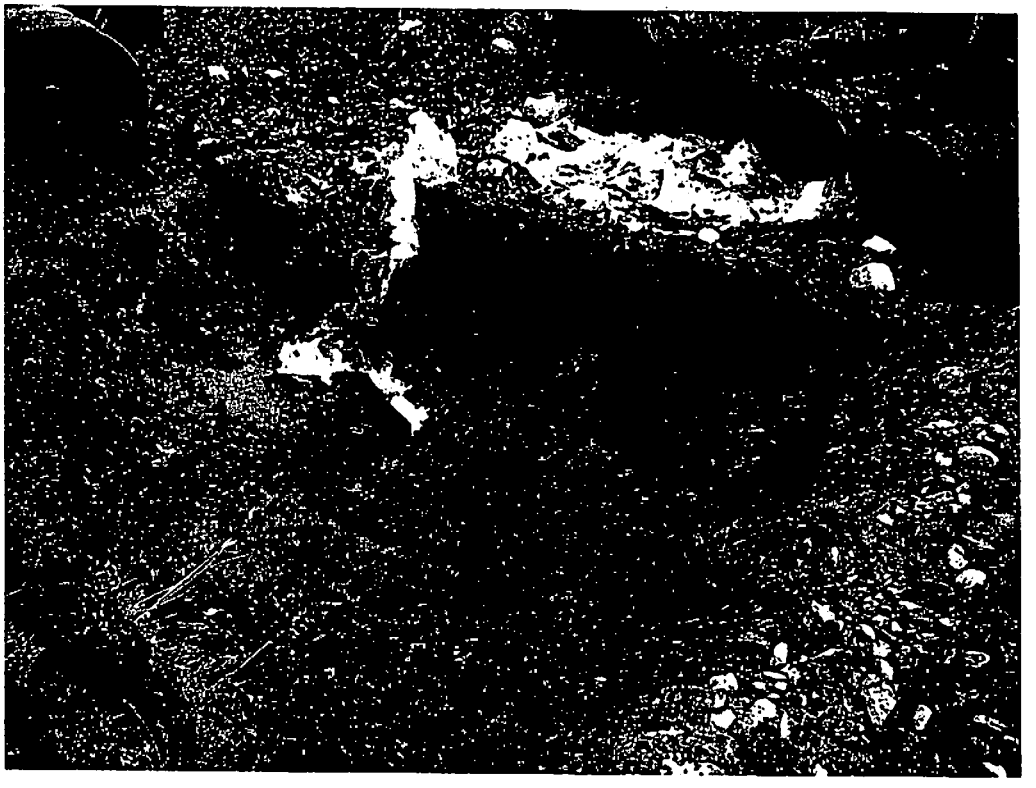
Consultant/contractor will designate a competent and qualified site supervisor to be on-site at all times during work, who has authority to oversee all aspects of the work, including but not limited to, estimating and negotiation of changes to the contract, update of submission requirements, scheduling, manpower and equipment requirements, and direct communication and co-ordination with the Project manager.

Do not replace supervisory personnel without written approval from the Project Manager.

Replace supervisory personnel, with approved replacements, within three (3) working days of a written request from the Project Manager.


BITUMEN DRUM
CACHE
APRON I
WASTE OIL DRUMS
RUNWAY 18-36
FORWARD OPERATING LOCATION





ENVIRONMENTAL MANAGEMENT TECHNOLOGIES

21 November 2006

Mike Molinski, Environment Officer
Transport Canada
Environmental Affairs
Programs, Prairie & Northern Region
344 Edmonton Street, 3rd Floor
P.O. Box 8550
Winnipeg, MB R3C 0P6

Re: Investigation of Cargo Container Located North of the Iqaluit Airport LTU Site
Iqaluit Airport, Iqaluit, Nunavut Territory
File No.: E1001-049-06

1.0 Scope of Work and Site Description

Environmental Management Technologies (EMT) was retained by Transport Canada to complete an environmental investigation at an area containing a steel cargo container that was located north of and adjacent to the Land Treatment Unit (LTU) site at Iqaluit Airport, Iqaluit, Northwest Territories. The site that was visited by an EMT site assessor consisted of a cargo container having dimensions of approximately 6 x 2.4 x 2.4m, a drum cache consisting of 100-205L drums contained in two areas and various discarded materials including 30-6V and 12V lead core batteries, as shown in Figure 1 (attached). However, the scope of the project was limited to an investigation of the cargo container, which contained 5-205L drums containing used oil and two carboys. The current report provides the details encompassing the site investigation activities completed by EMT site personnel on 30 August 2006.

The cargo container contained 5-205L drums and two carboys; four of the drums were contained within salvage drums. Each of the drums contained oil; conversely, one of the carboys was empty while the contents of the other carboy could not be determined since the site assessor was unable to safely remove the lid; the carboys had approximate dimensions of 1200 x 1200 x 1800mm. The drum cache located adjacent to the cargo container consisted of 96 metal drums and four plastic drums that were stored on wooden palettes, without appropriate secondary containment, and separated into two distinct areas of 30 and 70 drums. Some of the drums located in the drum cache were in a deteriorated state. Hydrocarbon staining was observed adjacent to the larger area of the drum cache. The discarded batteries were also located adjacent to the larger area of

805 BLACKDALE ROAD • WEST ST. PAUL, MB • R4A 9A4
PHONE: (204) 334-1631 • FAX: (204) 334-6933
Email: macnut@mts.net

carboy should be examined and the contents identified. If the carboy does contain oil, it is recommended that a sample is submitted to be tested for PCBs.

Furthermore, it is recommended that a more comprehensive investigation of this area is conducted to fully assess the site and subsurface conditions. Appropriate secondary containment should be provided for the drum cache adjacent to the cargo container or the drums should be disposed responsibly. All other materials in this area, including the discarded batteries, should be disposed responsibly. It is also recommended that a subsurface investigation is conducted to assess subsurface conditions at the site, particularly in areas of visible staining. At a minimum, soil samples obtained from the area of concern should be tested for PCBs, petroleum hydrocarbons and lead. Additional parameters to be tested may be required depending upon an historical review and a detailed inventory of materials at the area of concern.

5.0 Closure

The conclusions and recommendations presented in this report were based on the scope of work outlined for the purpose of the investigation, and were prepared in accordance with accepted environmental science principles and practices. However, as with any Environmental Site Assessment, the intent is to restore the impacted site to acceptable limits, and not to eliminate potential environmental concerns that were beyond the scope of work.

The observations made at the site do not apply to areas that could not be observed or beyond the scope of work. In addition, other materials or compounds not investigated or addressed, or beyond the scope of work could be present at the site. If other chemical parameters are identified as an environmental concern, EMT must be notified to assess whether modification to any part of this report should be conducted. If you have any questions or concerns regarding the findings, conclusions or recommendations presented herein, please contact the undersigned.

Prepared by:

Arthur Magri

Arthur Magri, B.Sc.
Environmental Regulation Superintendent
EMT

Reviewed by:

Dennis Antony

Dennis Antony, B.Sc., R.R.D.
Senior Project Manager
EMT

Encl.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

ANALYTICAL REPORT

ENVIRONMENTAL MANAGEMENT & TECH
ATTN: DENNIS ANTONY / A MAGRI
805 BLACKDALE ROAD
WEST ST PAUL MB R4A 9A4

Reported On: 12-OCT-06 02:26 PM

Lab Work Order #: L429955 **Date Received:** 05-SEP-06

Project P.O. #:
Job Reference: IQUALUIT PCB SITE
Legal Site Desc:
CofC Numbers:

Other Information:

Comments:

APPROVED BY:
GERRY VERA
Project Manager

Manitoba Technology Centre Ltd.
Part of the **ALS Laboratory Group**
1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4
Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com
A Campbell Brothers Limited Company

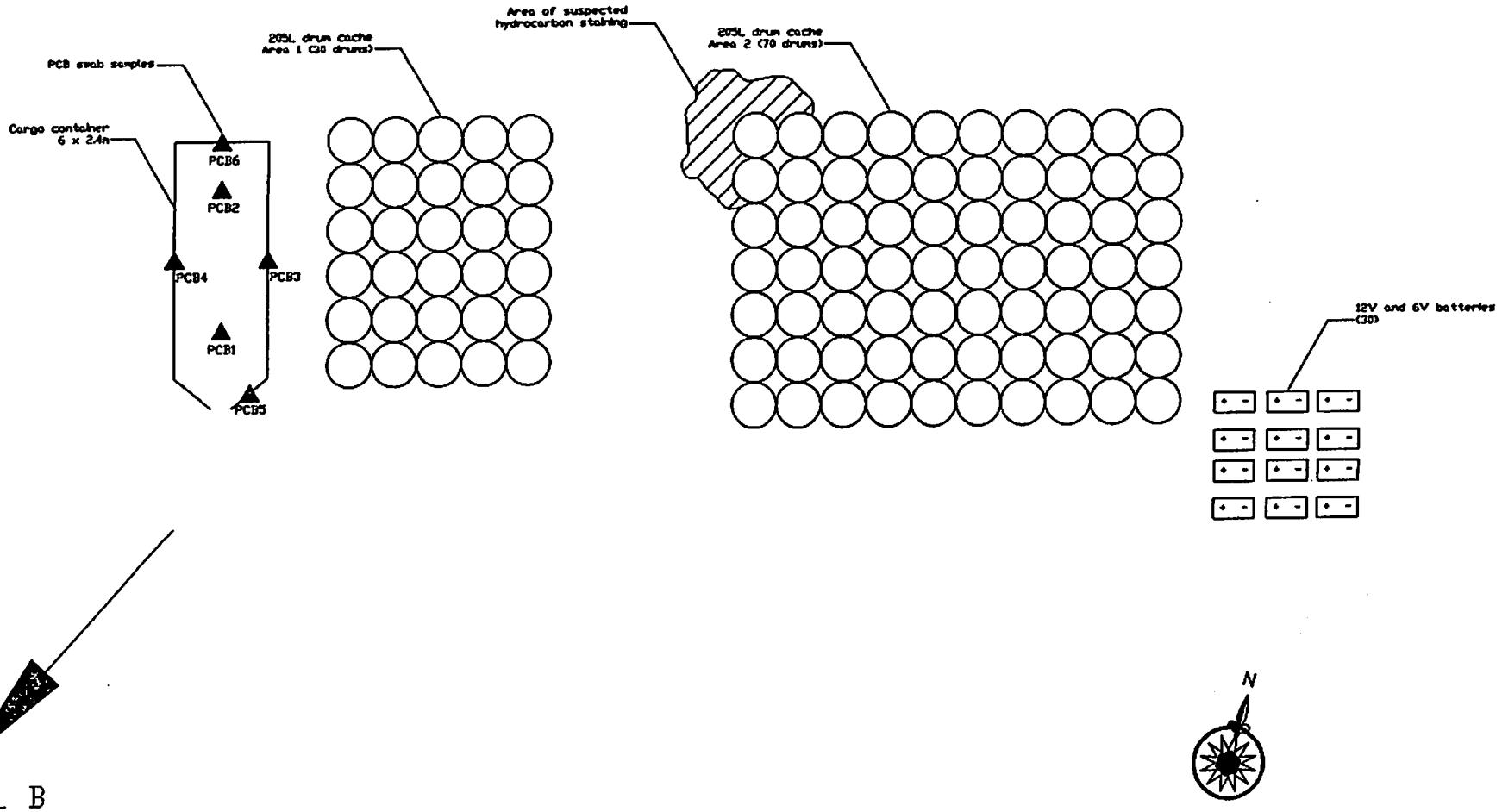
ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	MDL	Units	Extracted	Analyzed	By	Batch
L429955-4 IQ 4								
Sampled By: D. ANTONY on 30-AUG-06								
Matrix: OIL								
PCB								
Aroclor 1254	<1		1	mg/kg	08-SEP-06	11-SEP-06	THT	R440393
Aroclor 1260	<1		1	mg/kg	08-SEP-06	11-SEP-06	THT	R440393
Aroclor 1262	<1		1	mg/kg	08-SEP-06	11-SEP-06	THT	R440393
Aroclor 1268	<1		1	mg/kg	08-SEP-06	11-SEP-06	THT	R440393
Total PCBs	<1		1	mg/kg	08-SEP-06	11-SEP-06	THT	R440393
L429955-5 IQ V2								
Sampled By: D. ANTONY on 30-AUG-06								
Matrix: KITTY LITTER								
% Moisture	4.5		0.1	%	08-SEP-06	11-SEP-06	SSM	R440159
PCB								
Aroclor 1016	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1221	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1232	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1242	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1248	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1254	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1260	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1262	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Aroclor 1268	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
Total PCBs	<0.1		0.1	mg/kg	08-SEP-06	11-SEP-06	THT	R440176
L429955-6 PCB #1								
Sampled By: D. ANTONY on 30-AUG-06								
Matrix: SWAB								
PCB								
Aroclor 1016	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1221	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1232	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1242	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1248	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1254	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1260	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1262	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1268	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Total PCBs	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
L429955-7 PCB #2								
Sampled By: D. ANTONY on 30-AUG-06								
Matrix: SWAB								
PCB								
Aroclor 1016	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1221	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1232	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1242	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1248	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1254	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1260	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1262	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1268	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271

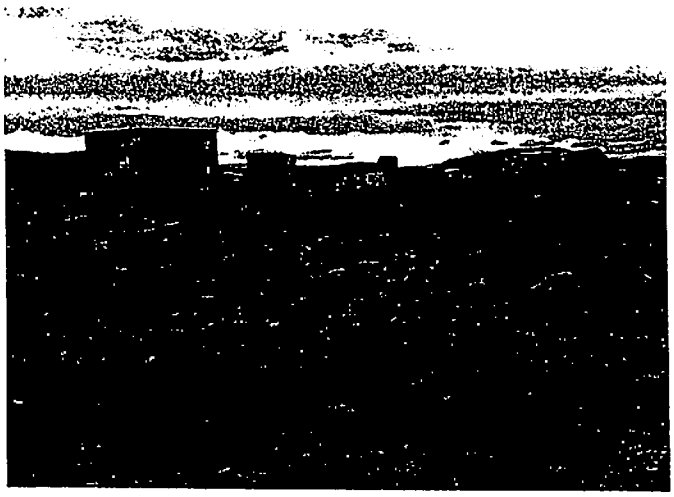
ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	DL	Units	Extracted	Analyzed	By	Batch
L429955-11 PCB #6								
Sampled By: D. ANTONY on 30-AUG-06								
Matrix: SWAB								
PCB								
Aroclor 1016	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1221	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1232	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1242	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1248	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1254	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1260	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1262	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Aroclor 1268	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271
Total PCBs	<0.5		0.5	ug	08-SEP-06	11-SEP-06	THT	R440271

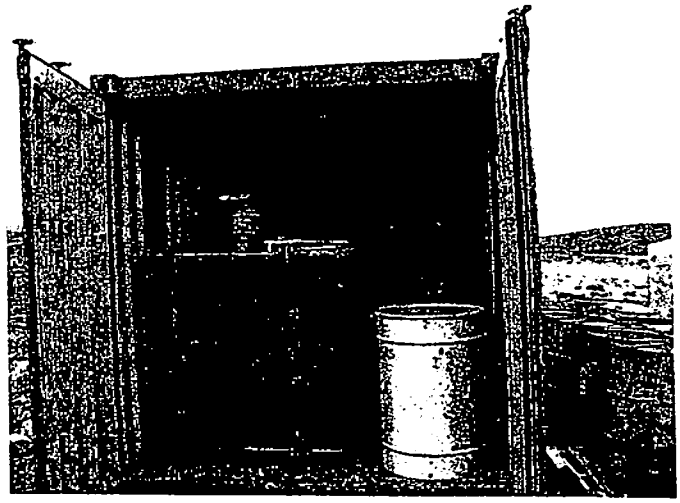
* Refer to Referenced Information for Qualifiers (if any) and Methodology.



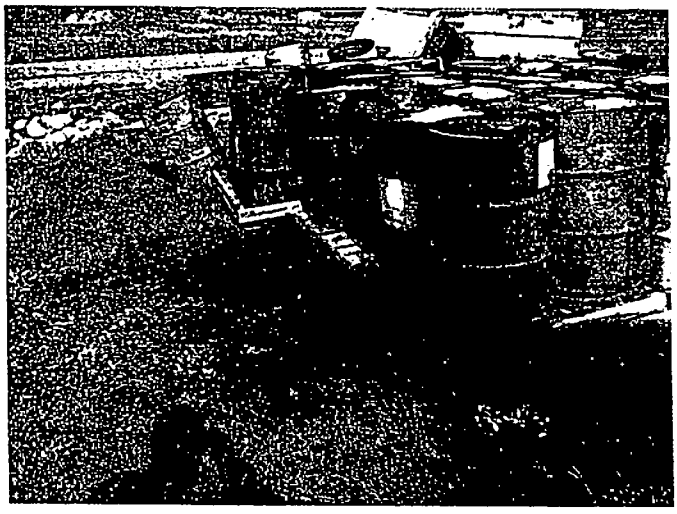
ERT	Client: Transport Canada File No.: E1001-049-06		Environmental Site Investigation Iqaluit Airport Iqaluit, Nunavut Territory Site Plan	
Drawn By: AM	Scale: NTS	Units: As Shown	Date: November 2006	Figure No.: 1



1: Profile of area containing cargo container located north of LTU

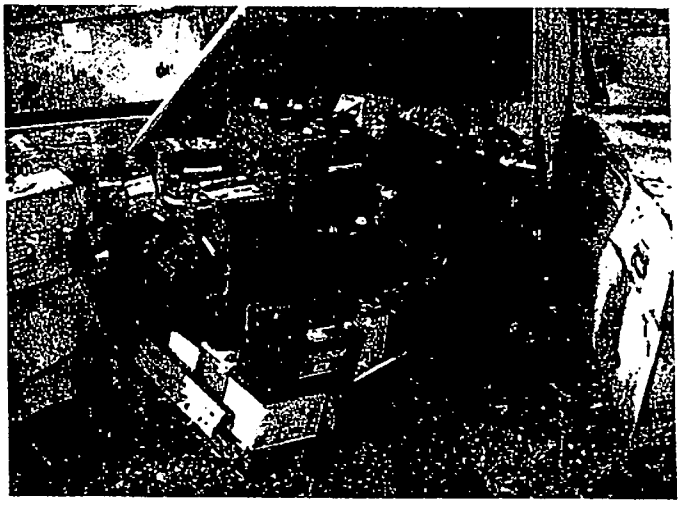


2: Contents of cargo container

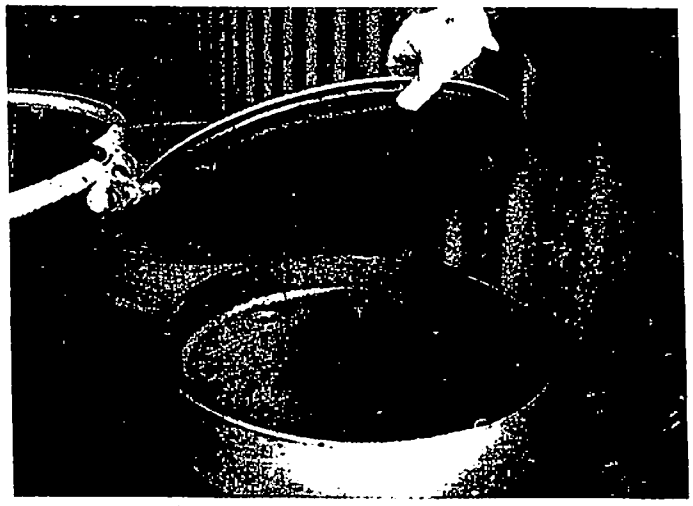


3: Suspected hydrocarbon stain near drum cache

4: Some of the drums were in deteriorated condition



5: Discarded batteries located near drum cache



6: Four 205L drums in the cargo container were contained in salvage drums

Molinski, Michael

From: Leslie Payette [lpayette@nirb.nunavut.ca]
Sent: Tuesday, February 06, 2007 5:17 PM
To: Molinski, Michael
Subject: FW: NIRB: Iqaluit Drum Cache

Dear Mr. Molinski:

This is the second of two emails I have sent with regards to this project proposal. I apologize if the first transmission did not reach you (attached above – Letter from January 16, 2007); I believe the email address I had was incorrect and I did not receive notice of it being undeliverable until I attempted to send this second email. Please see attached and below for today's correspondence.

Thank you.

Leslie

Leslie Payette
Manager Environmental Administration
Nunavut Impact Review Board
Cambridge Bay, Nunavut
Tel: 867.983.4611 (direct)
Tel: 866.233.3033 (toll-free)
Fax: 867.983.2594
http://ftp.nunavut.ca/nirb/

From: Leslie Payette [mailto:lpayette@nirb.nunavut.ca]
Sent: Tuesday, February 06, 2007 4:03 PM
To: 'molinskim@tc.gc.ca'
Cc: 'ghakongak@ntilands.com'; 'jeannie_ehaloak@ntilands.com'; Richard Dwyer; 'ecalder@nwmb.com'; 'lands@nunanet.com'; 'wbeveridge@ihti.ca'; 'holwellj@inac.gc.ca'; 'rogersji@inac-ainc.gc.ca'; 'kusugakp@inac.gc.ca'; 'gordaniert@dfo-mpo.gc.ca'; 'mike.fournier@ec.gc.ca'; 'colette.spagnuolo@ec.gc.ca'; 'cindy.parker@ec.gc.ca'; 'Myra.robertson@ec.gc.ca'; 'matkinson@gov.nu.ca'; 'hyeh@gov.nu.ca'; 'pondbiologist@qiniq.com'; 'dshewchuk@gov.nu.ca'; 'jmcconnell@gov.nu.ca'; 'eforson@gov.nu.ca'; 'gmackay@gov.nu.ca'; 'emckenna@gov.nu.ca'; 'ttoonoo@gov.nu.ca'; 'jdawe@gov.nu.ca'; 'achris@gov.nu.ca'; 'smakpah@gov.nu.ca'; 'bchambers@gov.nu.ca'; 'jross@gov.nu.ca'; 'wjoy@gov.nu.ca'; 'MAdams@gov.nu.ca'; 'preeve@gov.nu.ca'; 'jworkman@gov.nu.ca'; 'bhanley@gov.nu.ca'; 'jlamb@gov.nu.ca'; 'rmark@gov.nu.ca'; Karlette Tunaley (ktunaley@nirb.nunavut.ca); Kevin Buck (kbuck@nirb.nunavut.ca)
Subject: NIRB: Iqaluit Drum Cache

Dear Mr. Molinski:

Please see the attached letter from NIRB. Please be advised that, to date, NIRB has received no indication that this project is subject to any regulatory authorization or requires Ministerial signing authority. Therefore, pursuant to Article 12, NLCA, NIRB has determined that the project is not subject to a Part 4 screening. However, in order to proceed, this project should be subject to the attached recommended terms and conditions.

Regards,

Leslie Payette
Manager Environmental Administration
Nunavut Impact Review Board
Cambridge Bay, Nunavut
Tel: 867.983.4611 (direct)
Tel: 866.233.3033 (toll-free)

Fax: 867.983.2594
http://ftp.nunavut.ca/nirb/

3. NIRB Application Acknowledgment

NIRB File No: NA
TC File No: W583

January 17, 2007

Mike Molinski
Environmental Officer, Transport Canada
344 Edmonton Street
P.O. Box 8550
Winnipeg, Manitoba
R3C 0P3
Via email: molinskim@tc.gc.ca

Distribution

Re: Iqaluit Airport Drum Cache Remediation Project Proposal

Dear Mr. Molinski

On January 15, 2007 the Nunavut Impact Review Board (NIRB) was informed of the Iqaluit Airport Drum Cache Remediation Project Proposal from Transport Canada (TC) and requested to determine whether an application (for screening) would be required. NIRB received the following documents from TC regarding the project proposal:

- *Cover Letter from Mike Molinski to NIRB*
- *NIRB Project Summary – Part 1 Application Section 8in English*
- *Site Plan showing locations of Bitumen Drum Cache and Waste Oil Drums*
- *Photos*

All documents referenced above can be obtained from NIRB's ftp site at http://ftp.nunavut.ca/nirb/NIRB_SCREENINGS/PENDING_SCREENINGS/

Essentially, the outcome of a NIRB screening of a project proposal is an indication from NIRB to the responsible Minister as to whether the proposal may be processed without a review or that a review pursuant to Part 5 or 6 of the Nunavut Land Claims Agreement (NLCA) is required (see section 12.4.4 of the NLCA). The NLCA defines the Minister as the federal or territorial Minister having jurisdictional responsibility for authorizing a project to proceed (see section 12.1.1 of the NLCA).

NIRB and the proponents (GN and TC) have corresponded to determine whether the project proposal requires a permit or authorization from the Government of Canada or Territorial Government that would trigger a NIRB screening in accordance with Article 12 of the Nunavut Land Claims Agreement (NLCA). At this time, no such authorization has been identified. Since a Minister has not been identified to whom NIRB would report its recommendation, NIRB is of the view that this Project Proposal will not be screened (i.e. the Project will proceed without screening).

Prior to reaching a final decision on the screening of this Project Proposal, by copy of this letter NIRB wishes to confirm with the distribution list if any authorization for this Project Proposal is required by an authorizing agency. NIRB requests an indication of signing authority by **February 1, 2007.** If no authorization requirements are identified, NIRB will proceed on the basis that the Project Proposal will

not be screened. When doing so, NIRB will provide the attached recommendations to the proponent for the proponent's consideration.

Comments and any further correspondence on this file should be directed to Ms. Leslie Payette, NIRB's Manager of Environmental Administration, at lpayette@nirb.nunavut.ca.

If you have any questions or concerns, feel free to contact Karlette Tunaley, Technical Advisor at 403-697-7897 or ktunaley@nirb.nunavut.ca.

Yours Truly,

(original signed by:)

Karlette Tunaley
Technical Advisor

DRAFT RECOMMENDATIONS

General

1. These recommendations apply on the basis of the information received from Transport Canada on January 15, 2007 including:

   - *Cover Letter from Mike Molinski to NIRB*
   - *NIRB Project Summary – Part 1 Application Section 8in English*
   - *Site Plan showing locations of Bitumen Drum Cache and Waste Oil Drums*
   - *Photos*

2. Transport Canada is responsible to ensure that no permits or authorizations are required that would trigger a NIRB screening in accordance with Article 12 of the NLCA.

Physical Environment

3. The proponent shall control all movement of machinery, vehicles and equipment within the contaminated area to prevent the dispersion of contaminated materials into the environment.

4. The proponent shall decontaminate all equipment prior to movement to another area. Any fluids resulting from the decontamination shall be collected and contained.

5. The proponent shall avoid causing soil damage that exposes permafrost. These areas shall be repaired immediately.

6. The proponent shall ensure that any exposed soil piles are covered to prevent migration of wind blown contaminants.

7. The proponent shall not obstruct natural drainage.

8. The proponent shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting.

9. The backfilled areas shall match the general landscape and local drainage patterns.

Water

10. The proponent shall ensure compliance with Section 36 of the Fisheries Act which requires that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance may enter such a water body.

11. The proponent shall ensure that discharges of surface water and waste water meet the approval of the Nunavut Water Board

12. The Licensee shall not remove any material from below the ordinary high water mark of any water body.

13. The Licensee shall not do anything that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

14. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

Wildlife

15. The proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.

16. The proponent shall ensure there is minimal disturbance to any nesting birds and wildlife in the area.

Waste

17. Wastes shall be treated or disposed of in a manner deemed appropriate by the Nunavut Water Board (NWB)

18. The contaminated sites shall meet soil and water quality clean up objectives that are deemed acceptable to the Nunavut Water Board.

19. The requirements for storage and shipping of all material will comply with the *Transportation of Dangerous Goods Act*

20. Drums shall be placed in containers that will provide secondary containment

21. The proponent shall install an impermeable membrane on the ground/floor of any contaminated storage site.

22. The proponent shall have an emergency response and spill contingency plan approved by the Nunavut Water Board prior to the commencement of on-site activities

23. The proponent shall ensure that wastes associated with the project do not spread to the surrounding lands or enter into any waterbody.

24. The proponent shall ensure that drainage into and from the site is controlled to prevent contaminants from leaving the site and to prevent runoff from entering the site, thus becoming contaminated.

25. The proponent shall ensure that the contaminated areas have secured and controlled access.

Archaeology and Palaeontological Sites

26. Prior to commencing on site activities, the proponent shall contact the Government of Nunavut Department of Culture Language Elders and Youth.

Socio-Economics

27. The proponent shall ensure that all workers follow established protocols for working with wastes and/or contaminated materials and in conducting all on site works.

28. The proponent shall record all injuries and incidents and have reporting procedures included in an Emergency Response Plan.

29. The proponent shall conduct community consultation to ensure that community members are kept informed about the activities, results and plans regarding the site.

30. The proponent shall maximize business opportunities in Nunavut to the fullest extent possible

NIRB File No: NA
TC File No: W583

February 6, 2007

Mike Molinski
Environmental Officer, Transport Canada
344 Edmonton Street
P.O. Box 8550
Winnipeg, Manitoba
R3C 0P3
Via email: molinskim@tc.gc.ca

Distribution

Re: Iqaluit Airport Drum Cache Remediation Project Proposal

Dear Mr. Molinski

As you are aware NIRB requested that interested parties provide an indication (by February 1, 2007) as to whether this project was subject to any required authorization or subject to any ministerial signing authority (NIRB correspondence dated January 17, 2007 sent to TC and distribution list).

Please be advised that, to date, NIRB has received no indication that this project is subject to any regulatory authorization or requires ministerial signing authority. The Iqaluit International Airport Division of the Government of Nunavut, Department of Economic Development & Transportation did however extend complete and full support to Transport Canada for this application.

Therefore, pursuant to Article 12, NLCA, NIRB has determined that the project is not subject to a Part 4 screening. However, in order to proceed, this project should be subject to the attached recommended terms and conditions. These recommendations address environmental and socioeconomic concerns that may arise during the course of project activity.

If you have any questions or concerns, feel free to contact Karlette Tunaley, Technical Advisor at 403-697-7897 or ktunaley@nirb.nunavut.ca.

Yours Truly,

(original signed by:)

Karlette Tunaley
Technical Advisor

RECOMMENDATIONS

General

1. These recommendations apply on the basis of the information received from Transport Canada on January 15, 2007 including:

   - *Cover Letter from Mike Molinski to NIRB*
   - *NIRB Project Summary – Part 1 Application Section 8in English*
   - *Site Plan showing locations of Bitumen Drum Cache and Waste Oil Drums*
   - *Photos*

2. Transport Canada is responsible to ensure that no permits or authorizations are required that would trigger a NIRB screening in accordance with Article 12 of the NLCA.

Physical Environment

3. The proponent shall control all movement of machinery, vehicles and equipment within the contaminated area to prevent the dispersion of contaminated materials into the environment.

4. The proponent shall decontaminate all equipment prior to movement to another area. Any fluids resulting from the decontamination shall be collected and contained.

5. The proponent shall avoid causing soil damage that exposes permafrost. These areas shall be repaired immediately.

6. The proponent shall ensure that any exposed soil piles are covered to prevent migration of wind blown contaminants.

7. The proponent shall not obstruct natural drainage.

8. The proponent shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting.

9. The backfilled areas shall match the general landscape and local drainage patterns.

Water

10. The proponent shall ensure compliance with Section 36 of the Fisheries Act which requires that no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance may enter such a water body.

11. The proponent shall ensure that discharges of surface water and waste water meet the approval of the Nunavut Water Board

12. The Licensee shall not remove any material from below the ordinary high water mark of any water body.

13. The Licensee shall not do anything that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

14. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

Wildlife

15. The proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.

16. The proponent shall ensure there is minimal disturbance to any nesting birds and wildlife in the area.

Waste

17. Wastes shall be treated or disposed of in a manner deemed appropriate by the Nunavut Water Board (NWB)

18. The contaminated sites shall meet soil and water quality clean up objectives that are deemed acceptable to the Nunavut Water Board.

19. The requirements for storage and shipping of all material will comply with the *Transportation of Dangerous Goods Act*

20. Drums shall be placed in containers that will provide secondary containment

21. The proponent shall install an impermeable membrane on the ground/floor of any contaminated storage site.

22. The proponent shall have an emergency response and spill contingency plan approved by the Nunavut Water Board prior to the commencement of on-site activities

23. The proponent shall ensure that wastes associated with the project do not spread to the surrounding lands or enter into any waterbody.

24. The proponent shall ensure that drainage into and from the site is controlled to prevent contaminants from leaving the site and to prevent runoff from entering the site, thus becoming contaminated.

25. The proponent shall ensure that the contaminated areas have secured and controlled access.

Archaeology and Palaeontological Sites

26. Prior to commencing on site activities, the proponent shall contact the Government of Nunavut Department of Culture Language Elders and Youth.

Socio-Economics

27. The proponent shall ensure that all workers follow established protocols for working with wastes and/or contaminated materials and in conducting all on site works.

28. The proponent shall record all injuries and incidents and have reporting procedures included in an Emergency Response Plan.

29. The proponent shall conduct community consultation to ensure that community members are kept informed about the activities, results and plans regarding the site.

30. The proponent shall maximize business opportunities in Nunavut to the fullest extent possible

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No.: **1BR-LTU0608**

August 21, 2006

Mike Molinski
Environmental Affairs
Transport Canada
3rd Floor- 344 Edmonton St.
Winnipeg, MB R3C 0P6

RE: NWB Licence No. 1BR-LTU0608

Dear Mr. Molinski:

Please find attached Licence No. **1BR-LTU0608** issued to Transport Canada by the Nunavut Water Board pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada.* The terms and conditions of the attached Licence related to waste disposal are an integral part of this approval.

Sincerely,

Original Signed By:

Philippe di Pizzo
Chief Administrative Officer

PDP/sg/rqd

Enclosure: Licence No. **1BR-LTU0608**

cc:

Carson Gillis	Nunavut Tungavik Incorporated
Colette Spagnuolo	Environment Canada
Doug Sitland	Government of Nunavut Community & Government Services
Earle Baddaloo	Government of Nunavut Department of Environment
Erin Calder	Nunavut Wildlife Management Board
Jim Rogers	Indian and Northern Affairs Canada
Peter Kusugak	Indian and Northern Affairs Canada
Salamonie Shoo	Qikiqtani Inuit Association
Tania Gordanier	Department of Fisheries & Oceans

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

ᓄᓇᕗᑦ ᐃᒪᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ
NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

DECISION

LICENCE NUMBER: 1BR-LTU0608

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a new of a Water Licence dated May 4, 2006 made by:

TRANSPORT CANADA – ENVIRONMENTAL AFFAIRS

to allow for the disposal of waste during the construction and operation of a land treatment unit located within the Qikiqtani Region, Nunavut (contained within the geographical coordinates indicated in the application).

DECISION

After having been satisfied that the application was in conformity with the applicable Land Use Plan and exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with Schedule 12.1, Paragraph 5 of the *Nunavut Land Claim Agreement* (NLCA), the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA)* and Article 13 of the *NLCA*, public notice of the application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and representations made by interested persons, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *NWNSRTA*, decided to waive the requirement to hold a public hearing and furthermore to delegate its authority to approve the application to the Chief Administrative Officer pursuant to S. 13.7.5 of the *NLCA* and S. 49(a) of the *NWNSRTA*, and determined that:

Licence Number 1BR-LTU0608 be issued subject to the terms and conditions contained th erein.

SIGNED this 21st day of August 2006 at Gjoa Haven, NU.

Original Signed By:

Philippe di Pizzo
CHIEF ADMINISTRATIVE OFFICER

LICENCE 1BR-LTU0608

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

TRANSPORT CANADA – ENVIRONMENTAL AFFAIRES
(Licensee)

of

3rd Floor – 344 Edmonton Street, Winnipeg, MB R3C 0P6
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water for a period subject to restrictions and conditions contained within this Licence:

Licence Number	**1BR-LTU0608**
Water Management Area	**NUNAVUT 05**
Location	**QIKIQTANI REGION, NUNAVUT**
Purpose	**WASTE DISPOSAL**
Classification of Undertaking	**INDUSTRIAL – TYPE "B"**
Quantity of Water Not to Exceed	**0 CUBIC METRES PER DAY**
Date of Licence	**AUGUST 21, 2006**
Expiry Date of Licence	**DECEMBER 31, 2008**

Dated this 21st day of August 2006 at Gjoa Haven, NU.

Original Signed By:

Philippe di Pizzo, Chief Administrative Officer

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the use of water and the disposal of waste for an undertaking classified as Industrial as per the geographical coordinates indicated in the application.

i. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Nunavut Waters and Nunavut Surface Rights Tribunal Act, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and;

ii. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. Definitions

"**Act**" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Amendment**" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

"**Appurtenant Undertaking**" means an undertaking in relation to which a use of water or a deposit of waste is permitted by a licence issued by the Board;

"**Board**" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"**Inspector**" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"**Land Treatment Unit**" means the landfarm facility licensed to be constructed and operated under this Licence as described in the application;

"**Licensee**" means the holder of this Licence;

"**Modification**" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"**Nunavut Land Claims Agreement**" **(NLCA)** means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada"*, including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"**Project Drawing**" means the KGS Group drawing number 06-1344-01 stamped by a professional engineer that was submitted with the application;

"**Regulations**" means the *Northwest Territories Water Regulations sor/93-303 8th June, 1993*;

"**Spill Contingency Plan**" means a Plan developed to deal with unforeseen petroleum and chemical events that may occur during the operations conducted under the Licence;

"**Treatment Objective**" means the treatment objective for the Land Treatment Unit, which is the Canadian Council of Ministers of the Environment (CCME), 2001 *Canada – Wide Standard for Petroleum Hydrocarbon in Soil*, for Industrial land use; and

"**Waste**" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means.

3. Enforcement

i. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

ii. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

iii. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the licensee, Inspectors appointed under the *Act*, hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B: GENERAL CONDITIONS

1. Water use fees are not required for this Licence as per S. 7 of the *Act*.

2. Licensee shall file an Annual Report on the appurtenant undertaking with the Board no later than March 31st of the year following the calendar year being reported which shall contain the following information:

   i. A summary report of waste disposal activities, including photographic records of the waste disposal facilities;

   ii. A list of unauthorized discharges and a summary of follow-up actions taken;

   iii. A up-to-date copy of the Spill Contingency Plan;

   iv. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of operations;

   v. Results of the Monitoring Program; and

   vi. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

3. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

4. If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the Nunavut Land Claims Agreement. The NWB recommends that an application for the renewal of this Licence be filed at least three months before the Licence expiry date.

5. If this Licence requires an amendment, a public hearing may be required. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process may vary depending on the scope of the amendment requested.

6. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(i) Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369

(ii) Inspector Contact:
Water Resources Officer, INAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

7. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

8. It is the responsibility of the Licensee to ensure that any documents or correspondence submitted by the Licensee to the Board have been acknowledged by the Manager of Licensing.

9. This Licence is not assignable except as provided in Section 44 of the *Act*.

PART C: CONDITIONS APPLYING TO THE PROTECTION OF WATER

1. The Licensee shall not remove any material from below the ordinary high water mark of any water body.

2. The Licensee shall not do anything that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

3. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall locate areas designated for waste disposal at a minimum distance of thirty (30) metres from the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise authorized by the Board.

2. The Licensee shall provide at least 15 days written notice to the Inspector prior to any planned discharges from the sump in the Land Treatment Unit. The notice shall include the volume proposed for discharge.

3. Any planned discharge from the sump in the Land Treatment Unit to the environment shall meet the following wastewater discharge criteria:

Parameter	Maximum Allowable Concentration (µg/l)
Oil & Grease	5000
Lead	1
Benzyene	370
Toluene	2
Ethylbenzene	90

4. The Licensee shall select a discharge location that is to the satisfaction of an Inspector for any discharge as described in Part D Items 2 and 3.

5. The Licensee shall maintain the Land Treatment Unit to the satisfaction of an Inspector.

PART E: CONDITIONS FOR CONSTRUCTION AND OPERATION

1. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

2. With respect to earthworks, the deposition of debris or sediment into any water body is prohibited. These materials shall be disposed at a distance of at least thirty (30) metres from the ordinary high water mark in such a fashion that they do not enter the water.

3. The Licensee shall construct the Land Treatment Unit as per the Project Drawing and as described in the project application.

4. The Licensee shall provide to the Board, within 90 days of completion of the construction of any dams, dykes or structures intended to contain, withhold, divert or retain water or waste, including facilities or systems for the treatment and disposal of hydrocarbon contaminated soil, all respective design drawings and construction reports, including all as-built drawings, documentation of field decisions that deviate from original plans and any data used to support these decisions.

5. The Licensee shall submit for Board approval, within 90 days of the issuance of the Licence, an operation and maintenance manual for the Land Treatment Unit.

6. If, by the expiry of this Licence, the soil within the land treatment facility does not meet the Treatment Objectives the Licensee shall submit a plan for Board approval.

PART F: CONDITIONS APPLYING TO DRILLING OPERATIONS

1. The Licensee is authorized to drill and install the monitoring wells as shown in the Project Drawing.

PART G: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written consent from the Board, carry out Modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such Modifications are consistent with the terms of this License and the following requirements are met:

   i. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;

   ii. such Modifications do not place the Licensee in contravention of the License or the *Act*;

   iii. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and

   iv. the Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part G, Item 1 have not been met can be carried out only with written approval from the Board.

3. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this License within ninety (90) days of completion of the Modification. These plans and drawings shall be stamped by an Engineer.

PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. In accordance with section 6(2)(g)(i) and (ii) of the Regulations, the Licensee shall,

within thirty (30) days of issuance of this Licence, keep on the site of operations a Spill Contingency Plan that will describe how petroleum products and hazardous materials will be handled, stored and disposed of, as well as how they will be contained and cleaned-up in the event of a spill. This Plan shall include, but not be limited to, the following:

i. The name, address and contact number for the person in charge, management or control of the contaminant (in this case, fuel oil and any other chemicals associated with the program);
ii. The name and address and telephone number of the employer;
iii. The name, job title and 24 hour contact number for the person or persons responsible for activating the spill plan;
iv. A detailed description of the facility, including its geographic location – in UTM coordinates (map sheet number, Eastings and Northings) and geographic coordinates (Lat/Long) – size and storage capacity;
v. A description of the type and amount of contaminants stored on site;
vi. A description of the spill prevention measures to be undertaken in the handling, storage and disposal of petroleum products and hazardous materials;
vii. Steps taken to report, contain, clean up and dispose of a spill;
viii. A site map of sufficiently large scale to show the location of buildings, contaminants storage areas, sensitive areas such as water bodies, probable pathways of contaminant flow and general topography;
ix. A description of the spill response training provided to employees who will respond to a spill;
x. An inventory and location of the response and clean up equipment available to the spill clean up team;
xi. The means by which the spill plan is activated; and
xii. The date that the spill plan was prepared.

2. The Licensee shall annually review the Plan referred to in this Part and if needed, modify it to reflect changes in operation and/or technology. The Plan and any revisions shall be submitted with the Annual Report.

3. The Licensee shall ensure that any chemicals, petroleum products or wastes associated with the project do not enter water. All sumps and fuel caches shall be located at a distance of at least thirty (30) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis.

4. The Licensee shall ensure that any equipment maintenance and servicing be conducted only in designated areas and shall implement special procedures (such as the use of drip pans) to manage motor fluids and other waste and contain potential spills.

5. If during the term of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

i. Employ the Spill Contingency Plan;

ii. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to

the Inspector at (867) 975-4295; and

iii. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit for Board approval an abandonment and restoration plan for the Land Treatment Unit six months prior to the expiry of this Licence or six months prior to the planned abandonment and restoration of the site, which ever occurs first.

2. If the Plan referred to in Part I, Item 1 is not accepted, the Licensee shall make the necessary changes and resubmit the addendum within thirty (30) days following notification from the Board.

PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall measure and record the volume of all soil from all locations entering the Land Treatment Unit.

2. The Licensee shall assess and record the concentration of petroleum hydrocarbon contaminated soil, according to the CCME *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* F1-F4 fractions, entering the Land Treatment Unit from all sources and excavations.

3. The Licensee shall maintain Monitoring Stations as shown in Table 1.

4. An Inspector may impose additional monitoring requirements.

5. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board.

6. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

7. The Licensee shall, within 90 days of issuance of this Licence submit to the Board for approval a Quality Assurance/Quality Control (QA/QC) Plan.

8. The Licensee shall, within 30 days following the month being reported, submit to the Board all data and information required by the "Monitoring Program" in Table 1, including the results of the approved QA/QC Plan.

9. The Licensee shall include in the Annual Report required under Part B, Item 2 all data and information required by this Part.

Table 1 Monitoring Requirements for 1BR-LTU0608

Station	Location	Parameter[1]	Frequency
LTU-1	Discharge from the sump	TPH BTEX HM PAH	Representative sample prior to each discharge
LTU-MW1	Monitoring well upgradient of the Land Treatment Unit	TPH BTEX HM PAH	Twice per year (after freshet and at the end of the treatment season)
LTU-MW2	Monitoring well downgradient of the Land Treatment Unit	TPH BTEX HM PAH	Twice per year (after freshet and at the end of the treatment season)
LTU-MW3	Monitoring well down gradient of the Land Treatment Unit	TPH BTEX HM PAH	Twice per year (after freshet and at the end of the treatment season)

[1] Parameters: TPH (Total Petroleum Hydrocarbons)
PAH (Polycyclic Aromatic Hydrocarbons)
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)
HM (Heavy Metals, Al, As, Cd, Co, Cu, Fe, Pb, Mo, Ni, Se, Ag, Tl, Zn)

ENVIRONMENTAL SITE INVESTIGATION
DRUM STORAGE COMPOUND
IQALUIT AIRPORT
IQALUIT, NORTHWEST TERRITORIES

Submitted to:

TRANSPORT CANADA
Environmental Affairs
Prairie & Northern Region
PO Box 8550
3-344 Edmonton Street
Winnipeg, MB R3C 0P6

Submitted by:

ENVIRONMENTAL MANAGEMENT TECHNOLOGIES
805 Blackdale Road
West St. Paul, MB R2A 9A4
Ph: (204) 334-1631
Fx: (204) 334-6933
Email: macnut@mts.net

DRAFT REPORT

File No.: E1001-048-06

December 2006

TABLE OF CONTENTS

TABLES

ANNEXES

EXECUTIVE SUMMARY

Environmental Management Technologies (EMT) was retained by Transport Canada to complete an environmental investigation at the drum storage compound at Iqaluit Airport, Iqaluit, Northwest Territories. The drum storage compound was located north of the Main Aviation Apron and it consisted of an approximate area of 65 x 25m that was used to store metal drums that contained bitumen. The investigation included compiling an inventory of materials being stored in the compound, a visual assessment and an intrusive investigation to assess subsurface soil conditions. The current report provides the details encompassing the site investigation activities completed by EMT site personnel in August 2006.

The storage compound contained an estimated 1600-205L metal drums that previously contained or were containing bitumen, which was previously used to pave the runway at the airport. It was estimated that approximately 20% of the drums were full, 70% were empty and 10% were partially full. There were also approximately 35 empty (or near empty) 205L metal drums that contained Lorcon Foam Compound. Additionally, approximately 300 cylinders (each weighing approximately 45kg and having dimensions of 750mm x 450mmØ) of asphalt tar grit additive was being stored in the compound. It is presumed that the bitumen and the additive were used in combination during the paving of the runway.

For the most part, the drums were placed horizontally on their sides and some were stacked two- or three-barrels high. Several of the drums that contained bitumen had leaked and some of the drums were badly damaged. Bitumen is a viscous substance that becomes less viscous in the presence of heat (such as during a hot day,) which enabled the release of the product. This caused a pool of bitumen that collected in a low-lying area beneath the drums. It was estimated that 30% of the compound was impacted from the release. The top layer of the released bitumen was less viscous due to the warm temperatures of the summer; conversely, the bottom layer was highly viscous and firmer to the touch.

Two shallow test pits were excavated at either end of the drum storage area to assess subsurface conditions and the potential of vertical migration of petroleum hydrocarbons due to the release of the bitumen. The test pits were excavated to a depth of approximately 300mm below ground surface. A visual observation of the subsurface conditions at the test pit locations identified that the vertical impact from the leaking bitumen was minimal. This was not surprising, in spite of the coarse-grained soil present at the compound, since bitumen is a viscous material that is not capable of easily migrating through the soil.

A soil sampling program was conducted that included submitting two confirmatory soil samples from the test pit locations to an accredited laboratory to be tested for petroleum hydrocarbons. The soil samples were obtained from the base of the excavated test pits, at a depth of approximately 300mm below ground surface. The results of the laboratory analysis identified significant petroleum hydrocarbon impact in the sample submitted from the northern periphery of the compound. Some impact was identified in the parameters of benzene, toluene, ethyl benzene and

xylenes (BTEX) but the overwhelming majority of the impact was found in the parameters for hydrocarbon Fraction 3 and Fraction 4, which had results that exceeded the applicable remediation criteria of the Government of the Northwest Territories (GNWT) and the Canadian Council of Ministers of the Environment (CCME). This result is associated with heavier hydrocarbons and is typical of the bitumen product that was present in the area. Similarly, petroleum hydrocarbon impact was also identified in the sample submitted from the southern extent of the compound but only the parameter of benzene had a result that exceeded remediation criteria.

Although the potential of migration of the bitumen is considered minimal due to its physical characteristics, the released bitumen at the storage compound, nevertheless, poses a risk to human and environmental health. The compound was located in a secured area on airport property but there still exists the risk of direct human contact with the contaminants of concern, especially for airport personnel working within vicinity of the drum storage area. Furthermore, the exposed bitumen poses a risk to birds that land in the material and soon become trapped and eventually perish. This conclusion was verified when some bird carcasses and live trapped birds were observed in the released product during the investigation. Remediation of the impacted area is recommended to address the removal of the source of the impact (the drums) and to remove the released product from the impacted area. Furthermore, based upon the results of the soil sampling program, it is recommended that impacted subsoil is excavated for ex-situ treatment. Remedial alternatives for the impacted area are addressed in this report.

1.0 INTRODUCTION

1.1 Terms of Reference

Environmental Management Technologies (EMT), also referred to as the Consultant, was retained by Transport Canada, also referred to as the Client, to complete an environmental investigation of the drum storage compound located north of the Main Aviation Apron at Iqaluit Airport, Iqaluit, Northwest Territories. EMT received authorization to proceed from Mr. Mike Molinski, Project Manager, Environment Officer, Transport Canada. The work was conducted on 25 and 26 August 2006.

1.2 Objectives

The compound was being used to contain several metal storage drums that contained bitumen, a product that was used during the paving of the airport runway. The investigation was being conducted to inventory the type and quantity of materials located in the compound and to evaluate the potential of risk to environmental and human health due to the release of contaminants. A modest intrusive investigation was also conducted to evaluate subsurface soil conditions.

1.3 Scope of Work

The scope of work consisted of:

1. Compiling an inventory of the contents of the storage compound
2. Conducting a soil sampling program to assess subsurface soil conditions, which included the excavation of two (2) shallow test pits and submitting two (2) confirmatory soil samples to an accredited laboratory to be tested for petroleum hydrocarbons
3. Submitting an environmental report outlining the results of the site investigation, which will include a description of site activities, a drawing of the site layout, laboratory test results and comparison with the applicable criteria, and recommendations based upon the results of the investigation

1.4 Methodology

The environmental report was conducted using guidelines and criteria outlined in publications from the American Society for Testing and Materials (ASTM), the Government of the Northwest Territories (GNWT) and the Canadian Council of Ministers of the Environment (CCME).

2.0 DESCRIPTION OF SITE AND WORK

2.1 Description of Site and Inventory of Materials

The drum storage compound was located north of the Main Aviation Apron. It was established within a secured area on airport property and access was provided through Gate 10. The storage

compound had dimensions of approximately 65 x 25m and it consisted of a gravelled area with sparse vegetation growth. The compound was bounded by two roadways to the north and east and a stockpile of gravel material was located east of the compound, across the roadway. A makeshift berm constructed with coarse gravel and having a height of approximately 500mm had been established along the edge of the drum cache to prevent the horizontal migration of the released bitumen. The location of the storage compound and a layout of the site are included in Figures 1 and 2, respectively (Annex A.)

Materials contained within the storage compound primarily included 205L metal drums containing bitumen and Lorcon foam compound. Bitumen is a mixture of organic liquids that are highly viscous, black, sticky, and composed primarily of highly condensed polycyclic aromatic hydrocarbons (PAH). An inventory completed by the EMT site assessor estimated that there were more than 1600 drums in storage at the compound (with approximately 30 containing foam compound.) Most of the drums were lain along their sides and sometimes stacked two or three drums high. Of the drums that contained bitumen, it was estimated that 20% of the drums were full, 70% were empty and 10% were partially full.

Since the drums were stored horizontally, this enabled the release of some of the bitumen from the bungs. Furthermore, some of the drums were severely damaged or crushed, which further enabled the release of bitumen product. The result of these releases was a pool of bitumen that had collected in low-lying areas within vicinity of the drums. It was estimated that 30% of the storage compound was covered by bitumen that had leaked from the drums and it reached a depth of approximately 100mm.

In addition to the metal drums, the compound was also being used for the storage of approximately 300 asphalt cylinders (each weighing approximately 45kg and having dimensions of 750mm x 450mmØ.) It is presumed that the bitumen and the additive were mixed during the paving of the runway. Most of the cylinders were contained in metal shipping crates.

3.0 FIELD INVESTIGATION AND SAMPLING ANALYSIS

Confirmatory Soil Samples

An intrusive investigation was conducted at the storage compound to assess subsurface conditions and the potential of vertical migration of petroleum hydrocarbons due to the release of the bitumen. This investigation included the excavation of two (2) shallow test pits to a depth of approximately 300mm below ground surface. The test pits were located at the northern and southern extents of the compound. Field screening was not conducted as part of the test pitting program but visual observations indicated that the impact from the bitumen did not have significant vertical impact, since the viscosity of the material does not easily migrate through soil, even though the soil at the compound consisted primarily of coarse-grained sand.

Confirmatory soil sampling was conducted in conjunction with the test pitting. The confirmatory samples obtained from the test pits were placed in clean 125mL glass sample jars supplied by the analytical laboratory and stored in a cooler packed with ice. The soil samples were submitted for analysis to ALS Laboratory Group in Winnipeg, Manitoba, a Canadian Association for

Environmental Analytical Laboratories (CAEAL) and Standards Council of Canada (SCC) accredited laboratory. The analysis was conducted according to the regulations and guidelines of GNWT and CCME. A copy of the laboratory report is included in Annex B. The EMT Soil Sampling Protocol is available in Annex C.

In total, two (2) confirmatory soil samples were submitted for laboratory analysis (one from each test pit.) The samples were obtained from the base of the test pits at a depth of approximately 300mm below ground surface. Results of the laboratory analysis in comparison with the soil remediation criteria of GNWT and CCME are outlined in Table 1.

Remediation Criteria

Confirmatory soil samples were tested for benzene, toluene, ethyl benzene, xylenes (BTEX), hydrocarbon fractions F1 (C6-C10), F2 (C10-C16), F3 (C16-C34), F4 (C34-C50) and total hydrocarbons (C6-C50). The BTEX results from the analytical analysis were compared to the environmental remediation criteria established for industrial sites as outlined in the GNWT *Environmental Guideline for Contaminated Site Remediation,* 2003 and the CCME *Canadian Environmental Quality Guidelines,* 1999 with 2004 update. Human health criteria were applied to the CCME remediation criteria for the BTEX results since the sample was obtained from near ground surface and there exists the possibility of direct human contact with the contaminants of concern.

The hydrocarbon fractions analysis was compared to the environmental soil remediation criteria for coarse-grained surface soils, Tier 1, industrial land use, as published in the aforementioned GNWT *Environmental Guideline for Contaminated Site Remediation,* 2003 and the CCME *Canada-Wide Standards for Petroleum Hydrocarbons in Soil,* 2001. Surface soil criteria were applied to the results, since the samples were obtained from a depth of <1.5m below ground surface. The coarse-grained soil criteria were applied since the median grain size (D_{50}) of the soil particles was >75µm, based upon the observations of the site assessor. Both GNWT and CCME designate soils having a D_{50} of >75µm as coarse-grained soils. However, neither GNWT nor CCME currently publishes criteria for total hydrocarbons.

Discussion of Analytical Analyses

The results of the laboratory analysis identified petroleum hydrocarbon impact in both of the samples submitted from the test pits. The sample submitted from the test pit excavated near the southern extent of the compound, LBS1, had relatively low concentrations of petroleum hydrocarbons and only the parameter of benzene had a result that exceeded the CCME remediation criterion (result 0.41mg/kg; CCME criterion 0.030mg/kg); however, this result did not exceed the GNWT criterion. Conversely, the sample submitted from the test pit excavated near the northern extent of the compound, LBN1, had a much higher concentration of petroleum hydrocarbons that was mostly found in the parameters F3 and F4 (these parameters combined comprised nearly 80% of the total hydrocarbons.) The parameters benzene (result 0.43mg/kg; CCME criterion 0.030mg/kg), ethyl benzene (result 0.19mg/kg; CCME criterion 0.082mg/kg), F2 (result 770mg/kg; CCME and GNWT criterion 760mg/kg), F3 (result 15000mg/kg; CCME and GNWT criterion 1700mg/kg) and F4 (result 13000mg/kg; CCME and GNWT criterion 3300mg/kg) all had results in sample LBN1 that exceeded remediation criteria; however, the BTEX results for this sample did not

exceed the GNWT criterion. The extremely high values observed in the parameters F3 and F4 is typical of heavier petroleum hydrocarbons, such as the bitumen product found in the storage compound.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of the site investigation conducted at the drum storage compound, it is recommended that an environmental remediation plan is designed and implemented to address the contaminants of concern. The initial priority of the remediation plan will be the removal of the source of the impact, the metal drums that contain bitumen. Once the source is removed, the product that has leaked from the drums will be removed and, based upon the soil sample results, some excavation will be required to remove subsoil that is impacted with petroleum hydrocarbons.

There are different methodologies that can be implemented as part of the remediation plan. Various options are discussed, as follows. The benefits and limitations of each option are included and it is also possible to combine options, or parts of options, to broaden the scope of remedial alternatives for the drum storage compound.

Disposal of 205L Metal Drums and Bitumen in an Engineered Landfill

This option includes the design and construction of an engineered landfill on airport property t contain the metal drums and the bitumen, pending approval from the authorities havin jurisdiction. An engineered landfill site allows final disposal of solid waste in a secure manner b minimizing the impacts on the environment. The waste is spread out in a thin layer in th waterproof cell where it is leveled, compacted and covered periodically with soil or another ine material, such as a synthetic liner. In order to minimize the amount of space required for t landfill, it is recommended that the drums are mechanically crushed before being placed in t landfill. Once the final capacity is attained, a geomembrane cover is installed that will prevent t infiltration of water, thereby preventing the migration of leachate; nevertheless a leachate collect system should be included in the design of the landfill. Since bitumen is a stable viscous compou and firm when not exposed to direct sunlight, a geomembrane liner is likely unnecessary. engineered landfill site is then completed by installing a natural cover over the synthetic cap t will favour the growth of vegetation. The cap should be domed to promote drainage away from landfill site.

The use of this technology for final disposal of waste has significant advantages. It is a disposal method, whose initial investment and operation costs are low compared to other met of elimination. Furthermore, the use of a chemically-resistant synthetic cover in the constructi the landfill assures impermeability, thus avoiding any possible contamination of the soi groundwater.

Nevertheless, the use of engineered landfills to manage waste has limitations, which includ

- The availability of lands suited for landfilling is often limited; engineered landfil require a large surface area

- Topographical, geotechnical and hydrogeological conditions as well as town planning rules are also constraining elements in choosing a location for an engineered landfill site; for example, it is necessary to reserve a buffer zone between the site and the neighboring residences and distances must also be respected regarding facilities such as airports, sources of potable water and rivers
- Social acceptance for the construction of this type of facility is often very difficult and sometimes even impossible to obtain
- While using an engineered landfill does provide a long-term solution for managing waste, the location of the waste is merely being diverted and it is possible that the location of the landfill may become problematic during future development at or near the waste cell and may require relocating the waste

Disposal of Waste at a Southern Waste Management Facility

This option includes the containerizing of the waste and shipment to a licensed industrial waste management facility, likely located in Montréal, Québec. It is recommended that the drums located in the storage compound are placed in overpack drums (with a sealable lid equipped with a chemically resistant gasket) to provide appropriate secondary containment during shipping and subsequently placed in a cargo container that is lined with an impermeable geomembrane liner. Conversely, the released bitumen can be excavated and placed in suitable environmental containers to be shipped along with the drums. It is recommended that this work is performed during the spring or autumn (when daily highs in Iqaluit are typically <10°C) to facilitate the transfer of the released bitumen into the storage containers; this will also facilitate the transfer of the leaking drums into the overpack drums. Care should be taken to remove, as closely as possible, only the visible layer of released bitumen and to minimize the amount of soil that is excavated. (It is recommended that the impacted soil that will be excavated from the storage compound is treated locally, as discussed in the subsection entitled *Ex-situ Treatment of Petroleum Hydrocarbon Impacted Soil.*)

The advantage of this option is that the waste is effectively managed and removed from airport property. However, the cost associated with this option can be prohibitive. The cost of shipping the drums from Iqaluit to a southern location are significant and it also includes the purchasing of appropriate secondary containment to ship the drums and containers to ship the released bitumen. There will also be costs associated with the disposal of the drums and bitumen, although some of these costs may be abated if the waste management facility is able to find a secondary user for the product, *i.e.* a paving company that may be able to use the bitumen for paving projects. (Representative confirmatory sampling – to be tested by an accredited laboratory – will be required to determine that the product being disposed is bitumen, which will enable the re-sale of the product.)

Storing Waste at Iqaluit Airport

If the possiblility exists that the bitumen can be used during future paving projects at the airport, it may be feasible to construct an appropriate storage compound for the drums. This would include constructing a storage area with a compacted base and perimeter berm that is subsequently lined

with a chemically-resistant geomembrane liner to provide secondary containment in the event of a release of product. Furthermore, overpack drums should be provided to contain the drums that still contain bitumen, since the drums are deteriorating and can be compromised easily or are already leaking. The empty drums would be placed in an engineered landfill or shipped to an industrial waste management facility, as previously discussed. This option would reduce the cost of shipping the drums to a southern location.

Transfer of Bitumen to a Local Asphalt Plant

If a local asphalt plant is located in Iqaluit, it may be possible to transfer the bitumen at the storage compound to the plant, which could make use of the bitumen during local paving projects. This option would reduce the cost of shipping the drums to a southern location and provide local economic benefit. The empty drums, however, will still need to be disposed responsibly along with the bitumen that was released.

Thermal Decomposition

This option involves the thermal desorption of the released bitumen and the soil impacted with bitumen. Thermal desorption is a physical separation process that is not designed to destroy organics. Wastes are heated to volatilize water and organic contaminants. A carrier gas or vacuum system transports volatilized water and organics to the gas treatment system. The bed temperatures and residence times designed into these systems will volatilize selected contaminants but will typically not oxidize them.

Two common thermal desorption designs are the rotary dryer and thermal screw. Rotary dryers are horizontal cylinders that can be indirect or direct fired. The dryer is normally inclined and rotated. For the thermal screw units, screw conveyors or hollow augers are used to transport the medium through an enclosed trough. Hot oil or steam circulates through the auger to indirectly heat the medium. All thermal desorption systems require treatment of the off-gas to remove particulates and contaminants. Particulates are removed by conventional particulate removal equipment, such as wet scrubbers or fabric filters. Contaminants are removed through condensation followed by carbon adsorption, or they are destroyed in a secondary combustion chamber or a catalytic oxidizer. Most of these units are transportable.

Three types of thermal desorption are available and briefly described, as follows:

1. Direct Fired: Fire is applied directly upon the surface of contaminated media. The main purpose of the fire is to desorb contaminants from the soil though some contaminants may be thermally oxidized.
2. Indirect Fired: A direct-fired rotary dryer heats an air stream which, by direct contact, desorbs water and organic contaminants from the soil.
3. Indirect Heated: An externally fired rotary dryer volatilizes the water and organics from the contaminated media into an inert carrier gas stream. The carrier gas is later treated to remove or recover the contaminants.

Based on the operating temperature of the desorber, thermal desorption processes can be categorized into two groups: high temperature thermal desorption (HTTD) and low temperature thermal desorption (LTTD).

High Temperature Thermal Desorption (HTTD)

HTTD is a full-scale technology in which wastes are heated to 320 to 560°C. HTTD is frequently used in combination with incineration, solidification/stabilization, or dechlorination, depending upon site-specific conditions. The technology has proven it can produce a final contaminant concentration level below 5mg/kg for the target contaminants identified.

Low Temperature Thermal Desorption (LTTD)

In LTTD, wastes are heated to between 90 and 320°C. LTTD is a full-scale technology that has been proven successful for remediating petroleum hydrocarbon contamination in all types of soil. Contaminant destruction efficiencies in the afterburners of these units are greater than 95%. The same equipment could probably meet stricter requirements with minor modifications, if necessary. Decontaminated soil retains its physical properties. Unless being heated to the higher end of the LTTD temperature range, organic components in the soil are not damaged, which enables treated soil to retain the ability to support future biological activity.

Thermal desorption systems have varying degrees of effectiveness against the full spectrum of organic contaminants. The target contaminant groups for LTTD systems are nonhalogenated VOCs and fuels. The technology can be used to treat SVOCs at reduced effectiveness. The target contaminants for HTTD are SVOCs, PAHs, PCBs, and pesticides; however, VOCs and fuels also may be treated, but treatment may be less cost-effective. This type of remediation technology is relatively expensive since large energy volumes are required to separate the contaminants of concern.

Ex-situ Treatment of Petroleum Hydrocarbon Impacted Soil

The results of the soil sampling program conducted in conjunction with the excavation of the test pits identified subsurface impact in the soil samples submitted from the drum storage compound. There was insufficient information obtained from the test pitting program to estimate the extent of the impact plume and the volume of petroleum hydrocarbon impacted soil that is present at the site. Therefore, it is recommended that a comprehensive subsurface investigation is conducted to delineate the extent of the impact. This should include the excavation of several test pits and obtaining soil samples at various depths. Samples obtained from the test pits should be field screened using a photo ionization detector (PID) and/or a PetroFlag® system. The latter is typically more suitable for the detection of extractable hydrocarbons. Furthermore, confirmatory soil samples should be submitted from the test pits to confirm the results of the field screening.

The recommended remedial technology is excavation of the impacted soil and placement in the Land Treatment Unit (LTU) previously commissioned at Iqaluit Airport. The excavated soil will be spread in a thin layer within the LTU to facilitate treatment. This impacted soil would then be managed using the same methodology already in place for treating the petroleum hydrocarbon

impacted soil currently in the LTU. The excavated area at the drum storage compound will then be backfilled with suitable clean fill and restored to match pre-existing conditions. It may be possible that treated soil removed from the LTU may be a source for clean fill. The ex-situ treatment of the impacted soil is beneficial since it effectively removes contaminants of concern from the compound and the cost to manage the impacted soil on site is significantly reduced since a treatment cell was already commissioned to treat impacted material excavated from other sites at Iqaluit Airport.

5.0 CLOSURE

The conclusions and recommendations presented in this report were based on the scope of work outlined for the purpose of the investigation, and were prepared in accordance with accepted environmental science principles and practices. However, as with any Environmental Site Assessment, the intent was to restore the impacted site to acceptable limits, and not to eliminate potential environmental concerns that were beyond the scope of work.

The observations made at the site do not apply to areas that could not be observed or beyond the scope of work. In addition, other materials or compounds not investigated or addressed, or beyond the scope of work could be present at the site. If other chemical parameters are identified as an environmental concern, EMT must be notified to assess whether modification to any part of this report should be conducted. If you have any questions or concerns regarding the findings, conclusions or recommendations presented herein, please contact the undersigned.

Prepared by:

Arthur Magri

Arthur Magri, B.Sc.
Environmental Regulation Superintendent
EMT

Reviewed by:

Dennis Antony

Dennis Antony, B.Sc., R.R.D.
Senior Project Manager
EMT

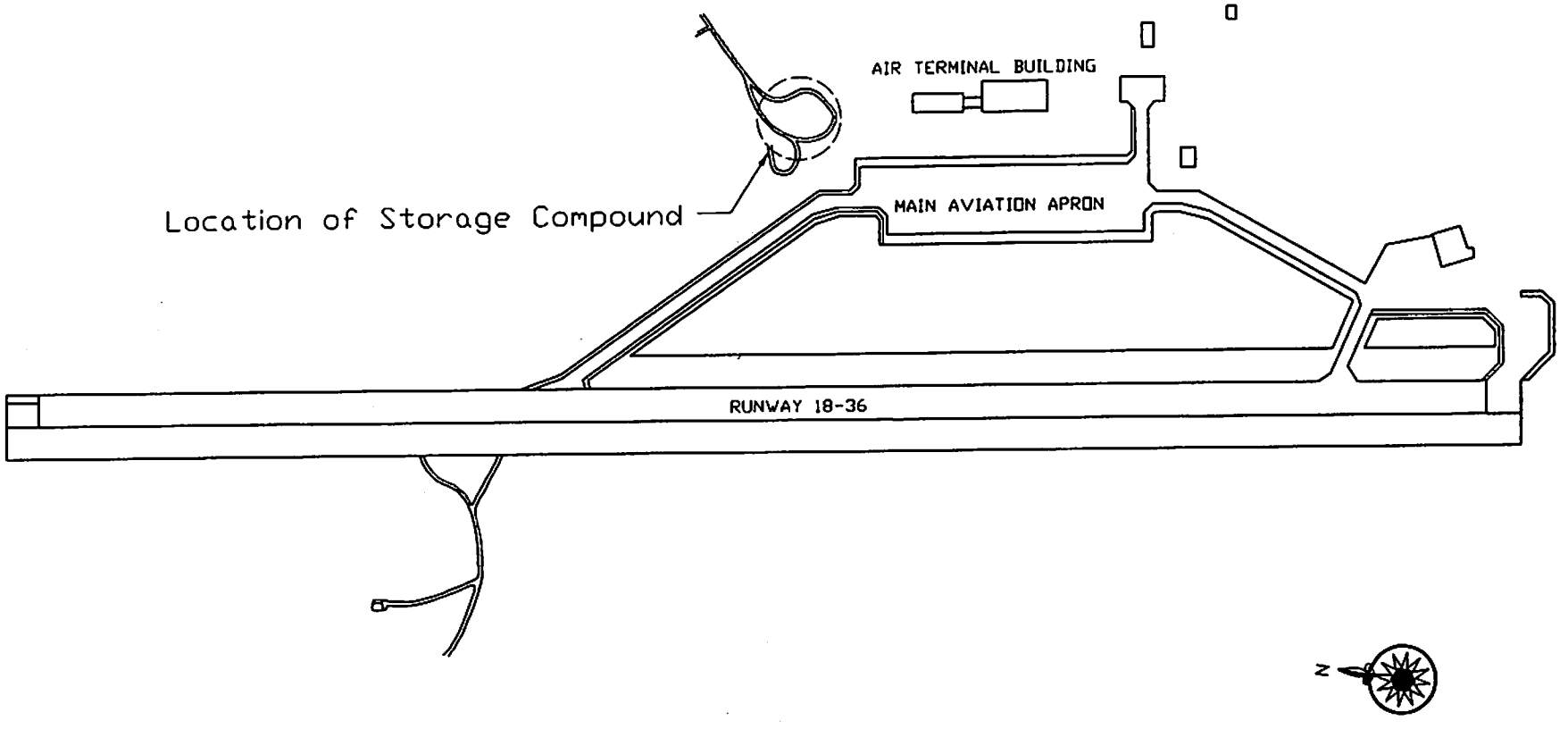
Table1: Soil Samples Analyses

Sample IDs	Parameters								
	BTEX				Total Hydrocarbons				
	Benzene	Toluene	Ethyl Benzene	Xylenes (total)	F1 (C6-C10)	F2 (C10-C16)	F3 (C16-C34)	F4 (C34-C50)	Total Hydrocarbons
Soil samples obtained from the drum storage compound at Iqaluit Airport (August 2006) *(all concentrations are in mg/kg)*									
LBS1	0.41	0.11	0.04	0.14	11	40	290	240	580
LBN1	0.43	0.32	0.19	1.2	29	770	15000	13000	36000
GNWT *Environmental Guideline for Contaminated Site Remediation*, 2003, for Soil at Industrial Sites *(all concentrations are in mg/kg)*									
Soil Criteria	5	0.8	20	20	—	—	—	—	—
Soil Criteria for Fine-grained Subsoils	—	—	—	—	1000	3000	5000	10000	—
Soil Criteria for Coarse-grained Subsoils	—	—	—	—	700	2000	3500	10000	—
Soil Criteria for Fine-grained Surface Soils	—	—	—	—	660	1500	2500	6600	—
Soil Criteria for Coarse-grained Surface Soils	—	—	—	—	330	760	1700	3300	—
CCME *Environmental Quality Guidelines*, 1999 with 2004 update, for Soil at Industrial Sites *(all concentrations are in mg/kg)*									
Soil Quality Guideline for Environmental Health for Coarse-grained Surface Soil	180	250	300	350	—	—	—	—	—
Soil Quality Guideline for Environmental Health for Coarse-grained Subsoil	360	500	600	700	—	—	—	—	—
Soil Quality Guideline for Human Health for Coarse-grained Surface Soil	0.030	0.37	0.082	11	—	—	—	—	—
Soil Quality Guideline for Human Health for Coarse-grained Subsoil	0.030	0.37	0.082	11	—	—	—	—	—
CCME *Canada-Wide Standards for Petroleum Hydrocarbons (PHCs) in Soil*, 2001, at Industrial Sites *(all concentrations are in mg/kg)*									
Soil Criteria for Fine-grained Sub-soils	—	—	—	—	1000	3000	5000	10000	—
Soil Criteria for Coarse-grained Sub-soils	—	—	—	—	700	2000	3500	10000	—
Soil Criteria for Fine-grained Surface Soils	—	—	—	—	660	1500	2500	6600	—
Soil Criteria for Coarse-grained Surface soils	—	—	—	—	330	760	1700	3300	—

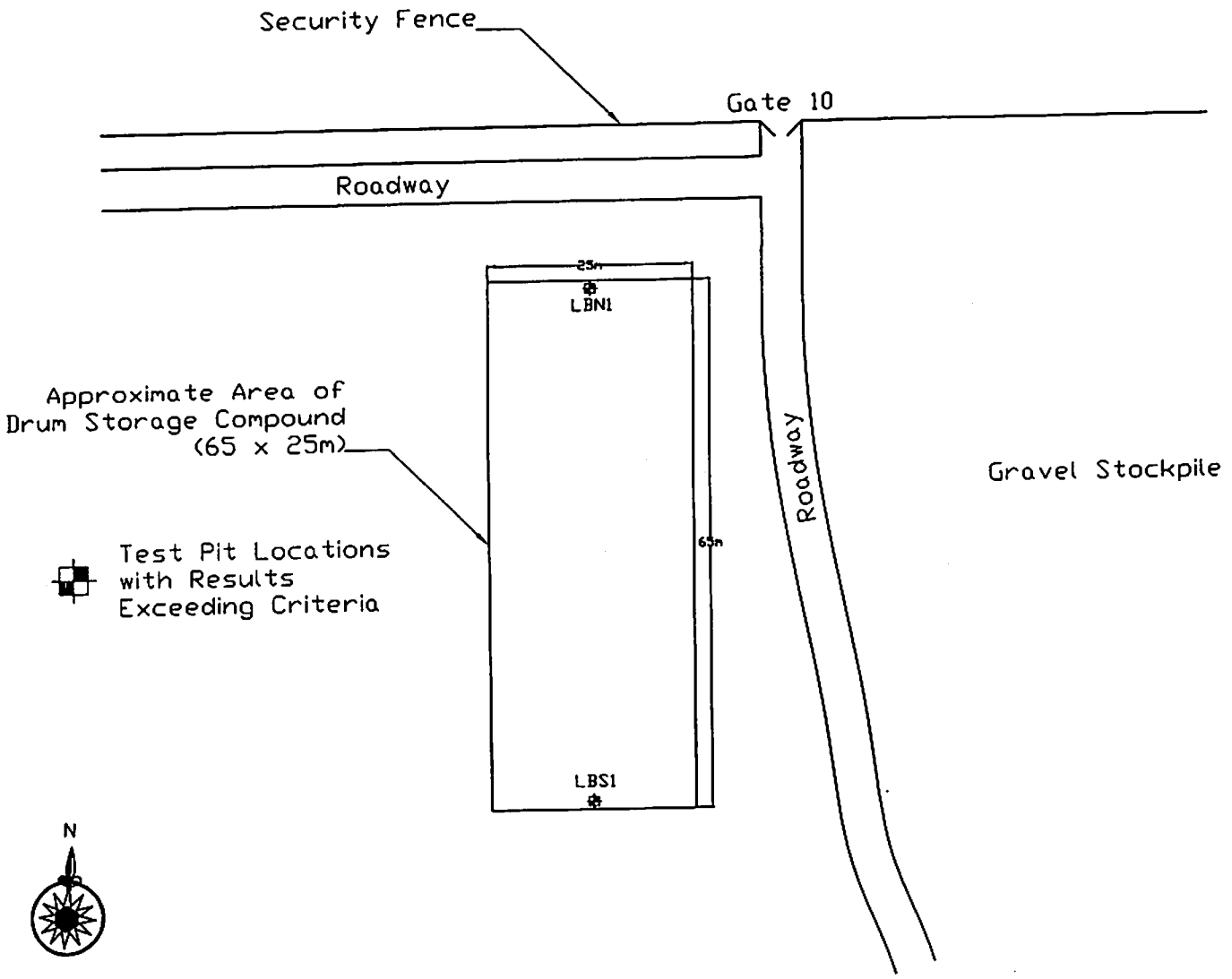
NOTES:

■ Results exceed applicable criteria

EMT



EMT	Client: Transport Canada File No.: E1001-048-06		Environmental Site Investigation Drum Storage Compound Iqaluit Airport, Iqaluit, Nunavut Territory Location of Storage Compound	
Drawn By: AM	Scale: NTS	Units: As Shown	Date: December 2006	Figure No.: 1



EMT	Client: Transport Canada File No.: E1001-048-06		Environmental Site Investigation Drum Storage Compound Iqaluit Airport, Iqaluit, Nunavut Territory Site Layout and Test Pit Locations	
Drawn By: AM	Scale: NTS	Units: As Shown	Date: December 2006	Figure No.: 2

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

PRELIMINARY RESULTS

ENVIRONMENTAL MANAGEMENT & TECH
ATTN: DENNIS ANTONY

Reported On: 12-SEP-06 03:55 PM

805 BLACKDALE ROAD

WEST ST PAUL MB R4A 9A4

Lab Work Order #: L429956 **Date Received:** 05-SEP-06

Project P.O. #:
Job Reference: LAKE BITUMEN
Legal Site Desc:
CofC Numbers:

Other Information:

Comments:

APPROVED BY: _____

GERRY VERA
Project Manager

Manitoba Technology Centre Ltd.
Part of the **ALS Laboratory Group**
1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4
Phone: +1 204 255 9720 Fax: +1 204 255 9721 www.alsglobal.com
A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameter	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L429956-1 LBS1								
Sampled By: D. ANTONY on 26-AUG-06								
Matrix: SOIL								
CCME BTEX + F1-F4								
CCME BTEX								
Benzene	0.41		0.005	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Toluene	0.11		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Ethylbenzene	0.04		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
o-Xylene	0.04		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Xylenes, m+p	0.10		0.02	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Xylenes	0.14		0.03	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					08-SEP-06	11-SEP-06	HDT	R439647
CCME Total Hydrocarbons								
F1 (C6-C10)	11		5	mg/kg		12-SEP-06		
F1-BTEX	10		5	mg/kg		12-SEP-06		
F2 (C10-C16)	40		5	mg/kg		12-SEP-06		
F3 (C16-C34)	290		5	mg/kg		12-SEP-06		
F4 (C34-C50)	240		5	mg/kg		12-SEP-06		
Total Hydrocarbons (C6-C50)	580		5	mg/kg		12-SEP-06		
Chromatogram to baseline at nC50	YES					12-SEP-06		
% Moisture	1.3		0.1	%	11-SEP-06	11-SEP-06	HDT	R440199
L429956-2 LBN1								
Sampled By: D. ANTONY on 26-AUG-06								
Matrix: SOIL								
CCME BTEX + F1-F4								
CCME BTEX								
Benzene	0.43		0.005	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Toluene	0.32		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Ethylbenzene	0.19		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
o-Xylene	0.50		0.01	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Xylenes, m+p	0.74		0.02	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
Xylenes	1.2		0.03	mg/kg	08-SEP-06	11-SEP-06	GEV	R439665
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					08-SEP-06	11-SEP-06	HDT	R439647
CCME Total Hydrocarbons								
F1 (C6-C10)	29		5	mg/kg		12-SEP-06		
F1-BTEX	27		5	mg/kg		12-SEP-06		
F2 (C10-C16)	7700		5	mg/kg		12-SEP-06		
F3 (C16-C34)	15000		5	mg/kg		12-SEP-06		
F4 (C34-C50)	13000		5	mg/kg		12-SEP-06		
Total Hydrocarbons (C6-C50)	36000		5	mg/kg		12-SEP-06		
Chromatogram to baseline at nC50	YES					12-SEP-06		
% Moisture	0.8		0.1	%	11-SEP-06	11-SEP-06	HDT	R440199

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (If applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-BTX,TVH-CCME-WP	Soil	CCME BTEX		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-WP	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-WP	Soil	CCME Total Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WP	ALS LABORATORY GROUP - WINNIPEG, MANITOBA, CANADA		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in environmental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds. The reported surrogate recovery value provides a measure of method efficiency. The Laboratory control limits are determined under column heading D.L.
mg/kg (units) - unit of concentration based on mass, parts per million.
mg/L (units) - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.