2015 ANNUAL NUNAVUT WATER BOARD REPORT FOR BAF-3

FOR THE

North Warning System

Contract # W8485-100224/001/NX
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CHANGE HISTORY

This sheet is a record of each issue of this document. When the revised document is issued, the previous issue is automatically superseded.

Version	Date	Configuration Management	Pages Changed	Reason for Change
1	17-Mar-2016	-	-	Initial Document Release.
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EXECUTIVE SUMMARY

This 2015 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada Limited (RCL) for the Department of National Defence in order to meet the requirements of the licence issued 10 September 2009 3BC-BAF0919 – Type "B", Part B. General Conditions, paragraph 1. This report covers the period from 01 January to 31 December 2015.

RCL is the Operation and Maintenance (O&M) Contractor for the North Warning System (NWS), including BAF-3. BAF-3 is an unattended (unmanned) North Warning System radar site located on Brevoort Island, Nunavut. The site is visited quarterly for preventive maintenance inspections and as required for other work by O&M Contractor staff based out of the Logistics Support Site – Iqaluit (LSS-Q), Iqaluit, Nunavut.

A total of 760.0 cubic meters was drawn from the water supply lake. This is below the annual maximum of 1,750 cubic meters allowed by the current licence.

The monitoring requirements for berm water at BAF-3 were met in 2015. Fuel tanks within the berms were demolished in 2012 and 2013, therefore no effluent (berm water) samples were taken in 2015. The summit berm was breached intentionally as a part of the project to remove the tanks, so that the berm no longer holds water. The beach berm was not breached, but following the 2015 inspection by the water licence inspector, the lab results from 2014 were provided to the inspector, the water was pumped out, and the berm was breached.

Hazardous waste was removed from BAF-3 for disposal outside of Nunavut. The waste went to Safety Kleen, 2730 boulevard Industriel, Chambly, QC, J3L 4V2. The hazardous waste was 90 drums of assorted waste (oil, fuel, glycol, etc.).

Non-hazardous domestic solid waste was flown out to the Logistics Support Site – Iqaluit and disposed of at Iqaluit's landfill. RCL has documented authorization from the community for receiving the waste.

Eleven outdoor spills occurred at BAF-3 in 2015. The spills were:

1. NT-NU Spill Line Report # 15-104. Discovered on 19Mar2015. Tank W22G overfilled because the submersible pump in that tank failed and the internal Pressure Relief Valve (PRV) allowed fuel into the tank every time one of the other three submersible pumps pushed fuel to the day tank indoors at BAF-3. Approximately 50,000 L of Jet A1 fuel was spilled.
2. NT-NU Spill Line Report # 15-114. On 27Mar2015, a hydraulic hose failed on the loader on-site. Approximately 20 L of hydraulic fluid was spilled.
3. NT-NU Spill Line Report # 15-287. On 30Jun2015 it was discovered that approximately 38 L of glycol had leaked from the bull dozer's radiator on 29Jun2015.
4. NT-NU Spill Line Report # 15-321. Discovered on 30Jul2015. Transfer valve to vehicle refueling tank were left open, resulting in an eventual overflow. Approximately 856 L of Jet A1 fuel was spilled.
5. NT-NU Spill Line Report # 15-334. Discovered on 07Aug2015. A drum containing fuel impacted soil was found ruptured. Approximately 250 L of Jet A1 fuel impacted soil was spilled.
6. NT-NU Spill Line Report # 15-337. On 12Aug2015, the loader operator connected to the forks and did not notice hydraulic fluid escaping from the connector until he had driven approximately 110 m. Approximately 1 L of hydraulic fluid was spilled.

7. NT-NU Spill Line Report # 15-343. On 13Aug2015, site personnel were checking a generator before using is and discovered a glycol leak from the radiator. Approximately 2 L of glycol was spilled.
8. NT-NU Spill Line Report # 15-360. On 28Aug2015, a hydraulic hose broke on a loader spilling approximately 1.5 L of hydraulic fluid.
9. NT-NU Spill Line Report # 15-384. On 15Sep2015, a hydraulic hose broke on a loader spilling approximately 2 L of hydraulic fluid.
10. NT-NU Spill Line Report # 15-368. On 15Sep2015, a small amount of hydraulic fluid noted on ground under a dump truck. It was determined that the Power Take Off seal was leaking. Approximately 0.1 L of hydraulic fluid was spilled.
11. NT-NU Spill Line Report # 15-425. On 03Oct2015, a small amount of hydraulic fluid noted on ground under a dump truck. It was determined that the shut off valve for the Power Take Off was leaking. Approximately 0.5 L of hydraulic fluid was spilled.

The Spill Contingency Plan was successfully implemented.

2015 was Year 9 of the remediation and monitoring of the January 2007 Jet A1 fuel spill (reported in the 2007 Annual Report). Stantec Consulting planned two monitoring visits in 2015, one in mid-July and the other in early September. One monitoring visit was completed from 07Aug2015 to 10Aug2015.

EXECUTIVE SUMMARY IN INUKTITUT

ᓇᐃᓪᓕᑎᒋᐊᖅᓯᒪᔪᖅ

ᑖᓐᓇ 2015 ᐊᕐᕌᒍᑕᒫᖅᓯᐅᑎ ᐅᓂᒃᑳᖅ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔨᒃᑯᓐᓄᑦ ᐋᖅᑭᒃᓱᖅᑕᐅᕗᖅ ᕆᐃᑎᐊᓐ ᑲᓇᑕ ᓕᒥᑎᑦᑯᓐᓂᑦ ᑐᕌᖅᓱᓂ ᑲᓇᑕᒥ ᐅᓇᑕᖅᑐᒃ ᓴᓕᕆᔨᒃᑯᓐᓄᑦ ᑎᑭᐅᑎᓯᒪᔪᒪᒧᑦ ᓄᓇᕗᒻᒥ ᐃᒪᓕᕆᔨᒃᑯᓐᓂ ᐱᓕᕆᐊᖃᕈᓐᓇᐅᑎᑖᕆᔭᐅᓚᖅᑐᒧᑦ ᓯᑎᐱᕆ 10 2009 3BC-BAF0919 – ᖃᓄᐃᑦ ᑑᓂᖓ "<", ᐃᓚᖓ <. ᐊᑐᖅᑕᐅᔪ ᓇᐊᓖᑦ, ᑎᑎᕋᖅᓯᒪᓂᖅ 1. ᑖᓐᓇ ᐅᓂᒃᑳᖅ ᐅᓂᒃᑲᐅᓯᖃᖅᐳᖅ ᖃᓄᐃᓐᓂᑯᓂᒃ ᔭᓄᐊᕆ 1ᒥᑦ ᑎᓯᐱᕆ 31ᒧᑦ 2015.

ᕆᐃᑎᐊᓐ ᑲᓇᑕ ᓕᒥᑎᑦᑯ ᑳᓐᑐᕌᖅᑎᑕᐅᔪᑦ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᒥᐊᓂᕆᔭᕐᓂᕐᒧᓪᓗ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓈᓕᒃᑎᖏᓐᓄᑦ, ᐃᓚᒋᖃᓯᐅᑎᓪᓗᓂᐅᒃ BAF-3. BAF-3 ᓇᔪᖅᑕᐅᓇᓂ ᐅᓇᑕᖅᑐᒃ ᓴᐃᑦ ᐅᑭᐅᖅᑕᖅᑐᒥ ᓈᓕᒃᑎᖏᓐᓄᑦ ᓈᓕᓪ ᕙᖃᕐᕙᐅᕗᖅ ᐳᓖᕗᐊᑦ ᕿᑭᖅᑕᒥ, ᓄᓇᕗᒻᒥ. ᐅᐸᒃ ᑕᐅᓰᖑᕗᖅ ᐊᕐᕌᒍ ᑎᓴᒪᐃᖅᓯᖅᓱᒍ ᖃᓄᐃᑦ ᑕᐃᓕᒪᑎᑦᑎᓂᕐᒧᑦ ᓇᐅᑦᑎᖅᓯᕐᓂᕐᒧᑦ ᕿᒥᕐᕈᓇᒃ ᑕᐅᔭᖅᑐᖅᓱᓂ ᑕᐃᒪ ᐃᑦ ᑕᓇᐊᖅᑳᖅᖢᒃᓗ ᐊᓯᖏᓂᒃ ᐊᐅᓚᑦᑎᓂᕐᒧᑦ ᒥᐊᓂᕆᔭᕐᓂᕐᒧᓪᓗ ᐃᖅᑲᓇᐃᔭᖅᑎᑦ ᐱᓕᕆᕙᒃᓱᑎᒃ ᖃᓄᐃᓕᐅᕆᐊᖅᑕᖅᕙᒥᑦ ᐃᓂᒥᑦ - ᐃᖃᓗᐃᑦ (ᓪᔅᔅ-ᖅ), ᐃᖃᓗᐃᑦ, ᓄᓇᕗᑦ.

ᑲᑎᖕᖏᒥᑦ 760.0 ᒦᑕᑲᓚᐅᑉ ᐃᓗᑐᓂᖓᓂᒃ ᐃᒥᖅᑕᓚᐅᖅᐳᑦ ᑰᖕᒥ ᐃᒥᖅᑕᕐᕕᖕᒥᑦ. ᑕᒪᓐᓇ ᑎᑭᐅᒪᑦ ᑎᖖᒋᖅ ᑭᒡ ᓯᒋ ᑎᑕᒥᑦ 1,750 ᒦᑕᑲᓚᐅᑉ ᐃᓗᑐᓂᖓᓂᒃ ᒫᓐᓇᐅᔪᒃᑯᑦ ᐊᑐᖅᑕᐅᔪᓐᓇᖅᑐᒥᑦ ᐱᓕᕆᐊᖃᕈᓐᓇᐅᑎᑎᒍᑦ.

ᖃᐅᔨᓴᖅᑕᐅᔾᔪᑎᓄᑦ ᒪᓕᒃ ᑕᐅᔭᓇᐊᓖᑦ ᑯᕕᔾᔭᒃ ᑯᑎᓕᖕᒧᑦ ᐃᒪᕐᒧᑦ ᑕᐃᑲᓂ BAF-3-ᒥᑦ ᑎᑭᐅᒪᔭᐅᑦ ᑎᐊᓚᐅᖅᑐᑦ 2015ᒥ. ᐅᖅᓱᐊᓗᖅᑲᐅᑎᕐᔪᐊᑦ ᐃᓂᖏᖅᑲᕐᕙᖕᓃᑦᑐᑦ ᓱᕿᑦᑎᖅᑕᐅᓚᐅᖅᑐᑦ 2012ᒥ 2013ᒥᓪᓗ, ᑕᐃᒪ ᐃᓐᓂᖕᒪᓄᑦ ᐃᒪᕐᒥᑦ ᑕᐃᑲᖔ ᖃᐅᔨᓴᖅᑐᐊᔪᒃ ᓴᓂᑦ ᐲᖅᓯᓚᐅᖏᑦᑐᑦ 2015ᒥ. ᐱᔫᖅᑯᑕᐅᔪᒥᒃ ᐅᖅᓱᐊᓗᖅᑲᐅᑎᕐᔪᐊᑦ ᐃᓂᖏᖕ ᓱᕿᑦᑎᖅᑕᐅᓚᐅᖅᑐᑦ ᐃᒪᖃᕈᓐᓂᖏᕐᓂᐊᕐᒪᑦ. ᓯᔾᔭᖕᒍᓂᑦᑐᖅ ᐃᓂᒃ ᓴᖅ ᓱᕿᑦᑎᖅᑕᐅᓚᐅᖖᒎᖅ, ᑭᓯᐊᓂ ᖃᐅᔨᓴᖅᑕᐅᔾᔪᑎᒥᓃᑦ 2014ᒥ ᑐᓂᔭᐅᓚᐅᖅᑐᑦ ᖃᐅᔨᓴᖅᑎᒧᑦ, ᐃᒪᖓ ᒥᓪᓗᐊᖅᑕᐅᓪᓗᓂ, ᐃᓂᖓᓗ ᓱᕿᑦᑎᖅᑕᐅᓪᓗᓂ.

ᓱᕈᕐᓇᖅᑐᖃᑦ ᐊᒃᑕᑯᑦ ᐲᔭᖅᑕᐅᓚᐅᖅᑐᑦ ᑕᐃᑲᓂ BAF-3-ᒥ ᐊᒃᑕᖅᑕᐅᓚᐅᖅᐳᑦ ᓄᓇᕘᑉ ᓯᓚᑖᓂ. ᐊᒃᑕᑯᑦ ᐅᕗᖕᒐᓚᐅᖅᑐᑦ ᓴᐃᑉᑎ ᑭᑌᓐ, 2730 boulevard Industriel, ᓵᓪᑉᓕ, ᑯᐊᐸᒃ, J3L 4V2. ᓱᕈᕐᓇᖅᑐᖃᑦ ᐊᒃᑕᑯᑦ ᐃᓕᖅᑲᓚᐅᖅᑐᑦ 90-ᓂᒃ ᐊᔾᔨᒌᖑᖏᑐᓂᒃ ᐊᒃᑕᑯᓂᒃ (ᑭᓂᖅᑐᖅ, ᐅᖅᓱᐊᓗᒃ, ᖁᐊᔾᔭᐃᒃᑯᑎᑦ, ᐊᓯᖏᑦ).

ᓱᕈᓐᓇᖖᖁᑦ ᐊᒃᑕᑯᐃᑦ ᖃᖓᑕᔫᒃ ᑰᕈᔾᔭᐅᓚᐅᖅᑐᑦ ᑲᓄᐃᓕᐅᕆᐊᖅᑕᖅᕙᒥᑦ, ᐃᖃᓗᓐᓂᐊᓪᒪᓗ ᐃᖃᓗᐃᑦ ᐊᑦᑕᕐᕙᖕᒫᖅᑕᐅᓗᑎ. ᕆᐃᑎᐊᓐ ᑲᓇᑕ ᓕᒥᑎᑦᑯᑦ ᑎᑎᖅᑲᑎᒍᑦ ᐊᖕᒥᖅᓯᒪᔪᓐᓇᐅᑎᖅᑐᑦ ᓄᓇᓯᖕᒥ ᑐᓂᓯᔪᓐᓇᕐᓂᖏᓐᓂᒃ ᐊᒃᑕᑰᔪᓂᑦ.

11ᓂᒃ ᓯᓚᒥ ᑯᕕᔪᖅᑲᓚᐅᖅᑐᖅ ᑕᐃᑲᓂ BAF-3-ᒥᑦ 2015ᒥ. ᑯᕕᓃᑦ ᐅᑯᐊᖑᓚᐅᖅᐳᑦ:

1. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᖅᒧᑦ ᐅᓂᒃᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-104. ᖃᐅᔨᔭᐅᓚᐅᖅᑐᖅ ᒫᔾᔨ 19 2015ᒥ. ᐅᖅᓱᐊᓗᖅᑲᕐᕙᒃ W22G ᑕᑕᓗᐊᓚᐅᖅᑐᖅ ᓲᖃᐃᒻᒪ ᐳᒃ ᑕᑰᕈᑎᐊ ᐅᖅᓱᐊᓗᖅᑲᐅᑎᒥ ᐊᔪᕆᓚᐅᕐᒪᑦ ᑖᓐᓇᓗ ᐃᓗᐊᓃᑦᑐᖅ ᐳᓐ ᓚᖕᒪᖕᖁᖅ ᓯᒥᒃ ᑕᐅᑎ (ᑉᕐᔅ) ᐅᖅᓱᐊᓗᖕᒥᑦ ᑯᕕᑎᑦᑎᓚᐅᕐᒪᑦ ᐅᖅᓱᐊᓗᖅᑲᐅᑎᒧᑦ ᑕᐃᒪᖕᒍᓕᒫᖅ ᓇᓕᐊᑐᐃᓐᓇᖅ ᐱᖕᒌᓕᖅᑲᖕᒐᓂᒃ ᐅᖅᓴᖅᓴᐃᕈᑏᑦ ᐅᖅᓴᐃᑎᓪᓗᒋᑦ ᐅᓪᓗᖅᓯᐅᑎᓄᑦ ᐅᖅᓱᐊᓗᖅᑲᐅᑎᓄᑦ ᐃᓯᖅᓯᒪᔪᓂᑦ ᑕᐃᑲᓂ BAF-3-ᒥᑦ. 50,000-ᐸᓗᖕᓂᒃ ᖃᓪᓗᑎᓂᒃ ᖃᖕᑕᕐᔫᖅᓯᐅᑎᒥᒃ ᐅᖅᓱᐊᓗᖕᒥᒃ ᑯᕕᔪᖅᑲᓚᐅᖅᑐᖅ.
2. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᖅᒧᑦ ᐅᓂᒃᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-114. ᒫᔾᔨ 27 2015ᒥ, ᐅᖅᓱᖅᑐᕈᑎ ᓱᓪᓗᖓ ᐊᔪᕆᓚᐅᕐᒪᑦ ᖃᓗᕿᐅᑎᓕᖕᒥᑦ ᐃᓂᐅᔪᒥᑦ. 20-ᐸᓗᖕᓂ ᖃᓪᓗᑎᓂᒃ ᐅᖅᓱᐊᓗᖕᒥᑦ ᑯᕕᔪᖅᑲᓚᐅᖅᑐᖅ.
3. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᖅᒧᑦ ᐅᓂᒃᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-287. ᔫᓂ 30 2015ᒥ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᖅ 38-ᐸᓗᖕᓂᒃ ᖃᓪᓗᑎᓂᒃ ᖁᐊᔾᔭᐃᒃᑯᑎᒥᒃ ᑯᑐᒃ ᑐᖅᑲᓚᐅᖅᑐᖅ ᓴᓕᒎᑎᐅᑉ ᐅᖅᑰᓴᐅᑎᐊᓂ ᔫᓂ 29 2015ᒥ.
4. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᖅᒧᑦ ᐅᓂᒃᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-321. ᔪᓚᐃ 30 2015ᒥ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᖅ. ᑕᒪ ᐃᖕᒪᐃᓐᓇᖅᑎᑕᐅᓐᓂᕐᒪᑦ ᐅᖅᓱᐊᓗᖕᒧᑦ ᓱᓪᓗᐊᓘᑉ ᒪᑐᖕᖃᑭ ᖑᓂᐊᒍᑦ ᑯᕕᔪᖅᑲᕐᓂᖅᓱᓂ. ᖃᓂᒋᔮᓂ 856ᓪ ᑏᑕᑦ ᖃᖕᑕᕐᔫᕐᓄᑦ A1 ᐅᖅᓱᐊᓗᖕᒥᒃ ᑯᕕᓯᔪᖅᑲᓚᐅᖅᑐᖅ.

5. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᕐᒧᑦ ᐅᓂᒃ ᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-334. ᐋᒌᔅᑦ 07 2015ᒥ ᖃᐅᔨᔭᐅᓚᐅᖅᑐᖅ. ᖃᑦᑕᐅᔭᕐᔪᐊᖅ ᐅᖅᓯᓂ ᓄᓇᒦᑦᑐᖅ ᐃᕐᖕᒐᖅᓯᒪᓚᐅᖅᑐᖅ. 250-ᐸᐅᓐᓂᒃ ᖃᓪᓗᑎᓂᒃ ᖃᖓᑕᓲᖅᓯᐅᒻᒥᒃ ᐅᖅᓯᐊᓗᓐᒥᑦ ᓄᓇᒧᑦ ᑯᕕᓚᐅᖅᑐᖅ.
6. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᕐᒧᑦ ᐅᓂᒃ ᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-337. ᐋᒌᔅᑦ 12 2015ᒥ, ᐊᕐᑯᑎᐅᔪᖅ ᑭᕕᓯᔾᔪᑎᒧᑦ ᑲᓯᓚᐅᖅᑐᖅ ᑲᑭᐊᙵᓐᓄᑦ ᖃᐅᔨ ᓇᓵᖅᑐᓂᓗ ᐅᖅᓯᐊᓗᓐᒥᑦ ᑯᕕᔪᒥᑦ ᑲᓯᔾᔪᑎᖕᓂᙵᐅᑐᒥᑦ ᑭᓯᐊᓂ ᐃᖕᖏᕋᓯᒪᓕᖅᑎᓪᓗᓂ 110 ᐆᒃ ᑑᑎᕐᔪᐊᓂ ᐅᖕᖁᖕᓂᓕᖕᒥᑦ. ᐊᑕᐅᓯᐸᐅᓐᒥᑦ ᖃᓪᓗᑎᒥᒃ ᐅᖅᓯᐊᓗᓐᒥᑦ ᑯᕕᔪᖃᓚᐅᖅᑐᖅ.
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8. ᓄᓇᑦᓯᐊᖅ–ᓄᓇᕗᑦ ᑯᕕᓂᕐᒧᑦ ᐅᓂᒃ ᑳᓕᐊᖅ ᓈᓴᐅᑖ 15-360. ᐋᒋᔅᑦ 28 2015ᒥ, ᐅᖅᓯᐊᓗᓐᒧᑦ ᓱᓪᓗ ᓱᕋᓚᐅᕐᒪᑦ ᖃᓗᕋᐅᑎᓕᖕᒥᑦ ᑯᕕᓯᓪᓗᓂ 1.5-ᐸᐅᓐᓂᒃ ᖃᓪᓗᑎᓂᒃ ᐅᖅᓯᐊᓗᓐᒥᑦ.
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2015ᒥ 9-ᕆ ᓚᐅᖅᑕᖕᒐ ᐊᕐᕌᒍ ᐅᑎᖅᑏᓂᕐᒧᑦ ᖃᐅᔨᓴᕐᓂᕐᒧᓪᓗ ᔭᓄᐊᕆ 2007ᒥ ᖃᖓᑕᓲᖅᓯᐅᑎ ᐅᖅᓯᐊᓗᒃ ᑯᕕᓚᐅᖅᓯᒪᓂᖕᒐ (ᐅᓂᒃ ᑳᓇᔭᐅᓚᐅᖅᑐᖅ 2007 ᐊᕐᕋᒍᑕᒫᖅᓯᐅᑎᐅᑉ ᐅᓂᒃ ᑳᖕᓂ). ᔅ ᑖᓐ ᑕᒃ ᑯ ᐅᖃᐅᔾᔨᕆᐊᖅᐱᑦ ᐸᕐᓇᐃᙳᐊᖅᓯᒪᔪᑦ ᒪᕐᕉᓐᓂᒃ ᖃᐅᔨᓴᕐᓂᕐᒧᑦ ᑕᑯᔭᖅᑐᕐᓗᑎ 2015ᒥ, ᓯᕗᓪᓕᖅ ᔪᓚᐃ ᕿᑎᐊᓂ ᐱᖃᑖᓗ ᓯᑎᐱᕆᐅᑉ ᐱᕆ ᐊᓕᕌᕐᓂᖕᒐ. ᐊᑕᐅᓯᕐᒥᑐᐊᖅ ᖃᐅᔨᓴᓇᐊᕐᓂᖃᓚᐅᖅᑐᑦ ᐱᔭᓈᓯᒪᔪᒥᒃ ᐋᒌᔅᑦ 7 2015ᒥ ᐋᒌᔅᑦ 10 2015ᒧᑦ.

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TABLES

1.0 INTRODUCTION

This 2015 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada Limited (RCL) for the Department of National Defence in order to meet the requirements of the licence issued 10 September 2009 3BC-BAF0919 – Type "B", Part B. General Conditions, paragraph 1. This report covers the period from 01 January to 31 December 2015.

RCL is the Operation and Maintenance (O&M) Contractor for the North Warning System (NWS), including BAF-3. BAF-3 is an unattended (unmanned) North Warning System radar site located on Brevoort Island, Nunavut. The site is visited quarterly for preventive maintenance inspections and as required for other work by O&M Contractor staff based out of the Logistics Support Site – Iqaluit (LSS-Q), Iqaluit, Nunavut.

1.1 REPORT DETAILS

Licensee:	Department of National Defence, Government of Canada
Licence:	3BC-BAF0919 – Type "B"
Location:	BAF-3 North Warning System Site, Brevoort Island, Qikiqtani Region, Nunavut
Report prepared by:	Raytheon Canada Limited, 17-Mar-2016
Time Period Covered:	01 January to 31 December 2015

2.0 WATER USE

A total of 760.0 cubic meters was drawn from the water supply lake. This is below the annual maximum of 1,750 cubic meters allowed by the current licence. See Table 2-1 for the volume of raw water drawn.

Table 2-1 Monthly Raw Water Usage at BAF-3 in 2015

Month	Raw water drawn in cubic meters (m^3)
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	630.6
September	129.4
October	0
November	0
December	0
TOTAL	**760.0**

3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

Hazardous waste and waste oil were sent to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The hazardous waste was shipped to Safety Kleen, 2730 boulevard Industriel, Chambly, QC, J3L 4V2.

See Table 3-1 for the list of items sent for disposal.

See **Annex A** for the shipping documents: the completed movement documents for waste regulated under the Transportation of Dangerous Goods Regulations (TDGR) and NWS Manifests for non-regulated waste.

Table 3-1 Hazardous Waste and Waste Oil Sent for Disposal from BAF-3 in 2015

Site	Description, TDG shipping name	Quantity	Movement Document or Manifest #
BAF-3	Waste calcium hypochlorite mixture, dry	1 Drum	2581517-6
BAF-3	Waste Glycol Not TDG Regulated	4 Drums	34751
BAF-3	Waste Jet A1 Fuel and Water Mixture Waste Fuel, Aviation, Turbine Engine Mixture	2 Drums	2581520-0

Site	Description, TDG shipping name	Quantity	Movement Document or Manifest #
BAF-3	Waste Jet A1 Fuel Impacted Soil Waste Solids Containing Flammable Liquid, N.O.S. (Fuel, Aviation, Turbine Engine)	44 Drums	2581520-0
BAF-3	Waste Jet A1 Fuel Soaked Absorbents Waste Solids Containing Flammable Liquid, N.O.S. (Fuel, Aviation, Turbine Engine)	10 Drum	2581520-0
BAF-3	Waste Jet A1 Fuel Waste Fuel, Aviation, Turbine Engine	8 Drums	2581520-0
BAF-3	Waste Oil Not TDG Regulated	16 Drums	34464, 34465, 34466, 34746, 34748
BAF-3	Waste Oily Rags Waste Solids Containing Flammable Liquid, N.O.S. (Fuel, Aviation, Turbine Engine)	1 Drum	2581517-6
BAF-3	Waste Paint	1 Drum	2581520-0
BAF-3	Waste Paint Related Materials	1 Drum	2581517-6
BAF-3	Waste Tank Bottom Water/Tank Cleaning Effluent Waste Fuel, Aviation, Turbine Engine Mixture	2 Drums	2581520-0

4.0 NON-HAZARDOUS SOLID WASTE DISPOSAL

Non-hazardous domestic solid waste was flown out to the Logistics Support Site – Iqaluit and disposed of at Iqaluit's landfill. RCL has documented authorization from the community for receiving the waste. See Table 4-1 for the quantity of waste generated.

Table 4-1 Non-hazardous Domestic Solid Waste Sent for Disposal from BAF-3 in 2015

Month	Waste Generated (kg)
January	0.0
February	0.0
March	635.0
April	1614.8
May	1914.2
June	267.6
July	1451.5
August	3159.3
September	1224.7
October	544.3
November	680.4
December	317.5
Total	**11,809**

5.0 MONITORING PROGRAM

See **Annex C** for the location of the sewage effluent outfall, BAF-2, with co-ordinates. A sump for the sewage outfall was built in 2010.

Annex D is blank. The sump for the sewage outfall was not pumped out therefore no samples were taken for laboratory analysis.

Annex E lists the bermed fuel storage facilities, Monitoring Station # BAF-4 with co-ordinates that used to exist on-site. Fuel tanks within the berms were demolished in 2012 and 2013, therefore no effluent (berm water) samples were taken in 2015. The summit berm was breached intentionally as a part of the project to remove the tanks, so that the berm no longer holds water. The beach berm was not breached, but following the 2015 inspection by the water licence inspector, the lab results from 2014 were provided to the inspector, the water was pumped out, and the berm was breached.

Annex F for analysis of berm water (water contained in the berms of fuel storage facilities). The results were confirmed to be within effluent quality limits of the NWB licence 3BC-BAF0919, Part D, item 10 before the water was pumped out of the berms.

Annex G for Monitoring Activities of 2007 Jet A1 Fuel Spill contains the information provided by Stantec to Nasittuq.

6.0 SPILLS (UNAUTHORIZED DISCHARGES)

Ten outdoor spills occurred. See Table 6-1 for details.

Table 6-1 Outdoor Spills Reported at BAF-3 in 2015

Date, Spill #	Product	Quantity	Cause and follow-up action	Location on-site
19Mar2015, NT-NU Spill Report # 15-104	Jet A1 fuel	50, 000 L	Tank W22G overfilled because the submersible pump in that tank failed and the internal Pressure Relief Valve (PRV) allowed fuel into the tank every time one of the other three submersible pumps pushed fuel to the day tank indoors at BAF-3. For details on the spill response actions see section 8. To ensure that a similar spill would not occur, the pump was changed in tank W22G and check valves (i.e. one way valves) were added to the piping configuration to prevent backflow into the tanks when not in operation.	W22G (63°20'24"N 64°9'23"W)
27Mar2015, NT-NU Spill Report # 15-114	Hydraulic fluid	20 L	On 27Mar2015, a hydraulic hose failed on the loader on-site. The spilled hydraulic fluid was contained and cleaned up. The failed hose was replaced.	Next to TSB Garage Door (63°20'26"N 64°9'31"W)
30Jun2015, NT-NU Spill Report #15-287	Glycol	38 L	On the 29th of June, the Heavy Equipment Operator (HEO) was clearing snow on the Water Lake Rd. When the HEO completed checks on Dozer prior to operation on the 30th of Jun, he noticed radiator low level. Upon further investigation it was discovered that 38 L (10 gallons) of anti-freeze had leaked from radiator. Site personnel are unable to determine where the leak occurred due to snow melt and water run off on the road. The HEO did not clear within 1 km of a water body when clearing snow. The failed radiator was repaired.	Summit to water lake road
30Jul2015, NT-NU Spill Report #	Jet A1 fuel	856 L	Transfer valve to vehicle refueling tank were left open, resulting in an eventual overflow. Shallow trenches dug around immediate area of spill so run off water directed through a shallow sump. Submersible pump removing water from this sump and pumping it into an insta-berm. Sorbent booms at strategic locations to capture product. 2nd shallow sump excavated south of the 1st culvert located N of the TSB which is down gradient from the spill site. Sorbent booms placed in existing control structure situated down gradient of culvert mentioned above. Sorbents placed on ground and water around spill area.	W21C (63°20'25.4"N 64°09'30.8"W)

Date, Spill #	Product	Quantity	Cause and follow-up action	Location on-site
07Aug2015, NT-NU Spill Report # 15-334	Jet A1 fuel Impacted Soil	250 L	While site personnel were moving crates and steel on beach in preparation for sealift, a ruptured salvage drum was discovered. It is unknown when the drum was originally damaged, however judging by rust on the drum and ice around the area of the spill, it is suspected that this happened during snow cover this past fall/winter/spring. The impacted soil was cleaned up.	North of sealift ramp at beach (63°19'12.4"N 64°08'19.2"W)
12Aug2015, NT-NU Spill Report # 15-337	Hydraulic fluid	1 L	The loader operator connected to the forks and did not notice hydraulic fluid escaping from the connector until he had driven approximately 110 m. He stopped loader, reported incident and started clean up. This incident will be discussed at morning meeting to ensure that equipment operators are aware of the cause of the incident to avoid similar incidents in future. The impacted dirt was shoveled up and placed in a container for future disposal at a licensed hazardous waste disposal facility outside of Nunavut.	Between Garage and TSB (63°20’25”N 64°09’31”W)
13Aug2015, NT-NU Spill Report # 15-343	Glycol	2 L	Site personnel were checking a generator before starting it up. Upon removing a radiator cap they noticed glycol starting to leak onto the ground from below the water pump. A pail was placed under the drip, and sorbent material on the ground. The remaining glycol was drained from the generator to prevent any further spills while personnel transported the generator to the garage located at the summit. An estimated 2L of glycol had leaked out. Once the generator was removed, the impacted soil was shoveled up and placed in a treatment area identified by Environmental Techs already on site. The generator remained out of service until repairs were completed.	Beside pump house at Fresh Water Lake (63°19'52.9"N 64°10'40.3"W)
28Aug2015, NT-NU Spill Report # 15-360	Hydraulic fluid	1.5 L	During the clean-up activities for a previous spill, a hydraulic hose broke on the loader. The Loader was immediately taken out of service and was not returned to service until repairs were made to ensure that no additional hydraulic fluid would escape. The impacted soil was dug up with shovel and placed with other soil that has been identified for treatment.	Summit, 30 m NE of Water Storage Building (63° 20' 26"N, 64° 9' 30"W)

Date, Spill #	Product	Quantity	Cause and follow-up action	Location on-site
15Sep2015, NT-NU Spill Report # 15-384	Hydraulic fluid	2 L	The cause of this spill was a coupling that had broken several times. Initially, the problem was believed to be a chain that would hang down and hit the hydraulic hose connector breaking it and allowing it to leak. The chain had been fastened to prevent this from happening. Even with the chain fastened, the connection leaked so the site FMT and mechanic re-examined the loader and determined that at when connecting the forks at a certain angle the front of the loader can make contact with the connector and nudge the connector until it breaks. A shield was installed to prevent the front of the loader from nudging the connector, preventing any further spills. The impacted soil was dug up and placed in existing impacted soil pile on site. This soil will be treated by the spill clean up technicians along with impacted soil from large spill earlier this year.	Approximately 20' NE of the Vehicle Storage Building (63°20'24.0"N 64°09'29.0"W)
15Sep2016, NT-NU Spill Report # 15-386	Hydraulic fluid	0.1 L	Small amount of hydraulic fluid noted on ground under Sterling Dump Truck. The impacted soil was cleaned up and mechanic examined vehicle and found that a Power Take Off (PTO) seal was leaking. Repairs were done to prevent any further leakage. The impacted soil was dug up and placed in existing impacted soil pile on site.	5 m west of power plant (63°20'25.8"N 64°09'31.0"W)
03Oct2015, NT-NU Spill Report #15-425	Hydraulic fluid	0.5	Staff were on-site and discovered hydraulic fluid leaking from the shut off valve for the Power Take Off (PTO). The leak was stopped and cleaned up. The truck was taken out of service until it was repaired. The impacted soil was dug up and placed in existing impacted soil pile on site.	20 m west of power plant (63°20'25.8"N 64°09'31.0"W)

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was successfully implemented.

8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

2015 was Year 9 of the remediation and monitoring of the January 2007 Jet A1 fuel spill (reported in the 2007 Annual Report). Stantec Consulting planned two monitoring visits in 2015, one in mid-July and the other in early September. One monitoring visit was completed from 07Aug2015 to 10Aug2015. For details of the monitoring visit see Annex G.

Following March 2015 discovery of a Jet A1 fuel release at the BAF-3 site, RCL initiated response actions to identify the nature and extent of the release, and to mitigate the migration of fuel or associated impact to the environment. Throughout 2015, response efforts included the containerization of approximately 1,500 cubic meters of impacted snow, recovery of 10,663 liters of non-aqueous phase liquid (NAPL) and treatment of approximately 2,000,000 liters of fuel contaminated water over a period of approximately 10 weeks.

Water treatment was performed on site using a system designed specifically for the BAF-3 response efforts, and was comprised of oil-water separation, heating the water to 80 degrees C, air stripping, then activated carbon polish.

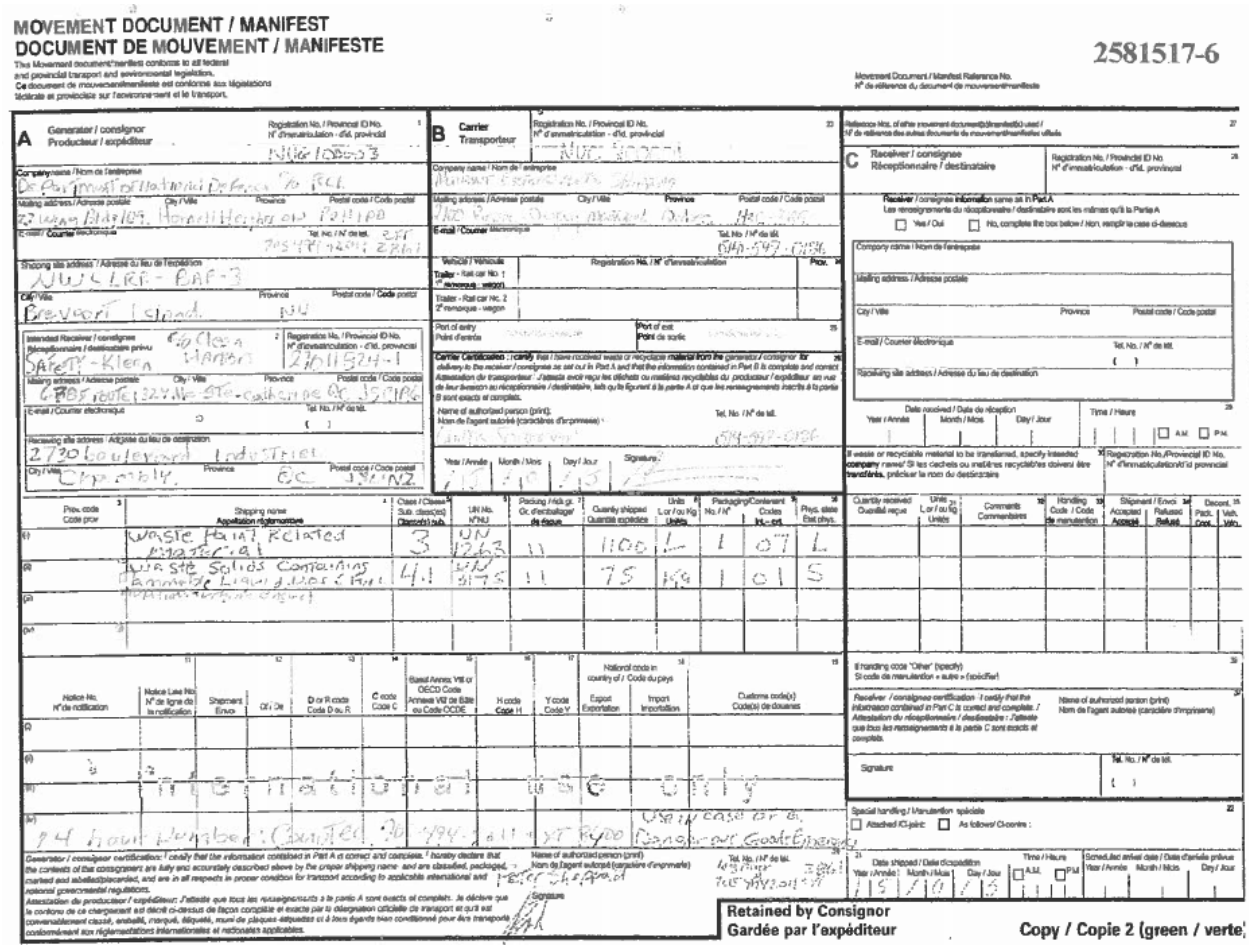
Water quality samples were collected midstream and after treatment, and analyzed in accordance with NWB Water Licence 3BC-BAF0919. All 2 million liters were treated to below licence limits for hydrocarbon components, and there were only two instances of an exceedance of phenols. The occurrence of phenols increased in late in the field season, and based on sampling data appears related to leaching of phenol from subsurface materials that have been in contact with the released fuel.

Recovery efforts ending during early September as temperatures dropped, and will continue with the 2016 warmer weather season. Details of the water treatment and summer response efforts are provided in the summary report for the 2015 field season.

9.0 ACRONYMS

Acronym	Definition
CC&C	Care, Custody, and Control
DEG	Diesel Engine Generator
DND	Department of National Defence
NWB	Nunavut Water Board
NWS	North Warning System
NWSO	North Warning System Office
O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyl
RCL	Raytheon Canada Limited
TDGR	Transportation of Dangerous Goods Regulations

ANNEX A – HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2015



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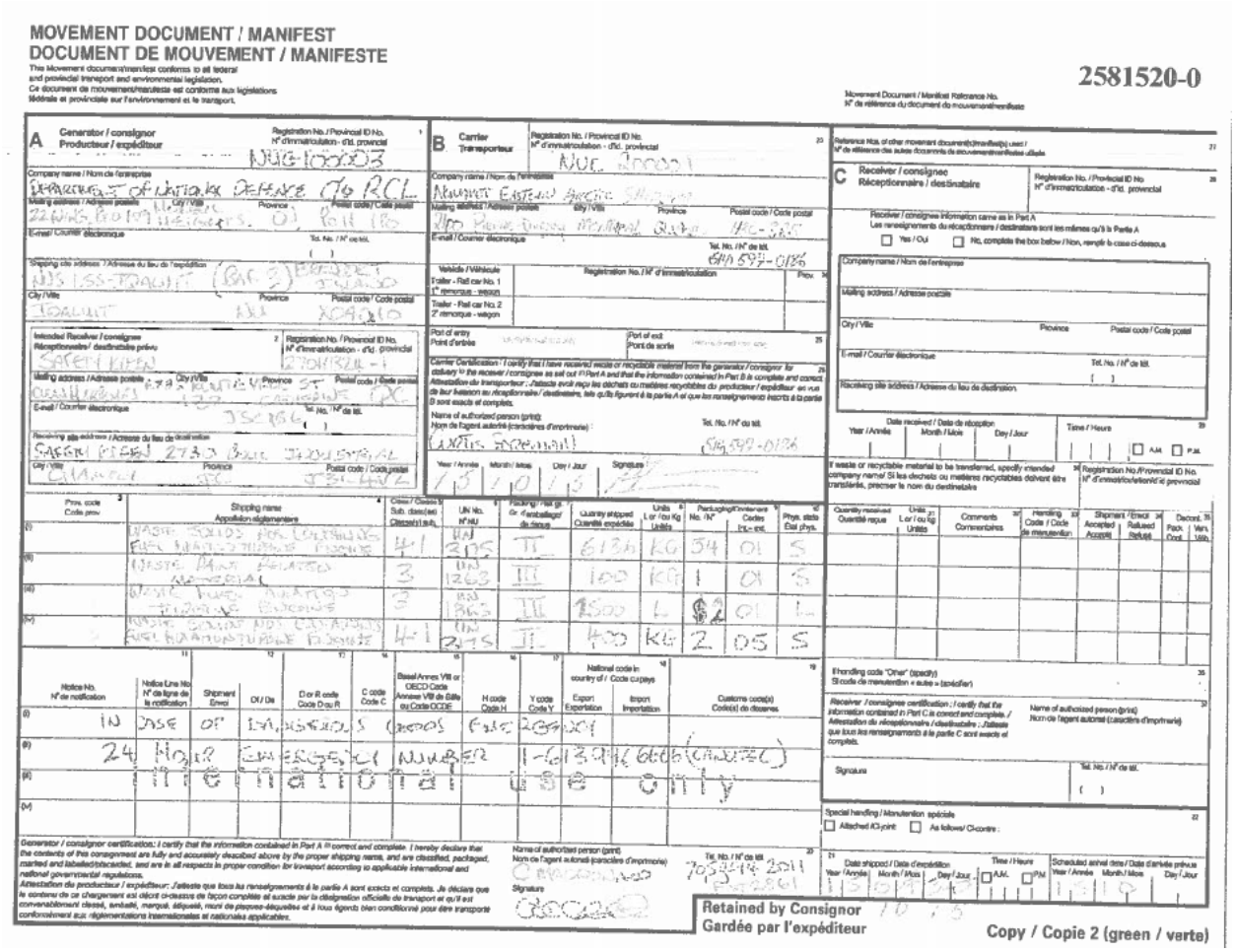

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NEAS				730 Kg

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4			2002406	WASTE - OIL (45 GALLON DRUM)			Asset# 323458, 330970, 330971, 328414

NOTE: All claims related to this shipment have to be filed with Raytheon within 45 hours of receipt.

Received By:	Date

Received By:	Date

SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Aug 18, 2015 8:57 AM	TCN-34465

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 2730 BOULEVARD INDUSTRIEL CHAMBLY, QC, J3L 4V2 CA	BAF-3, BREVOORT ISLAND, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818	0

Attention:		Attention:	

Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
NEAS			2	130 Kg

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1			2002505	WASTE - OILY RAGS			Asset# 326450
1			2002356	WASTE - OIL FILTERS (DRUM)			Asset# 326541

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date

Received By:	Date

SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Aug 18, 2015 9:07 AM	TCN-34466

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 2730 BOULEVARD INDUSTRIEL CHAMBLY, QC, J3L 4V2 CA	BAF-3, BREVOORT ISLAND, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818	0

Attention:		Attention:	

Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
NEAS			3	545 Kg

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
3			2002406	WASTE - OIL (45 GALLON DRUM)			Asset# 326452, 328415, 330969

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date

Received By:	Date

SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8 — NON NEGOTIABLE

Filled By:	Date:	
CMACDONALD	Sep 28, 2015 2:04 PM	TCN-34746

Ship To: , ,

From: BAF-3, BREVOORT ISLAND, DND Storeroom
Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089
Iqaluit, NU, X0A 0H0
867-979-4818

Priority: 1

Attention:		Attention:	

Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
NEAS	BAF-3-TO MONTREAL		1	1800 LBS

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	DRUMS	1800 LBS	2002406	WASTE - OIL (45 GALLON DRUM)	N/A	N/A	EIN'S 334946,334947,334948,334949

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8 — NON NEGOTIABLE

Filled By:	Date:	
CMACDONALD	Sep 28, 2015 2:11 PM	TCN-34748

Ship To: , ,

From: BAF-3, BREVOORT ISLAND, DND Storeroom
Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089
Iqaluit, NU, X0A 0H0
867-979-4818

Priority: 1

Attention:		Attention:	

Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
NEAS	BAF-3 TO MONTREAL		1	1650 LBS

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	DRUMS	1650 LBS	2002406	WASTE - OIL (45 GALLON DRUM)	N/A	N/A	EIN'S 328458,328414,330739,328413

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

SOW REF: 16.F.5.d

SHIPPING MANIFEST

Suite 3000, 400 Cooper Street, Ottawa, ON K2P 2H8

NON NEGOTIABLE

Filled By:	Date:	
CMACDONALD	Sep 28, 2015 2:28 PM	TCN-34751

Ship To:	From:	Priority
, ,	BAF-3, BREVOORT ISLAND, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818	1

Attention:		Attention:	

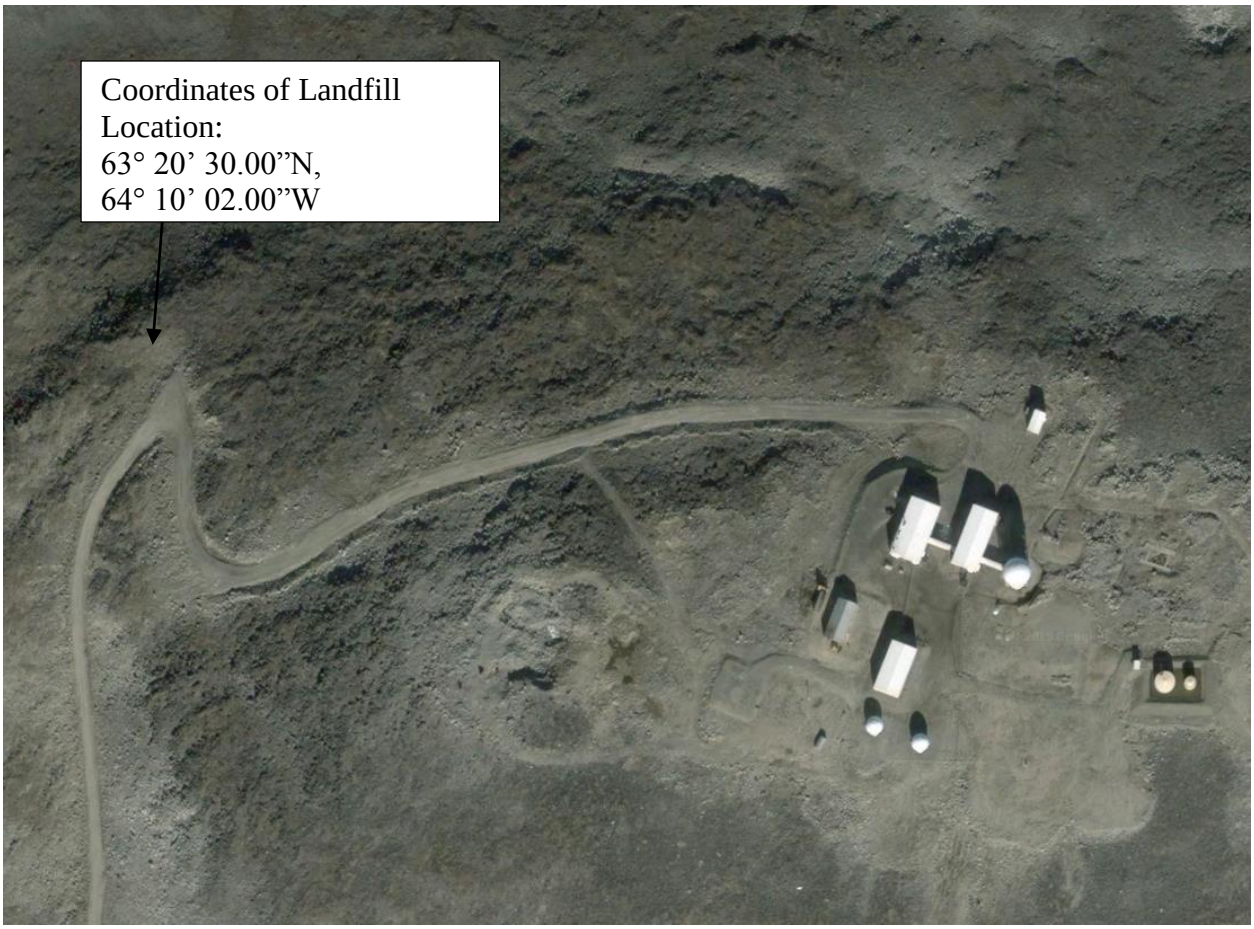
Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
NEAS	BAF-3 TO MONTREAL		1	800 LBS

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
2	DRUMS	800 LBS	2002344	WASTE - GLYCOL (DRUM)	N/A	N/A	EIN'S 334984,334985

NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.

Received By:	Date
Received By:	Date

ANNEX B - BAF-3 - LOCATION OF LANDFILL WITH COORDINATES



Coordinates of Landfill Location: 63° 20’ 30.00”N, 64° 10’ 02.00”W

ANNEX C - BAF-3 - SEWAGE OUTFALL LOCATION (BAF-2) WITH COORDINATES

Coordinates of Sewage Outfall Location (BAF-2): 63° 20’ 21.40”N, 64° 09’ 26.63”W

ANNEX D - BAF-3 - ANALYSIS OF SEWAGE EFFLUENT

The sump of the sewage outfall was pumped out twice do to the heavier than normal site loading

Sample Date	Parameter				
	pH	Oil and Grease (Present - P / Absent - A)	Biological Oxygen Demand (mg/L)	Total Suspended Solids (mg/L)	Faecal Coliforms
Maximum Concentration	6.0 to 9.0 (pH units)	No visible sheen	120 mg/L	180 mg/L	10,000 CFU/100 mL
25-Aug-15	7.85	A	159	77	770000[1]
17-Sep-15	7.63	A	203	100	38000[1]

[1] Faecal coliforms were outside of the acceptable range. The INAC Water Licence Inspector was notified on 01Dec2015.

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EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

Exova

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00343-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1517190
Date Submitted: 2015-08-31
Date Reported: 2015-09-09
Project:
COC #: 162786

				Lab I.D.	1198677
				Sample Matrix	Sewage
				Sample Type	
				Sampling Date	2015-08-25
				Sample I.D.	BAF-3 Sewage 1
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
General Chemistry	pH	1.00			7.85
	Total Suspended Solids	1	mg/L		77
Subcontract	BOD5	1	mg/L		159
	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		21
	Oil & Grease - Total	1	mg/L		21
Visable Sheen	Visible Sheen		P/A		A

Guideline = *** = Guideline Exceedence**

All analysis completed in Ottawa, Ontario (unless otherwise indicated by ** which indicates analysis was completed in Mississauga, Ontario).
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

25Aug2015 Page 2 of 2

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#:
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1517171
Date Submitted: 2015-08-31
Date Reported: 2015-09-02
Project:
COC #: 162786

				Lab I.D.	1198654
				Sample Matrix	Sewage
				Sample Type	
				Sampling Date	2015-08-25
				Sample I.D.	BAF-3 Sewage 1
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Microbiology	Faecal Coliforms	0	ct/100mL		770000

Guideline = * **= Guideline Exceedence**
All analysis completed in Ottawa, Ontario (unless otherwise indicated by ** which indicates analysis was completed in Mississauga, Ontario).
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

SOW REF: 16.F.5.d

17Sep2015 Page 1 of 2

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00343-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1519295
Date Submitted: 2015-09-29
Date Reported: 2015-10-06
Project:
COC #: 127315

Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.
					1204357 / Sewage / 2015-09-17 / Sewage Sample Baf-3 #1
General Chemistry	pH	1.00			7.63
	Total Suspended Solids	1	mg/L		100
Subcontract	BOD5	1	mg/L		203
	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		39
	Oil & Grease - Total	1	mg/L		39
Visable Sheen	Visible Sheen		P/A		A

Guideline = *** = Guideline Exceedence**

All analysis completed in Ottawa, Ontario (unless otherwise indicated by ** which indicates analysis was completed in Mississauga, Ontario).
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

Page 2 of 4

17Sep2015 Page 2 of 2

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00343-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1519282
Date Submitted: 2015-09-29
Date Reported: 2015-09-30
Project:
COC #: 127315

Group	Analyte	MRL	Units	Guideline	Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.
					1204325 / Sewage / 2015-09-17 / Sewage Sample BAF-3 #1
Microbiology	Faecal Coliforms	0	ct/100mL		38000

Guideline = *** = Guideline Exceedence**
All analysis completed in Ottawa, Ontario (unless otherwise indicated by ** which indicates analysis was completed in Mississauga, Ontario).
Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Page 2 of 2

01Dec2015 - INAC Water Licence Inspector notification

NWB Sewage Quality Exceedances

William Wyman to: Justin Hack
Cc: Don Beattie, SCOTT.CHARLAND, IAN.CREIGHTON3

12/01/2015 09:50 AM
Show Details

Hello Mr. Hack,

On three occasions, the criteria for sewage discharge set out in Nunavut Water Board Licences have been exceeded as follows:

1. BAF-3: The sewage sump was pumped out on 25-Aug-2015. A sample was taken and the faecal coliform levels were 770,000 CFU/100 mL. The limit in the site's water licence is 10,000 CFU/100 mL.

The BAF-3 sewage sump is located at 63°20'21"N, 64°9'27"W and the sewage was discharged about 5 m south of the sump. A melt water stream starts at the bottom of the hill from where the sewage was discharged, approximately 500 to 600 m down slope from where the sewage was discharged. Staff have been on site all summer responding to the 19-Mar-15 fuel spill, creating a higher than normal site loading. The sump filled up because it was not designed for this purpose. (It is not large enough for constant use by a number of people.) Once full, the sewage sump was pumped out on 25-Aug-15. Additionally, the sump is made from native fill containing high amounts of silt and clay which prevent water from filtering through the sump as designed. RCL and NWSO will examine this issue to determine whether the sewage sump needs to be replaced with a larger one constructed of more permeable material.

2. BAF-3: The sewage sump was pumped out on 17-Sep-15 . A sample was taken and the faecal coliform levels were 38,000 CFU/100 mL. The limit in the site's water licence is 10,000 CFU/100 mL.

The sewage sump was emptied to make repairs to the sump wall.

3. FOX-M: The sewage effluent was sampled on 14-Oct-15 and the pH was found to be 5.66. The licence stipulates that the pH must fall between 6 and 9.

Staff monitoring the sewage treatment plant identified losses in biomass and lab results showing the pH outside of the allowable range. Investigation for a root cause showed that some cleaning activities were using greater amounts of acidic cleaners than expected. These higher amounts of acidic materials impacted the biomass in the sewage treatment plant and adversely affected the effluent quality. The use of the acidic cleaners has since been stopped and alternative products have been found.

Please let me know if you have any questions or comments about these discharges.

Regards,

Will Wyman, EP(CEA)
Environmental Specialist
North Warning System
Raytheon Canada
Raytheon Company

+1 613-787-3655 (office)
+1 613-298-5123 (cell)
+1 613-787-3704 (fax)
william.wyman@raytheon.com

Suite 3000, 400 Cooper St.
Ottawa, ON, K2P 2H8 CAN
www.raytheon.ca

ANNEX E - BAF-3 - BERMED FUEL STORAGE FACILITIES WITH CO-ORDINATES

Licence	Location	Monitoring Station # (Final discharge point of bermed fuel storage facility)	Berm's location on-site	Berm's co-ordinates
3BC-BAF0919 Type "B"	BAF-3 North Warning System Site, Brevoort Island, Qikiqtani Region, Nunavut	BAF-4	Summit, berm of former tanks W22A and W22B. Note: Tanks W22A and W22B were demolished in 2013 and the berm was breached with an engineered breech.	63° 20' 23" N 64° 09' 18" W
			Beach, berm of former tanks W22C and W22D. Note: Tanks W22C and W22D were demolished in 2012 and the berm was left intact. The berm was breached in 2015.	63° 19' 52" N 64° 10' 40" W

ANNEX F - BAF-3 - ANALYSIS OF BERM WATER (EFFLUENT FROM BERMED FUEL STORAGE FACILITIES)

Environmental Sciences Group
Royal Military College of Canada
P.O. Box 17000 Stn. Forces
Kingston, Ontario K7K 7B4

(ESG-NWSO-0005)

Table 1: Water Sample Analytical Results

Sample #	Date Collected	Cu	Ni	Co	Cd	Pb	Zn	Cr	As	Hg	PCBs	Oil & Grease	Phenols	pH	Benzene	Toluene	Ethylbenzene
		[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]	[mg/L]
Water Use License 3BC-BAF0919		*0.2*	*0.2*	*0.05*	*0.01*	*0.05*	*0.5*	*0.1*	*0.1*	*0.0006*	*1.0*	*5.0*	*0.020*	*<6.0 or >9.0*	*0.37*	*0.002*	*0.09*
1. Beach POL																	
14-08749	28-Aug-14	<0.005	<0.005	<0.003	<0.001	<0.005	0.016	<0.005	<0.001	<0.0004	<0.003	<3.0	<0.001	6.71	<0.0005	<0.0005	<0.0005

Please do not hesitate to contact us if you require any additional information or have questions.

Sincerely,

Darren White – Deputy Project Manager
Environmental Sciences Group
Royal Military College of Canada
(Contractor - Calian)
P:613-541-6000 ex6564 C:613-329-7415
http://www.environmentalsciencesgroup.ca/

ANNEX G - BAF-3 - MONITORING ACTIVITIES OF 2007 JET A1 FUEL SPILL

2015 (Year 9) Remediation and Monitoring Activities of 2007 Jet A1 Fuel Spill. Details of the monitoring activities are in the following report by Stantec Corporation.

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue, Ottawa ON K2C 3G4

August 31, 2015
File: 122511156

Attention: Jacques Plante, President
Nasittuq Corporation
Suite 400, 160 Elgin Street
Ottawa, Ontario
K2P 2P7

Dear Jacques,

Reference: BAF-3 2015 Summit and Middle Site Monitoring and Strategic Closure Plan Development

INTRODUCTION

Stantec Consulting Limited (Stantec) completed a monitoring visit at BAF-3 between August 7-11, 2015, in accordance with the Stantec workplan *BAF-3 2015 Summit and Middle Site Monitoring and Strategic Closure Plan Development– Cost Estimate* dated April 7, 2015, having attempted an earlier visit July 14-17, 2015, which was canceled due to weather. This letter report provides the results of the August monitoring visit.

SCOPE OF WORK

The proposed scope of work from the Stantec April 2015 proposal was as follows:

- Monitoring Visit #1 (target: mid-July, 2015 –care, custody and control [CCC] of site belongs to Raytheon Canada Limited - RCL):
    - Summit – groundwater monitoring of seven wells and installation of additional wells, if warranted
    - Middle site – check control structures (and supervise repair, where warranted), monitor four wells, and sample biopiles (BPs) (both effluent, if present, and new soils in BP 17)
- Monitoring Visit #2 (target: early-September, 2015):
    - Summit – groundwater monitoring of seven wells and installation of additional wells, if warranted
    - Middle site – check control structures (and supervise repair, where warranted), monitor four wells, and sample BPs (effluent, if present, and new soils in BP 17 if not sampled during Visit #1)

- Strategic Closure Plan Development (target: August, 2015):
    - Cessation Criteria – development of criteria for application to monitoring results that would constitute necessary evidence for site closure
    - Plan development – identification of parties whose acceptance of the proposed cessation criteria would be required, consultation with parties, and finalization of Plan based on their feedback

METHODOLOGY

Stantec personnel arranged to get to site via the RCL LSS, having arrived in Iqaluit at noon on July 14, 2015. Due to other commitments and weather delays, no flights to site were available, and so the field team was directed to return to Ottawa on July 17. The second attempt occurred on August 6. Staff made it to site with a charter flight (Friday PM, August 7) and returned to Iqaluit after three days at site (Monday PM, August 10). Staff returned to Ottawa on August 11.

The contaminants of concern (COCs) for the summit site are benzene, toluene, ethylbenzene, and total xylenes (BTEX) and Canada Wide Standard petroleum hydrocarbons (CWS PHCs) fractions F1 to F4. The samples selected for analysis during the monitoring activities were submitted to Paracel Laboratories of Ottawa, Ontario. Paracel is fully accredited by to the International Standard IEC/ISO 17025 for the required analyses.

Two of the wells targeted for sampling were unavailable: MW 11 was not present and presumed destroyed, and MW 12 (refer to Drawing No. 1 in **Attachment 1**) was underneath a large flex tank put in place by Raytheon as part of the March 2015 spill cleanup effort. Materials required for the field visit were brought by Stantec field personnel from Ottawa. Survey data was collected from the available wells, including elevation, and an elevation point was taken at the ground surface over the approximate location of MW 12.

Stantec staff assessed the integrity of the control structures between the upper site and first switch back (APEC 2 and APEC 3), and the control structure at the middle site. Work at the middle site included collection of a confirmatory soil sample of the area where scrapings from the footprints of former BPs 11 and 13 had been located, and were reported moved to the upper site by Nasittuq during the week of 23 July, 2013[1] (refer to Drawing No. 2 in **Attachment 1**).

[1] Project Closeout and Variance Report for BAF-3 Bulk Fuel Tank Replacement and Beach Remediation. ILM #834901

Reference: BAF-3 2015 Summit and Middle Site Monitoring and Strategic Closure Plan Development

OBSERVATIONS

A photo log to support on-site observations is provided as **Attachment 3**. The following observations were collected from on-site during the monitoring visit:

- The RCL site supervisor (Dale McLeod) reported that a vehicle refueling spill had occurred at the southwest corner of the TSM in July, with an approximate volume of 850 L. The spill occurred in close proximity of MW3.
- The upper site stormwater pond and underflow dam are in good working order (Photo 4).
- MW 11 is no longer present at the upper site (Photo 3).
- The middle site stormwater pond and underflow dam are in good working order (Photo 7).

RESULTS

UPPER SITE GROUNDWATER MONITORING

Table B-1 in Attachment 2 provides a summary of the analytical results for the upper site groundwater monitoring, while Drawing 1 in **Attachment 1** shows the locations of monitoring wells. Figure 1 shows a chart of all upper site groundwater monitoring results collected since the start of remediation work at the upper site. A summary of historical groundwater monitoring results was provided in the addendum letter *BAF-3 Original Spill 2011 Results Report – Addendum Letter* dated April 23, 2012. Note that results below laboratory detection limits are shown as zero values in Figure 1 – it is therefore necessary to refer to tabulated results to differentiate between not sampled/no result cases and below detection limits cases. MW 12 could not be sampled in 2015, and MW11 was presumed destroyed.

Of the five upper site monitoring wells sampled, free product was found to be present in MW 3, as observed during the field sampling event and confirmed by the laboratory result. After purging and recovery this well was sampled, to provide a record of the product observed.

Other that the unexpected presence of free product in MW 3 (before our knowledge of the nearby recent July 2015 spill), there are no suggestions of trend changes in parameter concentrations for the other MWs at present.

It is likely that the dissolved component of the new spill (July 2015) has not yet progressed as far as the remaining MWs. Based upon the observed behaviour of the 2007 spill, it would be expected that the lighter PHC components would reach the MWs sequentially with time in a downgradient pattern. The next nearest wells to the spill point after MW 3 are MW 2 to the north and MW 9 to the south. This was demonstrated in our past sampling where free product was observed in MW 3 in 2009, in MW 2 in 2010 and in MW 9 in 2012. All three of these wells showed no recovery of free

Reference: BAF-3 2015 Summit and Middle Site Monitoring and Strategic Closure Plan Development

Figure 1. Groundwater Monitoring Results 2009-2015

product after purging, and no repeat of free product in subsequent years' monitoring events. No free product was observed in any upper site wells during the two monitoring visits of 2013 (last sampling event before August 2015).

MIDDLE SITE SOIL SAMPLING

Drawing 2 in **Attachment 1** shows the locations of middle site BPs as they existed during the last round of soil sampling completed by Stantec, as reported in *BAF-3 2012 Field Season – Monitoring Report #2* dated October 23, 2012. A composite sample was collected from a soil pile located between former BP 11 and the former settling pond. Analytical results for the sample show low concentrations of PHC fractions F3 and F4, well below DEW Line Cleanup criteria levels of 2,500 ppm Total PHCs. This confirms the reported removal of the last soils from the 2007 release from the middle site.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the results outlined in the preceding sections, the following conclusions are offered:

- Upper Site Groundwater Monitoring:
    - A recent refueling spill has occurred next to the TSM, as reported by RCL on-site support staff – this recent spill is the likely cause of the observed free product in MW 3
    - No trends can be drawn from MW 3 as a result of having been impacted by the new spill
    - Remaining sampled MWs at the upper site (MWs 2, 8, 9 and 10) appear to not yet show impacts from the new spill. Although MWs 2, 8, 9 and 10 can show a single event reduction in COC concentrations from the past sampling event (2013), no trends can yet be established, and, based upon the progression of observed impacts from the 2007 spill, it is expected that MWs 2 and 9 will show evidence of impacts from the July 2015 spill in the next year or so. No trends for MWs 2 and 9 will likely be able to be drawn in future years because of the July 2015 release
    - Previous results, and results for MWs 2, 8, 9 and 10 for this year, have been consistent with the site conceptual model showing an aging spill, with the fall off of free product within the subsurface by end-2012, and reducing dissolved phase concentrations migrating downgradient from the release point principally northwards and to lesser extent southwards. In the absence of the new release, 2015 monitoring gave the appearance of satisfying the monitoring objective of

decreasing trends, demonstrating the effectiveness of the upper site remediation program

- Middle Site Soil Sampling:
    - No soils from the 2007 release remain at the middle site
    - Sample results from the area of the final BPs show minor PHC impacts well below DLCU criteria – no further action is required
- Recommended next steps:
    - Given the inability to draw PHC parameter trend information from key upper site MWs as a result of the new (July 2015) spill, no further monitoring is recommended in relation to the proposed closure sampling from the 2007 spill
    - Future monitoring should be undertaken by the party responsible for the new (2015) spill within the footprint of the 2007 spill

CLOSURE

This report has been prepared for the sole benefit of the Nasittuq Corporation and their clients. The report may not be used by any other person or entity without the express written consent of Stantec, and the Nasittuq Corporation and their clients. Any use that a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions taken, based on this report. The information and conclusions contained in the approach presented in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Conclusions and recommendations presented should not be construed as legal advice.

Reference: BAF-3 2015 Summit and Middle Site Monitoring and Strategic Closure Plan Development

This report was prepared by David Wilson, M.A.Sc., P.Eng. Stantec internal technical review was provided by François Lauzon, M.Eng., P.Eng.

Respectfully submitted,

Original signed by

David Wilson, C.D., M.A.Sc., P.Eng.
Senior Project Manager
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Attachments: 1 Site Drawings
2 Analytical Results
3 Photo Log

Distribution: Addressee (1)

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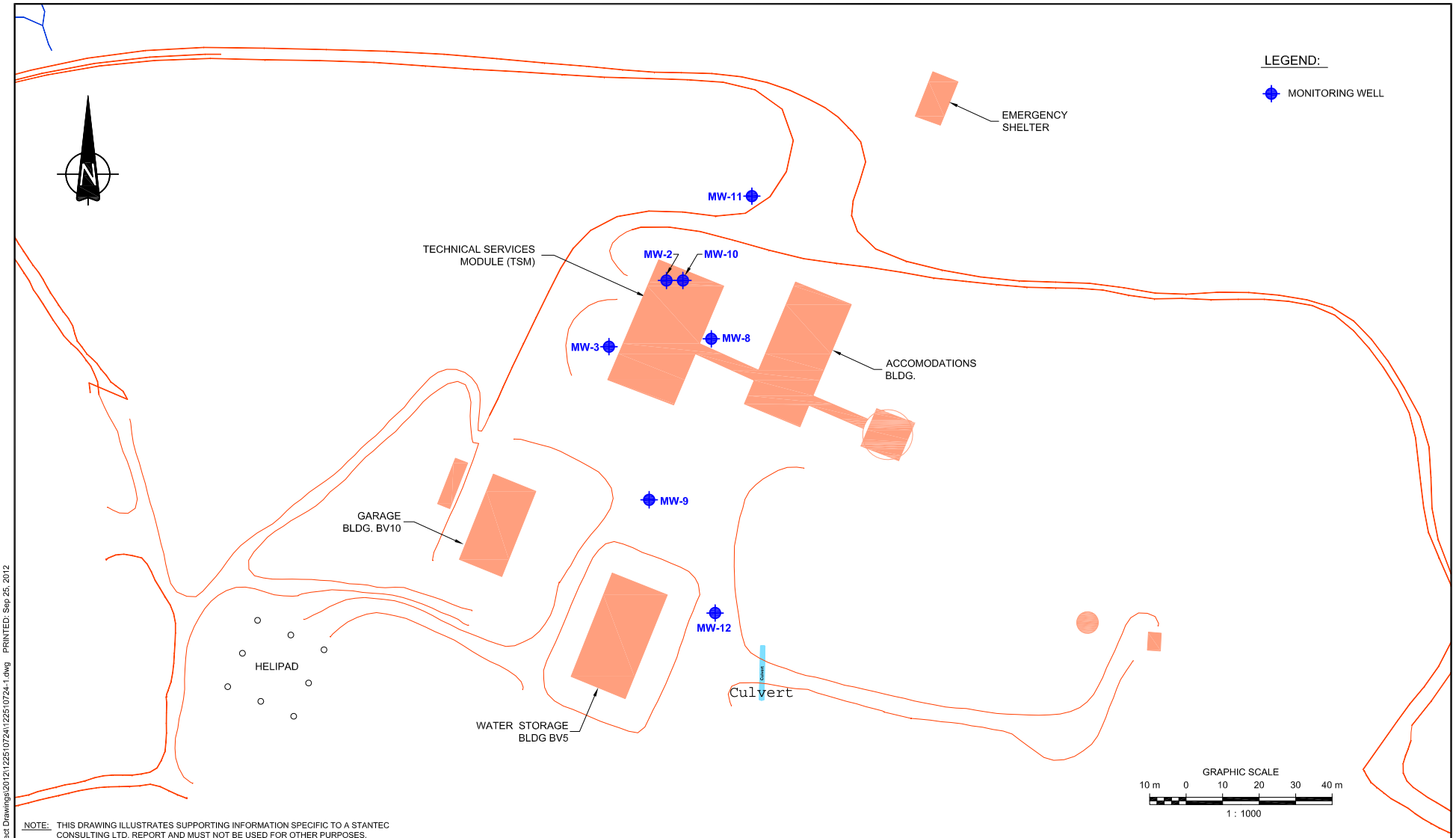
August 31, 2015

ATTACHMENT 1

Site Drawings

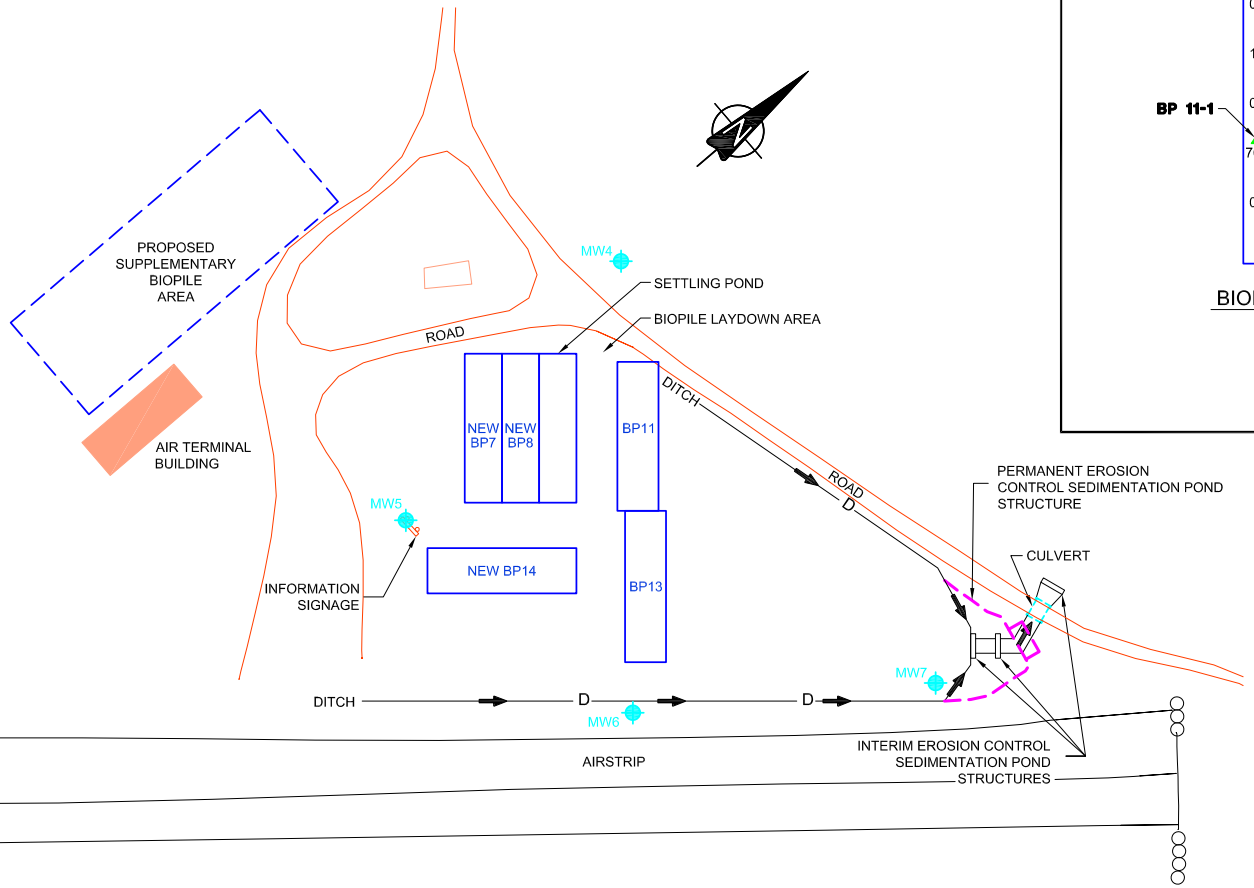
Design with community in mind



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

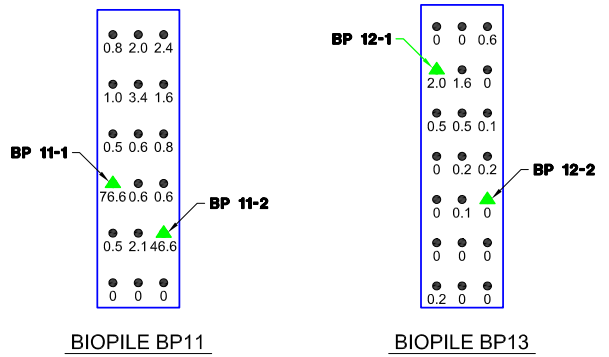
Reference: BAF3-NWS-ESG-2007-001 PLAN PROVIDED BY THE ENVIRONMENTAL SCIENCES GROUP, ROYAL MILITARY COLLEGE, KINGSTON, ONTARIO	**Job No.:** 122511156 **Scale:** 1 : 1000 **Date:** 27/08/2015 **Dwn. By:** GBB **App'd By:**	**Client:** NASITTUQ CORPORATION **Site Address** BAF-3, BREVOORT ISLAND, NUNAVUT	2012 MONITORING PROGRAM	UPPER SITE: MONITORING WELL LOCATION PLAN	**Dwg. No.:** 1

T:\Autocad\Drawings\Project Drawings\2012\122510724\122510724-1.dwg PRINTED: Sep 25, 2012



SITE PLAN

1 : 1000



SAMPLE LOCATION PLAN

1 : 500

LEGEND:

- INFERRED SURFACE DRAINAGE DIRECTION
- MONITORING WELL
- 46.6 PETROLEUM HYDROCARBON VAPOUR CONCENTRATION IN PPM
- SOIL SAMPLE SUBMITTED FOR LABORATORY ANALYSIS

GRAPHIC SCALE

10 m 0 10 20 30 40 m (1 : 1000)

5 m 0 5 10 15 20 m (1 : 500)

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference: BAF3-NWS-ESG-2007-001 PLAN PROVIDED BY THE ENVIRONMENTAL SCIENCES GROUP, ROYAL MILITARY COLLEGE, KINGSTON, ONTARIO	**Job No.:** 122511156 **Scale:** AS SHOWN **Date:** 27/08/2015 **Dwn. By:** GBB **App'd By:**	**Client:** NASITTUQ CORPORATION **Site Address** BAF-3, BREVOORT ISLAND, NUNAVUT	2012 MONITORING PROGRAM	MIDDLE SITE: SAMPLE LOCATION PLAN	**Dwg. No.:** 2

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August 31, 2015

ATTACHMENT 2

Analytical Results

Design with community in mind

TABLE B-1
WATER ANALYTICAL RESULTS - UPPER SITE
BTEX, PHC (F1 to F4)
BAF-3, Brevoort Island, NU
Project No. 122511156

Sample	Year	Date Collected	Location on Site	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L	PHC F1 µg/L	PHC F2 µg/L	PHC F3 µg/L	PHC F4 µg/L
				MDL (µg/L)							
				0.5	0.5	0.5	0.5	25	100	100	100
CCME CWQG: Marine Aquatic Life[1]				**110**	**215**	**25**	NC	NC	NC	NC	NC
Nunavut Water Board[2]				***370***	***2***	***90***	NC	NC	NC	NC	NC
FIGWQG[3]				690	83	11000	18000	9100	1300	NC	NC
Monitoring Wells; Upper Site APEC 3											
MW2	2015	8-Aug-15	Monitoring Well 2	<0.5	1.6	1.5	53.8	178	1520	230	<100
MW3	2015	8-Aug-15	Monitoring Well 3	<0.5	85.8	14.1	1130	816	157000[4]	7420[4]	<2000[4]
MW8	2015	8-Aug-15	Monitoring Well 8	<0.5	***9.9***	2.0	109	494	<100	<100	<100
MW9	2015	8-Aug-15	Monitoring Well 9	<0.5	<0.5	<0.5	2.2	128	2050	<100	<100
MW10	2015	8-Aug-15	Monitoring Well 10	<0.5	1.3	1.5	10.8	53	<100	291	<100
MW11	2015	-	Monitoring Well 11	well destroyed							
MW12	2015	-	Monitoring Well 12	well inaccessible							

NOTES:

1 Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life, Marine, accessed online at http://st-ts.ccme.ca/ on August 7, 2012

2 Nunavut Water Board (NWB) Water Licence 3BC-BAF0919 (September 10, 2009)

3 Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, Revised March 2014, commercial and industrial land use, coarse grained soils

4 Fee product was observed in the sample container

MDL Method detection limit

NC No criteria

Bold Exceeds CCME CWQG: Marine Aquatic Life criteria.

Bold & Italics Exceeds the NWB water licence criteria.

Exceeds FIGWQG criteria.

TABLE B-2
SOIL ANALYTICAL RESULTS - BIOPILES
Petroleum Hydrocarbons - BTEX, PHC (F1 to F4)
BAF-3, Brevoort Island, NU
Project No. 122511156

Sample	Year	Date Collected	Sample Location	Benzene µg/g	Toluene µg/g	Ethyl-benzene µg/g	Total Xylenes µg/g	PHC F1 µg/g	PHC F2 µg/g	PHC F3 µg/g	PHC F4 µg/g
				MDL (µg/g)							
				0.002	0.002	0.002	0.002	7	4	8	6
CCME SQG [1]				*0.03*	*0.37*	*0.082*	*11*	NC	NC	NC	NC
CCME CWS Criteria [2]				NC	NC	NC	NC	**30**	**150**	**300**	**2800**
Middle Site Biopiles											
BP11-BP13 Comp	2015	08-Aug-15	Presumed BP11-BP13 Base	<0.003	<0.003	<0.003	<0.003	<7	<4	82	10

NOTES:

1	CCME (Canadian Council of Ministers of the Environment), Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 1999, rev. June 2001, residential/parkland land use.
2	CCME, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, endorsed by CCME Council of Ministers, April 30 to May 1, 2001, Winnipeg, agricultural land-use, coarse-grained soil. Levels without parentheses do not include consideration of the soil-to-groundwater contamination pathway. Levels within parentheses do include protection of groundwater. (Updated January 2008)
3	DEW-Line Clean-up Criteria
MDL	Method detection limit
NC	No criteria
Italics	Exceeds the CCME SQG.
Bold	Exceeds the CCME CWS soil quality criteria.

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ATTACHMENT 3

Photo Log

Design with community in mind

Photo 1. North of TSM looking NE, booms and pads placed downgradient in evidence. August 8, 2015.

Photo 2. Looking under north end of TSM, showing MWs 2 (foreground) and 10. August 8, 2015.

Photo 3. North of TSM at location of former MW 11. August 8, 2015.

Photo 4. Stormwater pond with intact underflow dam north of TSM. August 8, 2015.

Photo 5. West side of TSM by MW 3. August 8, 2015.

Photo 6. Flex tank located on top of MW 12 location. August 8, 2015.

Photo 7. Stormwater pond and underflow dam at middle site. August 8, 2015.

Photo 8. Middle site showing water-filled footprints of former BPs 11 and 13. August 8, 2015.