2017 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 When the revised document is issued, the previous issue is automatically superseded.

Revision	Date	Author	Pages Changed	Reason for Change
1	21-Jan-2015	W. Wyman	All	Initial Document Release
2	12-Feb-2018	W. Wyman	All	Updated formatting

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ENGLISH EXECUTIVE SUMMARY FOLLOWS

ᐅᓇ 2017–ᒧᑦ ᐊᕐ ᕌᒍᑕᒫᖅᓯᐅᑎ ᐅᓂᒃ ᑳᖅ ᓄᓇᕘᒻ ᒥ ᐃᒪᓕᕆᓂᕐ ᒧᑦ ᑲᑎᒪᔨ ᓄᑦ ᐸᕐ ᓇᑕᐅᓯᒪᔪᖅ ᐅᑯ ᓄᖕᓚ Raytheon Canada Limited (RCL) ᒥᓂᕝ ᑕᐅᕙᖕᒌ ᓄᑦ ᐅᓇᑕᖅᑐᑦ ᓴᒃ ᑲᑦ ᑎᑭ ᐅᑎᒋ ᐊᕈ ᑕᐅᑦ ᓱᓂ ᐱᔭ ᕆᐊᓕᓐ ᓄᑦ ᐃᓗᐊᓃᑦ ᑐᓄᑦ ᓚᐃᓴᓐ ᓯᖃᕐ ᓂᐅᑉ ᑐᓂᔭ ᐅᓯᒪᔪᖅ 10 September 2009 3BC-BAF0919 – ᖃᓄᐃᑦ ᑑᓂᖕᓚ “B”, ᐃᓚᖕᓚ B “ᐃᓘᓐ ᓈᒍᑦ ᒪᓕᒐᑦ”, ᑎᑎᕋᖅᓯᒪᔪᖅ 1. ᐅᑯᐊ ᐅᓂᒃ ᑳᑦ ᑐᕌᖕᒐᑦ 01 ᔮᓐ ᓄᐊᕆ 31 ᑎᓯᒻ ᕙ 2017.

RCL ᐊᐅᓚᓂᓕᕆᔩ ᐅᕝᕙᖅ ᒪᑭᒪᑦ ᓯᔩ ᐅᑦ ᓱᑎᓪ ᓗ (O&M) ᑳᑦ ᑐᓖᑦ ᑎᐅᑦ ᓱᑎᒃ ᖃᐅᔨ ᓴᕐ ᕙᓪ ᒥ (NWS), ᐱᖃᓯ ᐅᑎᑦ ᓱᓂ BAF-3, ᓇᔫ ᑎᕙᐅᓐ ᖑᕐ ᑐᖅ (ᐃᓄᖃᓐ ᖑᕐ ᑐᖅ) ᖃᐅᔨ ᕐ ᕙᒃ ᐃᓂᖃᖅᑐᖅ ᐅᕙᓂ Brevoort Island, ᓄᓇᕗᒻ ᒥ. ᑖᓐ ᓇ ᐅᐸᑦ ᑕᐅᕙᑦ ᑐᖅ ᐱᖕᒐᐊᖅᑎᖅᓱᓂ ᐊᕐ ᕌᒍᒥ RCL ᐃᖅᑲᓇᐃᔭᖅᑎᖖ ᓄᑦ ᐃᓂᖃᖅᑐᓄᑦ ᐃᖃᓗᓐ ᓂ, ᓄᓇᕗᒻ ᒥ ᓱᕐᑯᑦ ᑕᐃᓕᒪ ᑎᒋ ᐊᓕᓐ ᓂᒃ ᑲᒪᑦ ᓱᑎᒃ ᐊᓯ ᖑᕐ ᓂᓪ ᓗ ᐃᖅᑲᓇᐃᔮ ᑎᒋ ᐊᓕᓐ ᓂᒃ.

ᑲᑎᑦ ᓱᑎᒃ 863.1 ᑭᑉ ᐹᓇᑦ ᑐᑦ ᒦᑕᐃᑦ ᐱᔭ ᐅᔪᔪᑦ ᐃᒥᖅᑕᕐ ᕙᖕᒋᒃ. ᑖᓐ ᓇ ᐊᑖᓃᑦ ᑐᖅ ᐊᕐ ᕌᒍᒥ ᐱᒍᓐ ᓇᖅᑕᖕᒪ 1,750 ᑭᑉ ᐹᓇᑦ ᑐᑦ ᒦᑕᐃᑦ ᐱᒍᓐ ᓇᖅᑎᑕᐅᓯᒪᔪᑦ ᒫᓐ ᓇ ᓚᐃᓴᓐ ᓯᖕᑎᒐ ᒍᑦ.

ᐊᖅᓱᐊᓗᖃᐅᑏᑦ ᐊᕙᐃᑦ ᐃᓗᐊᓃᑦ ᑐᑦ ᐃᑐᑦ ᑎᖅᑕᐅᔪᔪᑦ 2012-ᒥ 2013-ᒥ ᓗ, ᐊᕙᓗᖕᒋ ᓗ ᐱᖅᑕᐅᓕᔪᑦ ᓱᑎᒃ 2012-ᒥ 2015–ᒥ ᓗ. ᐊᕙᓘᑉ ᓗᐃᐊᓂᒃ ᐃᒪᕐ ᒥᒃ ᖃᐅᔨ ᓴᖅᑕᐅᔪ ᖃᔪᓐ ᖑᕐ ᑐᖅ 2017–ᒥ.

ᓱᑉᐱᓐ ᓇᖅᑐᓂᒃ ᐊᓂᑕᐅᔪ ᖃᔪᔪᖅ BAF-3 ᐊᓂᑕᐅᓂᐊᖅᑎᓪ ᓗᒍ ᓯᓚᑖᓄᑦ ᓄᓇᕘᑦ. ᓱᑉᐃᑦ ᐊᐅᓪ ᓚᖅᑎᑕᐅᔪᔪᑦ Safety Kleen, 2730 Boulevard Industriel, Chambly, QC, J3L 4V2. ᓱᑉᐱᓐ ᓇᖅᑐᑦ ᐊᐅᓪ ᓚᖅᑎᑕᐅᔪᔪᑦ BAF-3–ᒥᒃ 2017–ᒥ 19 ᖃᑦ ᑕᐅᔭ ᐃᑦ, ᐊᑕᐅᓯᖅ ᐃᑦ ᓯᕐ ᕙᒃ ᕚᑕᓕᒥ ᓂᖅ ᑕᓕᒃ, ᒪᕐ ᕉᓪ ᓗ ᖃᑦ ᑖᒃ ᐊᑐᖅᓯᒪᓐ ᖑᕐ ᑐᑦ ᕚᑕᓕᓂᒃ ᐆᑎᑎᕈᑏᑦ.

ᓱᑉᐱᓐ ᓇᖅᑐᖃᓐ ᖑᕐ ᑐᑦ ᓴᓃᑦ ᑕᖕᕿᓕᑦ ᐊᐅᓪ ᓚᐅᑉ ᔭᐅᔪᔪᑦ Logistics Support ᐃᓂᖓᓄᑦ ᐃᖃᓗᓐ ᓄᑦ ᐃᒋᑕᐅᑦ ᓱᑎᓪ ᓗ ᐃᖃᓗᓐ ᓂ ᐊᑦ ᑕᕐ ᕙᓪ ᒧᑦ. RCL–ᑯᑦ ᑎᑎᖅᑲᖁᑎᓖᑦ ᐱᔪᓐ ᓇᕐ ᓂᖃᖅᑎᑦ ᓯᔪᓂᒃ ᓄᓇᓕᓐ ᓂᒃ ᐃᒋᑦ ᓯᖃᑦ ᑕᕈᓐ ᓇᕐ ᓂᒧᑦ ᓴᓂᓐ ᓂᒃ.

ᓯᑕᒪᓂᒃ ᑯᕙᔪ ᖃᔪᔪᖅ BAF-3–ᒥ 2017–ᒥ:

a. NT-NU ᑯᕙᔪ ᖃᕐ ᓂᒧᑦ ᐅᓂᒃ ᑳᑦ # 17-222. On 21-Jun-ᔫᓂ 21, 2017-ᒥ, ᐃᖅᑲᓇᐃᔭᖅᑏᑦ ᐅᔾ ᔨᕈᓯᑦ ᑎᒥ ᓃᑦ ᑭᓛᒃ ᕿᐊᔪᒥᒃ ᖃᐅᔨ ᒍᑕᐅᓕᖅᓯᓂᓗ ᒪᕐ ᑉᐆᓐ ᓅᓐ ᖏᓇᐊᖕᓚ ᐊᐃᑉ ᐸᖕᓚ ᑯᑐᖅᑐᒥᒃ ᑲᒪᒋᔭ ᐅᔪᑦ ᓯᓂᓗ (ᕿᔾ ᔭᓪ ᓗᒐ ᖅᑎᒍᑦ) ᓄᖅᑲ ᖅᑎᑕᐅᑦ ᓯᓂᓗ ᑯᑐᖅᑐᖅ. ᐊᐃᑉ ᐸᖕᓚᐅᖅᓯ ᐊᓗᖃᐅᑎᐅᑉ ᐳᓪ ᓚᕝ ᕙᖕᒋᒃ. ᐳᓪ ᓚᕝ ᕙᖕᓚ ᐃᓕᔭ ᒥᓂᖅ ᐊᕙᓘᑉ ᐃᓗᐊᓂ ᐊᒻ ᒪᓗ ᓵ ᓗᕿᐊᓕᖅᑕᐅᑦ ᓯᓂ ᖁᓖᒍᑦ ᐊᐱᑎᑦ ᑕᐃᓕᒪᑦ ᓯᒍ ᐳᓪ ᓚᑦ ᑕᐅᑎᖕᓚ ᐅᑭᐅᒃ ᑯᑦ ᕿᓚᓐ ᓂᕐ ᒥᒃ ᒪᕐ ᑉᐆᓐ ᓂᒃ ᐃᑎᒐᓪ ᓗᐊᓂᒃ ᐊᖏᕐ ᕋᓕᒃ ᓵ ᓗᕿᐊᕐ ᒥ ᖁᓖᓃᑦ ᑐᒥ ᐳᓪ ᓚᕝ ᕙᖕᒐᓚ. ᐃᖅᑲᓇᐃᔭᖅᑏᑦ ᖃᐅᔨ ᔪᔪᑯ' ᑖᓐ ᓇ ᐊᐱᒪᕆᐊᖕᓚᓂᓚᕈᖅᓯᒪᕆᐊᖕᒐᓗ ᐳᓪ ᓚᕝ ᕙᒃ. ᓇᐃᐱᑕᐅᓚᒥ ᖃᐅᔨ ᔭᐅᔪᔪᖅ ᐅᖅᓱᐊᓗᓛᓪ ᒥᒃ ᑯᕙᓐ ᓂᓇᐊᖕᓚ ᐳᓪ ᓚᕝ ᕙᖕᓚ ᓄᖅᑲ ᖅᑎᑕᐅᑦ ᓯᓂ ᑯᕙᔪᖅ, ᐅᕙᓗᓕᖅ ᑕᐅᐅᑦ ᓱᓂ ᓴᓗᒻ ᒪᖅᓴᐃᑎᓕᖅ ᑐᖅ ᑕᐅᓕᔪᔪᖅ ᕿᓪ ᓛᒃ ᕿᐊᓂᖕᓚ
b. NT-NU ᑯᕙᔪ ᖃᕐ ᓂᕐ ᒧᑦ ᐅᓂᒃ ᑳᑦ # 17-231. ᐅᕙᓂ 30-ᔫᓂ-2017, ᐃᓗᐃᒃ ᑲᐅᓈᖅᓯᒪᔪᓂᒃ ᐅᖅᓱᐊᓗᓕᕆᓂᑦ ᐅᔾ ᔨᕋᔪᔪᑦ ᓯᒪᖅᓯᒪᔪᒥᒃ (40 cm ᑕᑭᓂᖕᒐ) ᐊᑖᓂ ᐅᖅᓱᐊᓗᒻ ᒧᑦ ᐊᖅᑯᑎᐅᑉ ᖃᖕᒪᔫᖅᓯᐅᑎᒧᑦ ᐅᖅᓱᐊᓗᖃᐅᑎᒥ (W20A). ᓱᓪ ᓗᓕᖕᓚ ᖃᐅᔨ ᓴᖅᑕᐅᔪᔪᖅ ᕿᕐ ᓛᖅᑐᓂᓪ ᓗ ᖃᐅᔨ ᔭᐅᔪ ᖃᕋᓂ. ᐅᑉ ᐱᓇᔭ ᐅᔪᖅ ᐅᖅᓱᐊᓗᒃ ᕿᕐ ᓛᕐ ᓂᓇᐊᖕᓚᕿᔾ ᔭᕐ ᓗᕝ ᕙᖕᒍᑦ ᐊᐅᑦ ᑕᕐ ᓂᒃ ᐱᔾ ᔪᑕᐅᓗᓂ.
c. NT-NU ᑯᕙᔪ ᖃᕐ ᓂᕐ ᒧᑦ ᐅᓂᒃ ᑳᑦ # 17-438. ᐅᕙᓂ 04-ᑏᓯᒻ ᕙ-2017, 1,600 ᖃᓪ ᓗᑎᖁᓖᑦ ᓃᑕᐃᑦ ᒐᓚᐃᑰ/ᐃᒪᖅ ᑲᑎᓯᒪᔪᖅ ᑯᕙᔪᒥᓂᖅ, ᐃᑖᓕᖅᓱᓂ ᑮᓇᓗᓕᕆᔾ ᔪᑎᓅᖕᒐ ᓄᑦ ᑕᖅᑲ ᐅᖕᒐᓕᖅᓱᓂᓗ ᓄᓇᒧᑦ. ᑏᓯᒻ ᕙ 10, 2017–ᒥ, ᒥᑦ ᓵᓃᑦ ᑐᑦ 1200 ᓃᑕᐃᑦ ᖃᓪ ᓗᑎᖁᓖᑦ ᒐᓚᐃᑯ ᐊᑦ ᑐᐃᓂᖅᑲᖅᑐᑦ ᑭᓈᓗᓐ ᓂᒃ ᓄᐊᑕᐅᔪᒧᑦ. ᓱᓕᒃ ᑲᓐ ᓂᖅ ᒐᓚᐃᑯᒧᑦ ᐊᑦ ᑐᖅᑕᐅᓯᒪᔪᑦ ᓄᐊᑕᐅᒃ ᑲᓐ ᓂᑐᐃᓐ ᓇᓇᐊᓖᑦ ᑐᓐ ᖕᕕᐅᓗᓂ ᖃᓄᐃᓕᖕᒋᖕᓚ ᐃᓂᐅᔪᑦ 2018–ᒥ ᓱᓇᒃ ᑯᑖᖃᐅᑎᖃᕐ ᕙᓪ ᒥᒃ ᐊᑦ ᑐᐊᔪᒥᒃ TSM–ᒧᑦ. ᑖᓐ ᓇ ᓱᓇᒃ ᑯᑖᖃᐅᑎ ᐃᒻ ᒥᒃ ᑰᖕᒐᖅᑎᑕᐅᓯᒪᔪᖅ, ᐃᒻ ᒥᒃ ᑰᑎᑕᐅᖕᒋᓐ ᓇᕐ ᓂᐊᖅᓱᓂ ᕿᒥᕐ ᕈᔭ ᐅᓚᐅᖖᕋ ᓂᖕᒋᓂ.
d. NT-NU ᑯᕙᔪ ᖃᕐ ᓂᕐ ᒧᑦ ᐅᓂᒃ ᑳᑦ # 17-446. ᐅᕙᓂ 08-ᑏᓯᒻ ᕙ-2017, ᐅᖁᒪ ᐃᑦ ᑐᕐ ᓂᐅᑎ ᐊᐳᑕᐃᔭ ᐃᒍᑕᐅᔪᔪᖅ BAF-3–ᒥ. ᐊᐳᑕᐃᔭᖅᑕᐅᕙᓪ ᓕᐊᑎᓪ ᓗᒍ, ᐊᐳᑎᒧᑦ ᓴᐅᔭ ᐅᓯᒪᔪᖅᖅᑐᒥ ᓂᖅ ᖃᑦ ᑕᐅᔭ ᒥᒃ 205 ᓃᑕᓂᒃ ᐃᒪᓕᒻ ᒥᒃ ᖃᖕᒪᔫᖅᓯᐅᑎᒥᒃ ᑭᓚᑦ ᑕᐅᑦ ᓱᓂ. ᖃᑦ ᑕᐅᔭ ᖅ ᑭᓚᑦ ᓱᓂ ᕿᑎᖕᒪ ᖁᓖᒍᑦ ᑯᕙᓕᖅᓱᓂ 30 ᓃᑕᓂᒃ. ᐃᖅᑲᓇᐃᔭᖅᑏᑦ ᓇᔫᑎᔪᑦ ᑲᒪᒋᐊᑦ ᓴᐅᑎᒋᔪᔪᑦ ᑯᕙᔪᒥᒃ ᐅᑎᖅᑎᑕᐅᑦ ᓱᓂᓗ ᐅᖅᓱᐊᓗᒃ ᐊᒻ ᒪᓗ ᐊᑦ ᑐᖅᑕᐅᔪᖅ ᐃᔾ ᔪ/ᐊᐳᑎ.

ᑯᕙᔪ ᖃᖅᐸᑦ ᑐᐊᕙᕐ ᓇᖅᑐᓕᕆᓂᕐ ᒧᑦ ᐸᕐ ᓇᐅᑎ ᑲᔪᓯᑦ ᓯᐊᔪᔪᖅ ᐊᑐᓕᖅᑎᑕᐅᓂᖕᒪ

ᓄᓇᒥ ᐃᒪᕐ ᒥᒃ ᖃᐅᔨ ᓴᕐ ᓂᐅᔪᑦ (BAF-5) ᑕᕝ ᕙᓂ 2015 Jet A1 ᑯᕙᓯᒪᔪᒥᒃ ᑲᔪᓯᔪᔪᖅ 2017–ᒥ.

EXECUTIVE SUMMARY

This 2017 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 2017.

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

A total of 863.1 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.

Fuel tanks within the berms were demolished in 2012 and 2013, and the berms were intentionally breached in 2012 and 2015. No effluent (berm water) samples were taken in 2017.

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 shipped from BAF-3 in 2017 consisted of 19 drums, 1 crate of waste of waste batteries, and 2 pails of unused battery acid.

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

There were four outdoor spills at BAF-3 in 2017:

a. NT-NU Spill Line Report # 17-222. On 21-Jun-2017, staff noted a sheen and traced it to two sources. One source was a leaking thread which was isolated (via valves) and the leak was stopped. The second source was a fuel bladder. The bladder had been placed in a berm and a plywood roof had been built over it to keep the snow off of the bladder. During the winter a hole approximately 2 square foot had broken in the plywood roof above the bladder. Staff found a considerable snow and ice buildup on the bladder. The pressure relief was located and a small amount of fuel was noted exiting the bladder. The spill was stopped, booms were deployed, and hydrogen peroxide was applied to the sheen.
b. NT-NU Spill Line Report # 17-231. On 30-Jun-2017, bulk fuel technicians noted a stain (40 cm in diameter) under the fuel line for the summit aviation tank (W20A). The pipeline was inspected and no leaks were found. It is believed that the fuel line had leaked through the valve stem due to thermal expansion.
c. NT-NU Spill Line Report # 17-438. On 04-Dec-2017, 1,600 L of glycol/water mixture was spilled, entering the site's sewage system and was discharged to the environment. On 10-Dec-2017, approximately 1200 L of glycol impacted sewage was recovered. Additional glycol impacted sewage may be recovered depending on site conditions in the summer of 2018from the sump shed adjacent to the TSM. This shed has been isolated, and will remain isolated until it can be accessed.
d. NT-NU Spill Line Report # 17-446. On 08-Dec-2017, a loader was clearing snow at BAF-3. During the snow removal process, a snow covered 205 L drum containing Jet A1 fuel was punctured. The drum was punctured at approximately 2/3 of its height which limited the spill to approximately 30 liters. The crew on-site was able to immediately action the spill and recover all fuel and impacted soil / snow.

The Spill Contingency Plan was successfully implemented.

Groundwater monitoring activities (BAF-5) of the 2015 Jet A1 spill continued in 2017.

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1.0 INTRODUCTION

This 2017 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 2017.

RCL is the Operations and Maintenance Contractor for the North Warning System (NWS), including BAF-3, the unattended (unmanned) North Warning System radar site located on Brevoort Island, Nunavut. The site is visited quarterly by RCL staff based in Iqaluit for preventive maintenance inspections and as required for other work.

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, 15-Mar-2017
Time period covered:	01 January to 31 December 2017

2.0 WATER USE

A total of 863.1 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 at BAF-3 in 2017.

Table 2-1: Monthly Raw Water Usage at BAF-3 in 2017

Month	Raw water usage (m^3)
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	863.1
September	0
October	0
November	0
December	0
TOTAL	**863.1**

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 document including the completed movement documents for waste regulated under the Transportation of Dangerous Goods Regulations (TDGR) and NWS Manifests for

non-regulated waste. The hazardous waste shipped from BAF-3 in 2017 consisted of 19 drums, 1 crate of waste of waste batteries, and 2 pails of unused battery acid.

Table 3-1: Hazardous Waste and Waste Oil Sent for Disposal from BAF-3 in 2017

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Unused - Battery Acid sulphuric	2 Pails in 1 crate	Movement Document 2539502-1
Waste batteries, wet, non-spillable	1 Crate	Movement Document 2539502-1
Waste Jet A1 fuel soaked sorbent Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	2 Drums	Movement Document 2539502-1
Waste Paint related materials, flammable Waste paint related materials	1 Drum	Movement Document 2539502-1
Waste contaminated soil non-regulated (drum) Not TDG Regulated	1 Drum	NWS Manifest 36952
Waste cooking oil Not TDG Regulated	1 Drum	NWS Manifest 36950
Waste glycol (drum) Not TDG Regulated	3 Drums	NWS Manifest 36945, 36950
Waste oil Not TDG regulated	9 Drums	NWS Manifest 36943, 36945, 36944
Waste oil filters Not TDG regulated	1 Drum	NWS Manifest 36946
Waste oil soaked sorbent Not TDG regulated	1 Drum	NWS Manifest 36953

4.0 NON-HAZARDOUS SOLID WASTE DISPOSAL

Non-hazardous domestic solid waste was flown out to the Logistics Support Site in 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 2017

Month	Waste Generated (kg)
January	635
February	0
March	91
April	975
May	318
June	136

Month	Waste Generated (kg)
July	0
August	0
September	0
October	0
November	136
December	295
TOTAL	**2,586**

5.0 MONITORING PROGRAM

In 2017, a monitoring program was implemented at BAF-3 as required by the water licence, Part J. The monitoring program included the following:

1. Volume of raw water drawn from the water Supply Lake (BAF-1). The information gathered from this requirement is shown in **Section 2.0 Water Use**. The volume of water drawn was within the limit stated in the water licence.
2. Quality of sewage discharged from the final discharge point of the sewage disposal facility (BAF-2). The location of the sewage effluent outfall is shown in **Annex C**, including coordinates. A sump for the sewage outfall was constructed in 2010. The sewage outfall sump was sampled twice in 2017. The results are shown in **Annex D: Analysis of Discharged Sewage Effluent**.
3. Fuel tanks within the berms were demolished in 2012 and 2013, and the berms were intentionally breached in 2012 and 2015. As there are no intact berms, no effluent (berm water) samples (BAF-4) were taken in 2017, **Annex E: Analysis of Berm Water** has been left blank.
4. Groundwater monitoring activities (BAF-5) of the 2007 Jet A1 spill ended in 2015 as per the recommendation by Stantec Consulting Ltd. Groundwater monitoring of the 2015 Jet A1 spill continued in 2017. A summary of the work completed in 2017 is included in **Annex F: Monitoring Activities**.

6.0 SPILLS (UNAUTHORIZED DISCHARGES)

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
21-Jun-2017, Spill # 17-222	Jet A1	1 L	On 21-Jun-2017, staff noted a sheen and traced it to two sources. One a leaking thread. The leaking component was isolated (via valves) and the leak was stopped. The second was a fuel bladder. The bladder had been set up in a berm with a plywood top. Over the winter an approximately 2 square foot hole had broken in the plywood. Staff found a considerable snow and ice build up on the bladder. The pressure relief valve was located and a small amount of fuel was noted exiting the bladder. The snow and ice was removed from the bladder (reducing pressure on the bladder) and fuel flow from the bladder's pressure relief valve stopped. Fuel/water mixture from in the berm was pumped into drums (stopping the sheen). Booms had been deployed as soon as the sheen was noted. Hydrogen peroxide was applied to the sheen.	Flexible bladder tank south of Technical Services Module (TSM) (63°20'25.60"N, 64° 9'30.70"W)
30-Jun-2017, Spill # 17-231	Jet A1	5 L	On 30-Jun-2017, bulk fuel technicians noted a stain (40 cm in diameter) under the fuel line for the summit aviation tank (W20A). The pipeline was inspected and no leaks were found. It is believed that the fuel line had leaked through the valve stem due to thermal expansion. Valves were opened to relieve pressure as there is no pressure relief on this section of piping. The valve packing was tightened to prevent future leaks. The stained soil has been excavated and containerized in a drum for off-site disposal.	Pipeline to W20A (63°20’22”N, 64°09’36”W)

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
04-Dec-2017, Spill # 17-438	50% Ethylene glycol solution	1600 L	On 04 December, technicians working at the Long Range Radar site BAF-3 noted that a pressure relief valve on the building's heating system released approximately 1,600 L of glycol/water mixture. The glycol entered the site's sewage system and was discharged automatically when the effluent level reached a certain level (~1,500L). On 10-Dec-2017, approximately 1200 L of glycol impacted sewage was recovered. Additional glycol impacted sewage could be recovered from the sump shed adjacent to the Technical Services Module (TSM). This shed has been isolated (i.e. will not automatically run), and will remain isolated until it can be accessed. Soil samples will be taken in summer 2018 to determine the area of impact from this incident.	Initially: Technical Services Module Into the Environment: end of the sewage discharge line (63°20'21.55"N, 64° 9'26.63"W)
08-Dec-2017, Spill # 17-446	Jet A1	30 L	On 08-Dec-17, a loader was clearing snow at BAF-3. During the snow removal process, a snow covered 205 L drum containing Jet A1 fuel was punctured. The drum was punctured at approximately 2/3 of its height which limited the spill to approximately 30 liters. The crew on-site was able to immediately action the spill and recover all fuel and impacted soil / snow.	Outside Garage (63° 20' 24" N 64° 09' 31.4" W)

The Spill Contingency Plan was successfully implemented.

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

There were no revisions to the Spill Contingency Plan in 2017.

8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

2017 was the third year of clean-up following the 19-Mar-2015 fuel spill. Environmental staff mobilized to the site on 13-Jun-2017 during the freshet to ensure that water control measures were in place and functioning. The facility for treating impacted water was re-established and water treatment began on 03-Jul-2017. A summary of the work completed in 2017 is included in **Annex F: Monitoring Activities**.

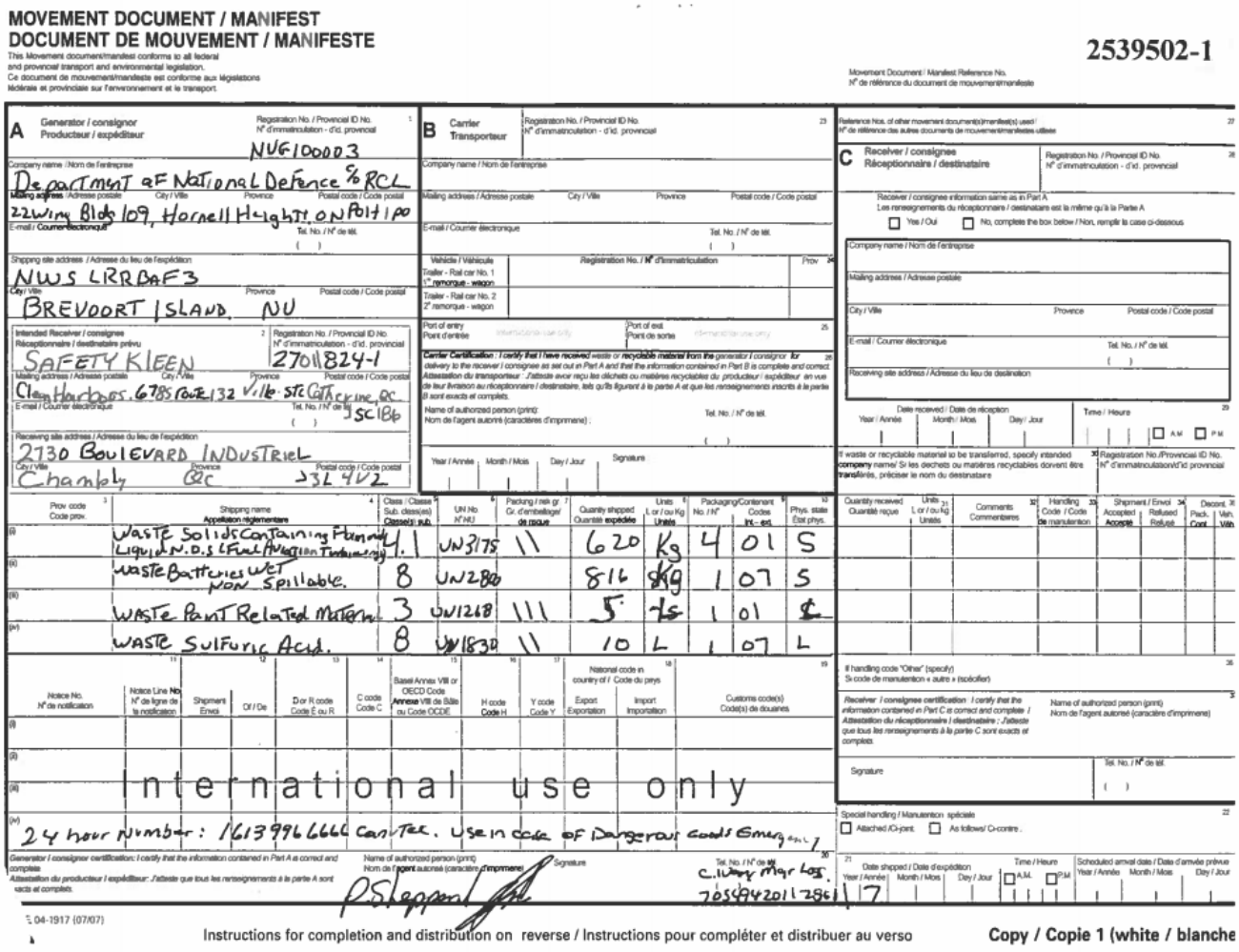
9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
NWB	Nunavut Water Board
NWS	North Warning System
NWSO	North Warning System Office
PCB	Polychlorinated Biphenyl
RCL	Raytheon Canada Limited
TDGR	Transportation of Dangerous Goods Regulations

ANNEX A: HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2017

The 2017 Movement Documents for TDG Regulated waste and NWS Manifests for non-TDG Regulated waste described in Table 3-1 are below.



MOVEMENT DOCUMENT / MANIFEST
DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifeste est conforme aux législations fédérale et provinciale sur l'environnement et le transport.

2539502-1

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifeste

A Generator / consignor / Producteur / expéditeur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: NUG1DOOD3

Company name / Nom de l'entreprise: Department of National Defence % RCL

Mailing address / Adresse postale: 22 Wing Bldg 109, Hornell Heights, ON P0H 1P0

E-mail / Courrier électronique:

Tel. No. / N° de tél.:

Shipping site address / Adresse du lieu de l'expédition: NWS LRR BAF3

City / Ville: BREVOORT ISLAND. Province: NU Postal code / Code postal:

Intended Receiver / consignee / Réceptionnaire / destinataire prévu: SAFETY KLEEN

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial: 2701824-1

Mailing address / Adresse postale: Clean Harbors, 6785 route 132 City / Ville: ste Catherine Province: QC Postal code / Code postal:

E-mail / Courrier électronique: Tel. No. / N° de tél.: JSC1B6

Receiving site address / Adresse du lieu de l'expédition: 2730 Boulevard Industriel

City / Ville: Chambly Province: Qc Postal code / Code postal: J3L 4V2

B Carrier / Transporteur

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial:

Company name / Nom de l'entreprise:

Mailing address / Adresse postale: City / Ville: Province: Postal code / Code postal:

E-mail / Courrier électronique: Tel. No. / N° de tél.:

Vehicle / Véhicule: Registration No. / N° d'immatriculation: Prov.

Trailer - Rail car No. 1 / 1re remorque - wagon:

Trailer - Rail car No. 2 / 2e remorque - wagon:

Port of entry / Point d'entrée: Port of exit / Point de sortie:

Carrier Certification: I certify that I have received waste or recyclable material from the generator / consignor for delivery to the receiver / consignee as set out in Part A and that the information contained in Part B is complete and correct. / Attestation du transporteur : J'atteste avoir reçu les déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie):

Tel. No. / N° de tél.:

Signature

Year / Année | Month / Mois | Day / Jour

C Receiver / consignee / Réceptionnaire / destinataire

Registration No. / Provincial ID No. / N° d'immatriculation - d'id. provincial:

Receiver / consignee information same as in Part A / Les renseignements du réceptionnaire / destinataire sont la même qu'à la Partie A: ☐ Yes / Oui ☐ No, complete the box below / Non, remplir la case ci-dessous

Company name / Nom de l'entreprise:

Mailing address / Adresse postale:

City / Ville: Province: Postal code / Code postal:

E-mail / Courrier électronique: Tel. No. / N° de tél.:

Receiving site address / Adresse du lieu de destination:

Date received / Date de réception: Year / Année | Month / Mois | Day / Jour

Time / Heure: ☐ A.M. ☐ P.M.

If waste or recyclable material to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire:

Registration No. / Provincial ID No. / N° d'immatriculation/d'id. provincial:

Prov. code / Code prov.	Shipping name / Appellation réglementaire	Class / Classe Sub. class(es) / Classe(s) sub.	UN No. / N° NU	Packing / Gr. d'emballage / de risque	Quantity shipped / Quantité expédiée	Units / L or / ou Kg / Unités	Packaging / No. / N°	Containers Codes / Int. - ext.	Phys. state / État phys.
(i)	WASTE Solids Containing Flammable Liquid N.O.S. (Fuel Aviation Turbine Engine)	1.1	UN3175	II	620	Kg	4	01	S
(ii)	Waste Batteries Wet Non Spillable.	8	UN2800		816	Kg	1	07	S
(iii)	WASTE Paint Related Material	3	UN1263	III	5	L	1	01	L
(iv)	WASTE Sulfuric Acid.	8	UN1830	II	10	L	1	07	L

Notice No. / N° de notification	Notice Line No. / N° de ligne de la notification	Shipment / Envoi	Of / De	D or R code / Code D ou R	C code / Code C	Basel Annex VIII or OECD Code / Annexe VIII de Bâle ou Code OCDE	H code / Code H	Y code / Code Y	National code in country of / Code du pays: Export / Exportation	Import / Importation	Customs code(s) / Code(s) de douanes
(i)											
(ii)											
(iii)	International use only										
(iv)	24 hour Number: 16139966666 Contact. Use in case of Dangerous Goods Emergency										

If handling code "Other" (specify) / Si code de manutention « autre » (isoler):

Receiver / consignee certification: I certify that the information contained in Part C is correct and complete. / Attestation du réceptionnaire / destinataire : J'atteste que tous les renseignements à la partie C sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie):

Signature

Tel. No. / N° de tél.:

Special handling / Manutention spéciale: ☐ Attached / Ci-joint. ☐ As follows / Ci-contre.

Generator / consignor certification: I certify that the information contained in Part A is correct and complete. / Attestation du producteur / expéditeur : J'atteste que tous les renseignements à la partie A sont exacts et complets.

Name of authorized person (print) / Nom de l'agent autorisé (caractères d'imprimerie): P.S. Leppard

Signature

Tel. No. / N° de tél.: C.I. Duty Mgr Log. 7055942011 7861

Date shipped / Date d'expédition: Year / Année | Month / Mois | Day / Jour: 17

Time / Heure: ☐ A.M. ☐ P.M.

Scheduled arrival date / Date d'arrivée prévue: Year / Année | Month / Mois | Day / Jour

04-1917 (07/07)

Instructions for completion and distribution on reverse / Instructions pour compléter et distribuer au verso

Copy / Copie 1 (white / blanche

Figure 1: Movement Document 2539502-1

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 10:49 AM	TCN-36943

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	430 KG

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4			2002406	WASTE - OIL, 45 GAL	RETROGRAD		ASSETS 330740, 341157, 341264, 341266

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

Received By:	Date
Received By:	Date

Figure 2: NWS Shipping Manifest TCN-36943

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 11:15 AM	TCN-36944

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	430 KGS

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4			2002406	WASTE - OIL, 45 GAL	RETROGRAD		ASSETS 341158, 341265, 340462, 331991*

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

Received By:	Date
Received By:	Date

Figure 3: NWS Shipping Manifest TCN-36944

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 11:19 AM	TCN-36945

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	215 Kg

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1			2002406	WASTE - OIL, 45 GAL			ASSET 343250
1			2002344	WASTE - GLYCOL (DRUM)			ASSET 343339

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

Received By:	Date
Received By:	Date

Figure 4: NWS Shipping Manifest TCN-36945

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 11:33 AM	TCN-36946

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	430 KG

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1			3006638	WASTE - FUEL SOAKED ABSORBENT	RETROGRAD		ASSET 340465
1			2007951	WASTE - PAINT RELATED MATERIAL	RETROGRAD		ASSETS 340474, 340473
1			2002356	WASTE - OIL FILTERS	RETROGRAD		ASSET 340464

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

Received By:	Date
Received By:	Date

Figure 5: NWS Shipping Manifest TCN-36946

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 1:58 PM	TCN-36950

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	430 KG

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
2			2002344	WASTE - GLYCOL (DRUM)	RETROGRAD		ASSETS 340472, 343340, 344908
1			3006485	WASTE - COOKING OIL	RETROGRAD		ASSET 340460

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

Received By:	Date
Received By:	Date

Figure 6: NWS Shipping Manifest TCN-36950

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 2:12 PM	TCN-36952

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	385 Kg

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1			2006261	WASTE - CONTAMINATED SOIL NON-	RETROGRAD		ASSET 340627

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

Received By:	Date
Received By:	Date

Figure 7: NWS Shipping Manifest TCN-36952

SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By:	Date:	
TSHAW	Jul 13, 2017 2:14 PM	TCN-36953

Ship To:	From:	Priority
CLEAN HARBORS CANADA INC. 6785 ROUTE 132 SAINTE-CATHERINE, QC, J5C 1B6 CA 450-632-6640	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		DR-C15864	1 PALLET	75 Kg

QTY Order	Type	Line	Item	Description	WO or PO	B/Code or S/N	Remarks
		Weight					
1			3006639	WASTE - OIL SOAKED ABSORBENT	RETROGRAD		ASSET 340721

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

Received By:	Date
Received By:	Date

Figure 8: NWS Shipping Manifest TCN-36953

ANNEX B: LOCATION OF LANDFILL WITH COORDINATES

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

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

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

ANNEX D: ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

The sewage outfall sump was sampled on 29-Jun-2017 and 19-Sep2017. The samples were analysed for the parameters listed in the water licence Part J, Item 3.

Table D-1: Summary of Analysis of Discharged Sewage Effluent at BAF-3 in 2017

Sample Date	Parameter				
	pH	Oil and Grease (Present - P / Absent - A)	Biological Oxygen Demand (mg/L)	Total Suspended Solids (mg/L)	Faecal Coliforms
29-Jun-17	7.04	A	Insufficient Sample[1]	188	48,667
19-Sep-17	7.34	A	474	66	1,700,000

[1] Note from lab: "There was limited sample volume received for this specific sample. The lab did as much as they could with the sample provided. BOD uses a lot of sample so it is often the test that gets dropped in cases like these."

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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: 1713099
Date Submitted: 2017-07-13
Date Reported: 2017-07-25
Project:
COC #: 821141

				Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.	1306334 Sewage 2017-06-29 BAF3 Sewage Pool
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			7.04
	Total Suspended Solids	2	mg/L		188
Nutrients	BOD5	1	mg/L		IS
Oil & Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		52
	Oil & Grease - Total	1	mg/L		52
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 3

Figure 9: 29-Jun-2017 sewage effluent results, Page 1 of 2

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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: 1713100
Date Submitted: 2017-07-13
Date Reported: 2017-07-14
Project:
COC #: 821141

				Lab I.D. / Sample Matrix / Sample Type / Sampling Date / Sample I.D.	1306335 Sewage 2017-06-29 BAF3 Sewage Pool - A	1306336 Sewage 2017-06-29 BAF3 Sewage Pool - B	1306337 Sewage 2017-06-29 BAF3 Sewage Pool - C
Group	Analyte	MRL	Units	Guideline			
Others	Faecal Coliforms	0	ct/100mL		46000	58000	42000

Figure 10: 29-Jun -2017 sewage effluent results, Page 2 of 2

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Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 17-00919-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1718532
Date Submitted: 2017-09-26
Date Reported: 2017-10-03
Project:
COC #: 823790

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1322649 Sewage 2017-09-19 BAF-3 Sewage
General Chemistry	pH	1.00			7.34
	Total Suspended Solids	2	mg/L		66
Oil & Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		53
	Oil & Grease - Total	1	mg/L		53
Subcontract	BOD5	1	mg/L		474
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

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Figure 11: 19-Sep-2017 sewage effluent results, Page 1 of 2

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Certificate of Analysis

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 17-00919-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1718533
Date Submitted: 2017-09-26
Date Reported: 2017-09-29
Project:
COC #: 823790

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D. 1322650 Sewage 2017-09-19 BAF-3 Sewage
Others	Faecal Coliforms	0	ct/100mL		1700000

Figure 12: 19-Sep-2017 sewage effluent results, Page 2 of 2

ANNEX E: ANALYSIS OF BERM WATER[2]

Fuel tanks within the berms were demolished in 2012 and 2013, and the berms were intentionally breached in 2012 and 2015. As there are no intact berms, no effluent (berm water) samples (BAF-4) were taken in 2017 and this section has been left blank.

[2] Effluent from bermed fuel storage facilities.

ANNEX F: MONITORING ACTIVITIES

A Jet A1 fuel release was discovered at the North Warning System BAF-3 radar station (Site) located on Brevoort Island, Nunavut, Canada on March 19, 2015. The tank involved in the release was immediately isolated by closing valves, an investigation was conducted to determine the extent of the release, and plans to address the release were prepared. Over the subsequent three summer field seasons of 2015 through 2017, extensive actions were taken to recover the released fuel, define the nature and extent of the release and remediate subsurface impacts.

Progress made to date has achieved several goals, including but not limited to:

1. completing an extensive additional soil, soil vapor, and water investigation to define the nature and extent of petroleum hydrocarbon impacts; this includes establishing and completing on-site laboratory testing and analyses;
2. ensuring minimal migration of non-aqueous phase liquid (NAPL) using engineering controls and booms in drainages;
3. construction and operation of soil vapor extraction (SVE) systems in two distinct areas of the release;
4. maximizing NAPL/fuel recovery, treatment, and analysis of recovered NAPL for reuse on-Site;
5. conducting soil treatment pilot testing, treatment evaluations, and construction of the soil treatment pile; and
6. construction, operation, and maintenance of a water treatment system to enable extracting subsurface water to mitigate migration of fuel and enhance recovery while maintaining compliance of discharge limits in the Site Water License. To date, over 11,200 liters (L) (2958 gallons [gal]) of NAPL has been recovered and collection and over 2,410,678 L (636,834 gal) of petroleum hydrocarbon contaminated water has been collected and treated.

Specific goals accomplished in 2017 include completion of comprehensive plume delineation, including collection and analysis analyses of over 240 soil samples. Mass removal efforts also continued successfully utilizing SVE and the water treatment system controls. Additionally, downward trends in NAPL concentrations were noted in perimeter subsurface water wells and non-detects were observed from the off-Site surface water sampling that was completed during the 2017 field season. The findings of the work completed during the 2017 field season confirmed the remediation treatments implemented were effective at reducing PHC concentrations.