2019 ANNUAL NUNAVUT WATER BOARD

REPORT FOR DYE-M

FOR THE

North Warning System

Contract # W8485-100224/001/NX

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North Warning System & Assoc. Projects

Aerospace Equipment Program Directorate
455 Blvd de la Carrière
11th Floor
Gatineau, Québec
K1A 0K2

Prepared by

Raytheon Canada Limited
400 Cooper Street
Suite 3000
Ottawa, ON, K2P 2H8

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EXECUTIVE SUMMARY IN ENGLISH FOLLOWS

ᐅᑯᐊ 2019 ᐊᖏᕐᕿᒍᒫᒃᑲ ᐅᓂᖅᑲᓂ ᓄᓇᕗᑦ ᐃᒥᓕᓴᕐᓂᖅᓂ ᑲᑎᒪᔨᖏᑦᓄᓪᓗᓂ (NWB) ᑎᑎᕖᖅᑕᐅᓯᒪᔪᓂ ᐅᑯᓄᖓ ᕿᐃᑎᐊᓵ ᑲᓇᑕ ᑎᒥᖓᓂ (RCL) ᐅᓇᓕᖅᑯᓄᓂ ᑎᑭᓂᑎᔨᓇᓂᐊᖏᓪᓗᑎ ᐱᑕᖃᓇᐊᖃᖅᑎᑕᐅᔪᓂᒃ ᐃᓕᖓ B “ᖃᓄᐃᓂᓂᒪᐊᑕᓇᓕᒥᓂᒃ”, ᑎᑎᕖᓯᒪᔪᓂᒃ 1 ᐃᒥᖏᒧᑦ ᓪᓚᐃᔨᓯᖓᓄᓂᒃ 3BC-DYE0919 ᐊᑐᖏᓂᖃᓪᓚᕆᔭᖅᑐᖅ ᐱᒋᐊᖅᑐᓂ 01 ᐅᓐᓄᐊᓗ ᑭᓯᐊᓂ ᑭᖑᖏᖅᑕᐅᓪᓚᑦᑕ ᓪᓚᐃᔨᓯᒧᑦ 8BC-DYE1929 ᐅᓇᐅᑎᒪᓕᒍ 01-ᓯᑎᐱᓗ-2019. ᐅᑯᐊ ᐅᓂᖅᑲᓂ ᐱᖃᓯᐅᐃᔪᓂ 01 ᐅᓐᓄᐊᓗ ᑎᑭᓂᑐᑐᒍ 31 ᑎᓯᐱᓗ 2019.

RCL ᐊᐅᓪᓚᑦᓴᓄᓂ ᐊᓪᓚ ᒪᑭᓂᑦᓴᓄᓂ (O&M) ᐅᓐᑐᕋᖅᑎᑕ ᐅᑭᐅᑕᖅᑐᑐᒃ ᐅᓇᑕᖅᑎᓄᓂ ᖃᐅᔨᓴᐅᑎᑦᓴᓄᓂ (NWS), ᐱᖃᓯᐅᑎᒪᓕᒍ CAM-M, ᐅᐸᐃᓯᓚᔪᖅ (ᐃᓐᓄᑦᑕᐅᓯᓚᔪᖅ) NWS ᓇᒫᓂᓗᓚᑦᓂ ᐃᖃᓗᓕᑐᑎᐊᖅ, ᓄᓇᕗᑦ. ᐅᐸᑦᑕᐅᖃᑦᑕᖅᑐᖅ ᑕᖅᑭᓂ ᐱᓚᓯᓂᑕᒫᑦ RCL ᐃᖅᖃᓇᐃᔨᖅᑎᑦᓴᓄᓂ ᐃᖃᓗᓐᓂᒋᑐᓂ ᒪᑭᒪᑎᑕᐅᓂᖏᓴᓄᓂ ᖃᐅᔨᓴᖅᑕᐅᓂᖏᓴᓄᓂ ᐊᓚᒪ ᐃᖅᖃᓇᐃᔨᖅᓯᒪᔭᖅᑎᑕᐅᔪᓂ ᐊᓯᖏᓴᓂᒃ.

2019–ᒥᑦ, ᖃᑎᑦᑐᑎᒥᑦ 100.2 ᑭᐸᓚᑦᑐᑦ ᒋᑕᐃᑦ ᐃᒥᖅ ᐱᔨᐅᓪᓚᕆᔭᖅᑐᑦ DYE-M–ᒥᑦ. ᐃᒥᓪᓚᒪᑦ ᐱᔨᐅᓪᓚᕆᔭᖅᑐᑦ ᐊᐅᓐᓂᓯᒋᐅᓂᖅᑐᑦ ᐃᒪᖃᖏᓴᐅᔪᒥᑦ, ᑎᑎᕖᖅᑕᐅᓯᒪᔪᓂ ᓪᓚᐃᔨᓯᒍ “DYE-1(b)”. ᐊᖏᓂᖓ ᐃᒥᖅ ᐱᔨᐅᔪᖅ ᑐᖓᓂᓄᓪᓚᑦᓴᖅ ᐊᖏᖅᓯᒪᔪᓂᒃ ᐊᖏᓂᒋᐊᓕᖅᑐᖅᑐᑦ 1,440 ᑭᐸᓵᓚᑦᑐᑦ ᒋᑕᐃᑦ ᐱᔨᓐᓇᖅᑎᑕᐅᔪᓂ ᓪᓚᐃᔨᓯᒍ ᐃᒪᓐᓇᖅᑐᓂᒃ.

ᖃᐅᔨᓴᕐᕿᐃᑦ ᐃᓗᐊᓂᑦᑐᑦ ᐃᒪᖃᖏᓴᖅᑐᓂᒃ ᐅᖃᓕᓗᖃᖏᓴᓂᒃ ᐊᖃᐅᔨᓴᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᑕᐸᓀᐃᐅᓇᖅ ᖃᐅᔨᓴᖅᑕᐅᓗᑎᒃ ᐊᓚᒪ ᓇᓗᓇᐃᖅᑕᐅᓕᖅᑎᑦᓴᓄᓂ ᐃᓗᐊᓂᑦᑐᑦ ᐃᒥᖏᓂᒃ ᐊᑐᐃᖏᓕᕐᓂᖅᑐᑦ ᐅᓂᒃᑳᖓᓂᒃ NWB ᓪᓚᐃᔨᓯᒥ ᐃᒪᓐᓇ ᒥᓪᓗᐊᖅᑕᐅᓯᒪᔭᖅᑎᐅᓇᔪ.

2019–ᒥᑦ, ᐊᑦᑕᓇᖅᑐᓂᑦ ᐊᑦᑕᓯᓂᑦ ᐊᐅᓯᑎᑦᑎᔨᖅᓯᒪᔭᕐᓂᑦᑐᖅ DYE-M–ᒥᑦ. ᐊᑦᑕᓇᖅᑐᑦ ᐊᑦᑕᓯᐃᐃᑦ ᐊᑐᐃᓇᓇᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᐊᐅᓪᓚᕆᔭᖅᑐᑦᓴᓄᓂ ᐃᓕᓴᕐᓂᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᐅᒥᐊᖅᐸᒥᑦ ᐊᑦᑕᓯᐃᐃᑦᐊᑦᑕᓇᐃᖅᑕᐅᓯᒪᔭᖅᑐᑦ DYE-M–ᒥᑦ.

ᐊᑦᑕᓇᕐᓂᑦ ᑎᓯᔪᑦ ᐊᑦᑕᓯᐃᐃᑦ ᐃᒋᑕᐅᓯᒪᔭᖅᑐᑦ ᓄᓇᕗᒥᒥ ᐊᖏᔪᓚᖅᓄᓂ ᑲᐅᑐᖅᑕᓯᓕᕐᓂᒃ ᐃᓐᓇᐃᓚᓚᖅᑐᑦ ᐱᔨᐅᓪᓚᕆᔭᖅᑐᑦᓴᓄᓂ ᐃᒪᒥᓚᓚᖅᑐᑦ ᐊᑦᑕᓯᐃᐃᑦ ᐊᑐᐃᓇᓇᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᐃᒥᖏᓂᒃ Hᐊᒪᓚᓚᖅᑐᑦ ᐃᖅᑲᓇᐃᔨᖅᑐᑦ. RCL ᑎᑎᕖᖅᑐᓯᒪᔪᓂᒃ ᐱᔨᓐᓇᖅᑎᑕᐅᔪᓂᒃ ᓄᓇᕗᒻᒥᑦ ᐊᑦᑕᓯᐃᐃᑦ ᐊᖏᔪᓚᒧᑦᑐᓂ.

ᐊᑕᐅᔪᖏᑦ ᔪᒥ ᑯᐃᓂᖅᑕᐅᓯᒪᔭᖅᑐᑦ DYE-M–ᒥᑦ 2019–ᖁᑎᓪᓗᒍ (NT-NU ᐅᓂᖅᑲᑦ ᓇᓴᐅᑎᖓ 18-294). ᐅᓇᐅᑎᓪᓗᒍ 06-ᔨᓕᐃ-2019, ᐱᓕᕆᔨ ᐊᒥᐊᓚᒪᐅᖅᑐᖅ ᐅᖅᑯᐊᓚᓵᓄᓂ ᓯᓪᓚᓕᕐᓂᓵᓂ ᐊᖏᓂ ᓇᓂᔨᓪᓚᒍ ᖃᓄᓪᓚᑦᑐᒥᑦ. ᐊᑦᑐᖅᑕᐅᔪᓯᒪᔪᖅ ᓄᓇᖓᓯᔪᐅᖅᑐᑦ; ᔪᑎᖏᓚᒥᑦ ᐃᓕᓴᔨᐅᖅᑐᑦ ᐊᑕᐌᓄᓂ ᖃᓄᓪᓚᖅᑐᒥᑦ. ᓯᕿᐊᖅᑕᐅᓕᖅᑐᖅᑐᖅ ᐊᖏᓂᒃ ᐱᐅᓂᖅᑐᑦ ᐅᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᓇᓗᓇᐃᖅᑕᐅᓗᑎᒃ ᐊᖏᓂᒃ ᑲᓇᓂᖅᑐᑦ ᐅᖅᑕᐅᓯᒪᔭᖅᑐᑦ ᓇᓗᓇᐃᖅᑐᒥᒃ.

ᔪᓚᕆᖅᑐᑦ ᑐᐊᕆᔭᓄᓂ ᐊᖏᔪᓚᖅᑐᑦ 29-ᒧᑦ-2019.

ᐱᐅᓯᑎᐊᕈᑎᑦᑎᓂᒃᑯᑦ ᐃᓄᐃᑦ ᐊᖏᔪᓚᖅᑐᑦ 2019-ᒥᑦ.

EXECUTIVE SUMMARY

This 2019 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 Part B “General Conditions”, paragraph 1 of its licence. Water licence 3BC-DYE0919 was in effect from 01 January until it was replaced with licence 8BC-DYE1929 on 01-Sep-2019. This report covers 01 January to 31 December 2019.

RCL is the Operation and Maintenance Contractor for the North Warning System (NWS), including DYE-M, the unattended (unmanned) North Warning System radar site located at Cape Dyer, Nunavut. The site is visited quarterly by RCL staff based in Iqaluit for preventive maintenance inspections and as required for other work.

In 2019, a total of 100.2 cubic meters of water were drawn at DYE-M. All water was taken from the melt-water water source, listed in the licence as “DYE-1(b)”. The quantity of water taken was below the annual maximum of 1,440 cubic meters allowed by the licence.

Samples of the water contained in the berms of fuel storage facilities were tested on-site using hydrocarbon test strips and confirmed to be within effluent quality limits of the NWB licence before the water was pumped out of the berms.

In 2019, no hazardous waste was shipped from DYE-M. The hazardous waste was prepared to be transported off-site, but there was no space available on the ship so the waste was secured on-site at DYE-M.

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.

One outdoor spill occurred at DYE-M in 2019 (NT-NU Report Number 18-294). On 06-Jul-2019, a technician was painting the fuel piping and found a weep from the valve. The impacted soil/gravel was removed; a drip tray was placed under the weep. The flange was tightened and Technicians monitored to confirm that the weep had stopped. The valve was re-packed, and the leak was confirmed to be stopped.

The Spill Contingency Plan was updated on 29-Mar-2019.

No progressive reclamation work was undertaken in 2019.

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1.0 INTRODUCTION

This 2019 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 Part B "General Conditions", paragraph 1 of its licence. Water licence 3BC-DYE0919 was in effect from 01 January until it was replaced with licence 8BC-DYE1929 on 01-Sep-2019. This report covers 01 January to 31 December 2019.

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1.1 Report Details

Licensee:	Department of National Defence, Government of Canada
Licence:	3BC-DYE0919 – Type "B" from 01-Jan-2019 until it was replaced on 01-Sep-2019 with 8BC-DYE1929 – Type "B"
Location:	DYE-M North Warning System Site, Cape Dyer, Qikiqtani Region, Nunavut
Report Prepared by:	Raytheon Canada Limited, 18-Mar-2020
Time period covered:	01 January to 31 December 2019

2.0 WATER USE

In 2019, a total of 100.2 cubic meters of water were drawn at DYE-M. All water was taken from the melt-water water source, listed in the licence as "DYE-1(b)". The quantity of water taken was below the annual maximum of 1,440 cubic meters allowed by the licence. See Table 2-1 for the volume of water drawn at DYE-M each month in 2019.

Table 2-1: Monthly Raw Water Usage at DYE-M in 2019

Month	Raw water usage (m^3)
January	0
February	0
March	0
April	0
May	12.7
June	0
July	36.1
August	18.8
September	20.1
October	12.5
November	0
December	0
TOTAL	**100.2**

3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

In 2019, no hazardous waste was shipped from DYE-M. The hazardous waste was prepared to be transported off-site, but there was no space available on the ship so the waste was secured on-site at DYE-M.

Annex A has been left blank.

4.0 NON-HAZARDOUS SOLID WASTE DISPOSAL

Non-hazardous domestic solid waste was flown out to the Logistics Support Site in Iqaluit and was 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 DYE-M in 2019

Month	Waste Generated (kg)
January	170
February	0
March	68
April	102
May	349
June	136
July	608
August	544
September	943
October	231
November	113
December	0
TOTAL	**3,264**

5.0 MONITORING PROGRAM

In 2019, a monitoring program was implemented at DYE-M as required by the water licence. The monitoring program included the following:

1. Volume of raw water drawn from the water Supply Lake (DYE-1(a)). No water was drawn from the water lake in 2019.
2. Volume of raw water drawn from the melt water source (DYE-1(b)). The information from this monitoring program is shown in **Section 2.0 Water Use**. The water drawn was within the limit stated in the water licence.
3. Quality of sewage discharged from the final discharge point of the sewage disposal facility (DYE-2). The location of the sewage effluent outfall is shown in **Annex B: Sewage Outfall Location (DYE-2) with Co-ordinates**. Two sumps for the sewage outfall were constructed in 2010. The sewage outfall sumps were not sampled in 2019 because neither sewage sump met the requirements of the Sewage Disposal Update Addendum (i.e., greater than 5 cm sludge or a need to pump out the sump). As the sewage has not been sampled, **Annex C: Analysis of Discharged Sewage Effluent** has been left blank.
4. Quality of the water contained in the berms of fuel storage facilities prior to discharge (DYE-3) was analyzed with hydrocarbon test strips and confirmed within the effluent quality limits listed

in the water licence, Part D. The coordinates and the results of the analysis are shown in **Annex D: Location of Bermed Fuel Storage Facilities and Analysis of Berm Water**. All samples met the effluent requirements of the water licence, Part D.

5. Final Discharge Point from the Landfarm (DYE-4). No landfarm has been established at DYE-M, so this monitoring station remains inactive

6.0 SPILLS (UNAUTHORIZED DISCHARGES)

Table 6-1: Unauthorized Discharges at DYE-M in 2019

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
06-Jul-2019, Spill # 19-272	Jet A1	0.5 L	On 06-Jul-2019, a technician was painting the fuel piping and found a weep from the valve. The impacted soil/gravel was removed, a drip tray was placed under the weep. The flange was tightened and Technicians monitored to confirm that the weep had stopped. The valve was re-packed, and the leak was confirmed to be stopped.	W22J (63°20'23.64"N, 64° 9'21.87"W)

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was updated on 29-Mar-2019. An updated copy of the Spill Contingency Plan has been submitted to the NWB with this annual report.

8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

No progressive reclamation work was undertaken in 2019.

9.0 ACRONYMS

Table 9-1: Acronyms

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

ANNEX A: HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2019

In 2019, no hazardous waste was shipped from DYE-M, so this annex has been left blank.

ANNEX B: SEWAGE OUTFALL LOCATION (DYE-2) WITH CO-ORDINATES

Coordinates of Sewage Outfall Location (DYE-2): 66° 39’ 51.26”N, 61° 21’ 16.54”W

ANNEX C: ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

The sewage outfall sump was not sampled in 2019.

ANNEX D: LOCATION OF BERMED FUEL STORAGE FACILITIES AND ANALYSIS OF BERM WATER[1]

The berms at DYE-M were sampled using hydrocarbon test strips as per the approved QA/QC Plan for Berm Water Sampling as stated in the water licence 8BC-DYE1929, PART D, Item 12.

Table D-0-1: Location of Bermed Fuel Storage Facilities and Date Sampled in 2019

Berm	Location on-site	Discharge Latitude[2]	Discharge Longitude	Date
DYE W20A	Summit	66°40'0.13"N	61°21'25.76"W	15-Jul-19
DYE W22K,J,I &W20B	Summit	66°39'53.59"N	61°21'23.78"W	15-Jul-19

Figure 1: Hydrocarbon test strips used in berm of tank W22A (15-Jul-2019)

[1] Effluent from bermed fuel storage facilities.
[2] Final discharge point of bermed fuel storage facility

Figure 2: Hydrocarbon test strips used in berm of tank DYE W22K,J,I &W20B (15-Jul-2019)