



UNCLASSIFIED



SOW Ref: 16.F.5.d

2021 ANNUAL NUNAVUT WATER BOARD

REPORT FOR DYE-M

FOR THE

North Warning System

Contract # W8485-100224/001/NX

SOW Ref: 16.F.5.d

Document Number

NWB-DM-2021, Rev 2, 22-Mar-2022

Prepared for
North Warning System & Assoc. Projects
Aerospace Equipment Program Directorate
455 Blvd de la Carrière
11th Floor
Gatineau, Québec
K1A 0K2

Prepared by



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

Warning: Information Subject to Export Control Laws — This document (and/or software, if applicable) may contain export-restricted data whose export/transfer/disclosure is restricted by U.S. and Canadian law. Dissemination to non U.S. persons whether in United States or abroad requires an export license or other authorizations from the United States and Canadian Governments.

UNCONTROLLED WHEN PRINTED

Copyright © Her Majesty the Queen in Right of Canada (2022)



EXECUTIVE SUMMARY IN ENGLISH FOLLOWS

பல்வீர்யா சுப்பிரமணியன் <புது> இந்திய நாட்டுப் பல்வீர்யா சுப்பிரமணியன் <புது> இந்திய நாட்டுப்



EXECUTIVE SUMMARY

This 2021 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada (RC) for the Department of National Defence in order to meet the requirements of Part B "General Conditions", paragraph 1 of its licence 8BC-DYE-1929. This report covers 01 January to 31 December 2021.

RC is the Operations 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 RC staff based in Iqaluit for preventive maintenance inspections and as required for other work.

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.

No hazardous waste was shipped off site in 2021.

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

One spill to the environment occurred at DYE-M in 2021:

- 29-Apr-2021, NT NU Spill#2021-139: A leaking oil line on a dozer caused a spill of ~9 L of engine oil and impacted 1 m² of snow. The snow was placed in barrels to be shipped off-site and the oil line was repaired.

The Spill Contingency Plan was successfully implemented.

No progressive reclamation work was undertaken in 2021.

UNCONTROLLED WHEN PRINTED



TABLE OF CONTENTS

Executive Summary	2
Table of Contents	3
List of Tables	3
List of Figures	3
1.0 Introduction	4
1.1 Report Details.....	4
2.0 Water Use	4
3.0 Hazardous Waste and Waste Oil Disposal	5
4.0 Non-Hazardous Solid Waste Disposal	5
5.0 Monitoring Program	5
6.0 Spills (Unauthorized Discharges)	6
7.0 Revisions to the Spill Contingency Plan	6
8.0 Progressive Reclamation Work Undertaken	6
9.0 Acronyms	6
Annex A. Hazardous Waste and Waste Oil Disposal in 2021	A-1
Annex B. Sewage Outfall Location (DYE-2) with Coordinates	B-1
Annex C. Analysis of Discharged Sewage Effluent	C-1
Annex D. Location of Bermed Fuel Storage Facilities	D-1
Annex E. Analysis of Berm Water	E-1

LIST OF TABLES

Table 2-1: Monthly Raw Water Usage at DYE-M in 2020.....	4
Table 4-1: Non-hazardous Domestic Solid Waste Sent for Disposal from DYE-M in 2021	5
Table 6-1: Unauthorized Discharges at DYE-M in 2021	6
Table 9-1: Acronyms.....	6

LIST OF FIGURES

Figure B-1: Coordinates of Sewage Outfall Location (DYE-2): 66° 39' 51.26"N, 61° 21' 16.54"W. B-1

UNCONTROLLED WHEN PRINTED



1.0 INTRODUCTION

This 2021 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada (RC) for the Department of National Defence in order to meet the requirements of Part B "General Conditions", paragraph 1 of its licence 8BC-DYE0919 issued on 01-Sep-2019. This report covers 01 January to 31 December 2021.

RC is the Operation and Maintenance (O&M) 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 RC 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: 8BC-DYE-1929 – Type "B"
Location: DYE-M North Warning System Site, Cape Dyer, Qikiqtani Region, Nunavut
Report Prepared by: Alaina Leslie and reviewed by Don Beattie
Raytheon Canada , 22-Mar-2021
Time period covered: 01 January to 31 December 2021

2.0 WATER USE

In 2021, 51.1 cubic metres of water was drawn from the water source. 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 from the water source at DYE-M each month in 2021.

Table 2-1: Monthly Raw Water Usage at DYE-M in 2021

Month	Raw water usage (m ³)
January	0
February	0
March	0
April	0
May	7.7
June	22.3
July	0
August	15.5
September	0
October	5.6
November	0
December	0
TOTAL	51.1

UNCONTROLLED WHEN PRINTED



3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

No hazardous waste was shipped off site in 2021.

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. RC 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 2021

Month	Waste Generated (kg)
January	0
February	0
March	726
April	0
May	227
June	1120
July	635
August	91
September	0
October	91
November	48
December	143
TOTAL	3,081

5.0 MONITORING PROGRAM

In 2021, 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 2021.
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 volume of 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**. Two sumps for the sewage outfall were constructed in 2010. The outfalls were not discharged in 2021 and therefore no sampling was required. **Annex C** has been left blank.
4. Accumulated rain and meltwater contained in the berms of fuel storage facilities was analyzed with hydrocarbon test strips and confirmed to be within the effluent quality limits listed in the water licence, Part D, prior to discharge (DYE-3). The coordinates and the results of the analysis are shown in **Annex D**. All samples met the effluent requirements of the water licence, Part D.

UNCONTROLLED WHEN PRINTED



SOW Ref: 16.F.5.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 2021

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
30-Apr-2021, Spill # 2021-139	Engine Oil	9L	<p>On 29Apr2021, the technicians on site at DYE-M were using the dozer to clear the snow when they noticed an oil leak from the oil line of the dozer. The technicians shut down the dozer as soon as they noticed the oil leak. It was determined that the spill was ~9 L of engine oil. The spill impacted an area of 1m² of snow and has not reached the ground under the snow. The snow has been picked up with shovels and transferred into a salvage drum for off-site disposal.</p> <p>The technicians on site placed absorbent pads around the oil line and drove the dozer back to the garage where they repaired the oil line.</p>	200 m away from old warehouse (66°39'53.1"N 61°21'10.9"W)

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was updated on 20-Jul-21. 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 2021.

9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
n.o.s.	not otherwise specified
NWB	Nunavut Water Board
NWS	North Warning System
PCB	Polychlorinated Biphenyl
RC	Raytheon Canada
TDGR	Transportation of Dangerous Goods Regulations

UNCONTROLLED WHEN PRINTED



UNCLASSIFIED

SOW Ref: 16.F.5.d

ANNEX A. HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2021

Hazardous waste was not shipped off site in 2021.

UNCONTROLLED WHEN PRINTED



ANNEX B. SEWAGE OUTFALL LOCATION (DYE-2) WITH COORDINATES



Figure B-1: Coordinates of Sewage Outfall Location (DYE-2): 66° 39' 51.26"N, 61° 21' 16.54"W

UNCONTROLLED WHEN PRINTED



ANNEX C. ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

The sewage outfall sump was not discharged in 2021 and therefore samples were not required.

UNCONTROLLED WHEN PRINTED



UNCLASSIFIED

 **Raytheon**
Canada

SOW Ref: 16.F.5.d

ANNEX D. LOCATION OF BERMED FUEL STORAGE FACILITIES

Table D-1 contains the locations and sampling dates for the wastewater discharged from the bermed fuel storage facilities.

Table D 1: Location of Bermed Fuel Storage Facilities and Date Sampled in 2021

Berm	Location on-site	Discharge Latitude ¹	Discharge Longitude	Date
DYE W20A	Summit	66°40'00.13"N	61°21'25.76"W	3-Jul-2021
DYE W22K, W22J, W22I &W20B	Summit	66°39'53.59"N	61°21'23.78"W	30-Jul-2021

¹ Final discharge point of bermed fuel storage facility

UNCONTROLLED WHEN PRINTED



UNCLASSIFIED

 **Raytheon**
Canada

SOW Ref: 16.F.5.d

ANNEX E. ANALYSIS OF BERM WATER²

Accumulated rain and meltwater in the bulk fuel storage tank berms at DYE-M was analysed 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. The photo log of the hydrocarbon test strips is included in pages which follow.

The following documents are enclosed:

1. Hydrocarbon Test Strip Photo Log

² Effluent from bermed fuel storage facilities.

UNCONTROLLED WHEN PRINTED



UNCLASSIFIED

 **Raytheon**
Canada

SOW Ref: 16.F.5.d



Photo E-3: Hydrocarbon test strips used in berm of tank W20A (03-Jul-21)

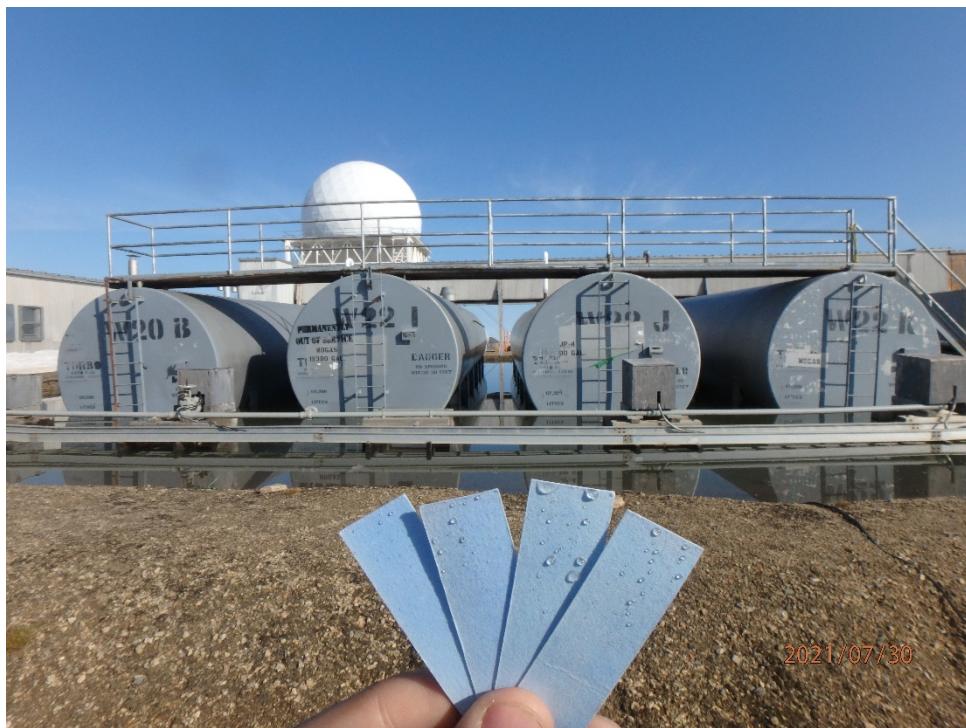


Photo E-1: Hydrocarbon test strips used in berm of tank W22K, W22J, W22I &W20B (30-Jul-21)

UNCONTROLLED WHEN PRINTED

Document Number: NWB-DM-2021

Rev. No.: 2

Effective Date: 22-Mar-2022

Page: E-2

Copyright © Her Majesty the Queen in Right of Canada (2022)