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2021 ANNUAL NUNAVUT WATER BOARD REPORT FOR DYE-M FOR THE North Warning System

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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.

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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



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.



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



ANNEX A. HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2021

Hazardous waste was not shipped off site in 2021.

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



ANNEX C. ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

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



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



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.



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

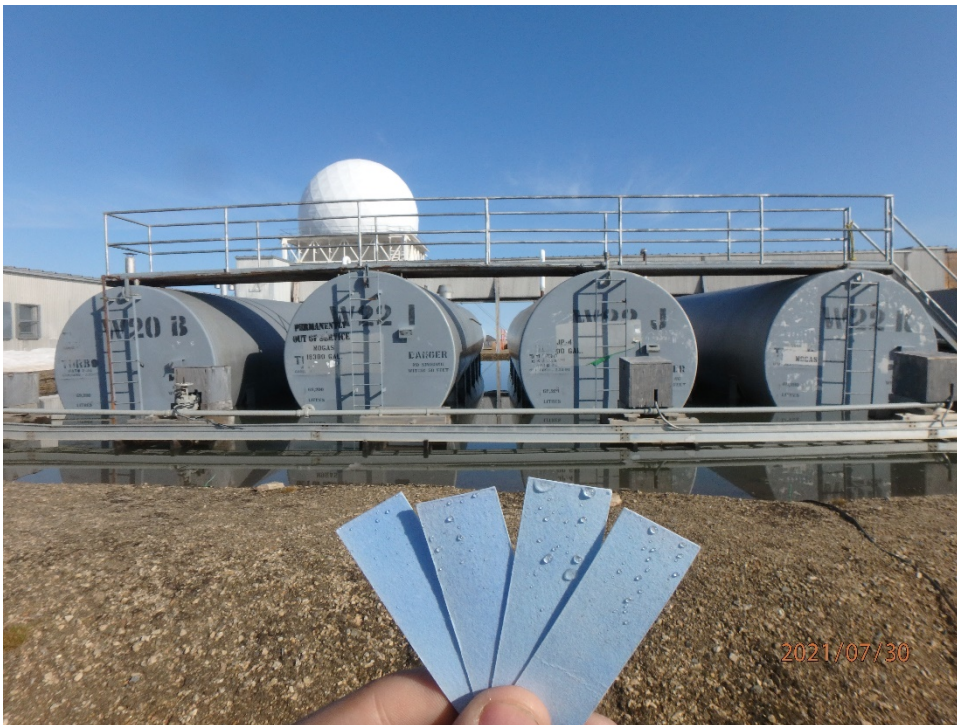


Photo E-1: Hydrocarbon test strips used in berm of tank W22K, W22J, W22I & W20B (30-Jul-21)

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