



UNCLASSIFIED



SOW Ref: 16.F.5.d

# **2020 ANNUAL NUNAVUT WATER BOARD**

## **REPORT FOR FOX-3**

FOR THE

### **North Warning System**

Contract # W8485-100224/001/NX

SOW Ref: 16.F.5.d

Document Number

NWB-F3-2020, Rev 1, 18-Mar-2021

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## EXECUTIVE SUMMARY

This 2020 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 the licence issued 08 June 2018, 8BC-FOD1828 – Type “B”, Part B “General Conditions”, paragraph 1 of its licence. This report covers 01 January to 31 December 2020.

RC is the Operation and Maintenance (O&M) Contractor for the North Warning System (NWS) including FOX-3, the unattended (unmanned) North Warning System radar site at Dewar Lakes, Nunavut. The site is visited quarterly by RC staff from FOX-M, Hall Beach, Nunavut for preventive maintenance inspections and as required for other work.

A total of 142.3 cubic meters was drawn from the water lake. This is below the annual maximum of 1,440 cubic meters allowed by the licence.

As FOX-3 is a landlocked site, all hazardous waste, including waste oil, is transported to FOX-M before being shipped to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The hazardous waste was shipped to Qikiqtaaluk Environmental, through their subcontractor Veolia, 2630, boul. Industriel, Chambly, QC J3L 4V2. A total of one crate and 19 drums of waste HAZMAT were shipped from FOX-3 in 2020.

Non-hazardous domestic solid waste was disposed of through a contract with the Hamlet of Sanirajak at the local landfill. RC has documented authorization from the community for receiving the waste.

In 2020, a monitoring program was implemented at FOX-3 as required by the water licence, Part I. Rain and melt water that accumulated in the berms of fuel storage facilities was tested with hydrocarbon test strips and confirmed to be within effluent quality limits before the water was pumped out of the berms.

There was one spill (unauthorized discharge) to the environment at FOX-3 in 2020.

- On 6-Apr-2020, the radiator on a heater on-site failed, resulting in a spill of approximately 50 L of glycol. The technicians shut down the radiator right away, stopping the spill. The spill leaked through the floor and made its way under the radiator building. Absorbent Pads were put down to contain the spill. The contaminated snow was removed and transferred into a salvage drum. The spill was remediated and is now closed.

The Spill Contingency Plan was updated on 6-Jan-2021.

The landfarm was sampled in 2020 and it was determined that tilling will continue in 2021.



## 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.....	6
6.0 Spills (Unauthorized Discharges).....	6
7.0 Revisions to the Spill Contingency Plan .....	7
8.0 Progressive Reclamation Work Undertaken .....	7
9.0 Acronyms .....	7
Annex A. Hazardous Waste and Waste Oil Disposal in 2020 .....	A-1
Annex B. Location of Effluent Outfall and Landfill 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
Annex F. Monitoring Activities.....	F-1

## LIST OF TABLES

Table 2-1: Monthly Raw Water Usage at FOX-3 in 2020.....	4
Table 3-1: Hazardous Waste and Waste Oil Sent for Disposal from FOX-3 in 2020.....	5
Table 4-1: Non-hazardous Domestic Solid Waste Sent for Disposal from FOX-3 in 2020 .....	6
Table 7-1: Unauthorized Discharges at FOX-3 in 2020 .....	7
Table 9-1: Acronyms.....	7
Table D-1: Location of Bermed Fuel Storage Facilities and Date Sampled in 2020.....	D-1

## LIST OF FIGURES

Figure B-1: Coordinates of landfill: 68° 39' 1.50"N, 71°14'35.00"W.....	B-1
Figure B-2: Coordinates of Sewage Outfall Location : 68° 39' 6.38"N, 71° 14' 6.44"W .....	B-1



## 1.0 INTRODUCTION

This 2020 Annual Report for the Nunavut Water Board (NWB) has been prepared by Raytheon Canada (RC) for the Department of National Defence (DND) in order to meet the requirements of the licence issued 08 June 2018, 8BC-FOD1828 – Type “B”, Part B “General Conditions”, paragraph 1 of its licence. This report covers 01 January to 31 December 2020.

RC is the Operation and Maintenance (O&M) Contractor for the North Warning System (NWS), including FOX-3. FOX-3 is an unattended (unmanned) North Warning System radar site located at Dewar Lakes, Nunavut. The site is visited quarterly by RC staff from FOX-M, Hall Beach, Nunavut for preventive maintenance inspections and as required for other work.

### 1.1 Report Details

Licensee: Department of National Defence, Government of Canada  
Licence: 8BC-FOD1828 – Type “B”  
Location: FOX-3 North Warning System Site, Dewar Lakes, Qikiqtani Region, Nunavut  
Report Prepared by: Alaina Leslie and reviewed by Don Beattie  
Raytheon Canada, 17-Mar-2021  
Time period covered: 01 January to 31 December 2020

## 2.0 WATER USE

A total of 142.3 m<sup>3</sup> of water was drawn from the supply lake in 2020. This is below the annual maximum of 1,440 m<sup>3</sup> allowed by the licence.

See Table 2-1 for the volume of water usage at FOX-3 each month in 2020.

Table 2-1: Monthly Raw Water Usage at FOX-3 in 2020

Month	Raw water usage (m <sup>3</sup> )
January	0
February	0
March	0
April	0
May	0
June	27.1
July	52.2
August	63.0
September	0
October	0
November	0
December	0
<b>TOTAL</b>	<b>142.3</b>



### 3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

As FOX-3 is a landlocked site, all hazardous waste, including waste oil, is transported to FOX-M (Sanirajak) before being shipped to an approved hazardous waste disposal site outside of Nunavut as required by the licence. The hazardous waste was shipped to Qikiqtaaluk Environmental, through their subcontractor Veolia, 2630, boul. Industriel, Chambly, QC J3L 4V2.

See **Annex A** for the shipping documents including the completed movement documents for waste regulated under the Transportation of Dangerous Goods Regulations (TDGR) and NWS Manifests for non-regulated waste. A total of one crate and 19 drums of waste HAZMAT were shipped from FOX-3 in 2020.

**Table 3-1: Hazardous Waste and Waste Oil Sent for Disposal from FOX-3 in 2020**

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste Jet A1 fuel and water mixture	9 Drums*	NWS Manifest 41718
Waste fuel, aviation, turbine engine mixture		
Waste Fuel, Aviation, Turbine Engine	1 Drum	NWS Manifest 41718
Waste batteries, wet, filled with acid	1 Crate	NWS Manifest 41718
Waste glycol (drum)	2 Drums	NWS Manifest 41718
Not TDG Regulated		
Waste Jet A1 fuel soaked rags	1 Drum	NWS Manifest 41718
Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)		
Waste oil	4 Drums	NWS Manifest 41718
Not TDG regulated		
Waste oily rags	1 Drum**	NWS Manifest 41718
Not TDG regulated**		
Waste paint flammable	1 Drum	NWS Manifest 41718
Waste paint		

\* 7 drums of Jet-A1 fuel and water mixture were included in the Shipper's Declaration as "waste fuel, aviation, turbine engine". The remaining two drums were not included on the Shipper's Declaration in error (but are included on the NWS Manifest).

\*\* Oily rags are TDG regulated only when shipped by vessel.

### 4.0 NON-HAZARDOUS SOLID WASTE DISPOSAL

Non-hazardous domestic solid waste was disposed of through a contract with the Hamlet of Sanirajak at the local landfill. RC has documented authorization from the community for receiving the waste.

See **Table 4-1**, below, for the quantity of waste generated.



The FOX-3 landfill still exists, but no new materials have been landfilled in the reporting period. See **Annex B** for it location on-site.

**Table 4-1: Non-hazardous Domestic Solid Waste Sent for Disposal from FOX-3 in 2020**

Month	Waste Generated (kg)
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	318
September	0
October	0
November	0
December	0
<b>TOTAL</b>	<b>318</b>

## 5.0 MONITORING PROGRAM

In 2020, a monitoring program was implemented at FOX-3 as required by the water licence, Part I. The monitoring program included the following:

1. Volume of raw water drawn from the water Supply Lake (FOD-1). The information from monitoring water use is shown in **Section 2.0 Water Use**. The 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. The location of the sewage effluent outfall is shown in **Annex B**. A sump for the sewage outfall was constructed in 2010. The sewage outfall sump was not discharged in 2020 and therefore **Annex C** is left blank.

Monitoring Station FOD-2 was discontinued in water licence 8BC-FOD1828.

3. Accumulated rain and melt water contained in the berms of fuel storage facilities was analyzed using hydrocarbon test strips and confirmed within the effluent quality limits listed in the water licence, Part D prior to discharge (FOD-3). The coordinates and the results of the analysis are shown in **Annex D and Annex E**. All samples met the effluent requirements of the water licence, Part D.
4. Final Discharge Point from the Landfarm (FOD-4). No samples were taken in 2020.

## 6.0 SPILLS (UNAUTHORIZED DISCHARGES)

One spill to the environment occurred at FOX-3 in 2020 which consisted of 50 L of glycol solution. Table 7-1, below, describes the spill (unauthorized discharge) details.

The Spill Contingency Plan was successfully implemented.



Table 6-1: Unauthorized Discharges at FOX-3 in 2020

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
06-Apr-2020, Spill # 20-097	Glycol	50 L	<p>On 6-Apr-2020, the radiator on a heater on-site failed, resulting in a spill of approximately 50 L of glycol.</p> <p>The technicians shut down the radiator right away, stopping the spill. The spill leaked through the floor and made its way under the radiator building. Absorbent Pads were put down to contain the spill. The contaminated snow was removed and transferred into a salvage drum.</p> <p>The spill was remediated and closed.</p>	Mod 22 room #2 (68°39'2.12"N 71°13'57.77"W)

## 7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was updated on 6-Jan-2021. An updated copy of the Spill Contingency Plan has been submitted to the NWB with this annual report.

## 8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

The landfarm was operated in 2020. A summary of the work completed in 2020 is included in **Annex F**.

## 9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
BTEX	benzene toluene ethylbenzene xylene
CCME	Canadian Council of Ministers of the Environment
DCC	Defence Construction Canada
DND	Department of National Defence
n.o.s.	not otherwise specified
NWB	Nunavut Water Board
NWS	North Warning System
O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyl
PHC CWS	Canada-Wide Standards for Petroleum Hydrocarbons
RC	Raytheon Canada
SQG	Soil Quality Guidelines
TDGR	Transportation of Dangerous Goods Regulations
QA/QC	Quality Assurance/Quality Control





## **ANNEX A. HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2020**

The 2020 Movement Document for TDG Regulated waste and NWS Manifests for non-TDG Regulated waste (as previously described Table 4-1) are included in the following pages.

The following documents are enclosed.

1. Shipper's Declaration for Dangerous Goods – 30-June-2020
2. NWS Manifest 41718

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS**  
**DÉCLARATION DE L'EXPÉDITEUR DE MARCHANDISES DANGEREUSES**

Shipper  
Expéditeur

Raytheon Canada Ltd.  
FOX-3  
Dewar Lakes, NU

Air Waybill No.  
No de L.T.A.

Page 1 of 1  
Page 1 de 1 Pages pages

Shipper's Reference Number (optional)  
N° de référence de l'expéditeur (facultatif)

Consignee  
Destinataire

Raytheon Canada Ltd.  
FOX-M  
Hall Beach, NU  
XOA 0100

Two completed and signed copies of this Declaration must be handed to the operator.  
Deux copies de cette déclaration dûment remplies et signées doivent être remises à l'exploitant.

**TRANSPORT DETAILS**  
**RENSEIGNEMENTS SUR LE TRANSPORT**

This shipment is within the limitations prescribed for: (delete non-applicable)

Cette expédition est dans les limites autorisées pour: (biffer la mention inutile)

Airport of Departure:  
Aéroport de départ:

Dewar Lakes, NU

PASSENGER AND  
CARGO AIRCRAFT  
AÉRONEF PASSAGERS  
ET CARGO

~~CARGO AIRCRAFT  
ONLY  
AÉRONEF CARGO  
SEULEMENT~~

Airport of Destination:  
Aéroport de destination:

Hall Beach, NU

**WARNING**

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

**AVERTISSEMENT**

Le non-respect sur quelque point que ce soit de la Réglementation sur le transport des marchandises dangereuses peut constituer une infraction aux lois en vigueur, punissable par la loi.

Shipment type: (delete non-applicable) Type d'envoi: (biffer la mention inutile)

NON-RADIOACTIVE  
NON-RADIOACTIF

~~RADIOACTIVE  
RADIOACTIF~~

**NATURE AND QUANTITY OF DANGEROUS GOODS / NATURE ET QUANTITÉ DE MARCHANDISES DANGEREUSES**

Dangerous Goods Identification / Identification des marchandises dangereuses						
UN or ID No. N° UN ou ID	Proper Shipping Name Désignation exacte d'expédition	Class or Division (Subsidiary Risk) Classe ou division (risque subsidiaire)	Packing Group Groupe d'emballage	Quantity and type of packing Quantité et type d'emballage	Packing Inst. Instructions d'emballage	Authorization Autorisation
UN 2794	Waste Batteries, Wet Filled With Acid	8		1 Crate x 316 kg	370	
UN 1863	WASTE Fuel, Aviation, Turbine Engine	3		8 drums x 1640 L	366	
UN 1363	WASTE Paint	3	11	1 drum x 1 L	353	
UN 3175	Waste Solids Containing Flammable Liquid, N.O.S. (Fuel, Aviation, Turbine Engine)	4.1	11	1 drum x 45 kg	445	

Additional Handling Information/ Renseignements complémentaires concernant la manutention

For emergency contact: 24-hour No.:

Pour urgence: Numéro 24 heures:

Canutec: 1-613-596-6666

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.

Je déclare par la présente que la désignation exacte d'expédition ci-dessus décrit avec précision et exactitude le contenu de cette expédition, qui est classifiée, emballée, marquée, étiquetée ou dotée d'une plaque-étiquette de danger et à tous égards en bon état pour le transport conformément à la réglementation internationale ou nationale applicable.

Je déclare que toutes les prescriptions requises pour le transport aérien ont été respectées.

Name/Title of Signatory / Nom/Titre du Signataire

Jerry Pailley  
Warehouseperson

Place and Date / Lieu et Date

Dewar Lakes, NU 30 June 2020

Signature

(See warning above)

(Voir avertissement ci-dessus)



# SHIPPING MANIFEST

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

**NON NEGOTIABLE**

Filled By: <b>JPIALLAQ</b>	Date: <b>Jun 30, 2020, 2:29 PM</b>	Project ID:	Task ID: <b>TCN-41718</b>
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Ship To: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987	From: FOX-3, DEWAR LAKES, DND Storeroom Raytheon Canada Limited, NWS LSS Hall Beach, P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987	Priority <div>0</div>
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Attention:		Attention:		
Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
			21	24,300

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4		1500 LBS	2006405	WASTE - FUEL AND WATER MIXTURE	PALLET # 1		ASSET# 352040, 352041, 352042, 352053 (48" x 47" x 43")
2		1300 LBS	2002344	WASTE - GLYCOL (DRUM)	PALLET # 4		ASSET # 347766, 339894 55" x 54" x 41"
1			2002343	WASTE - FUEL	PALLET # 6		ASSET # 352279
1		1000 LBS			CRATE # 16		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		1000 LBS			CRATE # 17		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		700 LBS	1003058	DRUM,STORAGE,SHIPPING SALVAGE,	PALLET # 2		3 SALVAGE DRUMS (GARBAGE) (55" x 54" x 41")
1		800 LBS			CRATE # 12		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		1200 LBS			CRATE # 14		CRATE CONTAINS STEEL SCRAP (72" x 48" x 57")
1		900 LBS			CRATE # 15		CRATE CONTAINS GARABGE (72" x 48" x 57")
4		1600 LBS	2002406	WASTE - OIL, 45 GAL	PALLET # 7		ASSET # 352926, 355088, 354034, 354030
1		800 LBS	2006405	WASTE - FUEL AND WATER MIXTURE	PALLET # 5		ASSET # 352908 (55" x 54" x 41")
1		900 LBS			CRATE # 10		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		800 LBS			CRATE # 11		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		1000 LBS			CRATE # 19		CRATE CONTAINS GARABGE (72" x 48" x 57")
13		1800 LBS	2002347	WASTE - BATTERIES, WET, FILLED	CRATE # 21		ASSET # 355091 (72" x 48" x 57")
1			2002355	WASTE - PAINT FLAMMABLE	PALLET # 3		ASSET # 352348
1			3000731	WASTE - FUEL CONTAMINATED RAGS	PALLET # 5		ASSET # 352495
1			2002505	WASTE - OILY RAGS	PALLET # 5		ASSET # 354076
1		800 LBS			CRATE # 18		CRATE CONTAINS GARABGE (72" x 48" x 57")
1		1000 LBS			CRATE # 20		CRATE CONTAINS GARABGE (72" x 48" x 57")
4		1600 LBS	2002406	WASTE - OIL, 45 GAL	PALLET # 8		ASSET # 352925, 352037, 352254, 344582
3		1700 LBS	2006405	WASTE - FUEL AND WATER MIXTURE	PALLET # 6		ASSET # 352906, 352907, 344581
1		1300 LBS			CRATE # 13		CRATE CONTAINS STEEL SCRAP (72" x 48" x 57")
1			1003058	DRUM,STORAGE,SHIPPING SALVAGE,	PALLET # 4		CONTAINS SEWAGE SUMP TANK



## SHIPPING MANIFEST

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

**NON NEGOTIABLE**

Filled By: <b>JPIALLAQ</b>	Date: <b>Jun 30, 2020, 2:29 PM</b>	Project ID:	Task ID: <b>TCN-41718</b>
-------------------------------	---------------------------------------	-------------	------------------------------

Ship To: LSS-F/FOX-M, HALL BEACH, DND Storeroom Raytheon Canada Limited, LSS Hall Beach: P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987	From: FOX-3, DEWAR LAKES, DND Storeroom Raytheon Canada Limited, NWS LSS Hall Beach, P.O. Box 46 Hall Beach, NU, X0A 0K0 867-928-8987	Priority <b>0</b>
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Attention:		Attention:	
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Carrier:	Routing:	Waybill #:	Total Pcs.	Total Weight:
			21	24,300

QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
3		1400 LBS	1003058	DRUM,STORAGE,SHIPPING SALVAGE,	PALLET # 3		4 SALVAGE DRUMS OF SEWAGE SUMP TANK (55" x 54" x 41")
1		1200 LBS			CRATE # 9		CRATE CONTAINS GARABGE (72" x 48" x 57")

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

Received By:	Date
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Received By:	Date
--------------	------

**ANNEX B. LOCATION OF EFFLUENT OUTFALL AND LANDFILL WITH COORDINATES****Figure B-1: Coordinates of landfill: 68° 39' 1.50"N, 71° 14' 35.00"W****Figure B-2: Coordinates of Sewage Outfall Location: 68° 39' 6.38"N, 71° 14' 6.44"W****UNCONTROLLED WHEN PRINTED**



## ANNEX C. ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

Monitoring Station FOD-2 was discontinued in water licence 8BC-FOD1828. The sewage outfall sump was not discharged in 2020 and therefore sampling was not required.



**ANNEX D. LOCATION OF BERMED FUEL STORAGE FACILITIES<sup>1</sup>**

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

**Table D-2: Location of Bermed Fuel Storage Facilities and Date Sampled in 2020**

Berm	Location on-site	Discharge Latitude <sup>2</sup>	Discharge Longitude	Date
DEW W22A&B	Summit	68°39'05.43"N	71°14'03.23"W	29-Jun-2020
DEW W22C&D	Summit	68°39'03.67"N	71°13'49.97"W	29-Jun-2020
DEW W20D&E	Airstrip	68°37'24.90"N	71°08'05.62"W	29-Jun-2020

<sup>1</sup> Effluent from bermed fuel storage facilities.

<sup>2</sup> Final discharge point of bermed fuel storage facility



## ANNEX E. ANALYSIS OF BERM WATER<sup>3</sup>

The berms at FOX-3 were sampled using hydrocarbon test strips as per the approved QA/QC Plan for Berm Water Sampling as stated in the water licence 8BC-FOD1929, PART D, Item 11. 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

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<sup>3</sup> Effluent from bermed fuel storage facilities.



## Photo Log of Hydrocarbon Test Strips



Photo E 1: Hydrocarbon test strips used in berm of tanks W22A & W22B (29-Jun-2020)



Photo E 2: Hydrocarbon test strips used in berm of tank W22C & W22D (29-Jun-2020)

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Photo E 3: Hydrocarbon test strips used in berm of tank W20D & W20E (29-Jun-2020)



## ANNEX F. MONITORING ACTIVITIES

The following memo was provided to RC by DND on 2-Feb-2021 regarding the landfarm activities at FOX-3 during the summer of 2020:

In December 2017, Canada assumed liability from the previous NWS O&M contractor for the spills resulting from a pipeline leak discovered in 2009 and a helicopter crash that occurred in 2013.

In summer 2018, Canada procured the services of Defence Construction Canada (DCC) to contract an environmental engineering firm to excavate both spill areas and treat the impacted soil in a land farm on site. The contractor mobilized to the site in late August 2018 and successfully excavated, backfilled, and compacted the spill areas and landfarmed the impacted soil. Confirmatory sampling from September 2018 showed that further tilling of the land farm is required.

In 2020, samples were taken but no tilling took place because of COVID-19 restrictions. Samples were compared to the Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQG) and the CCME Canada-wide Standard for Petroleum Hydrocarbons (PHC CWS) for coarse soil and commercial land-use. BTEX concentrations were below detection limits for all soil samples within the FOX-3 landfarm. All PHC concentrations were below guidelines with the exception of five soil samples that were above CCME PHC CWS for F2 (C10-C16) fractions.

The five soil sample results remaining above the guideline for PHC-F2 (C10-C16) indicate that further tilling and confirmatory sampling is recommended in order to close the FOX-3 landfarm. Tilling and sampling are planned for summer 2021. The goal is to reach the CCME SQG and CCME PHC CWS criteria for hydrocarbon remediation and decommission the land farm by the end of summer.