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SOW Ref: 16.F.5.d

# 2017 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  
FM-EHS-13, Rev 2, 12-Feb-2018

Prepared for  
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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 When the revised document is issued, the previous issue is automatically superseded.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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## **EXECUTIVE SUMMARY IN ENGLISH FOLLOWS**



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## 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-FOD0919 – Type “B”, Part B “General Conditions”, paragraph 1. This report covers 01 January to 31 December 2017.

RCL 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 RCL staff from FOX-M, Hall Beach, Nunavut for preventive maintenance inspections and as required for other work.

A total of 36 cubic meters was drawn from the water supply lake. This is below the annual maximum of 1,440 cubic meters allowed by the licence.

The water contained in the berms of fuel storage facilities was sent for laboratory analysis and confirmed to be within effluent quality limits of the NWB licence 3BC-FOD0919, Part D, item 10 before the water was pumped out of the berms.

As FOX-3 is a landlocked site, all Hazardous Waste and 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 waste went to Safety Kleen, 2730 Boulevard Industriel, Chamby, QC, J3L 4V2. A total of 14 drums of waste HAZMAT were shipped from FOX-3 in 2017.

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

There was one outdoor spill at FOX-3 in 2017. The spill was:

NT-NU Spill Report # 17-321, on 29-Aug-2017, a twin otter was refuelled at FOX-3. While emptying the hoses used to refuel the aircraft some fuel was spilled on the apron. The aircrew stopped the spill. The impacted gravel was placed in a drum for disposal.

The Spill Contingency Plan was successfully implemented.

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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-FOD0919 – 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 (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 RCL 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: 3BC-FOD0919 – Type “B”  
Location: FOX-3 North Warning System Site, Dewar Lakes, 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 36 cubic meters ( $m^3$ ) was drawn from the water supply lake. This is below the annual maximum of 1,440  $m^3$  allowed by the licence. See Table 2-1 for the volume of raw water drawn at FOX-3 in 2017.

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

Month	Raw water usage ( $m^3$ )
January	0
February	0.0
March	0.0
April	0.0
May	0.0
June	22.0
July	0.0
August	14.1
September	0.0
October	0.0
November	0.0
December	0.0
<b>TOTAL</b>	<b>36</b>

## 3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

As FOX-3 is a landlocked site, all Hazardous Waste and 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 Safety Kleen, 2730 Boulevard Industriel, Chamby, QC, J3L 4V2. See Table 3-1 for the list of items sent for disposal.

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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. A total of 14 drums of waste HAZMAT were shipped from FOX-3 in 2017.

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

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste glycol	1 drum	NWS Manifest 37763
Not TDG Regulated		
Waste Jet A1 fuel	1 drum	
Waste Fuel, Aviation Turbine Engine		
Waste oil (drum)	11 drums	
Not TDG Regulated		
Waste oily rags	1 drum	
Waste Solids containing flammable liquids not otherwise specified (n.o.s.) (fuel, aviation, turbine engine)		

#### **4.0 NON-HAZARDOUS SOLID WASTE DISPOSAL**

Non-hazardous domestic solid waste was disposed of through a contract with the Hamlet of Hall Beach at the local dump. RCL has documented authorization from the community for receiving the waste.

See **Table 4-1** 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 the location of the landfill with co-ordinates.

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Table 4-1: Non-hazardous Domestic Solid Waste Sent for Disposal from FOX-3 in 2017

Month	Waste Generated (kg)
January	0
February	0
March	0
April	0
May	0
June	0
July	0
August	7929
September	0
October	0
November	0
December	0
<b>TOTAL</b>	<b>7,929</b>

## 5.0 MONITORING PROGRAM

In 2017, 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 (FOD-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 once in 2017. The results are shown in **Annex D: Analysis of Discharged Sewage Effluent**.
3. Quality of the water contained in the berms of fuel storage facilities prior to discharge (FOD-3) was analyzed 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 E: Analysis of Berm Water. All samples met the effluent requirements of the water licence, Part D.

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## 6.0 SPILLS (UNAUTHORIZED DISCHARGES)

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
29-Aug-2017, Spill # 17-321	Jet A1	2 L	<p>On 29Aug2017, a twin otter was refuelled at FOX-3. While emptying the hoses used to refuel the aircraft some fuel was spilled on the apron. The aircrew stopped the spill. The hoses were not connected to the storage tank system at the time of the spill.</p> <p>The impacted gravel was placed in a drum for disposal.</p>	Apron (68°37'23.60"N, 71°7'59.41"W)

## 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

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 which occurred in 2013. Prior to that, pending resolution of this issue with the previous O&M contractor, Canada engaged the Environmental Sciences Group (ESG) in summer 2016 to complete a delineation of both spills and prepare an assessment report. The report indicates both spills combined represent approximately 438 m<sup>3</sup> of impacted soil requiring excavation and treatment. These spills have been entered into the Federal Contaminated Sites Inventory (FCSI) as federal site identifier 24931 (one identifier for both spills). Treatment of the contaminated soil will be via land farm. An application for a new water license allowing a land farm to be established has been submitted to the Water Board and it is anticipated that it will be in place spring 2018. Canada secured the services of Defence Construction Canada (DCC) to have an environmental engineering firm to prepare specifications and drawings for the clean-up with this work completed in January 2018. DCC is currently preparing to tender for the clean-up in March 2018. The intent is to mobilize to the site early July 2018 to ensure that the work, including remediation of the contaminated soil, can be completed in one season.

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## 9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
DCC	Defence Construction Canada
ESG	Environmental Sciences Group
FCSI	Federal Contaminated Sites Inventory
n.o.s.	Not Otherwise Specified
NWB	Nunavut Water Board
NWS	North Warning System
O&M	Operations and Maintenance
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.

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SHIPPER'S DECLARATION FOR DANGEROUS GOODS DÉCLARATION DE L'EXPÉDITEUR POUR MARCHANDISES DANGEREUSES										
Shipper Expéditeur RAYTHEON NWS LRR DEWAR LAKES			Air Waybill No. No de L.T.A. Page 1 of 1 Pages Page de 1 pages Shipper's Reference Number (optional) N° de référence de l'expéditeur (facultatif) <b>TCN-11771</b>							
Consignee Destinataire RAYTHEON NWS LSS HALL BEACH										
<p>Two completed and signed copies of this Declaration must be handed to the operator. Deux copies de cette déclaration doivent être remises à l'opérateur.</p> <p><b>TRANSPORT DETAILS</b> <b>RENSEIGNEMENTS SUR LE TRANSPORT</b></p> <p>This shipment is within the limitations presented for: (check non-applicable) Cette expédition est dans les limites autorisées pour: (biffer la mention inutile)</p> <table border="1"><tr><td>Passenger and cargo aircraft</td><td>Air cargo only</td></tr><tr><td>Aéropost passagers et cargo</td><td>Aéropost cargo seulement</td></tr></table> <p>Airport of Departure: Aéroport de départ: <b>DEWAR LAKES</b></p> <p>Airport of Destination: Aéroport de destination: <b>HALL BEACH</b></p> <p>Shipment type: (check non-applicable) <b>NON-RADIOACTIVE</b> Type d'envoi: (biffer la mention inutile) <b>NON-RADIOACTIF</b></p>							Passenger and cargo aircraft	Air cargo only	Aéropost passagers et cargo	Aéropost cargo seulement
Passenger and cargo aircraft	Air cargo only									
Aéropost passagers et cargo	Aéropost cargo seulement									
<p><b>WARNING</b> Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.</p> <p><b>AVERTISSEMENT</b> 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.</p>										
NATURE AND QUANTITY OF DANGEROUS GOODS / NATURE ET QUANTITÉ DE 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 1013	CARBON DIOXIDE	2.2		6 CYLINDER ON PALLET X 34Kgs NET	200					
UN 1863	WASTE, FUEL, AVIATION TURBINE, ENGINE *	3	III	1 STEEL DRUM X 200L NET	355					
UN 3175	WASTE, SOLIDS CONTAINING, FLAMMABLE LIQUID, N.O.S (FUEL, AVIATION, TURBINE, ENGINE)	4.1	II	1 STEEL DRUM X 15kg NET	445					
Additional Handling Information/ Renseignements complémentaires concernant la manutention <b>* FLASH POINT 38°C</b>										
For emergency contact: 24-hour No.: Pour urgence: Numéro 24 heures:										
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 labeled/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.				Name/Title of Signatory / Nom/Titre du Signataire <b>SHIPPER RON DUBAU</b>						
Par la présente, je déclare que les renseignements relatifs à la description du contenu du chargement et à la désignation exacte d'expédition du produit expédié sont complets et exacts; et que le contenu est correctement classé, emballé, identifié, étiqueté/placardé et qu'il est conforme à tous égards aux règlements gouvernementaux, nationaux et internationaux en matière de transport. Je déclare que toutes les prescriptions requises pour le transport aérien ont été respectées.				Place and Date / Lieu et Date <b>03-08-2017 DEWAR LAKES</b> Signature (See warning above) <b>Ron Dubau</b>						
FM-USF838 Centre de Conformité ICC Inc. Dorval, Québec - Mississauga, Ontario www.thecompliancecenter.com 1-888-977-6834 Imprimé au Canada/printed in Canada 0108										

Figure 1: Shipper's Declaration for Dangerous Goods removed from FOX-3

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## SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: RDUBEAU	Date: 2018-01-25 3:49 PM	TCN-37763	
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 2
Attention:		Attention:	
Carrier:	Routing: YUW/YUX	Waybill #:	Total Pcs. 5 PCS
QTY Order	Type Line Weight	Description	WO or PO B/Code or S/N Remarks
1	PALLET 1400 LBS		2017-9 CARBON DIOXIDE CYLINDERS EIN 157981,160836,336077,336075,15 72 X 48 X 32
1	PALLET 1600 LBS		# 4 WASTE OIL NON-REGULATED EIN 342815,340889,339425,340887 48 X 48 X 44
1	PALLET 1500 LBS		# 3 WASTE OIL NON-REGULATED EIN 339423,334717,334536,340891 48 X 48 X 44
1	PALLET 1700 LBS		# 5 WASTE OIL NON-REGULATED EIN 340636,339424,339426 48 X 48 X 44
1			# 5 WASTE FUEL JET-A1 EIN 326268
1	PALLET 1000 LBS		# 1 SCRAP METAL IN OVERPACK DRUM 53 X 52 X 46
1			# 1 WASTE GLYCOL NON- REGULATED EIN 344583
1			# 1 WASTE OILY RAGS EIN 339892
NOTE: All claims related to this shipment have to be filed with Raytheon within 45 hours of receipt.			Received By: _____ Date: _____
			Received By: _____ Date: _____

Figure 2: NWS Shipping Manifest TCN-37763

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## ANNEX B: LOCATION OF LANDFILL WITH COORDINATES



Coordinates of landfill: 68° 39' 1.50"N, 71°14'35.00"W

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



Coordinates of Sewage Outfall Location (FOD-2): 68° 39' 6.38"N, 71° 14' 6.44"W

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## ANNEX D: ANALYSIS OF DISCHARGED SEWAGE EFFLUENT

The sewage outfall sump was sampled on 16-Jun-2017. The sample was analysed for the parameters listed in the water licence Part I, Item 3.

Table D-1: Summary of Analysis of Discharged Sewage Effluent at FOX-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
16-Jun-17	7.08	A	482	76	6,900



Environment Testing

### 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: 1711693

Date Submitted: 2017-07-04

Date Reported: 2017-07-11

Project: FOX-3

COC #: 135821

Lab I.D.  
Sample Matrix  
Sample Type  
Sampling Date  
Sample I.D.  
1303293  
Wastewater  
2017-06-16  
Fox-3 Raw Sewage

Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00		7.08	
Oil & Grease	Total Suspended Solids	2	mg/L	76	
	Oil & Grease - Mineral	1	mg/L	<1	
	Oil & Grease - Non-mineral	1	mg/L	40	
	Oil & Grease - Total	1	mg/L	40	
Subcontract	BOD5	1	mg/L	482	
Visible 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 Q/A/C 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 3: 16-Jun-2017 sewage effluent results, Page 1 of 2

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Environment Testing

**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: 1711797  
Date Submitted: 2017-07-04  
Date Reported: 2017-07-05  
Project: Fox-3  
COC #: 135821

Lab I.D.	1303488
Sample Matrix	Wastewater
Sample Type	*
Sampling Date	2017-06-16
Sample I.D.	Fox-3 Raw Sewage

Group	Analyte	MRL	Units	Guideline	
Others	Faecal Coliforms	0	ct/100mL	6900	

Figure 4: 28-Aug-2017 sewage effluent results, Page 2 of 2

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## ANNEX E: ANALYSIS OF BERM WATER<sup>1</sup>

Table E-1: Analysis of Berm Water at FOX-3 in 2017

Berm	Maximum concentration of any grab sample (ug/L)	DEW W20D&E	DEW W22A&B	DEW W22C&D
Location on-site		Airstrip	Summit	Summit
Discharge Latitude <sup>2</sup>		68°37'24.90"N	68°39'5.43"N	68°39'3.67"N
Discharge Longitude		71° 8'5.62"W	71°14'3.23"W	71°13'49.97"W
Date		30-Jun-17	30-Jun-17	30-Jun-17
pH (pH Units)	6 to 9	6.99	6.08	6.55
Oil and Grease (ug/L)	5000	<1000	1000	2000
Arsenic (total) (ug/L)	100	<20	<20	<20
Cadmium (dissolved) (ug/L)	10	<0.1	<0.1	0.5
Chromium (dissolved) (ug/L)	100	<1	<1	<1
Cobalt (dissolved) (ug/L)	50	0.5	0.9	1.5
Copper (dissolved) (ug/L)	200	1	1	3
Lead (dissolved) (ug/L)	50	<1	<1	<1
Mercury (total) (ug/L)	0.6	<0.1	<0.1	<0.1
Nickel (dissolved) (ug/L)	200	8	<5	7
PCB (total) (ug/L)	1000	<0.1	<0.1	<0.1
Phenols (ug/L)	20	<1	<1	<1
Zinc (total) (ug/L)	500	100	100	50
Benzene (ug/L)	370	<0.5	<0.5	<0.5
Toluene (ug/L)	2	<0.5	<0.5	<0.5
Ethyl benzene (ug/L)	90	<0.5	<0.5	<0.5

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

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

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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: 1712351  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-14  
Project: COC #: 191382

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1304697 Water 2017-06-30 DEW W 20 ED Berm Water - Total
General Chemistry	pH	1.00				6.99
Mercury	Hg	0.0001	mg/L			<0.0001
Metals	Aqua-Regia Digest					Y
		As	0.02	mg/L		<0.02
		Zn	0.04	mg/L		0.10
Oil & Grease	Oil & Grease - Total	1	mg/L			<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L			<0.1
Phenols	Phenols	0.001	mg/L			<0.001
VOCs	Benzene	0.5	ug/L			<0.5
		Ethylbenzene	0.5	ug/L		<0.5
		Toluene	0.5	ug/L		<0.5
VOCs Surrogates (%)	Toluene-d8	0	%			104

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.

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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

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Figure 5: DEW W20D&E berm water laboratory results, page 1 of 2



**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: 1712349  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-13  
Project: COC #: 191382

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1304696 Water 2017-06-30 DEW W 20 ED Berm Water - Dissolved
Metals	Cd	0.0001	mg/L			<0.0001
	Co	0.0002	mg/L			0.0005
	Cr	0.001	mg/L			<0.001
	Cu	0.001	mg/L			0.001
	Ni	0.005	mg/L			0.008
	Pb	0.001	mg/L			<0.001

Figure 6: DEW W20D&E berm water laboratory results, page 2 of 2

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Environment Testing

**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: 1712346  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-14  
Project: Fox-3 150104  
COC #: 191381

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	pH	1.00		6.08	1304692 Water 2017-06-30 FOX3 DEW W 22AB
Mercury	Hg	0.0001	mg/L	<0.0001	
Metals	Aqua-Regia Digest			Y	
	As	0.02	mg/L	<0.02	
	Zn	0.04	mg/L	0.10	
Oil & Grease	Oil & Grease - Total	1	mg/L	1	
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	<0.1	
Phenols	Phenols	0.001	mg/L	<0.001	
VOCs	Benzene	0.5	ug/L	<0.5	
	Ethylbenzene	0.5	ug/L	<0.5	
	Toluene	0.5	ug/L	<0.5	
VOCs Surrogates (%)	Toluene-d8	0	%	95	

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.

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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

Page 2 of 5

Figure 7: DEW W22A&B berm water laboratory results, page 1 of 2



Environment Testing

**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: 1712348  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-13  
Project: Fox-3 150104  
COC #: 191381

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Metals	Cd	0.0001	mg/L	<0.0001	1304693 Water 2017-06-30 FOX3 DEW W 22AB - Dissolved
	Co	0.0002	mg/L	0.0009	
	Cr	0.001	mg/L	<0.001	
	Cu	0.001	mg/L	0.001	
	Ni	0.005	mg/L	<0.005	
	Pb	0.001	mg/L	<0.001	

Figure 8: DEW W22A&B berm water laboratory results, page 2 of 2

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SOW Ref: 16.F.5.d



**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: 1712352  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-14  
Project: Fox-3 150104  
COC #: 191384

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	pH	1.00		6.55	1304700 Water
Mercury	Hg	0.0001	mg/L	<0.0001	2017-06-30 Fox 3 DEW W 22 CD
Metals	Aqua-Regia Digest			Y	
	As	0.02	mg/L	<0.02	
	Zn	0.04	mg/L	0.05	
Oil & Grease	Oil & Grease - Total	1	mg/L	2	
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	<0.1	
Phenols	Phenols	0.001	mg/L	<0.001	
VOCs	Benzene	0.5	ug/L	<0.5	
	Ethylbenzene	0.5	ug/L	<0.5	
	Toluene	0.5	ug/L	<0.5	
VOCs Surrogates (%)	Toluene-d8	0	%	102	

**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.

146 Colonnade Rd. Unit 8, Ottawa, ON K2E 7Y1

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

Page 2 of 5

**Figure 9: DEW W22C&D berm water laboratory results, page 1 of 2**



**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: 1712354  
Date Submitted: 2017-07-06  
Date Reported: 2017-07-13  
Project: Fox-3 150104  
COC #: 191384

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Metals	Cd	0.0001	mg/L	0.0005	1304703 Water
	Co	0.0002	mg/L	0.0015	2017-06-30 Fox 3 DEW W 22 CD
	Cr	0.001	mg/L	<0.001	
	Cu	0.001	mg/L	0.003	
	Ni	0.005	mg/L	0.007	
	Pb	0.001	mg/L	<0.001	

**Figure 10: DEW W22C&D berm water laboratory results, page 2 of 2**

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