



2016 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, 29-Mar-2017

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 When the revised document is issued, the previous issue is automatically superseded.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	16-Mar-2017	W. Wyman	All	Initial Document Release
2	29-Mar-2017	W. Wyman	All	Updated as per NWSO comments

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EXECUTIVE SUMMARY IN ENGLISH FOLLOWS

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EXECUTIVE SUMMARY

This 2016 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 2016.

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 216.4 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, Chambly, QC, J3L 4V2. A total of 27 drums and 2 crates of waste HAZMAT were shipped from FOX-3 in 2016.

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.

No outdoor spills occurred at FOX-3 in 2016.

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1.0 INTRODUCTION

This 2016 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 2016.

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, 29-Mar-2017
Time period covered: 01 January to 31 December 2016

2.0 WATER USE

A total of 216.4 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 2016.

Table 2-1: Monthly Raw Water Usage at FOX-3 in 2016

Month	Raw water usage (m^3)
January	0
February	0
March	0
April	0
May	0
June	114.4
July	0
August	22.8
September	79.3
October	0
November	0
December	0
TOTAL	216.5

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 27 drums and 2 crates of waste HAZMAT were shipped from FOX-3 in 2016.

Table 3-1: Hazardous Waste and Waste Oil Sent for Disposal from FOX-3 in 2016

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste batteries, wet, filled with acid	1 drum	
Expired fire extinguishers ¹	2 crates	
Waste glycol soaked pads	1 drum	
Not TDG Regulated		
Waste glycol soaked rags	1 drum	
Not TDG Regulated		
Waste Jet A1 fuel	1 drum	
Waste Fuel, Aviation Turbine Engine		
Waste oil (drum)	13 drums	NWS Manifest 35544
Not TDG Regulated		
Waste oily rags		
Waste Solids containing flammable liquids n.o.s. (fuel, aviation, turbine engine)	1 drum	
Waste paint, Flammable	1 drum	
Waste tank cleaning effluent	8 drums	
Waste Fuel, Aviation Turbine Engine Mixture		

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.

¹ These fire extinguishers will be kept in FOX-M until they can be used for Fire training.

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Table 4-1: Non-hazardous Domestic Solid Waste Sent for Disposal from FOX-3 in 2016

Month	Waste Generated (kg)
January	0
February	0
March	0
April	0
May	0
June	0
July	9,013
August	0
September	0
October	0
November	0
December	0
TOTAL	9,013

5.0 MONITORING PROGRAM

In 2016, 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 this monitoring 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 pumped out once in 2016. The results are shown in **Annex D: Analysis of Discharged Sewage Effluent**.

A misinterpretation of sampling requirements led field staff to believe that samples were only required when the sump was pumped out, as opposed to sampling monthly during periods of flow (i.e. a sample every month the sewage holding tank is discharged). Corrective action will be taken to ensure this does not recur.

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.

6.0 SPILLS (UNAUTHORIZED DISCHARGES)

Date, NT-NU Spill #	Product	Quantity	Cause and follow-up action	On-site location
No spills to the environment in 2016.				

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

There were no revisions to the Spill Contingency Plan in 2016.

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8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

In December 2016, Canada assumed liability from the previous NWS O&M contractor for the spills resulting from the pipeline leak discovered in 2009 and the 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. As of 22 February 2017, the draft assessment reports have been received and are being reviewed. Sample results indicate both spills combined represent approximately 438 m³ of impacted soil to be excavated and treated. These spills have been entered into the Federal Contaminated Sites Inventory (FCSI) as federal site identifier 24931 (one identifier for both spills). As a parallel activity, Defence Construction Canada (DCC) has been engaged to prepare the contract to effect remediation of these two spills in summer 2017, and \$750K in funding has been secured for this effort. Canada plans to establish an on-site engineered land farm to treat this contaminated soil. The intent is to initiate the on-site work early enough such that the contaminated soil can be remediated to CCME commercial standard for coarse grained soil within one season, however, summer 2018 may be required to complete this task.

9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
CC&C	Care, Custody, and Control
DCC	Defence Construction Canada
DEG	Diesel Electric Generator
DND	Department of National Defence
ESG	Environmental Sciences Group
FCSI	the Federal Contaminated Sites Inventory
NWB	Nunavut Water Board
NWS	North Warning System
NWSO	North Warning System Office
O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyl
RCL	Raytheon Canada Limited
TDGR	Transportation of Dangerous Goods Regulations

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ANNEX A: HAZARDOUS WASTE AND WASTE OIL DISPOSAL IN 2016

The 2016 Movement Documents for TDG Regulated waste and NWS Manifests for non-TDG Regulated waste described in Table 3-1 are below.



SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: BGRANDY		Date: Jul 8, 2016 9:22 AM	TCN-35544			
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 0	
Attention:		Attention:				
Carrier:		Routing:		Waybill #:	Total Pcs.	
				11	13,080 LBS	
QTY Order	Type	Line Weight	Item	Description	WO or PO B/Code or S/N	Remarks
1	PALLET	1,700 #5 LBS				WASTE FUEL, WASTE OIL, 48" X 48" X 43"
1	CRATE	800 #10 LBS				WASTE FIRE EXTINGUISHERS, 42" X 32" X 37"
1	PALLET	350 #2 LBS				WASTE PAINT, OIL FILTERS, GLYCOL PADS
1	PALLET	550 #8 LBS				WASTE BATTERIES, NON-SPILL, 48" X 40" X 41"
1	PALLET	1,810 #1 LBS				WASTE OIL, 48" X 48" X 43"
1	CRATE	250 #11 LBS				WASTE FIRE EXTINGUISHERS, 45" X 18-1/2" X 27"
1	PALLET	1,650 #10 LBS				WASTE EFFLUENT, 48" X 48" X 41"
1	PALLET	1,550 #11 LBS				WASTE EFFLUENT, 46" X 45" X 40"
1	PALLET	1,810 #3 LBS				WASTE OIL, 48" X 48" X 43"
1	PALLET	1,810 #4 LBS				WASTE OIL, 48" X 48" X 43"
1	PALLET	800 #12 LBS				WASTE GLYCOL RAGS, OIL RAGS, OIL FILTERS, 60" X 48" X 45-1/2"
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 1: NWS Shipping Manifest TCN-35544

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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 pumped out and sampled on 28-Aug-2016. 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 2016

Sample Date	Parameter				
	pH	Oil and Grease (Present - P / Absent - A)	Biological Oxygen Demand (mg/L)	Total Suspended Solids (mg/L)	Faecal Coliforms
28-Aug-2016	7.22	A	356	298	280,000

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis



Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00344-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1616137
Date Submitted: 2016-09-09
Date Reported: 2016-09-16
Project: FOX-3
COC #: 130535

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1259776 Sewage 2016-08-26 FOX 3-Sewage Lagoon
General Chemistry	pH	1.00				7.22
	Total Suspended Solids	1	mg/L			298
Subcontract	BOD5	1	mg/L			356
	Oil & Grease - Mineral	1	mg/L			3
	Oil & Grease - Non-mineral	1	mg/L			15
	Oil & Grease - Total	1	mg/L			18

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.

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

Page 2 of 3

Figure 2: 28-Aug-2016 sewage effluent results, Page 1 of 2

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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: 1616136
Date Submitted: 2016-09-09
Date Reported: 2016-09-11
Project: FOX-3
COC #: 130535

Group	Analyte	MRL	Units	Guideline	
Others	Faecal Coliforms	0	ct/100mL		280000

Lab I.D.
Sample Matrix
Sample Type
Sampling Date
Sample I.D.
1259775
Sewage
2016-08-26
Fox-3 Sewage
Lagoon

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.

Analytical Method: AMBCOLM1
additional QA/QC information available on request.
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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 3: 28-Aug-2016 sewage effluent results, Page 2 of 2

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ANNEX E: ANALYSIS OF BERM WATER²

Table E-1: Analysis of Berm Water at FOX-3 in 2016

Berm	Maximum concentration of any grab sample (ug/L)	DEW W22A&B	DEW W22C&D	DEW W20D&E
Location on-site		Summit	Summit	Airstrip
Discharge Latitude ³		68°39'3.67"N	68°39'5.43"N	68°37'24.90"N
Discharge Longitude		71°13'49.97"W	71°14'3.23"W	71° 8'5.62"W
Date		22-Jun-16	22-Jun-16	24-Jun-16
pH (pH Units)	6 to 9	6.75	6.63	7.61
Oil and Grease (ug/L)	5000	<1000	<1000	<500
Arsenic (total) (ug/L)	100	<20	<20	<20
Cadmium (dissolved) (ug/L)	10	0.3	0.7	<0.1
Chromium (dissolved) (ug/L)	100	2	<1	<1
Cobalt (dissolved) (ug/L)	50	0.7	1	1.1
Copper (dissolved) (ug/L)	200	3	6	1
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	<5	7	<5
PCB (total) (ug/L)	1000	<0.1	<0.1	<0.1
Phenols (ug/L)	20	<1	<1	<1
Zinc (total) (ug/L)	500	100	60	90
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

² Effluent from bermed fuel storage facilities.

³ Final discharge point of bermed fuel storage facility

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Certificate of Analysis

Exova

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00344-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1610962
Date Submitted: 2016-06-30
Date Reported: 2016-07-05
Project: Fox-3
COC #: 172478

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	pH	1.00		6.75	1248280 Water
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-4AAP	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	%	96	

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.

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Figure 4: DEW W22A&B berm water laboratory results, page 1 of 2

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Exova

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: 1610963
Date Submitted: 2016-06-30
Date Reported: 2016-07-04
Project: Fox-3
COC #: 172478

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Metals	Cd	0.0001	mg/L		1248281 Water
	Co	0.0002	mg/L		2016-06-22 F3-W22A B-1 Diss Metals
	Cr	0.001	mg/L		
	Cu	0.001	mg/L		0.002
	Ni	0.005	mg/L		0.003
	Pb	0.001	mg/L		<0.005

Guideline = * = Guideline Exceedence
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Figure 5: DEW W22A&B berm water laboratory results, page 2 of 2

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Certificate of Analysis

Exova

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00344-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1610687
Date Submitted: 2016-06-28
Date Reported: 2016-06-30
Project: Fox-3
COC #: 172477

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	pH	1.00			1247575 Water
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		0.06
Oil & Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Phenols-4AAP	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	%		96

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 listed on the samples submitted.
Methods references and/or additional QA/QC information available on request.

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Figure 6: DEW W22C&D berm water laboratory results, page 1 of 2

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EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

Exova

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00344-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1610688
Date Submitted: 2016-06-28
Date Reported: 2016-07-04
Project: Fox-3
COC #: 172477

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Metals	Cd	0.0001	mg/L	0.0007	1247576 Water
	Co	0.0002	mg/L	0.0010	2016-06-22 F3-W22C D-1 Dissolved
	Cr	0.001	mg/L	<0.001	
	Cu	0.001	mg/L	0.006	
	Ni	0.005	mg/L	0.007	
	Pb	0.001	mg/L	<0.001	

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.

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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 3

Figure 7: DEW W22C&D berm water laboratory results, page 2 of 2

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SOW Ref: 16.F.5.d

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

EXOVA

Client: Raytheon Canada Limited Ottawa
400 Cooper St.
Ottawa, ON
K2P 2H8
Attention: Mr. Will Wyman
PO#: 15-00344-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1611276
Date Submitted: 2016-07-05
Date Reported: 2016-07-07
Project: Fox-3
COC #: 172480

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	pH	1.00		7.61	1248983 Wastewater 2016-06-24 F3-W20D E-1
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	0.09	
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	<0.1	
Phenols-4AAP	Phenols	0.001	mg/L	<0.001	
Subcontract	Oil & Grease - Total	0.5	mg/L	<0.5	
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	%	99	

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.

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

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SOW Ref: 16.F.5.d

EXOVA ENVIRONMENTAL ONTARIO

Certificate of Analysis

EXOVA

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: 1611284
Date Submitted: 2016-07-05
Date Reported: 2016-07-06
Project: Fox-3
COC #: 172480

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	1248993 Wastewater 2016-06-24 F3-W20D E-1
	Co	0.0002	mg/L	0.0011	
	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	

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

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