



2018 ANNUAL NUNAVUT WATER BOARD REPORT FOR DYE-M FOR THE North Warning System

Contract # W8485-100224/001/NX
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Prepared for
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EXECUTIVE SUMMARY

This 2018 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-DYE0919 – Type “B”, Part B “General Conditions”, paragraph 1. This report covers the period of 01 January to 31 December 2018.

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

A total of 87.7 cubic meters was drawn from the raw water sources. In 2018, all water was taken from the melt-water water source, DYE-1(b). 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 before the water was pumped out of the berms.

Hazardous waste and waste oil were sent to an approved hazardous waste disposal facility 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. The hazardous waste consisted of 3 crates and 37 drums of assorted waste (oil, fuel, glycol, etc.).

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

One outdoor spill occurred at DYE-M in 2018. NT-NU Report Number 18-294. On 21-Jul-2018, staff were inspecting the truck prior to use on-site when the hydraulic cylinder failed on the dump truck, releasing approximately 1 L of hydraulic fluid. The spill was stopped and the impacted gravel was cleaned up. The dump truck has been placed in the site garage until repairs can be completed. The impacted gravel was collected and containerized for disposal.

The Spill Contingency Plan was updated on 29-Mar-2018.



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1.0 INTRODUCTION

This 2018 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-DYE0919 – Type “B”, Part B. General Conditions, paragraph 1. This report covers the period from 01 January to 31 December 2018.

RCL is the Operation 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 RCL 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: 3BC-DYE0919 – Type “B”
Location: DYE-M North Warning System Site, Cape Dyer, Qikiqtani Region, Nunavut
Report Prepared by: Raytheon Canada Limited, 05-Feb-2019
Time period covered: 01 January to 31 December 2018

2.0 WATER USE

A total of 87.7cubic meters was drawn from the raw water sources. In 2018, all water was taken from the melt-water water source, listed in the licence as “DYE-1(b)”. This is below the annual maximum of 1,440 cubic meters allowed by the licence. See Table 2-1 for the volume of raw water drawn at DYE-M in 2018.

Table 2-1: Monthly Raw Water Usage at DYE-M in 2018

Month	Raw water usage (m ³)
January	0
February	0
March	0
April	0
May	19.2
June	0
July	27.1
August	24.2
September	14.3
October	2.9
November	0
December	0
TOTAL	87.7



3.0 HAZARDOUS WASTE AND WASTE OIL DISPOSAL

Hazardous waste and waste oil were sent to an approved hazardous waste disposal facility 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 Table 3-1 for the list of items sent for disposal.

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. The hazardous waste consisted of 3 crates and 37 drums of assorted waste (oil, fuel, glycol, etc.).

Table 3-1: Hazardous Waste and Waste Oil Sent for Disposal from DYE-M in 2018

Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste batteries, wet, filled with acid	1 Crate	Movement Document 2539181-4
Waste batteries, wet, non-spillable	1 Crate	Movement Document 2539181-4
Waste tank bottom water/ tank cleaning effluent Waste fuel, aviation, turbine engine mixture	12 Drums	Movement Document 2539181-4
Waste POL soaked absorbent Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	4 Drums	Movement Document 2539181-4
Waste Jet A1 fuel filters Waste solids containing flammable liquids, n.o.s (fuel, aviation, turbine engine)	2 Drums	Movement Document 2539181-4
Waste Jet A1 fuel and water mixture Waste fuel, aviation, turbine engine mixture	2 Drums	Movement Document 2539181-4
Waste oil Not TDG regulated	1 Crate	NWS Manifest TCN38680
Waste oil Not TDG regulated	10 Drums	NWS Manifest TCN38681, TCN38682, TCN38698
Waste empty oil drum with residues Not TDG regulated	4 Drums	NWS Manifest TCN38683
Waste glycol filters (drum) Not TDG Regulated	2 Drums	NWS Manifest TCN38693

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Description, TDG shipping name	Quantity	Movement Document or Manifest #
Waste oil filters Not TDG regulated	1 Drum	NWS Manifest TCN38697

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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. RCL 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 2018

Month	Waste Generated (kg)
January	136
February	0
March	143
April	0
May	0
June	181
July	499
August	0
September	113
October	45
November	136
December	0
TOTAL	1,253

5.0 MONITORING PROGRAM

In 2018, a monitoring program was implemented at DYE-M 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 (DYE-1a) and the melt water source (DYE-1b). The information from this monitoring program 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 (DYE-2). The location of the sewage effluent outfall is shown in **Annex B**, including coordinates. A sump for the sewage outfall was constructed in 2010. The sewage outfall sump was sampled once in 2018. The results are shown in **Annex C: Analysis of Discharged Sewage Effluent**.
3. Quality of the water contained in the berms of fuel storage facilities prior to discharge (DYE-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 D: Location of Bermmed Fuel Storage Facilities and 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
21-Jul-2018, Spill # 18-294	Hydraulic fluid	1 L	On 21-Jul-2018, staff were inspecting the truck prior to use on-site when the hydraulic cylinder failed on the dump truck, releasing approximately 1 L of hydraulic fluid. The spill was stopped and the impacted gravel was cleaned up. The dump truck has been placed in the site garage until repairs can be completed. The impacted gravel was collected and containerized for disposal.	Near Hangar (66°35'49.25"N, 61°34'50.34"W)

7.0 REVISIONS TO THE SPILL CONTINGENCY PLAN

The Spill Contingency Plan was updated on 29-Mar-2018. An updated copy of the Spill Contingency Plan was submitted to the NWB with the application for water licence renewal.

8.0 PROGRESSIVE RECLAMATION WORK UNDERTAKEN

No progressive reclamation work was undertaken in 2018.

9.0 ACRONYMS

Table 9-1: Acronyms

Acronym	Definition
NWB	Nunavut Water Board
NWS	North Warning System
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 2018

The 2018 Movement Documents for TDG Regulated waste and NWS Manifests for non-TDG Regulated waste described in Table 3-1 are below.

MOVEMENT DOCUMENT / MANIFEST DOCUMENT DE MOUVEMENT / MANIFESTE

This Movement document/manifest conforms to all federal and provincial transport and environmental legislation.
Ce document de mouvement/manifester est conforme aux législations fédérales et provinciales sur l'environnement et le transport.

2539181-4

Movement Document / Manifest Reference No.
N° de référence du document de mouvement/manifester

A Generator / consigneur Producteur / expéditeur		B Carrier Transporteur		C Receiver / consignee Réceptionnaire / destinataire	
Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial		Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial		Registration No. / Provincial ID No. N° d'immatriculation - d'id. provincial	
Company name / Nom de l'entreprise DEPARTMENT OF NATIONAL DEFENCE C/O RCL Mailing address / Adresse postale DOWLING BLD 109 HORNEIL HEIGHTS ON P0H 1P0 E-mail / Courriel électronique 105-494-2011-2861		Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél.		Receiver / consignee information same as in Part A Les renseignements du réceptionnaire / destinataire est le même qu'à la Partie A <input type="checkbox"/> Yes / Oui <input type="checkbox"/> No, complete the box below / Non, remplir la case ci-dessous Company name / Nom de l'entreprise Mailing address / Adresse postale City / Ville Province Postal code / Code postal E-mail / Courriel électronique Tel. No. / N° de tél.	
Shipping site address / Adresse du lieu de l'expédition NWS LSS IQALUIT (CAPE DIER INEMAN) City / Ville Province Postal code / Code postal Y0A 0H0		Vehicle / Véhicule Trailer - Rail car No. 1 Trailer - Rail car No. 2 2 nd remorque - wagon Port of entry / Point d'entrée Port of exit / Point de sortie		Date received / Date de réception Year / Année Month / Mois Day / Jour Time / Heure AM PM	
Intended Receiver / consignee Réceptionnaire / destinataire prévu RIKIKTAAKUK ENVIRONMENTAL C/O Jeelela 2630 BOUL INDUSTRIEL CHAMBLY QC City / Ville Province Postal code / Code postal J3L 4G2		Carrier Certification / Je certifie que j'ai reçu des déchets ou matières recyclables du producteur / expéditeur en vue de leur livraison au réceptionnaire / destinataire, tels qu'ils figurent à la partie A et que les renseignements inscrits à la partie B sont exacts et complets. Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimerie) Year / Année Month / Mois Day / Jour Signature		If waste or recyclable material is to be transferred, specify intended company name / Si les déchets ou matières recyclables doivent être transférés, préciser le nom du destinataire Registration No. / Provincial ID No. N° d'immatriculation / d'id. provincial	
Prox. code Code prov.		Class / Classe Sub. class(es) / Class(es) sub.		Quantity received / Quantité reçue	
(i) Waste Battery, wet filled with Acid		8 2794 III		386 K 1 7 S	
(ii) Waste Battery, wet NON Spillable		8 2800 III		500 K 1 7 S	
(iii) Waste Fuel Aviation		3 1863 III		2300 L 14 01 L	
(iv) Turbine Engine mixture Waste Solid Containing Flammable Liquid NOS (Fuel Aviation Turbine)		4.1 3175 II		634 K 6 01 S	
Notice No. N° de notification		Notice Line No. N° de ligne de la notification		Shipment Envoi	
24-HOUR EMERGENCY NUMBER - Canutec - 613-996-6666		USE IN CASE OF DANGEROUS GOODS EMERGENCY.		FLASH POINT 38°C	
Generator / consigneur certification: I certify that the information contained in Part A is correct and complete. Attestation du producteur / expéditeur: J'atteste que tous les renseignements à la partie A sont exacts et complets.		Name of authorized person (print) Nom de l'agent autorisé (caractères d'imprimerie) Signature CIVANNA 20		Special handling / Manutention spéciale <input type="checkbox"/> Attached / Ci-joint <input type="checkbox"/> As follows / Ci-contre:	
Date shipped / Date d'expédition Year / Année Month / Mois Day / Jour		Time / Heure AM PM		Scheduled arrival date / Date d'arrivée prévue Year / Année Month / Mois Day / Jour	

MOE 04-1917 (07/07)

Figure 1: Movement Document 2539181-4

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SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Aug 30, 2018, 3:53 PM		TCN-38680			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0			
Attention:		Attention:					
Carrier: NEAS	Routing:	Waybill #: DR-C22044	Total Pcs: 1	Total Weight: 350LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
1	CRATE	350LBS	2003658	WASTE - OIL (5 GALLON PAIL)	CRATE # 3		DIMS 48" x 70" x 54"
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date	
				Received By:		Date	

Figure 2: NWS Shipping Manifest TCN-38680



SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Aug 30, 2018, 3:55 PM		TCN-38681			
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0			
Attention:		Attention:					
Carrier: NEAS	Routing:	Waybill #: DR-C22050	Total Pcs:	Total Weight: 1675LBS			
QTY Order	Type	Line Weight	Item	Description	WO or PO	B/Code or S/N	Remarks
4	PALLET	1675	2002406	WASTE - OIL, 45 GAL	PALLET #1		Assets 348073,348081,348072,348071
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.				Received By:		Date	
				Received By:		Date	

Figure 3: NWS Shipping Manifest TCN-38681

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SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Aug 30, 2018, 3:57 PM		TCN-38682	
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0	
Attention:		Attention:			
Carrier: NEAS	Routing:	Waybill #: DR-C22050	Total Pcs. 1	Total Weight: 1600LBS	
QTY Order	Type Line Weight	Item	Description	WO or PO	B/Code or S/N
4	PALLET	1600LB:2002406	WASTE - OIL, 45 GAL	PALLET #2	Assets 346362,346363,346364,349634
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.					
Received By:			Date		
Received By:			Date		

Figure 4: NWS Shipping Manifest TCN-38682



SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Aug 30, 2018, 4:00 PM		TCN-38683	
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0	
Attention:		Attention:			
Carrier: NEAS	Routing:	Waybill #: DR-C22050	Total Pcs. 1	Total Weight: 200LBS	
QTY Order	Type Line Weight	Item	Description	WO or PO	B/Code or S/N
4	PALLET	200LBS 3000929	WASTE - OIL, EMPTY DRUM WITH R	PALLET #3	Assets 349630,349631,349632,349633
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.					
Received By:			Date		
Received By:			Date		

Figure 5: NWS Shipping Manifest TCN-338683

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Aug 31, 2018, 10:39 AM		TCN-38693	
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0	
Attention:		Attention:			
Carrier: NEAS	Routing:	Waybill #: DR-C22044	Total Pcs: 1	Total Weight: 450LBS	
QTY Order	Type Line Weight	Item Description	WO or PO	B/Code or S/N	Remarks
2	PALLET	450LBS 2003634	WASTE - GLYCOL FILTERS (DRUM)	PALLET #11	ASSETS 151220,349220
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.			Received By:		Date
			Received By:		Date

Figure 6: NWS Shipping Manifest TCN-338693



SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Sep 1, 2018, 8:15 AM		TCN-38697	
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0	
Attention:		Attention:			
Carrier: NEAS	Routing:	Waybill #: DR-C22050	Total Pcs: 1	Total Weight: 275 LBS	
QTY Order	Type Line Weight	Item Description	WO or PO	B/Code or S/N	Remarks
1	PALLET	275LBS 2002356	WASTE - OIL FILTERS	PALLET #13	ASSET 342432
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.			Received By:		Date
			Received By:		Date

Figure 7: NWS Shipping Manifest TCN-338697

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SHIPPING MANIFEST

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

NON NEGOTIABLE

Filled By: MSTRANO		Date: Sep 1, 2018, 8:17 AM		TCN-38698	
Ship To: QIKIQTAAALUK ENVIRONMENTAL (QE) C/O VEOLIA 2630, BOUL. INDUSTRIEL CHAMBLY, QC, J3L 4V2 1-866-634-6367		From: DYE-M, CAPE DYER, DND Storeroom Raytheon Canada Limited, NWS LSS Iqaluit, P.O. Box 1089 Iqaluit, NU, X0A 0H0 867-979-4818		Priority 0	
Attention:		Attention:			
Carrier: NEAS		Routing:		Waybill #: DR-C22044	
				Total Pcs. 1	
				Total Weight: 450 LBS	
QTY Order	Type	Line Weight	Item	Description	WO or PO
2	PALLET	450LBS	2002406	WASTE - OIL, 45 GAL	PALLET # 14
					B/Code or S/N
					ASSETS 345524, 341068
Remarks					
NOTE: All claims related to this shipment have to be filled with Raytheon within 45 hours of receipt.					
				Received By:	Date
				Received By:	Date

Figure 8: NWS Shipping Manifest TCN-38698

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ANNEX B: SEWAGE OUTFALL LOCATION (DYE-2) WITH CO-ORDINATES



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

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**ANNEX C: ANALYSIS OF DISCHARGED SEWAGE EFFLUENT**

The sewage outfall sump sampled three times in 2018. The samples were analysed for the parameters listed in the water licence Part I, Item 3.

Table C-1: Summary of Analysis of Discharged Sewage Effluent at DYE-M in 2018

Sample Date	Parameter				
	pH	Oil and Grease (Present - P / Absent - A)	Biological Oxygen Demand (mg/L)	Total Suspended Solids (mg/L)	Faecal Coliforms
11-Aug-18	7.2	A	226	76	16800
25-Aug-18	6.45	A	510	271	132000
20-Oct-18	5.9	A	1350	247	16,100,000



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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#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814602
Date Submitted: 2018-08-16
Date Reported: 2018-08-23
Project: DYE M Sewage Sump
COC #: 183357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry	BOD5	1	mg/L		1381221 Sewage
	pH	1.00			2018-08-11 Sewage Lagoon DYE M
	Total Suspended Solids	2	mg/L		
Oil and Grease	Oil & Grease - Mineral	1	mg/L		
	Oil & Grease - Non-mineral	1	mg/L		
	Oil & Grease - Total	1	mg/L		
	Visible Sheen		P/A		

Guideline = * = Guideline Exceedence
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 9: 11-Aug-18 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#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814624
Date Submitted: 2018-08-16
Date Reported: 2018-08-17
Project: DYEM Sewage Swamp
COC #: 183357

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1381266 Sewage 2018-08-11 Sewage Lagoon Dye-M A	1381267 Sewage 2018-08-11 Sewage Lagoon Dye-M B	1381268 Sewage 2018-08-11 Sewage Lagoon Dye-M C
Others	Faecal Coliforms	0	ct/100mL			18100	17400	14900

Figure 10: 11-Aug-18 sewage effluent results, Page 2 of 2

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400 Cooper St.
Ottawa, ON
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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1815574
Date Submitted: 2018-08-29
Date Reported: 2018-09-07
Project:
COC #: 183353

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
General Chemistry		BOD5	1	mg/L		1384075 Sewage
		pH	1.00			2018-08-25 1
		Total Suspended Solids	2	mg/L		
Oil and Grease		Oil & Grease - Mineral	1	mg/L		
		Oil & Grease - Non-mineral	1	mg/L		
		Oil & Grease - Total	1	mg/L		
		Visible Sheen		P/A		

Guideline = * = Guideline Exceedence

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 11: 25-Aug-2018 sewage effluent results, Page 1 of 2



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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1815526
Date Submitted: 2018-08-29
Date Reported: 2018-08-30
Project:
COC #: 183353

Group		Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1383891 Sewage 2018-08-25 Dye Main A	1383892 Sewage 2018-08-25 Dye Main B	1383893 Sewage 2018-08-25 Dye Main C
Others		Faecal Coliforms	0	ct/100mL			131000	76000	189000

Figure 12: 25-Aug-2018 sewage effluent results, Page 2 of 2

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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1819677
Date Submitted: 2018-10-29
Date Reported: 2018-11-05
Project:
COC #: 837327

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1395853 Sewage 2018-10-20 DYE M #1+#2+#3
Group	Analyte	MRL	Units	Guideline	
General Chemistry	BOD5	1	mg/L		1350
	pH	1.00			5.90
	Total Suspended Solids	2	mg/L		247
Oil and Grease	Oil & Grease - Mineral	1	mg/L		17
	Oil & Grease - Non-mineral	1	mg/L		58
	Oil & Grease - Total	1	mg/L		75
	Visible Sheen		P/A		A

Guideline = * = Guideline Exceedence

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 13: 20-Oct-2018 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#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1819678
Date Submitted: 2018-10-29
Date Reported: 2018-10-30
Project:
COC #: 837327

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1395854 Sewage 2018-10-20 DYE M #4
Group	Analyte	MRL	Units	Guideline	
Microbiology	Faecal Coliforms	0	ct/100mL		16100000

Figure 14: 20-Oct-2018 sewage effluent results, Page 2 of 2

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**ANNEX D: LOCATION OF BERMED FUEL STORAGE FACILITIES AND ANALYSIS OF BERM WATER¹**

Table D-1: Analysis of Berm Water at DYE-M in 2018

Berm	Maximum concentration of any grab sample (ug/L)	DYE W20A	DYE W22K,J,I &W20B	DYE W22K,J,I &W20B
Location on-site		Summit	Summit	Summit
Discharge Latitude ²		66°40'0.13"N	66°39'53.59"N	66°39'53.59"N
Discharge Longitude		61°21'25.76"W	61°21'23.78"W	61°21'23.78"W
Date		20-Jul-18	9-Aug-18	28-Aug-18
pH (pH Units)	6 to 9	6.91	3.91	6.27
Oil and Grease (ug/L)	5000	<1000	<1000	<1000
Arsenic (total) (ug/L)	100	<20	<20	<20
Cadmium (dissolved) (ug/L)	10	<0.1	0.3	<0.1
Chromium (dissolved) (ug/L)	100	<1	<1	<1
Cobalt (dissolved) (ug/L)	50	<0.2	<0.2	<0.2
Copper (dissolved) (ug/L)	200	<1	5	<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	<5	<5
PCB (total) (ug/L)	1000	<0.1	<0.1	<0.1
Phenols (ug/L)	20	<1	<1	<1
Zinc (total) (ug/L)	500	<40	160	180
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

¹ Effluent from bermed fuel storage facilities.² Final discharge point of bermed fuel storage facility



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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1813288
Date Submitted: 2018-07-27
Date Reported: 2018-07-30
Project:
COC #: 834189

				Lab I.D.	1377189
				Sample Matrix	Water
				Sample Type	2018-07-20
				Sampling Date	DYE-M W20A Bern
				Sample I.D.	Water Total
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			6.91
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		<0.04
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		95
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline = * = Guideline Exceedence

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 15: DYE W20A berm water laboratory results, page 1 of 2

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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1813289
Date Submitted: 2018-07-27
Date Reported: 2018-07-31
Project:
COC #: 834189

					Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1377190 Water
					2018-07-20 DYE-M W20 A Berm Water Diss
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	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 16: DYE W20A berm water laboratory results, page 2 of 2



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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814389
Date Submitted: 2018-08-14
Date Reported: 2018-08-21
Project: Dye Main Tank Cleaning
COC #: 176747

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1380376 Water 2018-08-09 PGS Tank
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			3.91
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		0.16
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		101
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline = * = Guideline Exceedence
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

Figure 17: DYE W22K, J, I & W20B berm water laboratory results (09-Aug-2018), page 1 of 2³

³ Sample failed on pH, tested in situ with hand-help meter (See Figure 20 and 21), Berm was sample was re-taken on 28-Aug-2018.



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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1814390
Date Submitted: 2018-08-14
Date Reported: 2018-08-21
Project: Dye Main Tank Cleaning
COC #: 176747

		Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.			
		1380377 Water 2018-08-09 PGS Tank			
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		0.0003
	Co	0.0002	mg/L		<0.0002
	Cr	0.001	mg/L		<0.001
	Cu	0.001	mg/L		0.005
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L		<0.001

Figure 18: DYE W22K, J, I & W20B berm water laboratory results (09-Aug-2018), page 2 of 2



Figure 19: In situ sampling of pH, location of sample

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Figure 20: In situ sampling of pH, results

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Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1815836
Date Submitted: 2018-09-04
Date Reported: 2018-09-10
Project:
COC #: 176743

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1385012 WW 2018-08-28 Berm PGS Tank Dye Main
Group	Analyte	MRL	Units	Guideline	
General Chemistry	pH	1.00			6.27
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		0.18
Oil and Grease	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L		<0.1
Subcontract-Inorg	Phenols	0.001	mg/L		<0.001
VOCs Surrogates	Toluene-d8	0	%		99
Volatiles	Benzene	0.5	ug/L		<0.5
	Ethylbenzene	0.5	ug/L		<0.5
	Toluene	0.5	ug/L		<0.5

Guideline =

* = Guideline Exceedence

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, IPWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

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Figure 21: DYE W22K, J, I & W20B berm water laboratory results (28-Aug-2018), page 1 of 2

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K2P 2H8
Attention: Mr. Will Wyman
PO#: 002160-OT
Invoice to: Raytheon Canada Limited Ottawa

Report Number: 1815837
Date Submitted: 2018-09-04
Date Reported: 2018-09-07
Project:
COC #: 176743

Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.					1385013 WW 2018-08-28 Berm PGS Tank Dye Main
Group	Analyte	MRL	Units	Guideline	
Metals	Cd	0.0001	mg/L		<0.0001
	Co	0.0002	mg/L		<0.0002
	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 22: DYE W22K, J, I & W20B berm water laboratory results (28-Aug-2018), page 2 of 2