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403 254 3301 tel 403 270 9196 fax

July 21, 2011

Sean Joseph Technical Advisor Nunavut Water Board P.O. Box 119 Gjoa Haven, NU

Dear Sean:

Project No: Water Use Licence No.: 1BR-BYR0712 2010 Annual Report

Regarding: Comments Dated June 13, 2011

AECOM Canada Ltd., on behalf of Defence Construction Canada and the Department of National Defence, is providing the following information in response to the comments received on June 13, 2011 with regards to the 2010 Annual Report for 1BR-BYR0712.

- The volume of material placed in the Non-hazardous Waste Landfill to date, including intermediate fill, is approximately 5,460 m<sup>3</sup>. The volume of material placed in the Tier II Disposal Facility to date, including intermediate fill, is approximately 2,475 m<sup>3</sup>. The volume of material placed within the landfarm for treatment is approximately 2,800 m<sup>3</sup>.
- 2. In order to prevent unauthorized discharges, the following actions will be taken: Samples of any meltwater from within the constructed facilities (landfarm, Non-Hazardous Waste Landfill, Tier II Disposal Facility) will be collected and analyzed prior to the discharge of contact water to ensure that it meets the quality guidelines provided within the water use license. Secondly, snow will be removed from the facilities immediately upon arrival at the site to reduce the potential for excessive contact water and the need to pump contact water from the facilities.
- 3. Efforts to ensure that effluent criteria are met prior to discharge include the collection and analysis of effluent samples prior to discharge. However, some locations, such as the PIN-4 site, have only coarse grained materials available and generally some seepage can be anticipated. All discharge and seepage from the PIN-4 sewage lagoon is to the tundra and not a waterway or waterbody. According to the water use license, the effluent quality standards apply at the point of discharge to a water body. The sewage lagoon at PIN-4 is located approximately 30 m from an area of seasonally ponded water, over 100 m from a permanent pond of water and over 1 km from the water supply lake. There are no flowing waterways, such as creeks or streams in the area. Therefore, the criteria are not strictly applicable to the point of effluent discharge at the PIN-4. However, if required, water



samples can be collected from the nearby water bodies to ensure that the effluent quality is being met.

- 4. References to the FOX-2 site have been removed from the Monitoring Report, which has been reissued and attached for reference.
- 5. As-built drawings for the permanent facilities (Non-Hazardous Waste Landfill and Tier II Disposal Facility) are prepared after the final cover has been placed and closure is complete. At this time, as-built drawings are not available, but will be provided upon closure of the facilities and completion of the remediation work at the site.

We trust the information provided is sufficient. Please feel free to contact the undersigned, or Tamara Van Dyck with Defence Construction Canada at 613-995-9741, if you have any additional questions or comments.

Sincerely,

**AECOM Canada Ltd.** 

Eva Schulz, P.Ag.

Senior Environmental Scientist

Eva.Schulz@aecom.com

Encl.

cc: Tamara Van Dyck, DCC

Candice Casucci Environmental Sciences Group The Royal Military College of Canada PO Box 17000 Stn. Forces Kingston, ON K7K 7B4 WORLD A SCIENCES GROWN ON THE SECOND OF THE

Tamara Van Dyck Environmental Officer Defence Construction Canada DEW Line Cleanup PMO 101 Colonel By Drive Ottawa ON K1A 0K2

March 15, 2011

# RE: 2010 Report for Water Use License Number: 1BR-BYR0712

The following results of the Monitoring Program (MP) and/or Water Use License are provided by the Environmental Sciences Group to meet the requirements of the above-noted license for PIN-4 (Byron Bay).

#### 1. CAMP SEWAGE LAGOON

A 2 cell sewage lagoon was constructed to service the PIN-4 construction camp in August 2009. The sewage lagoon was constructed a minimum of 100 m from drainage courses and water bodies.

#### 2. SEWAGE EFFLUENT SAMPLES

The Water Use License and MP require that samples from treated sewage lagoon effluent at the point of discharge to the receiving water be collected prior to each discharge event.

No sampling was completed at the PIN-4 sewage lagoons during the 2010 field season. The level of liquid in the lagoons remained low, and discharge was not required.



Photo 1 (P9270732): PIN-4 sewage lagoon cell 1 facing northeast. Sept 27th 2010.



Photo 2 (P9270733): PIN-4 sewage lagoon cell 2 facing north. Sept 27<sup>th</sup> 2010.

Please contact the undersigned if you have any questions or concerns. Sincerely,

Candice Casucci

**Environmental Sciences Group** 

cc: Eva Schulz (UMA)

Daniela Loock, Kat White, Shari Reed, Jennifer Joubert (ESG)

Candice Casucci Environmental Sciences Group The Royal Military College of Canada PO Box 17000 Stn. Forces Kingston, ON K7K 7B4

Tamara Van Dyck Environmental Officer Defence Construction Canada DEW Line Cleanup PMO 101 Colonel By Drive Ottawa ON K1A 0K2

Friday, March 18, 2011



# RE: Analytical Results for Wastewater Samples Collected at PIN-4 in June 2010

The following report summarizes results of the analysis of wastewater samples as per the PIN-4 (Byron Bay) DEW Line Cleanup Project (DLCU) Specifications.

The PIN-4 specifications require that "wash water, melt water collection, rinse water resulting from the cleaning of fuel tanks and pipelines, and/or any other liquid effluent stream" meet the following guidelines prior to their discharge to land:

Parameter	Maximum Allowable Concentration	Units
pН	6-9	pH units
Total arsenic (As)	0.100	mg/L
Dissolved cadmium (Cd)	0.010	mg/L
Dissolved chromium (Cr)	0.100	mg/L
Dissolved cobalt (Co)	0.050	mg/L
Dissolved copper (Cu)	0.200	mg/L
Dissolved lead (Pb)	0.050	mg/L
Total mercury (Hg)	0.0006	mg/L
Dissolved nickel (Ni)	0.200	mg/L
Total zinc (Zn)	0.500	mg/L
Oil & grease	5	mg/L
PCBs	1.0	mg/L
Phenols	0.020	mg/L

#### Phenols

The wastewater samples collected by ESG at PIN-4 are not analyzed for phenols but they are analyzed for oil and grease. Research conducted by ESG<sup>1</sup> has determined that a) no federal, territorial or provincial criteria exist for the discharge of wastewater containing phenols to land at a minimum distance of 30-m from natural drainage courses b) the maximum concentration of phenols in DLCU wastewater to date (2.44 mg/L) is below the

<sup>&</sup>lt;sup>1</sup> Environmental Sciences Group. DEW Line Clean Up Project – Phenols in Wastewater. June, 2007.

 $LC_{50}$  for freshwater fish and crustaceans and below the oral and dermal  $LD_{50}$ s for rats and rodents and c) phenols in excess of the maximum allowable concentration (MAC) have historically co-occurred with a visible oil & grease sheen and/or with an exceedance of the MAC for oil & grease. This information, and a subsequent decision to not test for phenols, has been presented to the NWB. To date, verbal agreement from the NWB has been received, but the project is awaiting written confirmation of the decision to suspend testing for phenols.

# **WASTEWATER SAMPLES**

Four wastewater samples were collected at PIN-4 and analyzed in June 2010. A summary of the details of these results follows. Laboratory results are provided in Appendix A

LOCATION: WEST CORNER OF NON HAZARDOUS WASTE LANDFILL

**GPS COORDINATES:** 12W 0577200 7628902

**SAMPLE:** 10-10925 **DATE:** June 24, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-10925
pН	6-9	pH units	7.04
Total arsenic (As)	0.100	mg/L	0.004
Dissolved cadmium (Cd)	0.010	mg/L	0.003
Dissolved chromium (Cr)	0.100	mg/L	< 0.005
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.016
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	1.03
Oil & grease	5	mg/L	<2.0
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 1 (P6240003) Sample 10-10925: Pin-4 Sample collection at West end of Non-Hazardous Waste Landfill

Water was discharged from the facility prior to a sample being collected. Sample 10-10925 was above criteria for Zn and the onsite team collected soil samples from the area where water was discharged to. All results were below criteria.

LOCATION: BEACH POL AREA BP -11299 GPS COORDINATES: 12W 0581920 762507

**SAMPLE:** 10-10992 **DATE:** June 28, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-10992
pН	6-9	pH units	7.53
Total arsenic (As)	0.100	mg/L	< 0.003
Dissolved cadmium (Cd)	0.010	mg/L	< 0.001
Dissolved chromium (Cr)	0.100	mg/L	< 0.005
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.021
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	< 0.010
Oil & grease	5	mg/L	<2.0
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 2 (P6280009) Sample 10-10992 Pin-4: Water collected within excavation of BP-11299 facing south towards ocean.

Waste water from the Beach POL Area was discharged to the ground on July 20, 2010. The water was discharged to an area greater than 30m from natural drainage courses (581880 7626522).

LOCATION: BEACH POL AREA BP -11421 GPS COORDINATES: 12W 0581951 7626473

**SAMPLE:** 10-10993 **DATE:** June 28, 2010

Parameter	Maximum Allowable Concentration Uni		Sample # 10-10993
pН	6-9	pH units	7.62
Total arsenic (As)	0.100	mg/L	0.005
Dissolved cadmium (Cd)	0.010	mg/L	< 0.001
Dissolved chromium (Cr)	0.100	mg/L	0.027
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.012
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	0.039
Oil & grease	5	mg/L	(broken bottle)
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 3 (P6280011) Sample 10-10993 Pin-4: Water collected within excavation of BP-11421 facing south west towards ocean.

Wastewater from the area was retested in July as the analysis for oil and grease could not be completed (broken sample vessel).

LOCATION: BEACH POL AREA BP - 22286 GPS COORDINATES: 12W 0581984 7626464

**SAMPLE:** 10-11005 **DATE:** JUNE 28, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-11005
pН	6-9	pH units	7.74
Total arsenic (As)	0.100	mg/L	< 0.003
Dissolved cadmium (Cd)	0.010	mg/L	< 0.001
Dissolved chromium (Cr)	0.100	mg/L	< 0.005
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.011
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	< 0.010
Oil & grease	5	mg/L	2.2
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 4 (P6280005) Sample 10-11005 Pin-4: Water collected within the excavation BP-22286 facing south towards water.

Wastewater collected from the area was below criteria for all parameters. Beach POL Area BP-22286 (10-11005)) was backfilled in late July without discharing any water from the excavation.

We trust that the information provided meets current requirements. Please contact the undersigned if you have any questions or concerns.

Sincerely,

Candice Casucci

Masuri.

**Environmental Sciences Group** 

cc: Eva Schulz (UMA)

Daniela Loock, Kat White, Shari Reed, Jennifer Joubert, Andrea Ellis, William Pain

(ESG)

# APPENDIX A LABORATORY RESULTS

ESG					ASG	Login No:	20687	
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Fax: (613) 541-65	96				Date	Reported:		
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Client: Site: Report of Analysis  Total Metals  SAMPLE  10-10925  Blank  Control Control Target  Dissolved Metals  SAMPLE	Cor Control  12831 ESG  PIN-4 10-057  Results in mg/L  Results in mg/L  Cu  Cu  Cu  Cu	Ni Ni Ni Ni	7.00 7.00 7.00 Report ID: Date Submitted: Date tested: Date: Matrix:  Co	30-Jun-10 2-Jul-10 2-Jul-10 Water  Cd Cd Cd	- - - - Pb	1.03 <0.010 3.30 3.00	<0.005 <0.005 0.90 0.80	0.004 <0.003 0.83 0.80
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Client:	ESG	Date Submitted:	30-Jun-10
		Date tested:	30-Jun-10
Site:	PIN-4	Date:	30-Jun-10
	10-057	Matrix:	water
Report of Analysis	S		
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10-10925	<2.0		
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(613) 541-6000 ex			N	Method No:	ASG 037	
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			Page:	1 of 1		
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	2010-10993	7.62				
	2010-11005*	7.74				
	* Averaged result of duplicate					
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ASU#	12849	Report ID:	PIN-4 W6
Client:	ESG	Date Submitted:	5-Jul-10
		Date tested:	5-Jul-10
Site:	PIN-4	Date:	6-Jul-10
	10-073	Matrix:	water
Report of Analysis	S		
Sample	Oil & Grease		
	mg/L		
10-10992	<2.0		
10-10993	broken bottle		
10-11005	2.2		
Blank	< 2.0		
Control	14.0		
Control Target	15.7		

ASU#	12849		Report ID:	PIN-4 W7				
Client:	ESG		Date Submitted:	5-Jul-10				
			Date tested:	5-Jul-10				
Site:	PIN-4		Date:	6-Jul-10				
	10-073		Matrix:	Water				
Report of Analysis								
Total Metals	Results in mg/L							
SAMPLE	Cu	Ni	Co	Cd	Pb	Zn	Cr	As
10-10992	-	-	-	-	-	< 0.010	< 0.005	< 0.003
10-10993	-	-	-	-	-	0.039	0.027	0.005
10-11005	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Blank	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Control	-	-	-	-	-	3.16	0.85	0.81
Control Target	-	-	-	-	-	3.00	0.80	0.80
10-11005	_	-	-	-	-	< 0.010	< 0.005	< 0.003
10-11005	-	-	-	-	-	< 0.010	< 0.005	<0.003
Dissolved Metals	Results in mg/L							
SAMPLE	Cu	Ni	Co	Cd	Pb	Zn	Cr	As
10-10992	0.021	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
10-10993	0.012	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
10-11005	0.011	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
Blank	< 0.005	< 0.005	<0.003	< 0.001	< 0.010	-	-	-
Control	1.60	1.64	1.63	0.79	8.10	-	-	-
Control Target	1.60	1.60	1.60	0.80	8.00	-	-	-
10-11005	0.011	<0.005	< 0.003	< 0.001	< 0.010	_		
10-11005	0.011	<0.005	<0.003	<0.001	<0.010	-	-	-

ESG					ASG Login No:	20709
12 Verite Ave					Site:	Pin-4
Dept. of Chem. / Che	m. Eng., R	MC			Client No:	10-073
P.O. Box 17000, Stn.	. Forces				Samples Received:	5-Jul-10
Kingston, Ontario K7l	K 7B4				Date of analysis:	13-Jul-10
(613) 541-6000 ext 65	567				Method No:	ASG 006
Fax: (613) 541-6596					Date Reported:	
					Sheet No:	1 of 1
	I	RESULTS OF PC	B IN W	ATER ANAL	YSIS	
	Sample Type **	Sample I.D.	Unit	Aroclor 1254	Aroclor 1260	
	W	10992	mg/L	< 0.003	< 0.003	İ
	W	10993	mg/L	< 0.003	< 0.003	
	W	11005	mg/L	< 0.003	< 0.003	
		e result of duplicate				
	**Report	Values in PPM**				
		LABORA	ATORY	QA/QC		
		Blank	mg/L	< 0.003	< 0.003	
		Control Sample	mg/L	< 0.003	0.018	
		Control Sample Target	mg/L	< 0.003	0.016	

Candice Casucci Environmental Sciences Group The Royal Military College of Canada PO Box 17000 Stn. Forces Kingston, ON K7K 7B4

Tamara Van Dyck Environmental Officer Defence Construction Canada DEW Line Cleanup PMO 101 Colonel By Drive Ottawa ON K1A 0K2

Friday, March 18, 2011



# RE: Analytical Results for Wastewater Samples Collected at PIN-4 in July 2010

The following report summarizes results of the analysis of wastewater samples as per the PIN-4 (Byron Bay) DEW Line Cleanup Project (DLCU) Specifications.

The PIN-4 specifications require that "wash water, melt water collection, rinse water resulting from the cleaning of fuel tanks and pipelines, and/or any other liquid effluent stream" meet the following guidelines prior to their discharge to land (01560.4.1):

Parameter	Maximum Allowable Concentration	Units
pН	6-9	pH units
Total arsenic (As)	0.100	mg/L
Dissolved cadmium (Cd)	0.010	mg/L
Dissolved chromium (Cr)	0.100	mg/L
Dissolved cobalt (Co)	0.050	mg/L
Dissolved copper (Cu)	0.200	mg/L
Dissolved lead (Pb)	0.050	mg/L
Total mercury (Hg)	0.0006	mg/L
Dissolved nickel (Ni)	0.200	mg/L
Total zinc (Zn)	0.500	mg/L
Oil & grease	5	mg/L
PCBs	1.0	mg/L
Phenols	0.020	mg/L

#### Phenols

The wastewater samples collected by ESG at PIN-4 are not analyzed for phenols but they are analyzed for oil and grease. Research conducted by ESG<sup>1</sup> has determined that a) no federal, territorial or provincial criteria exist for the discharge of wastewater containing phenols to land at a minimum distance of 30-m from natural drainage courses b) the maximum concentration of phenols in DLCU wastewater to date (2.44 mg/L) is below the

<sup>&</sup>lt;sup>1</sup> Environmental Sciences Group. DEW Line Clean Up Project – Phenols in Wastewater. June, 2007.

 $LC_{50}$  for freshwater fish and crustaceans and below the oral and dermal  $LD_{50}$ s for rats and rodents and c) phenols in excess of the maximum allowable concentration (MAC) have historically co-occurred with a visible oil & grease sheen and/or with an exceedance of the MAC for oil & grease. This information, and a subsequent decision to not test for phenols, has been presented to the NWB. To date, verbal agreement from the NWB has been received, but the project is awaiting written confirmation of the decision to suspend testing for phenols.

#### WASTEWATER SAMPLES

Two wastewater samples were collected at PIN-4 and analyzed in July 2010. A summary of the details of these results follows. Laboratory results are provided in Appendix A.

LOCATION: BEACH POL AREA BP -11421 GPS coordinates: 12W 0581951 7626473

**SAMPLE:** 10-19428 **DATE:** JULY 6, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-19428
pН	6-9	pH units	N/A
Total arsenic (As)	0.100	mg/L	N/A
Dissolved cadmium (Cd)	0.010	mg/L	N/A
Dissolved chromium (Cr)	0.100	mg/L	N/A
Dissolved cobalt (Co)	0.050	mg/L	N/A
Dissolved copper (Cu)	0.200	mg/L	N/A
Dissolved lead (Pb)	0.050	mg/L	N/A
Total mercury (Hg)	0.0006	mg/L	N/A
Dissolved nickel (Ni)	0.200	mg/L	N/A
Total zinc (Zn)	0.500	mg/L	N/A
Oil & grease	5	mg/L	39.4
PCBs	1.0	mg/L	N/A
Phenols	0.020	mg/L	N/A



**Photo 1 (P6280011) Sample 10-19428 Pin-4:** Water collected within excavation of BP-11421 facing south west towards ocean.

Water from Beach POL Area BP-11421 (10-19428) was above criteria for Oil and Grease and therefore was not discharged to land. The level of water in the excavation decreased throughout the season, and no discharge was required prior to backfill.

**LOCATION: LANDING DERIS AREA - LOBE C GPS COORDINATES:** 12W 0582215 7626834

**SAMPLE:** 10-19887 **DATE:** JULY 20, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-19887
pН	6-9	pH units	7.92
Total arsenic (As)	0.100	mg/L	< 0.003
Dissolved cadmium (Cd)	0.010	mg/L	0.001
Dissolved chromium (Cr)	0.100	mg/L	< 0.005
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.023
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	N/A
Dissolved nickel (Ni)	0.200	mg/L	0.007
Total zinc (Zn)	0.500	mg/L	0.014
Oil & grease	5	mg/L	<2.0
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 2 (P7190001) Sample 10-19887 Pin-4: Water collected with excavation of Landing Debris Area - Lobe C.

Water from Landing Debris Area – Lobe C (10-19887) was discharged to land on August 25<sup>th</sup>. The water was discharged to an INAC approved location (12W 582238 7626806).

We trust that the information provided meets current requirements. Please contact the undersigned if you have any questions or concerns.

Sincerely,

Candice Casucci

Masuri.

**Environmental Sciences Group** 

cc: Eva Schulz (UMA)

Daniela Loock, Kat White, Shari Reed, Jennifer Joubert, Andrea Ellis, William Pain

(ESG)

# APPENDIX A LABORATORY RESULTS

ASU#	12885	Report ID:	PIN-4 W8
Client:	ESG	Date Submitted:	12-Jul-10
		Date tested:	12-Jul-10
Site:	PIN-4	Date:	13-Jul-10
	10-099	Matrix:	water
Report of Analysis	S		
Sample	Oil & Grease		
	mg/L		
10-19428	39.4		
Blank	<2.0		
G . 1	1.4.0		
Control	14.0		
Control Target	15.9		

ASU#	12938	Report ID:	PIN-4 W10
Client:	ESG	Date Submitted:	26-Jul-10
		Date tested:	26-Jul-10
Site:	PIN-4	Date:	27-Jul-10
	10-141	Matrix:	water
Report of Analysis			
Sample	Oil & Grease		
	mg/L		
10-19887	<2.0		
10-19888	<2.0		
Blank	<2.0		
Control	13.1		
Control Target	15.9		

		Control	Sample Target	mg/L	<	< 0.003	0.0	)15		
			ntrol Sample	mg/L		< 0.003		)15		
			Blank	mg/L	<	< 0.003		.003		
			LABOR	ATORY	' QA	/QC				
	**Report	Values in	PPM**							
	Type **	88	19887	Unit mg/L		clor 1254 : 0.003	Aroclo < 0.			
	Sample		ammia I D	Unit	A	eler 1251	Arada	- 4260		
	F	RESUI	LTS OF PC	B IN W	ATE	R ANAL	rsis			
Fax: (613) 541-6596							Date	e Reported: Sheet No:		
613) 541-6000 ext 65							ı	Method No:	ASG 015	
P.O. Box 17000, Stn Kingston, Ontario K7								s Received: of analysis:		
Dept. of Chem. / Che		МС					_	Client No:	10-141	
ESG 12 Verite Ave							ASC	3 Login No: Site:	20811 Pin-4	
	-10.			2.30						
Control Target	1.54		1.62	1.62 1.60		0.80	8.12 8.00	2.95 3.00	0.82	0.76
Blank	<0.00		<0.005	<0.00		<0.001	<0.010	<0.010	<0.005	<0.003
10-19887	0.01		<0.005	<0.00		<0.001	<0.010	0.014	<0.005	<0.003
SAMPLE	Cu	l	Ni	Co		Cd	Pb	Zn	Cr	As
Dissolved Metals	Results in m			_		a:				
Control Target			1.00	1.00		0.80	8.00	3.00	0.80	0.80
Control	1.54		1.62 1.60	1.62 1.60		0.80 0.80	8.12 8.00	2.95 3.00	0.82 0.80	0.76 0.80
Blank	<0.0	05	< 0.005	< 0.00	3	<0.001	< 0.010	< 0.010	<0.005	<0.003
10-19887	0.02	.3	0.007	< 0.003	3	0.001	< 0.010	0.044	< 0.005	< 0.003
SAMPLE	Cu	ı	Ni	Co		Cd	Pb	Zn	Cr	As
Total Metals	Results in m	ng/L								
Report of Analysis										
	10-14	41		Matrix:		Water				
Site:	PIN-			Date:		27-Jul-10				
Chent.	1230	J		Date tested		27-Jul-10				
ASU # Client:	1293 ESC			Report ID: Date Subm		PIN-4 W11 26-Jul-10				

ESG			ASG Login No	· 20811
12 Verite Ave				: Pin-4
Dept. of Chem. / Che	m Fng RMC		Client No.	
P.O. Box 17000, Stn.	-		Samples Received	
Kingston, Ontario K7l			Date of analysis	
(613) 541-6000 ext 65			Method No	
Fax: (613) 541-6596			Date Reported	: 28-Jul-10
(= =, = = = = = = = = = = = = = = = = =				: 1 of 1
	RESULTS OF	pH ANALYSIS		
	INEGGET G GT	p117417421010		
	Sample I.D.	рН		
	19887*	7.92		
	* Averaged result of dup	licates		
	LABORAT	ORY QA/QC		
	Sample I.D.	pH		
	19887*; Duplicate Control	7.92 ; 7.92		
		7.01		
	Control Target	7.00		

**Candice Casucci Environmental Sciences Group** The Royal Military College of Canada PO Box 17000 Stn. Forces Kingston, ON K7K 7B4

Tamara Van Dvck **Environmental Officer Defence Construction Canada DEW Line Cleanup PMO** 101 Colonel By Drive Ottawa ON K1A 0K2



Friday, March 18, 2011

# RE: Analytical Results for Wastewater Samples Collected at PIN-4 in August 2010

The following report summarizes results of the analysis of wastewater samples as per the PIN-4 (Byron Bay) DEW Line Cleanup Project (DLCU) Specifications.

The PIN-4 specifications require that "wash water, melt water collection, rinse water resulting from the cleaning of fuel tanks and pipelines, and/or any other liquid effluent stream" meet the following guidelines prior to their discharge to land (01560.4.1):

Parameter	Maximum Allowable Concentration	Units
pН	6-9	pH units
Total arsenic (As)	0.100	mg/L
Dissolved cadmium (Cd)	0.010	mg/L
Dissolved chromium (Cr)	0.100	mg/L
Dissolved cobalt (Co)	0.050	mg/L
Dissolved copper (Cu)	0.200	mg/L
Dissolved lead (Pb)	0.050	mg/L
Total mercury (Hg)	0.0006	mg/L
Dissolved nickel (Ni)	0.200	mg/L
Total zinc (Zn)	0.500	mg/L
Oil & grease	5	mg/L
PCBs	1.0	mg/L
Phenols	0.020	mg/L

#### Phenols

The wastewater samples collected by ESG at PIN-4 are not analyzed for phenols but they are analyzed for oil and grease. Research conducted by ESG<sup>1</sup> has determined that a) no federal, territorial or provincial criteria exist for the discharge of wastewater

<sup>&</sup>lt;sup>1</sup> Environmental Sciences Group. DEW Line Clean Up Project – Phenols in Wastewater. June, 2007.

containing phenols to land at a minimum distance of 30-m from natural drainage courses b) the maximum concentration of phenols in DLCU wastewater to date (2.44 mg/L) is below the LC<sub>50</sub> for freshwater fish and crustaceans and below the oral and dermal LD<sub>50</sub>s for rats and rodents and c) phenols in excess of the maximum allowable concentration (MAC) have historically co-occurred with a visible oil & grease sheen and/or with an exceedance of the MAC for oil & grease. This information, and a subsequent decision to not test for phenols, has been presented to the NWB. To date, verbal agreement from the NWB has been received, but the project is awaiting written confirmation of the decision to suspend testing for phenols.

#### WASTEWATER SAMPLES

Two wastewater sample was collected at PIN-4 and analyzed in August 2010. A summary of the details of these results follows. Laboratory results are provided in Appendix A.

LOCATION: LANDING DEBRIS AREA – LOBE C GPS COORDINATES: 12W 0582331 7626689

**SAMLE:** 10-31709 **DATE:** AUGUST 23, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-31709
pН	6-9	pH units	8.23
Total arsenic (As)	0.100	mg/L	< 0.003
Dissolved cadmium	0.010	mg/L	< 0.001
(Cd)			
Dissolved chromium	0.100	mg/L	< 0.005
(Cr)			
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	0.005
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	< 0.010
Oil & grease	5	mg/L	<2.0
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



**Photo 1 (P8230468) Sample 10-31709 Pin-4:** Collecting a wastewater sample from Landing Debris Area - Lobe E

LOCATION: LANDING DEBRIS AREA – LOBE E GPS COORDINATES: 12W 0582348 7626701

**SAMPLE:** 10-31815 **DATE:** AUGUST 28, 2010

Parameter	Maximum Allowable Concentration	Units	Sample # 10-31815
pН	6-9	pH units	7.92
Total arsenic (As)	0.100	mg/L	< 0.003
Dissolved cadmium (Cd)	0.010	mg/L	<0.001
Dissolved chromium (Cr)	0.100	mg/L	<0.005
Dissolved cobalt (Co)	0.050	mg/L	< 0.003
Dissolved copper (Cu)	0.200	mg/L	< 0.005
Dissolved lead (Pb)	0.050	mg/L	< 0.010
Total mercury (Hg)	0.0006	mg/L	< 0.0004
Dissolved nickel (Ni)	0.200	mg/L	< 0.005
Total zinc (Zn)	0.500	mg/L	< 0.010
Oil & grease	5	mg/L	<2.0
PCBs	1.0	mg/L	< 0.003
Phenols	0.020	mg/L	N/A



Photo 2 (P280511) Sample 10-31815 Pin-4: Collecting a wastewater sample from Landing Debris Area - Lobe E (b)

Waste water from the Landing Debris Area – Lobe E (10-31709) was below criteria for all parameters. Water was not discharged prior to backfilling the excavation.

We trust that the information provided meets current requirements. Please contact the undersigned if you have any questions or concerns.

Sincerely,

Candice Casucci

Masuri.

**Environmental Sciences Group** 

cc: Eva Schulz (UMA)

Daniela Loock, Kat White, Shari Reed, Jennifer Joubert, Andrea Ellis,

William Pain (ESG)

# APPENDIX A LABORATORY RESULTS

ASU#	13144	Report ID:	PIN-4 W12
Client:	ESG	Date Submitted:	30-Aug-10
		Date tested:	31-Aug-10
Site:	PIN-4	Date:	31-Aug-10
	10-324	Matrix:	water
Report of Analysis	S		
Sample	Oil & Grease		
	mg/L		
10-31709	<2.0		
Blank	<2.0		
Control	13.3		
Control Target	15.9		

ASU#	13144		Report ID:	PIN-4 W13				
Client:	ESG		Date Submitted:	30-Aug-10				
			Date tested:	1-Sep-10				
Site:	PIN-4		Date:	2-Sep-10				
	10-324		Matrix:	Water				
eport of Analysis								
Total Metals	Results in mg/L							
SAMPLE	Cu	Ni	Со	Cd	Pb	Zn	Cr	As
10-31709	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Blank	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Control	-	-	-	-	-	2.91	0.78	0.73
Control Target	-	-	-	-	-	3.00	0.80	0.80
Dissolved Metals	Results in mg/L							
SAMPLE	Cu	Ni	Со	Cd	Pb	Zn	Cr	As
10-31709	0.005	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
Blank	< 0.005	< 0.005	< 0.003	<0.001	< 0.010	-	-	-
Control	1.44	1.55	1.54	0.77	7.66	-	-	-
Control Target	1.60	1.60	1.60	0.80	8.00	-	-	-

ESG			ASG	Login No:	20982
12 Verite Ave				Site:	Pin-4
Dept. of Chem. / C	hem. Eng., RMC			Client No:	10-324
P.O. Box 17000, S	tn. Forces		Samples	Received:	30-Aug-10
Kingston, Ontario I	<7K 7B4		Date of	of analysis:	1-Sep-10
(613) 541-6000 ext	6567		l l	Method No:	ASG 037
Fax: (613) 541-659	6		Date	e Reported:	1-Sep-10
				Page:	1 of 1
	RESULTS OF p	OH ANALYSIS			
	Sample I.D.	рН			
	31709*	8.23			
	* Averaged result of duplic	cates			
	LABORATO	DRY QA/QC			
		pH			
	Sample I.D.	•			
	31709*; Duplicate	8.23 ; 8.23			
		•			

ESG			ASG Login No:	20982
12 Verite Ave			Site:	Pin-4
Dept. of Chem. / Chem. Eng.,	RMC		Client No:	10-324
P.O. Box 17000, Stn. Forces			Samples Received:	30-Aug-10
Kingston, Ontario K7K 7B4			Date of analysis:	1-Sep-10
(613) 541-6000 ext 6567			Method No:	ASG 021
Fax: (613) 541-6596			Date Reported:	2-Sep-10
			Sheet:	1 of 1
RESUL	TS OF MERCUR	Y IN WATER A	NALYSIS	
	Sample	Mercury <sup>^</sup>		
	ID	mg/L		
	31709	< 0.0004		
	^ Acid digestion perform	ned.		
	# Reported at 0.0004 m			
	LABORAT	ORY QA/QC		
	Sample	Mercury^		
	ID	mg/L		
	Blank	< 0.0004		
	Control Target	0.0040		
	Control Sample	0.0041		

ESG					ASG Login No:	20982
12 Verite Ave					Site:	Pin-4
Dept. of Chem. / Cher	n. Eng., R	MC			Client No:	10-324
P.O. Box 17000, Stn.	Forces				Samples Received:	30-Aug-10
Kingston, Ontario K7h	< 7B4				Date of analysis:	2-Sep-10
(613) 541-6000 ext 65	67				Method No:	ASG 015
Fax: (613) 541-6596					Date Reported:	
					Sheet No:	1 of 1
	F	RESULTS OF PC	B IN V	VATER ANALY	'SIS	
	Sample Type **	Sample I.D.	Unit	Aroclor 1254	Aroclor 1260	
	W	31709*	mg/L	< 0.003	< 0.003	
	**Report	Values in PPM**				
	* Average	Result of Duplicate				
		LABORA	ATOR'			
		Blank	mg/L	< 0.003	< 0.003	
		Dumlinata : 24700*	1	< 0.003 ; < 0.003	< 0.003 ; < 0.003	
		Duplicate; 31709*				
		Control Sample	mg/L	< 0.003	0.011	

ASU#	13161		Report ID:	PIN-4 W14				
Client:	ESG		Date Submitted:	1-Sep-10				
			Date tested:	3-Sep-10				
Site:	PIN-4		Date:	3-Sep-10				
	10-351		Matrix:	Water				
Report of Analysis								
Total Metals	Results in mg/L							
SAMPLE	Cu	Ni	Со	Cd	Pb	Zn	Cr	As
10-31815	-	-	-	-	-	<0.010	< 0.005	< 0.003
Blank	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Control	-	-	-	-	-	3.04	0.83	0.75
Control Target	-	-	-	-	-	3.00	0.80	0.80
10-31815	_		_	-		< 0.010	< 0.005	< 0.003
10-31815	-	-	-	-	-	< 0.010	< 0.005	< 0.003
Dissolved Metals	Results in mg/L							
SAMPLE	Cu	Ni	Со	Cd	Pb	Zn	Cr	As
10-31815	< 0.005	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
Blank	<0.005	< 0.005	< 0.003	< 0.001	< 0.010	-	-	-
Control	1.46	1.61	1.59	0.81	8.00	-	-	-
Control Target	1.60	1.60	1.60	0.80	8.00	-	-	-
10-31815	<0.005	< 0.005	< 0.003	<0.001	< 0.010	-	-	_
10-31815	< 0.005	< 0.005	<0.003	< 0.001	< 0.010	-	-	-
Results relate only to the	e items tested							

ASU#	13161	Report ID:	PIN-4 W15
Client:	ESG	Date Submitted:	1-Sep-10
		Date tested:	1-Sep-10
Site:	PIN-4	Date:	1-Sep-10
	10-351	Matrix:	water
Report of Analysis	3		
Sample	Oil & Grease		
	mg/L		
10-31815	<2.0		
Blank	<2.0		
Control	15.0		
Control Target	15.7		

ESG			ASGI	_ogin No:	20994
12 Verite Ave			7,001	-	Pin-4
Dept. of Chem. / Cher	m. Eng., RMC		C	lient No:	
P.O. Box 17000, Stn.			Samples F	Received:	1-Sep-10
Kingston, Ontario K7					3-Sep-10
(613) 541-6000 ext 65	567		Me	ethod No:	ASG 037
Fax: (613) 541-6596			Date F	Reported:	3-Sep-10
				Page:	1 of 1
	RESULTS OF	pH ANALYSIS			
	Sample I.D.	рН			
	10-31815*	7.92			
	* Averaged result of dupl	licates			
	LADODAT				
	LABORAT	ORY QA/QC			
	Sample I.D.	pН			
	10-31815*; Duplicate	7.92 ; 7.92			
	Control	7.00			
	Control Target	7.00			

ESG					ASG	Login No:	20994
12 Verite A	\ve					Site:	Pin-4
Dept. of Cl	nem. / Ch	em. Eng.,	RMC			Client No:	10-351
P.O. Box	17000, St	n. Forces			Samples	Received:	1-Sep-10
Kingston,	Ontario K	7K 7B4			Date of	of analysis:	3-Sep-10
(613) 541-6	6000 ext 6	6567			N	Nethod No:	ASG 014
Fax: (613)	541-6596	6			Date	Reported:	3-Sep-10
						Sheet:	1 of 1
	F	RESULT	<b>IS OF MERCUR</b>	Y IN WATER A	NALYSI	S	
			Sample	Mercury^			
			ID	mg/L			
			31815*	< 0.0004			
			*Average result of duplic				
			^ Acid digestion perform				
			# Reported at 0.0004 m	g/L detection limit.			
			LABORAT	ORY QA/QC			
			Sample	Mercury <sup>^</sup>			
			ID	mg/L			
			Duplicate; 31815*	0.0004 ; < 0.0004			
			Blank	< 0.0004			
			Control Target	0.0040			
			Control Sample	0.0041			
			•	·	•		

ESG					ASG Login No:	20994
12 Verite Ave					Site:	Pin-4
Dept. of Chem. / Che	m. Eng., R	MC			Client No:	10-351
P.O. Box 17000, Stn	. Forces				Samples Received:	1-Sep-10
Kingston, Ontario K7	K 7B4				Date of analysis:	2-Sep-10
(613) 541-6000 ext 65	567				Method No:	ASG 015
ax: (613) 541-6596					Date Reported:	3-Sep-10
					Sheet No:	1 of 1
	F	RESULTS OF PC	B IN W	ATER ANAL	/SIS	
	-					
	Sample Type **	Sample I.D.	Unit	Aroclor 1254	Aroclor 1260	
	W	31815	mg/L	< 0.003	< 0.003	
	**Report \	Values in PPM**				
		Values in PPM** Result of Duplicate				
			TORY	( QA/QC		
		Result of Duplicate				
		Result of Duplicate	ATORY	<b>QA/QC</b> < 0.003	< 0.003	
		Result of Duplicate			< 0.003 0.011 0.015	

Candice Casucci Environmental Sciences Group The Royal Military College of Canada PO Box 17000 Stn. Forces Kingston, ON K7K 7B4 ON TAL SCIENCES GROOM ON THE PROPERTY OF THE P

Tamara Van Dyck Environmental Officer Defence Construction Canada DEW Line Cleanup PMO 101 Colonel By Drive Ottawa ON K1A 0K2

Friday, March 18, 2011

# RE: Analytical Results for Wastewater Samples Collected at PIN-4 in September 2010

The following report summarizes results of the analysis of wastewater samples as per the PIN-4 (Byron Bay) DEW Line Cleanup Project (DLCU) Specifications.

The PIN-4 specifications require that "wash water, melt water collection, rinse water resulting from the cleaning of fuel tanks and pipelines, and/or any other liquid effluent stream" meet the following guidelines prior to their discharge to land (01560.4.1):

Parameter	Maximum Allowable Concentration	Units
pН	6-9	pH units
Total arsenic (As)	0.100	mg/L
Dissolved cadmium (Cd)	0.010	mg/L
Dissolved chromium (Cr)	0.100	mg/L
Dissolved cobalt (Co)	0.050	mg/L
Dissolved copper (Cu)	0.200	mg/L
Dissolved lead (Pb)	0.050	mg/L
Total mercury (Hg)	0.0006	mg/L
Dissolved nickel (Ni)	0.200	mg/L
Total zinc (Zn)	0.500	mg/L
Oil & grease	5	mg/L
PCBs	1.0	mg/L
Phenols	0.020	mg/L

#### Phenols

The wastewater samples collected by ESG at PIN-4 are not analyzed for phenols but they are analyzed for oil and grease. Research conducted by ESG<sup>1</sup> has determined that a) no federal, territorial or provincial criteria exist for the discharge of wastewater

<sup>&</sup>lt;sup>1</sup> Environmental Sciences Group. DEW Line Clean Up Project – Phenols in Wastewater. June, 2007.

containing phenols to land at a minimum distance of 30-m from natural drainage courses b) the maximum concentration of phenols in DLCU wastewater to date (2.44 mg/L) is below the  $LC_{50}$  for freshwater fish and crustaceans and below the oral and dermal  $LD_{50}$ s for rats and rodents and c) phenols in excess of the maximum allowable concentration (MAC) have historically co-occurred with a visible oil & grease sheen and/or with an exceedance of the MAC for oil & grease. This information, and a subsequent decision to not test for phenols, has been presented to the NWB. To date, verbal agreement from the NWB has been received, but the project is awaiting written confirmation of the decision to suspend testing for phenols.

#### WASTEWATER SAMPLES

No wastewater sample were collected at PIN-4 in September 2010.

We trust that the information provided meets current requirements. Please contact the undersigned if you have any questions or concerns.

Sincerely,

Candice Casucci

(Casuri

**Environmental Sciences Group** 

cc: Eva Schulz (UMA)

Daniela Loock, Kat White, Shari Reed, Jennifer Joubert, Andrea Ellis,

William Pain (ESG)