APPENDIX B

Sample Results for August 2009

SAMPLING RESULTS – August 13, 2009

The analytical results of the samples collected from the Kugaaruk Sewage Lagoon and Wetland Treatment System are summarized in Table 1. Based on these results, all parameters set out in the water licence were met. One concern is the data for Total Suspended Solids (TSS) from PEL-5. Although there is no guideline for TSS from PEL-5, the value was 52 mg/L which is higher than the guideline for water quality from PEL-4.

Another parameter of concern is the amount of mercury in the lagoon effluent. The value for mercury from the lagoon effluent is higher than the recommended CCME Guideline as shown in bold in Table 1.

Table 1. Water Quality Results of Lagoon Effluent and Wetland Effluent

Test Parameter	Units	Water Board Requirements	PEL-3-1	PEL-4	PEL-5
Inorganics - Physicals					
Alkalinity, Total (as $CaCO_3$)	mg/L		360	372	118
Conductivity, Specific (@ 25°C)	µS/cm		1120	1090	23700
pH	pH units	6 - 9	7.59	7.69	7.73
Solids, Total Suspended	mg/L	180 / 45[1]	34	10	**52**
Inorganics - Nutrients					
Ammonia as Nitrogen	mg/L		65.6	62.5	3.31
Biochemical Oxygen Demand	mg/L	120 / 45[2]	78	18	6
CBOD	mg/L		82	14	2
Nitrate + Nitrite as Nitrogen	mg/L		0.05	0.04	0.51
Organic Carbon, Total	mg/L		105	57.3	5.4
Phosphorous, Total	mg/L		4.99	4.5	0.33
Subcontracted Nutrients					
Kjeldahl Nitrogen, Total	mg/L		54	51.8	3.68
Major Ions					
Calcium	mg/L		41	41.6	255
Chloride	mg/L		126	111	10300
Hardness	mg/L		180	177	3330
Magnesium	mg/L		18.9	17.8	654
Nitrate as Nitrogen	mg/L	3.6*	0.04	0.04	0.51
Nitrite as Nitrogen	mg/L		<0.01	<0.01	<0.01
Potassium	mg/L		21.9	16.2	206
Sodium	mg/L		99.9	84.5	5130
Sulphate	mg/L		30	8	1460

Microbiology					
Coliforms, Fecal	CFU/100mL	1 x 10^4	7300	320	44
Escherichia coli	MPN/100mL		12700	921	23.5
Organics					
Oil and Grease, visible		No visible sheen	Non-visual	Non-visual	Non-visual
Trace Metals, Total					
Aluminum	µg/L		367	81	95
Arsenic	µg/L	12.5*	1.6	3.4	1.6
Cadmium	µg/L	0.12*	<0.1	<0.1	<0.1
Chromium	µg/L	56/1.5*[3]	0.9	0.5	0.4
Cobalt	µg/L		1.4	1.8	0.3
Copper	µg/L		33.9	7.6	1.3
Iron	µg/L		1360	785	175
Lead	µg/L		1.5	1.4	0.3
Manganese	µg/L		525	1020	82.8
Mercury	µg/L	0.016*	**0.02**	<0.01	0.01
Nickel	µg/L		3.6	6.1	1.1
Zinc	µg/L		38	7	<5
Subcontracted Organics					
Phenols, Total	mg/L		0.26	<0.001	0.003

* CCME Guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life, December 2007)

[1] Discharge criteria for Total Suspended Soils for PEL-3-1 is 180 mg/L. Discharge criteria for PEL-4 is 45 mg/L.

[2] Discharge criteria for Biochemical Oxygen Demand for PEL-3-1 is 120 mg/L. Discharge criteria for PEL-4 is 45 mg/L.

[3] Trivalent chromium (Cr(III))/Hexavalent chromium (Cr(VI))

Acute lethality testing was also completed for *Oncorhynchus mykiss* (Rainbow Trout) and *Daphnia magna* (crustacean) at SNP point PEL-4 in August as per the requirements of the Hamlet's water licence. Results of the tests concluded that there was a 100% mortality rate for the *Oncorhynchus mykiss* (Rainbow Trout) and a 0% mortality rate for the *Daphnia magna* (crustacean).

Results for the solid waste and metal dump sites are located in Table 2. PEL-6 is leachate run-off from the municipal solid waste facility and PEL-9-2 is leachate run-off from the metals dump. The Hamlet's water licence does not state any guidelines for either of these sites. Therefore the CCME Guidelines were used to compare the results. No parameters were found to be greater than the values stated in the CCME Guidelines.

Table 2. Water Quality Results of Leachate from Solid Waste and Metals Dump Sites

Test Parameter	Units	CCME Guidelines	PEL-6	PEL-9-2
Inorganics - Physicals				
Alkalinity, Total (as $CaCO_3$)	mg/L		126	36.2
Conductivity, Specific (@ 25°C)	µS/cm		441	154
pH	pH units	7.0 - 8.7	7.5	7.47
Solids, Total Suspended	mg/L		6	<3
Inorganics - Nutrients				
Ammonia as Nitrogen	mg/L		1.06	<0.01
Biochemical Oxygen Demand	mg/L		20	<2
CBOD	mg/L		20	<2
Nitrate + Nitrite as Nitrogen	mg/L		0.15	0.08
Organic Carbon, Total	mg/L		21.5	3.7
Phosphorous, Total	mg/L		0.04	<0.01
Subcontracted Nutrients				
Kjeldahl Nitrogen, Total	mg/L		2.7	0.2
Major Ions				
Calcium	mg/L		55.8	12.4
Chloride	mg/L		27.9	22.3
Hardness	mg/L		170	43.7
Magnesium	mg/L		7.4	3.1
Nitrate as Nitrogen	mg/L	3.6	0.15	0.08
Nitrite as Nitrogen	mg/L		<0.01	<0.01
Potassium	mg/L		3.9	1
Sodium	mg/L		23.5	13.2
Sulphate	mg/L		75	13
Microbiology				
Coliforms, Fecal	CFU/100mL		57	<1
Escherichia coli	MPN/100mL		154	<1.0
Organics				
Oil and Grease, visible			Non-visual	Non-visual

Trace Metals, Total				
Aluminum	µg/L		53	83
Arsenic	µg/L	12.5	1	<0.2
Cadmium	µg/L	0.12	<0.1	<0.1
Chromium	µg/L	56/1.5[1]	0.5	0.2
Cobalt	µg/L		0.9	<0.1
Copper	µg/L		2.3	1.3
Iron	µg/L		1650	85
Lead	µg/L		0.9	0.3
Manganese	µg/L		902	8.3
Mercury	µg/L	0.016	<0.01	<0.01
Nickel	µg/L		1.6	0.3
Zinc	µg/L		101	6
Subcontracted Organics				
Acenaphthylene	µg/L		<0.1	<0.1
Acenapthene	µg/L		<0.1	<0.1
Acridine	µg/L		<0.1	<0.1
Anthracene	µg/L		<0.005	<0.005
Benzene	mg/L	0.11	<0.001	*
Benzo(a)anthracene	µg/L		<0.01	<0.01
Benzo(a)pyrene	µg/L		<0.008	<0.008
Benzo(bj)fluoranthene	µg/L		<0.1	<0.1
Benzo(g,h,i)perylene	µg/L		<0.05	<0.05
Benzo(k)fluoranthene	µg/L		<0.1	<0.1
Carcinogenic Potency	µg/L		<0.01	<0.01
Chrysene	µg/L		<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L		<0.05	<0.05
Ethlybenzene	mg/L	0.025	<0.001	*
Fluoranthene	µg/L		0.02	<0.01
Fluorene	µg/L		<0.1	<0.1
Hydrocarbons, Total Extractable	mg/L		<0.1	<0.1
Hydrocarbons, Total Purgeable	mg/L		0.02	*
Indeno(1,2,3-cd)pyrene	µg/L		<0.05	<0.05
Naphthalene	µg/L	1.4	0.6	<0.1
Phenanthrene	µg/L		0.1	<0.1
Phenols, Total	mg/L		0.004	0.001
Pyrene	µg/L		0.03	<0.01
Quinoline	µg/L		<0.3	<0.3
Toluene	mg/L	0.215	0.001	*
Xylenes	mg/L		0.003	*

* Air bubble in sample bottle, analysis not possible

[1]Trivalent chromium (Cr(III))/Hexavalent chromium (Cr(VI))

SUMMARY

As Table 1 indicates, the parameters of concern are TSS and mercury. As the TSS value of concern is from the ocean sample (PEL-5), it is suspected that this may be the result of other substances in the ocean and not caused by the effluent from the lagoon.

The elevated mercury value was obtained from the lagoon effluent sample (PEL-3). However, in the wetland effluent sample (PEL-4) the mercury value was very low. This indicates that the mercury is being taken up by vegetation within the wetland and very little if any is being deposited into the ocean (PEL-5).

Although the results appear to be favourable, it must be noted that there was no continuous flow through the wetland at the time of sampling. This is due to the fact that discharge from the lagoon had been completed at an accelerated rate to allow for installation of the heat trace in the discharge pipe. It is recommended that during the next discharge event (Summer 2010), the discharge rate should be slowed down to allow for more effective treatment of the effluent. Also, discharge should not begin until the snow has melted from the wetland and the vegetation has had a chance to establish itself.

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Taiga Batch No.:
290578

- FINAL REPORT -

Prepared For: Dillon Consulting Ltd.

Address: Suite 303 - 4920 47 St.
Box 1409
Yellowknife, NT
X1A 2L8

Attn: Jennifer Spencer **Facsimile:** (867) 873-3328

Final report has been reviewed and approved by:

Angelique Ruzindana
Quality Assurance Officer

NOTES:

- Test methods and data are validated by the laboratory's Quality Assurance Program. Taiga Environmental Laboratory is accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL) as a testing laboratory for specific tests registered with CAEAL.
- Routine methods are based on recognized procedures from sources such as
  - Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF;
  - Environment Canada
  - USEPA
- Samples shall be kept for thirty (30) days after the final report is issued. All microbiological samples shall be disposed of immediately upon completion of analysis to minimize biohazardous risks to laboratory personnel. Please contact the laboratory if you have any special requirements.
- Final results are based on the specific tests at the time of analysis and do not represent the conditions during sampling.

ReportDate: Friday, August 28, 2009
Print Date: Friday, August 28, 2009

Taiga Environmental Laboratory
4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-3-1 **Taiga Sample ID: 001**

Client Project: 05-4744
Sample Type: Sewage
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	360	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	1120	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	7.59		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	34	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	65.6	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Biochemical Oxygen Demand	78	2	mg/L	14-Aug-09	SM5210:B	
CBOD	82	2	mg/L	14-Aug-09	SM5210:B	
Nitrate+Nitrite as Nitrogen	0.05	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	105	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	4.99	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	54.0	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-3-1 **Taiga Sample ID: 001**

Calcium	41.0	0.1	mg/L	17-Aug-09	SM4110:B
Chloride	126	0.7	mg/L	17-Aug-09	SM4110:B
Hardness	180	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	18.9	0.1	mg/L	17-Aug-09	SM4110:B
Nitrate as Nitrogen	0.04	0.01	mg/L	17-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Potassium	21.9	0.1	mg/L	17-Aug-09	SM4110:B
Sodium	99.9	0.1	mg/L	17-Aug-09	SM4110:B
Sulphate	30	1	mg/L	17-Aug-09	SM4110:B
Microbiology					
Coliforms, Fecal	7300	100	CFU/100mL	14-Aug-09	SM9222:D
Escherichia coli	12700	100	MPN/100mL	14-Aug-09	SM9223:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	367	5	µg/L	21-Aug-09	EPA200.8
Arsenic	1.6	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Chromium	0.9	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	1.4	0.1	µg/L	21-Aug-09	EPA200.8
Copper	33.9	0.2	µg/L	21-Aug-09	EPA200.8
Iron	1360	5	µg/L	21-Aug-09	EPA200.8
Lead	1.5	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	525	0.1	µg/L	21-Aug-09	EPA200.8

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-3-1 **Taiga Sample ID: 001**

Mercury	0.02	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	3.6	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	38	5	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Phenols, Total	0.260	0.001	mg/L	20-Aug-09	APHA 5530D

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID: 002**

Client Project: 05-4744
Sample Type: Sewage
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	372	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	1090	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	7.69		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	10	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	62.5	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Biochemical Oxygen Demand	18	2	mg/L	14-Aug-09	SM5210:B	81
CBOD	14	2	mg/L	14-Aug-09	SM5210:B	81
Nitrate+Nitrite as Nitrogen	0.04	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	57.3	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	4.50	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	51.8	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID: 002**

Calcium	41.6	0.1	mg/L	17-Aug-09	SM4110:B
Chloride	111	0.7	mg/L	17-Aug-09	SM4110:B
Hardness	177	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	17.8	0.1	mg/L	17-Aug-09	SM4110:B
Nitrate as Nitrogen	0.04	0.01	mg/L	17-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Potassium	16.2	0.1	mg/L	17-Aug-09	SM4110:B
Sodium	84.5	0.1	mg/L	17-Aug-09	SM4110:B
Sulphate	8	1	mg/L	17-Aug-09	SM4110:B
Microbiology					
Coliforms, Fecal	320	10	CFU/100mL	14-Aug-09	SM9222:D
Escherichia coli	921	1.0	MPN/100mL	14-Aug-09	SM9223:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	81	5	µg/L	21-Aug-09	EPA200.8
Arsenic	3.4	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Chromium	0.5	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	1.8	0.1	µg/L	21-Aug-09	EPA200.8
Copper	7.6	0.2	µg/L	21-Aug-09	EPA200.8
Iron	785	5	µg/L	21-Aug-09	EPA200.8
Lead	1.4	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	1020	0.1	µg/L	21-Aug-09	EPA200.8

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-4 **Taiga Sample ID: 002**

Mercury	< 0.01	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	6.1	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	7	5	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Phenols, Total	< 0.001	0.001	mg/L	20-Aug-09	APHA 5530D

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-5 **Taiga Sample ID: 003**

Client Project: 05-4744
Sample Type: Sewage
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	118	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	23700	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	7.73		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	52	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	3.31	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Biochemical Oxygen Demand	6	2	mg/L	14-Aug-09	SM5210:B	81
CBOD	2	2	mg/L	14-Aug-09	SM5210:B	81
Nitrate+Nitrite as Nitrogen	0.51	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	5.4	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	0.33	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	3.68	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						

ReportDate: Friday, August 28, 2009
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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-5 **Taiga Sample ID: 003**

Calcium	255	0.1	mg/L	18-Aug-09	SM4110:B
Chloride	10300	0.7	mg/L	18-Aug-09	SM4110:B
Hardness	3330	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	654	0.1	mg/L	18-Aug-09	SM4110:B
Nitrate as Nitrogen	0.51	0.01	mg/L	18-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	18-Aug-09	SM4110:B
Potassium	206	0.1	mg/L	18-Aug-09	SM4110:B
Sodium	5130	0.1	mg/L	18-Aug-09	SM4110:B
Sulphate	1460	1	mg/L	18-Aug-09	SM4110:B
Microbiology					
Coliforms, Fecal	44	1	CFU/100mL	14-Aug-09	SM9222:D
Escherichia coli	23.5	1.0	MPN/100mL	14-Aug-09	SM9223:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	95	5	µg/L	21-Aug-09	EPA200.8
Arsenic	1.6	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Chromium	0.4	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	0.3	0.1	µg/L	21-Aug-09	EPA200.8
Copper	1.3	0.2	µg/L	21-Aug-09	EPA200.8
Iron	175	5	µg/L	21-Aug-09	EPA200.8
Lead	0.3	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	82.8	0.1	µg/L	21-Aug-09	EPA200.8

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Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-5 **Taiga Sample ID: 003**

Mercury	0.01	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	1.1	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	< 5	5	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Phenols, Total	0.003	0.001	mg/L	20-Aug-09	APHA 5530D

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4601-52nd Ave., Box 1500, Yellowknife, NT. X1A 2R3
Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID: 004**

Client Project: 05-4744
Sample Type: SolidW.Leachate
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	126	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	441	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	7.50		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	6	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	1.06	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Biochemical Oxygen Demand	20	2	mg/L	14-Aug-09	SM5210:B	
CBOD	20	2	mg/L	14-Aug-09	SM5210:B	
Nitrate+Nitrite as Nitrogen	0.15	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	21.5	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	0.04	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	2.70	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						

ReportDate: Friday, August 28, 2009
Print Date: Friday, August 28, 2009

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID: 004**

Calcium	55.8	0.1	mg/L	17-Aug-09	SM4110:B	
Chloride	27.9	0.7	mg/L	17-Aug-09	SM4110:B	
Hardness	170	0.7	mg/L	17-Aug-09	SM2340:B	
Magnesium	7.4	0.1	mg/L	17-Aug-09	SM4110:B	
Nitrate as Nitrogen	0.15	0.01	mg/L	17-Aug-09	SM4110:B	
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B	
Potassium	3.9	0.1	mg/L	17-Aug-09	SM4110:B	
Sodium	23.5	0.1	mg/L	17-Aug-09	SM4110:B	
Sulphate	75	1	mg/L	17-Aug-09	SM4110:B	
Microbiology						
Coliforms, Fecal	57	1	CFU/100mL	14-Aug-09	SM9222:D	20
Escherichia coli	154	1.0	MPN/100mL	14-Aug-09	SM9223:B	
Organics						
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam	
Trace Metals, Total						
Aluminum	53	5	µg/L	21-Aug-09	EPA200.8	
Arsenic	1.0	0.2	µg/L	21-Aug-09	EPA200.8	
Cadmium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8	
Chromium	0.5	0.1	µg/L	21-Aug-09	EPA200.8	
Cobalt	0.9	0.1	µg/L	21-Aug-09	EPA200.8	
Copper	2.3	0.2	µg/L	21-Aug-09	EPA200.8	
Iron	1650	5	µg/L	21-Aug-09	EPA200.8	
Lead	0.9	0.1	µg/L	21-Aug-09	EPA200.8	
Manganese	902	0.1	µg/L	21-Aug-09	EPA200.8	

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID: 004**

Mercury	< 0.01	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	1.6	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	101	5	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Acenaphthylene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Acenapthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Acridine	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Anthracene	< 0.005	0.005	µg/L	20-Aug-09	EPA8270
Benzene	< 0.001	0.001	mg/L	21-Aug-09	EPA8021B
Benzo(a)anthracene	< 0.01	0.01	µg/L	20-Aug-09	EPA8270
Benzo(a)pyrene	< 0.008	0.008	µg/L	20-Aug-09	EPA8270
Benzo(bj)fluoranthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270
Benzo(k)fluoranthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Carcinogenic Potency	< 0.01	0.01	µg/L	20-Aug-09	EPA8270
Chrysene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270
Ethylbenzene	< 0.001	0.001	mg/L	21-Aug-09	EPA8021B
Fluoranthene	0.02	0.01	µg/L	20-Aug-09	EPA8270
Fluorene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	20-Aug-09	Alta.Env.Met
Hydrocarbons, Total Purgeable	0.02	0.01	mg/L	20-Aug-09	EPA8021B
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270
Naphthalene	0.6	0.1	µg/L	20-Aug-09	EPA8270

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-6 **Taiga Sample ID: 004**

Phenanthrene	0.1	0.1	µg/L	20-Aug-09	EPA8270
Phenols, Total	0.004	0.001	mg/L	20-Aug-09	APHA 5530D
Pyrene	0.03	0.01	µg/L	20-Aug-09	EPA8270
Quinoline	< 0.3	0.3	µg/L	20-Aug-09	EPA8270
Toluene	0.001	0.001	mg/L	21-Aug-09	EPA8021B
Xylenes	0.003	0.001	mg/L	21-Aug-09	EPA8021B

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-9-2 **Taiga Sample ID: 005**

Client Project: 05-4744
Sample Type: MetalDumpLeacha
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: **Final**

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	36.2	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	154	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	7.47		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	< 3	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.01	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Biochemical Oxygen Demand	< 2	2	mg/L	14-Aug-09	SM5210:B	
CBOD	< 2	2	mg/L	14-Aug-09	SM5210:B	
Nitrate+Nitrite as Nitrogen	0.08	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	3.7	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	< 0.01	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	0.20	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-9-2 **Taiga Sample ID: 005**

Calcium	12.4	0.1	mg/L	17-Aug-09	SM4110:B
Chloride	22.3	0.7	mg/L	17-Aug-09	SM4110:B
Hardness	43.7	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	3.1	0.1	mg/L	17-Aug-09	SM4110:B
Nitrate as Nitrogen	0.08	0.01	mg/L	17-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Potassium	1.0	0.1	mg/L	17-Aug-09	SM4110:B
Sodium	13.2	0.1	mg/L	17-Aug-09	SM4110:B
Sulphate	13	1	mg/L	17-Aug-09	SM4110:B
Microbiology					
Coliforms, Fecal	< 1	1	CFU/100mL	14-Aug-09	SM9222:D
Escherichia coli	< 1.0	1.0	MPN/100mL	14-Aug-09	SM9223:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	83	5	µg/L	21-Aug-09	EPA200.8
Arsenic	< 0.2	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Chromium	0.2	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Copper	1.3	0.2	µg/L	21-Aug-09	EPA200.8
Iron	85	5	µg/L	21-Aug-09	EPA200.8
Lead	0.3	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	8.3	0.1	µg/L	21-Aug-09	EPA200.8

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-9-2 **Taiga Sample ID: 005**

Mercury	< 0.01	0.01	µg/L	21-Aug-09	EPA200.8	
Nickel	0.3	0.1	µg/L	21-Aug-09	EPA200.8	
Zinc	6	5	µg/L	21-Aug-09	EPA200.8	
Subcontracted Organics						
Acenaphthylene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Acenapthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Acridine	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Anthracene	< 0.005	0.005	µg/L	20-Aug-09	EPA8270	
Benzene			mg/L		EPA8021B	111
Benzo(a)anthracene	< 0.01	0.01	µg/L	20-Aug-09	EPA8270	
Benzo(a)pyrene	< 0.008	0.008	µg/L	20-Aug-09	EPA8270	
Benzo(bj)fluoranthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Benzo(g,h,i)perylene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270	
Benzo(k)fluoranthene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Carcinogenic Potency	< 0.01	0.01	µg/L	20-Aug-09	EPA8270	
Chrysene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Dibenzo(a,h)anthracene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270	
Ethylbenzene			mg/L		EPA8021B	111
Fluoranthene	< 0.01	0.01	µg/L	20-Aug-09	EPA8270	
Fluorene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Hydrocarbons, Total Extractable	< 0.1	0.1	mg/L	20-Aug-09	Alta.Env.Met	
Hydrocarbons, Total Purgeable			mg/L		EPA8021B	111
Indeno(1,2,3-cd)pyrene	< 0.05	0.05	µg/L	20-Aug-09	EPA8270	
Naphthalene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: PEL-9-2 **Taiga Sample ID: 005**

Phenanthrene	< 0.1	0.1	µg/L	20-Aug-09	EPA8270	
Phenols, Total	0.001	0.001	mg/L	20-Aug-09	APHA 5530D	
Pyrene	< 0.01	0.01	µg/L	20-Aug-09	EPA8270	
Quinoline	< 0.3	0.3	µg/L	20-Aug-09	EPA8270	
Toluene			mg/L		EPA8021B	111
Xylenes			mg/L		EPA8021B	111

ReportDate: Friday, August 28, 2009
Print Date: Friday, August 28, 2009

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TB **Taiga Sample ID: 006**

Client Project: 05-4744
Sample Type: Water
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	< 0.4	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	0.7	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	5.60		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	4	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.01	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Nitrate+Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	< 0.5	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	< 0.01	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	< 0.06	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						
Calcium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B	
Chloride	< 0.7	0.7	mg/L	17-Aug-09	SM4110:B	

ReportDate: Friday, August 28, 2009
Print Date: Friday, August 28, 2009

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: TB **Taiga Sample ID: 006**

Hardness	< 0.7	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B
Nitrate as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Potassium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B
Sodium	0.1	0.1	mg/L	17-Aug-09	SM4110:B
Sulphate	< 1	1	mg/L	17-Aug-09	SM4110:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	< 0.6	0.6	µg/L	21-Aug-09	EPA200.8
Arsenic	< 0.2	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.05	0.05	µg/L	21-Aug-09	EPA200.8
Chromium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Copper	< 0.2	0.2	µg/L	21-Aug-09	EPA200.8
Iron	< 5	5	µg/L	21-Aug-09	EPA200.8
Lead	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Mercury	< 0.01	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	< 0.4	0.4	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Phenols, Total	0.002	0.001	mg/L	20-Aug-09	APHA 5530D

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: FB **Taiga Sample ID: 007**

Client Project: 05-4744
Sample Type: Water
Received Date: 13-Aug-09
Sampling Date: 13-Aug-09
Sampling Time: 8:30
Location: Kugaaruk
Report Status: Final

Test Parameter	Result	Detection Limit	Units	Analysis Date	Analytical Method *	Qualifer
Inorganics - Physicals						
Alkalinity, Total (as CaCO3)	< 0.4	0.4	mg/L	14-Aug-09	SM2320:B	
Conductivity, Specific (@ 25°C)	0.8	0.4	µS/cm	14-Aug-09	SM2510:B	
pH	5.29		pH units	14-Aug-09	SM4500-H:B	
Solids, Total Suspended	4	3	mg/L	19-Aug-09	SM2540:D	
Inorganics - Nutrients						
Ammonia as Nitrogen	< 0.01	0.01	mg/L	18-Aug-09	SM4500-NH3:	
Nitrate+Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B	
Organic Carbon, Total	< 0.5	0.5	mg/L	17-Aug-09	SM5310:B	
Phosphorous, Total	< 0.01	0.01	mg/L	17-Aug-09	SM4500-P:D	
Subcontracted Nutrients						
Kjeldahl Nitrogen, Total	< 0.06	0.06	mg/L	20-Aug-09	ISO 11905-2	
Major Ions						
Calcium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B	
Chloride	< 0.7	0.7	mg/L	17-Aug-09	SM4110:B	

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Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: FB **Taiga Sample ID: 007**

Hardness	< 0.7	0.7	mg/L	17-Aug-09	SM2340:B
Magnesium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B
Nitrate as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Nitrite as Nitrogen	< 0.01	0.01	mg/L	17-Aug-09	SM4110:B
Potassium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B
Sodium	< 0.1	0.1	mg/L	17-Aug-09	SM4110:B
Sulphate	< 1	1	mg/L	17-Aug-09	SM4110:B
Organics					
Oil and Grease, visible	NonVisual			17-Aug-09	Visual Exam
Trace Metals, Total					
Aluminum	< 0.6	0.6	µg/L	21-Aug-09	EPA200.8
Arsenic	< 0.2	0.2	µg/L	21-Aug-09	EPA200.8
Cadmium	< 0.05	0.05	µg/L	21-Aug-09	EPA200.8
Chromium	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Cobalt	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Copper	< 0.2	0.2	µg/L	21-Aug-09	EPA200.8
Iron	< 5	5	µg/L	21-Aug-09	EPA200.8
Lead	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Manganese	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Mercury	< 0.01	0.01	µg/L	21-Aug-09	EPA200.8
Nickel	< 0.1	0.1	µg/L	21-Aug-09	EPA200.8
Zinc	< 0.4	0.4	µg/L	21-Aug-09	EPA200.8
Subcontracted Organics					
Phenols, Total	0.001	0.001	mg/L	20-Aug-09	APHA 5530D

ReportDate: Friday, August 28, 2009
Print Date: Friday, August 28, 2009

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Tel: (867)-669-2788 Fax: (867)-669-2718

Taiga Batch No.: 290578

- CERTIFICATE OF ANALYSIS -

Client Sample ID: FB **Taiga Sample ID: 007**

- DATA QUALIFERS -

Data Qualifier Descriptions:

20	*Possible matrix interference, reported result uncertain.*
81	*Results are inconclusive due to insufficient depletion of sample, minimum 2 mg/L required over 5 days.*
111	*Sample bottle contained air bubble, analysis not possible.*

*** Taiga analytical methods are based on the following standard analytical methods**

SM - Standard Methods for the Examination of Water and Wastewater

EPA - United States Environmental Protection Agency

HydroQual Laboratories Ltd.
#4, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Trout Test Summary

Client: Dillon Consulting | Client #: DIL113 | Contact: Jennifer Spencer

Fax #: 867-873-3328 | Date: 2009/08/21

Reference #: 09-1477 | Date Collected: 2009/08/13 | Date Rec'd: 2009/08/17

HydroQual Contact: Evangeline Blais or Elisabeth Henson

Description: PEL-4
Method: Rainbow trout
Tester: EV/ HS
Started: 2009/08/17
Ended: 2009/08/21

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Control	0	0	0	0	
100	100%	100%	100%	100%	

Description:
Method:
Tester:
Started:
Ended:

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	72 hrs	96 hrs	Endpoint/Comments
Control					

HydroQual Laboratories Ltd.
#4, 6125 12th Street SE Calgary, Alberta Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.hydroqual.ca

Daphnia Test Summary

Client: Dillon Consulting Client #: DIL113 Contact: Jennifer Spencer

Fax #: 867-873-3328 Date: 2009/08/19

Reference #: 09-1477 Date Collected: 2009/08/13 Date Rec'd: 2009/08/17

HydroQual Contact: Evangeline Blais or Elisabeth Henson

Description: PEL-4
Method: Daphnia magna
Tester: NL
Started: 2009/08/17
Ended: 2009/08/19

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	Endpoint/Comments
Control	0	0	
100	0	0	

Description:
Method:
Tester:
Started:
Ended:

Sample Strength %	Cumulative Mortality % 24 hrs	48 hrs	Endpoint/Comments
Control			

HydroQual Laboratories Ltd.

Trout (single concentration) Test Report

Result Summary

Client: DIL113
Reference: 09-1477-01-TRS

Client: Dillon Consulting; operation Yellowknife

Sample: PEL-4

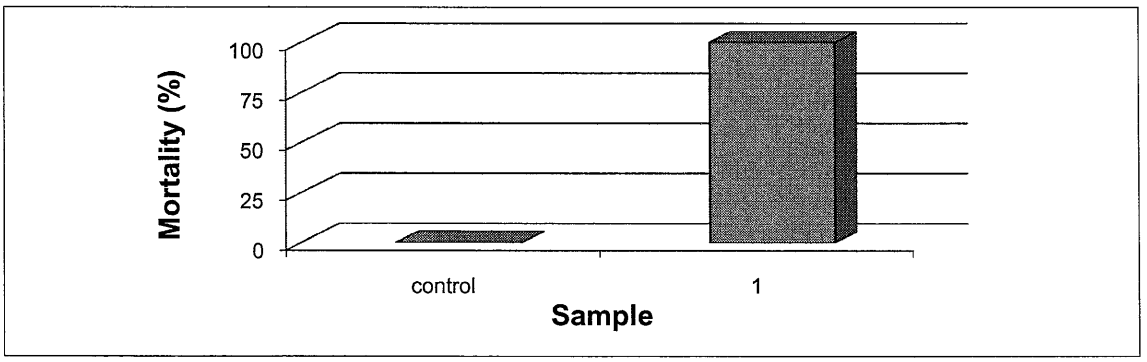
Collection: collected on 2009/08/13 at 0830 by J. Spencer
Receipt: received on 2009/08/17 at 0850 by E. Vinish
Containers: received 1 x 20L carboy at 1 °C, in good condition with no seals and no initials
Description: type: effluent, collection method: grab

Test: started on 2009/08/17 ; ended on 2009/08/21

Contents

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
1	PEL-4	100	toxic as tested



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

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Test Conditions

Client: DIL113
Reference: 09-1477-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended 2007).

Test type: Trout 96-h Static Acute Test (HQ 4.4.4.1)
Species: *Oncorhynchus mykiss*
Organism source: Sun Valley Trout Farms (Batch 20090716TR)
Acclimation: 32 days (must be ≥ 2 weeks)
Stock mortality: 0.17% (seven days preceeding testing)

Sample initial chemistry: pH: 7.7; EC: 1207 (µS/cm); DO: 8.5 (mg/L); temperature: 8 °C
hardness (mg CaC03/L): 171; colour: brown ; odour: odourless
Sample holding time: 4 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners
Test volume: 18 Litres (depth of solution in each test vessel ≥15cm)
Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 ±1 mL/min/L
Dissolved oxygen in full strength sample was 8.3 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing
Loading density: 0.186 g/Litre (must be ≤ 0.5 g/Litre)
Control water: Dechlorinated City of Calgary water acclimated to test conditions
Test concentrations: Undiluted sample plus a negative control
Test replicates: One replicate per treatment; 10 fish per replicate
Feeding: Fish are not fed 24 hours before test initiation and no feeding during test
Measurements: pH, conductivity, dissolved oxygen and temperature measured daily
Aeration: All treatments aerated at 6.5 ±1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones
Lighting: Overhead full spectrum fluorescent lights; 100-500 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 15 ± 1°C

Endpoint: Mortality, % mortality at 96-h
Test validity: The control had 100% survival (must ≥ 90%)

Reference toxicant: 96-h test with Phenol (C_6H_5OH) initiated August 6, 2009; current results (96-h LC50 and 95% confidence limits) = 0.92 (0.79-1.01) log (mg/L Phenol)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

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Test Data

Client: DIL113
Reference: 09-1477-01-TRS

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/17	0	1100	E. Vinish/H. Stewart	test fish loaded at 1100 h
2009/08/18	1	0830	J. Amyotte/E. Vinish	all test fish appear normal
2009/08/19	2	1020	N. Lavoie/E. Vinish	all test fish appear normal
2009/08/20	3	1000	S. Ehman/N. Lavoie	all test fish appear normal
2009/08/21	4	1135	J. Amyotte/N. Lavoie	all test fish appear normal

Chemistry:

Sample	control	1						

pH (units)

Day								
0	8.1	7.7						
1	7.6	7.7						
2	8.2	-						
3	8.0	-						
4	8.4	-						

Conductivity (µS/cm)

0	382	1159						
1	381	1126						
2	384	-						
3	387	-						
4	390	-						

Dissolved Oxygen (mg/L)

0	8.3	8.3						
1	7.5	7.4						
2	7.7	-						
3	7.6	-						
4	8.2	-						

Temperature (°C)

0	15	16						
1	15	15						
2	15	-						
3	15	-						
4	15	-						

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Test Data

Client: DIL113
Reference: 09-1477-01-TRS

Number Alive:

Sample	control	1						
Day								
0	10	10						
1	10	0						
2	10	0						
3	10	0						
4	10	0						
				Mortality (%)				
4	0	100						

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.4
2	3.3	0.4
3	3.0	0.3
4	2.7	0.2
5	3.0	0.3
6	3.0	0.3
7	3.1	0.3
8	3.3	0.4
9	3.0	0.3
10	2.9	0.3
average	3.1	0.3
sd	0.2	0.1
cv(%)	6.0	19.2

Notes: nd, not done; na, not applicable; sd, standard deviation; cv(%), coefficient of variation

Sample	Group Wet Weight (g)
control	3.3
1	4.0

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Comments/Statistics

Client: DIL113
Reference: 09-1477-01-TRS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

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HydroQual Laboratories Ltd.

Warning Chart
Trout

Test Method: Trout 96h Static Acute Test. (LC50, five or more treatments plus a control)
HydroQual Test Method Manual, section: 4.4.4.1

Reference: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 1990. Environment Canada, EPS 1/RM/13. including May 1996 and December 2000 amendments.

Test Organism:

test species:	*Oncorhyncus mykiss*
culture source:	Sun Valley
temperature (°C):	15 ± 1
dissolved oxygen:	saturated
stock mortality (last 7d):	0.00%
batch number:	20090716TR

Test Design:

vol. of test vessel (L):	22
test volume depth:	>15 cm
replicates per treatment:	1
fingerlings per replicate:	10
loading (g fish/L):	<0.5
temperature (°C):	15 ± 1
photoperiod:	16h light: 8h dark
light level (water surface):	100-500 lux
control/dilution water:	dechlorinated tap water

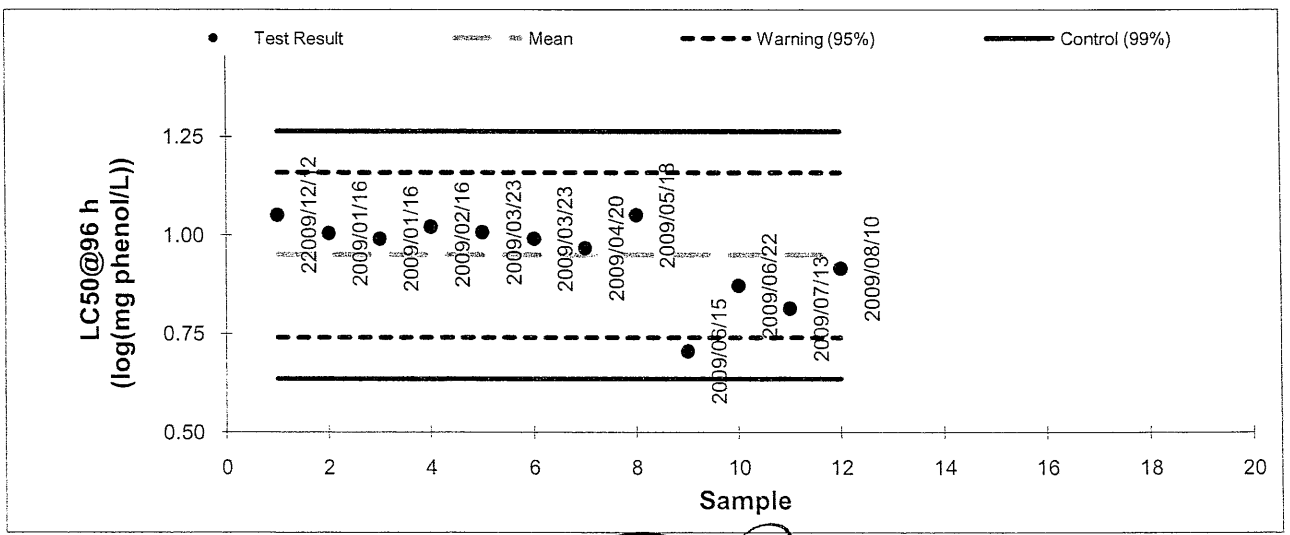
Current Test

toxicant	phenol (C_6H_5OH)				
started on	2009/08/06	ended on	2009/08/10		
Result (LC50 @ 96h)	0.92	log (mg phenol/L); geometric mean			
Confidence Limits (95%)	lower	0.79	upper	1.01	

Historical Values

mean	0.95	sd	0.10	cv(%):	11
	lower	upper			
warning limits (±2 sd)	0.74	1.16	(95% confidence limits)		
control limits (±3 sd)	0.63	1.26	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance



Qualty Assurance Unit:

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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HydroQual Laboratories Ltd.

Daphnia (single concentration) Test Report

Result Summary

Client: DIL113
Reference: 09-1477-01-DAS

Client: Dillon Consulting; operation Yellowknife

Sample: PEL-4

Collection: collected on 2009/08/13 at 0830 by J. Spencer
Receipt: received on 2009/08/17 at 0850 by E. Vinish
Containers: received 1 x 20L carboy at 1 °C, in good condition with no seals and no initials
Description: type: effluent, collection method: grab

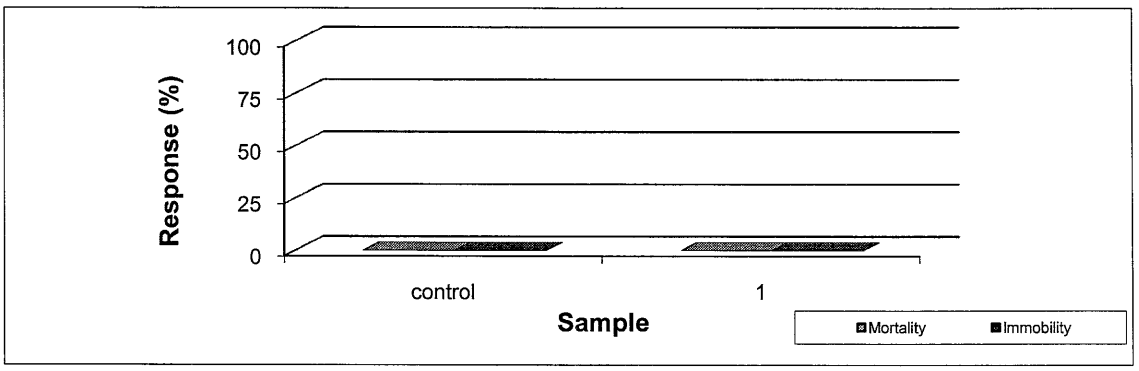
Test: started on 2009/08/17 ; ended on 2009/08/19

Contents

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
1	PEL-4	0	0	not toxic as tested

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

E. Blais, B.Sc., Technical Lead

S. Krishnappa, B.Sc., Quality Coordinator

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Test Conditions

Client: DIL113
Reference: 09-1477-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (HQ 4.4.3.1)
Species: *Daphnia magna*
Age: < 24 hours old
Organism source: in-house culture
Stock mortality: 0%
Culture brood data: 10 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1207 (µS/cm); DO: 8.5 (mg/L); temperature: 8 °C
hardness (mg CaC03/L): 171; colour: brown ; odour: odourless
Sample holding time: 4 days (must be ≤ 5 days)
Sample storage: 4 ± 2°C in darkness

Test vessel: 385 mL plastic vessels
Test volume: 150 mL
Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L^{-1})
The hardness of the sample was not adjusted (mg $CaCO_3$/L) prior to or during testing
Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)
Control water: Dechlorinated City of Calgary water acclimated to test conditions
The hardness of the control/dilution water was 171 mg $CaCO_3$/L
Test concentrations: Undiluted sample plus a negative control
Test replicates: Three replicates per treatment, 10 daphnids per replicate
Feeding: None
Aeration: None
Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination
Lighting: Cool white fluorescent lights; 400-800 lux at surface
Photoperiod: 16h light:8h dark
Test temperature: 20 ± 2°C

Note: Outlined sections are protocol deviations explained on the comment page

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Test Conditions

Client: DIL113
Reference: 09-1477-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must ≥ 90%)
Control had 0% abnormal behaviour (must ≤ 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 7, 2009; current results
(48-h LC50 and 95% confidence limits) = 0.76 (0.73-0.79) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

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Test Data

Client: DIL113
Reference: 09-1477-01-DAS

Test Log:

Date	Day	Time	Technician	Comment/Observation
2009/08/17	0	1050	N. Lavoie	test *Daphnia* appear normal
2009/08/18	1	0920	S. Ehman	test *Daphnia* appear normal
2009/08/19	2	0915	E. Vinish	test *Daphnia* appear normal

Chemistry:

Sample	control			1		
replicate	a	b	c	a	b	c
pH (units)						
0	8.0	8.2	8.2	7.5	7.6	7.6
2	8.1	8.2	8.2	8.4	8.4	8.5
Conductivity (µS/cm)						
0	349	351	352	1072	1076	1068
2	379	365	363	986	1026	1037
Dissolved Oxygen (mg/L)						
0	8.1	8.1	8.1	8.4	8.3	8.2
2	7.0	7.0	7.0	6.3	6.2	6.2
Temperature (°C)						
0	19	18	19	20	20	20
2	21	21	21	21	21	21

Biology:

Sample	control			1		
replicate	a	b	c	a	b	c
Number Alive and Behavior (behavior is in brackets)						
1	10	10	10	10	10	10
2	10	10	10	10	10	10
Mortality (%)						
2	0	0	0	0	0	0
Immobility (%)						
2	0	0	0	0	0	0

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

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Comments/Statistics

Client: DIL113
Reference: 09-1477-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

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Quality Assurance Information

Test Method: *Daphnia* Static Acute Test (LC50, five or more treatments plus a control)
HydroQual Test Method Manual, section: 4.4.3.1

Reference: Biological Test Method: Reference Method for Determining the Acute Lethality of Effluents to *Daphnia magna,* 1990. Environment Canada, EPS 1/RM/14. including May 1996 and December 2000 ammendments.

Test Organism:		**Test Design:**	
test species:	*Daphnia magna*	vol. of test vessel (mL):	500
culture source:	in-house	toxicant:	sodium chloride
original culture source:	Environment Canada	test volume (mL):	150
days to first brood:	10	replicates per treatment:	1
mean brood size:	23	neonates per replicate:	10
ephippia in stock culture:	no	volume per neonate (mL):	15
age of test organisms:	<24 hours old	samples preaerated:	no
culture mortality (%):	7%	hardness adjustment:	no
		temperature (°C):	20
		photoperiod:	16h light:8h dark
		light level (water surface):	400-800 lux
		control/dilution water:	dechlorinated tap water

Current Test

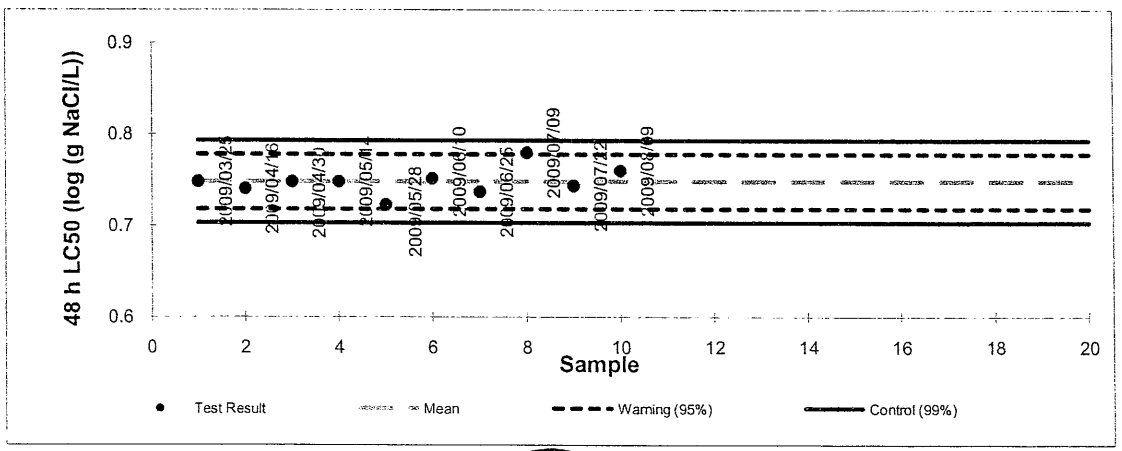
toxicant	Sodium Chloride (NaCl)				
started on	2009/08/07	ended on	2009/08/09		
Result (LC50 @ 48h)	0.76	log (g NaCl/L); geometric mean			
Confidence Limits (95%)	lower	0.73	upper	0.79	

Historical Values

mean	0.75	sd	0.01	cv(%):	2
	lower	upper			
warning limits (±2 sd)	0.72	0.78	(95% confidence limits)		
control limits (±3 sd)	0.70	0.79	(99% confidence limits)		

notes: sd, standard deviation; cv, coefficient of variance

Comments: None.



Quality Assurance Unit:

Authorized by S. Krishnappa, B.Sc., Quality Assurance Coordinator
The test data and results are verified correct.

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