

DATE August 31, 2010**PROJECT No.** 09-1493-5038**TO** Mike Reiner, Senior Environmental Protection Officer
BC Ministry of Environment, Penticton**CC** City of Kelowna (Mark Watt, Gordon Light)**FROM** Rick Peleshytyk**EMAIL** RPeleshytyk@golder.com**KELOWNA – VERNON COMPOST FACILITY
WATER SAMPLING DATA REPORT – JULY 2010**

On behalf of the City of Kelowna, this memorandum reports on the results of water sampling and analytical testing conducted at the above facility located on Commonage Road, Vernon, BC. Future data reports will be submitted to the MoE on a monthly basis as requested in a letter from the BC Ministry of Environment to the City of Kelowna (dated April 22, 2010).

Sampling Date(s)

The water sampling summarized in this report was completed on July 29, 2010.

Sample Locations

Water samples were collected from the following locations:

- Drainage Pond. Used to store storm water runoff generated at the biosolids facility.
- Irrigation Standpipe (McKay Reservoir). Reclaim water from McKay Reservoir used to flush the drainage trench, which then flows into the Drainage Pond.
- Rose's Pond. Located approximately 200 m west of the facility.
- Davidson Pond. Located approximately 100 m south of the facility.

Field Methods

City of Kelowna technical staff collected the water samples from all four locations.

A grab sample was collected from near the shoreline of the Drainage Pond, Rose's Pond and Davidson Pond. The reclaim water from McKay Reservoir was sampled directly from irrigation standpipe located on site.

Water samples were collected in bottles supplied by Exova laboratories of Surrey, BC, placed in chilled coolers and transported via overnight courier. Samples submitted for total metals analysis were preserved in the field as per laboratory specifications and samples for dissolved metals analysis were submitted unpreserved and filtered by the laboratory.



Field Observations

During sampling on July 29, the ambient temperature was 30.0 C. Waterfowl was present on all three ponds.

Lab Analysis Results

All four water samples were submitted to Exova laboratories in Surrey, BC., and tested for parameters listed in Golder Associates Ltd.'s report to the City of Kelowna titled "Kelowna – Vernon Compost Facility, Interim Report on Leachate Drainage Pond" (February 17, 2010).

The water chemistry results are presented in Table 1 (Exova lab report number 1345795). Water chemistry concentrations were compared to the freshwater aquatic life criteria listed in the BC Ministry of Environment Contaminated Sites Regulation (CSR; updated May 1, 2010) and the approved Water Quality Guidelines (WQG; updated January 2010). The water results from the Drainage Pond were also compared to the CSR drinking water standards which are used to assess groundwater quality.

The aquatic life criteria were generally compared to total metals (unfiltered) concentrations, except for aluminum which has a BC WQG that is based on the dissolved concentration.

A summary of the water sampling results is provided below:

- All parameters tested were below the freshwater aquatic life criteria (CSR and WQG) at the Drainage Pond, McKay Reservoir, and Davidson Pond.
- The total arsenic concentration at Rose's Pond was 0.0084 mg/L, which is slightly above the WQG of 0.005 mg/L.
- All parameters measured in the Drainage Pond were below the CSR drinking water standards for groundwater.

Other Items

- An evaporation pan was monitored at the Site for at least two weeks in August. Those results and daily water level measurements from the Drainage Pond will be presented in the August report.
- The next round of water sampling was completed in August 2010.

Closure

Should you have any questions regarding the above report, please contact the undersigned.

GOLDER ASSOCIATES LTD.



Rick Peleshytyk, P.Eng.
Associate, Environmental Engineer

RP/jc

Attachment: Table 1: Water Chemistry Results

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Table 1: Water Chemistry Results (July 2010)
Kelowna - Vernon Compost Facility

Location	CSR - AW Aquatic Life (freshwater)	Notes	BCWQG Aquatic Life (freshwater)	Notes	McKay Reservoir Reclaim Water 29-Jul-10	Drainage Pond 29-Jul-10	Rose's Pond 29-Jul-10	Davidson Pond 29-Jul-10
General Parameters								
biochemical oxygen demand					<4	6	<4	6
chemical oxygen demand					30	90	90	90
total nitrogen					2.56	5.75	2.7	3.6
orthophosphate as P					1.29	2.74	<0.002	<0.002
nitrogen, ammonia as N	11.3		0.68 - 28.7*	pH/T	0.48	3	0.13	0.42
nitrogen, nitrate as N	400		31.3*		0.57	0.17	0.06	<0.01
nitrogen, nitrite as N	0.2 - 2	Cl	0.06 - 0.60*	Cl	0.075	0.086	0.007	0.01
total coliform (MPN/100 mL)					146.7	>2419.6	>2419.6	>2419.6
E. coli (MPN/ 100 mL)					1	>2419.6	20.1	4.1
total suspended solids					4	19	36	15
pH (laboratory)			6.5 - 9.0		8.09	8.28	8.9	8.9
conductivity (EC) (µS/cm at 25C)					899	926	8750	4430
hardness (as CaSO3)					199	207	1450	439
hardness, Total (Total as CaCO3)					223	234	1600	508
Total Metals								
aluminum					0.053	0.083	0.533	0.026
antimony	0.2		0.02		0.0002	0.0003	0.0006	0.0003
arsenic	0.05		0.005		0.0015	0.0029	0.0084	0.0046
barium	10		5*		0.017	0.014	0.021	0.015
beryllium	0.053		0.0053*		<0.00004	<0.00004	<0.00004	<0.00004
bismuth					<0.001	<0.001	<0.001	<0.001
boron	50		1.2		0.189	0.206	0.082	0.02
cadmium	0.0001 - 0.0006	P/H	variable	H	0.00002	0.00002	<0.00001	<0.00001
calcium			4 - 8	W	52.3	54.7	40.1	49
chromium	0.010 ^{VI} , 0.090 ^{III}	V	0.001 ^{VI} , 0.0089 ^{III}	W	0.0078	0.0036	0.0055	0.0123
cobalt	0.04		0.11*		0.00068	0.00077	0.00052	0.00021
copper	0.020 - 0.090	H	variable*	H	0.006	0.01	0.006	0.002
iron			0.35		0.063	0.12	0.45	0.032
lead	0.040 - 0.160	H	0.003 - variable*	H	0.0001	0.0002	<0.0001	<0.0001
lithium			0.87*		0.011	0.012	0.037	0.034
magnesium					22.4	23.6	364	93.7
manganese			0.8 - 3.8	H	0.113	0.104	0.0708	0.0282
molybdenum	10		2*		0.0092	0.0089	0.0029	0.0009
nickel	0.250 - 1.5	H	0.025 - 0.15	H	0.005	0.003	0.004	0.003
phosphorus					1.48	3.42	0.081	0.031
potassium					19.8	25.8	123	54
selenium	0.01				0.0013	0.0011	0.0028	0.0014
silicon					2.16	2.77	0.94	1.28
silver	0.0005 - 0.015	H			0.00007	0.00005	<0.00001	<0.00001
sodium					110	113	1190	644
strontium					0.587	0.596	0.455	0.644
sulfur					32.4	33.7	894	376
tellurium					<0.0001	<0.0001	<0.0001	<0.0001
thallium	0.003		0.0017		<0.00001	<0.00001	<0.00001	<0.00001
thorium					<0.0004	<0.0004	0.0006	<0.0004
tin					0.0002	0.0002	0.0002	0.0001
titanium	1		2		<0.001	<0.001	0.014	<0.001
uranium	3		0.3		0.0021	0.002	0.0044	0.0039
vanadium			0.006		0.0015	0.0018	0.0055	0.0012
zinc	0.075 - 2.4	P/H	0.033 - 0.265*	H	0.06	0.018	0.005	0.003
zirconium			0.0075 - 0.24		0.0002	0.0002	0.0011	0.0004
Dissolved Metals								
aluminum			0.1	pH	<0.005	0.028	0.011	0.007
antimony					0.0002	0.0003	0.0005	0.0003
arsenic					0.0013	0.0023	0.0072	0.0038
barium					0.015	0.01	0.015	0.015
beryllium					<0.00004	<0.00004	<0.00004	<0.00004
bismuth					<0.001	<0.001	<0.001	<0.001
boron					0.176	0.186	0.076	0.011
cadmium					<0.00001	<0.00001	<0.00001	<0.00001
chromium					<0.0004	0.0004	0.0008	0.0005
cobalt					0.00062	0.0007	0.00024	0.0002
copper					0.004	0.004	0.001	<0.001
iron					0.07	0.09	0.09	0.09
lead					<0.0001	<0.0001	<0.0001	<0.0001
lithium					0.011	0.011	0.044	0.037
manganese					0.0564	0.0112	0.0149	0.0177
molybdenum					0.0088	0.0092	0.0025	0.0008
nickel					0.005	0.003	0.003	0.003
selenium					0.001	0.0009	0.0024	0.0017
silver					<0.00001	0.00001	0.00009	<0.00001
strontium					0.559	0.568	0.375	0.603
sulfur					28.8	30.8	832	344
tellurium					<0.0001	<0.0001	<0.0001	<0.0001
thallium					<0.00001	<0.00001	<0.00001	<0.00001
thorium					<0.0004	<0.0004	<0.0004	<0.0004
tin					<0.0001	<0.0001	<0.0001	<0.0001
titanium					<0.01	<0.01	<0.01	<0.01
uranium					0.0025	0.0024	0.0055	0.0049
vanadium					0.0014	0.0019	0.0037	0.0014
zinc					0.048	0.01	0.001	<0.001
Zirconium					0.0001	0.0002	0.0012	0.0007
Calcium					47	48.2	34.1	42.7
Magnesium					19.8	21	333	80.7
Phosphorus					1.29	2.69	0.01	<0.01
Potassium					17.5	23.1	111	49
Silicon					1.81	2.38	0.41	1.2
Sodium					92.5	98.2	1070	586
Chloride					95.9	104	429	242

Notes:
 All concentrations in milligrams per litre (mg/L), unless otherwise noted.
 CSR = the Contaminated Sites Regulation (CSR); Schedule 6 (amended June 2010).
 Land Use abbreviations: AW (Aquatic Life).
 BCWQG = British Columbia Approved Water Quality Guidelines (updated January 2010).
 H = standard is hardness (mg/L as CaCO₃) dependent.
 pH = standard is pH dependant
 Cl = standard is chloride dependent
 sal = standard varies with salinity and/or salinity based assumptions
 T = standard varies with temperature
 * Instantaneous maximum concentration.
 W = Working Criteria (not approved)