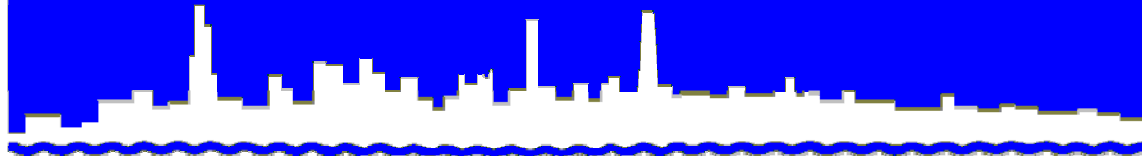


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 06-78

HARLEM AVENUE SOLIDS MANAGEMENT AREA

MONITORING DATA FOR

THIRD QUARTER 2006

DECEMBER 2006

Metropolitan Water Reclamation District of Greater Chicago

100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3154 312-751-5600

Louis Kollias, P.E., BCEE
Director of Research and Development

December 22, 2006

312-751-5190

Mr. S. Alan Keller, P.E.
Manager, Permit Section
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794 -9276

Dear Mr. Keller:

Subject: Harlem Avenue Solids Management Area - Stickney WRP, Contract No. 84-111-2P, IEPA Permit No. 2004-AO-2591, Monitoring Report for July, August, and September 2006

The attached nine tables contain the monitoring data for the Harlem Avenue Solids Management Area for July, August, and September 2006 as required by IEPA Operating Permit No. 2004-AO-2591. On a few occasions during the quarter, no sample was obtained from Lysimeter L-1N, but sample was obtained from its replacement L-1N-1 on all occasions. The District has submitted a request to the IEPA for approval to terminate monitoring of the old lysimeters L-1 and L-1N.

The data reported are as follows:

Table 1, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on July 5, 2006

Table 2, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on July 19, 2006

Table 3, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on August 2, 2006

Table 4, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on August 16, 2006

Table 5, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on August 30, 2006

Subject: Harlem Avenue Solids Management Area - Stickney WRP, Contract No. 84-111-2P, IEPA Permit No. 2004-AO-2591, Monitoring Report for July, August, and September 2006

Table 6, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on September 13, 2006

Table 7, Analysis of Water from Lysimeters L-1N through L-1N-1 at the Harlem Avenue Solids Management Area Sampled on September 27, 2006

Table 8, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During August 2006

Table 9, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During September 2006

No biosolids were placed in the solids drying area during the period of July to September. Biosolids were removed from the solids drying area during August and September.

Very truly yours,

Louis Kollias
Director
Research and Development

LK:PL:spy

Attachments

cc w/att: Mr. Sulski, IEPA
Records Unit, IEPA
Mr. S. Levy
Ms. M. Sharma
Mr. W. Stuba
Dr. T. Granato
Dr. A. Cox
Dr. P. Lindo
Ms. M. Patel

TABLE 1: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 5, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹			7.3	7.3	7.4	7.7
EC	mS/m		389	166	208	233
Total Dissolved Solids	mg/L		4,056	1,570	1,744	1,408
Total Dissolved Organic Carbon	"		54	4	7	37
Cl ⁻	"		95	163	83	100
SO ₄ ⁼	"		1,579	304	174	22
TKN	"		127	5.7	0.70	8.1
NH ₃ -N	"	L	115	4.7	0.08	5.1
NO ₂ + NO ₃ -N	"	Y	29	1.2	0.21	0.15
Total P	"	S	< 0.05	< 0.05	< 0.05	< 0.10
Alkalinity as CaCO ₃	"	I	886	392	943	1,184
		M				
Al	"	E	0.070	0.031	0.056	0.044
Ca	"	T	486	239	321	296
Cd	"	E	< 0.0004	< 0.0004	< 0.0004	< 0.0008
Cr	"	R	< 0.0005	< 0.0005	< 0.0005	< 0.0010
Cu	"		< 0.002	< 0.002	< 0.002	< 0.004
		D				
Fe	"	R	0.051	0.013	0.016	0.208
Hg	μg/L	Y	< 0.05	< 0.05	< 0.05	< 0.10
K	mg/L		20	1	1	5
Mg	"		260	64.5	144	191
Mn	"		0.5688	0.0291	0.1223	0.3234
Na	"		77	74	36	51
Ni	"		0.0179	< 0.0004	< 0.0004	0.0014
Pb	"		< 0.004	0.010	0.004	0.014
Zn	"		0.054	0.019	0.026	0.016

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 19, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹		8.0	7.3	7.4	7.4	7.6
EC	mS/m	163	389	159	224	269
Total Dissolved Solids	mg/L	NA	3,632	1,428	1,846	2,002
Total Dissolved Organic Carbon	"	NA	51	3	7	36
Cl ⁻	"	NA	87	157	83	130
SO ₄ ⁼	"	NA	1,419	265	244	46
TKN	"	8.9	111	4.7	0.77	8.5
NH ₃ -N	"	6.6	105	3.5	< 0.02	4.4
NO ₂ + NO ₃ -N	"	1.1	30	1.0	0.19	0.07
Total P	"	0.26	0.12	< 0.05	0.05	0.07
Alkalinity as CaCO ₃	"	NA	813	368	967	1,259
Al	"	NA	0.062	0.029	0.033	0.037
Ca	"	NA	454	218	321	307
Cd	"	NA	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Cr	"	NA	0.0016	0.0009	< 0.0005	< 0.0005
Cu	"	NA	< 0.002	< 0.002	< 0.002	< 0.002
Fe	"	NA	0.034	0.022	0.011	4.34
Hg	μg/L	NA	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L	NA	19	0.9	1	5
Mg	"	NA	244	59.5	147	201
Mn	"	NA	0.5326	0.0478	0.1096	0.3471
Na	"	NA	70	74	36	53
Ni	"	NA	0.0150	< 0.0004	< 0.0004	0.0008
Pb	"	NA	0.006	0.009	< 0.004	0.006
Zn	"	NA	0.039	0.012	0.021	0.021

¹pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 2, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹		7.8	7.3	7.5	7.4	7.6
EC	mS/m	170	358	146	192	204
Total Dissolved Solids	mg/L	1,168	3,956	1,464	1,896	1,512
Total Dissolved Organic Carbon	"	20	53	4	7	36
Cl ⁻	"	37	83	167	85	93
SO ₄ ⁼	"	20	1,459	253	244	2
TKN	"	10	111	5.1	0.67	7.2
NH ₃ -N	"	7.6	110	4.2	< 0.02	4.4
NO ₂ + NO ₃ -N	"	1.3	34	1.4	0.19	0.03
Total P	"	0.15	< 0.05	< 0.05	< 0.05	0.08
Alkalinity as CaCO ₃	"	941	776	395	989	1,203
Al	"	0.036	0.050	0.031	0.044	0.044
Ca	"	256	451	213	319	300
Cd	"	< 0.0004	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Cr	"	< 0.0005	0.0005	< 0.0005	< 0.0005	< 0.0005
Cu	"	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Fe	"	2.72	0.056	0.017	0.037	4.00
Hg	μg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L	3	19	1	1	5
Mg	"	137	245	58.2	145	202
Mn	"	0.3308	0.5642	0.0257	0.0842	0.3494
Na	"	42	71	73	35	48
Ni	"	0.0011	0.0182	0.0010	< 0.0004	0.0015
Pb	"	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Zn	"	0.027	0.015	0.007	0.006	0.010

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 4: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 16, 2006

Parameter	Unit	Lysimeter No.				
		L-1N ²	L-1	L-2	L-3	L-1N-1
pH ¹		8.0	7.2	7.5	7.5	7.1
EC	mS/m	229	386	163	231	245
Total Dissolved Solids	mg/L	1,428	3,806	1,426	1,966	1,662
Total Dissolved Organic Carbon	"	24	51	3	7	38
Cl ⁻	"	185	82	167	81	20
SO ₄ ⁼	"	13	1,640	245	242	3
TKN	"	13	113	4.1	0.67	7.9
NH ₃ -N	"	11	89	3.2	< 0.02	4.5
NO ₂ + NO ₃ -N	"	3.1	32	1.2	0.61	0.95
Total P	"	0.14	0.08	< 0.05	0.10	0.17
Alkalinity as CaCO ₃	"	2,162	754	387	968	495
Al	"	0.026	0.044	0.019	0.034	0.038
Ca	"	255	440	208	321	292
Cd	"	0.0020	0.0008	0.0005	< 0.0004	0.0018
Cr	"	< 0.0010	0.0005	< 0.0005	< 0.0005	< 0.0005
Cu	"	0.004	0.002	< 0.002	< 0.002	< 0.002
Fe	"	1.09	0.078	0.006	0.132	7.02
Hg	μg/L	< 0.10	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L	3	19	0.8	1	4
Mg	"	143	232	56.6	147	184
Mn	"	0.2606	0.4142	0.0609	0.1088	0.4872
Na	"	43	68	76	35	46
Ni	"	< 0.0008	0.0177	< 0.0004	< 0.0004	0.0022
Pb	"	0.014	0.006	0.007	0.005	0.008
Zn	"	0.012	0.010	0.003	0.005	0.012

¹pH analyzed beyond recommended holding time of 15 minutes.

²Sample inadvertently diluted 1:2 before pH and EC analyzed.

TABLE 5: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 30, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹		7.9	7.3	7.4	7.4	7.5
EC	mS/m	212	433	180	265	294
Total Dissolved Solids	mg/L	1,344	NA	1,366	1,850	2,080
Total Dissolved Organic Carbon	"	20	56	3	7	35
Cl ⁻²	"	42	91	184	89	155
SO ₄ ⁼	"	23	1,627	233	252	56
TKN	"	12	99	2.9	0.72	8.8
NH ₃ -N	"	10	91	2.4	< 0.02	5.7
NO ₂ + NO ₃ -N	"	3.5	45	1.4	0.68	0.71
Total P	"	0.18	0.10	0.07	0.08	0.16
Alkalinity as CaCO ₃	"	1,160	707	413	1,137	1,536
Al	"	0.040	0.079	0.035	0.048	0.070
Ca	"	253	441	202	333	322
Cd	"	< 0.0008	< 0.0004	< 0.0004	< 0.0004	< 0.0008
Cr	"	0.0014	0.0021	0.0007	< 0.0005	0.0016
Cu	"	0.008	0.010	< 0.002	< 0.002	< 0.004
Fe	"	0.200	0.039	0.016	0.010	2.80
Hg	μg/L	0.16	0.14	0.19	0.10	0.24
K	mg/L	3	19	0.8	1	5
Mg	"	138	246	54.9	153	201
Mn	"	0.1824	0.3468	0.0618	0.1074	0.3314
Na	"	42	72	76	35	55
Ni	"	< 0.0008	0.0160	0.0007	< 0.0004	0.0016
Pb	"	< 0.008	< 0.004	< 0.004	< 0.004	< 0.008
Zn	"	0.008	0.006	0.003	0.004	0.009

¹pH analyzed beyond recommended holding time of 15 minutes.

²Cl data qualified due to faulty electrode. No re-runs performed due to insufficient sample.

NA = No analysis; insufficient sample.

TABLE 6: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 13, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹		7.8	7.1	7.2	7.2	7.3
EC	mS/m	211	332	158	195	189
Total Dissolved Solids	mg/L	NA	NA	1,296	1,686	1,532
Total Dissolved Organic Carbon	"	NA	51	3	7	39
Cl ⁻	"	NA	101	166	93	119
SO ₄ ⁼	"	NA	1,609	236	263	10
TKN	"	NA	98	3.2	0.57	8.0
NH ₃ -N	"	NA	85	2.6	0.05	4.7
NO ₂ + NO ₃ -N	"	NA	45	2.3	0.84	0.65
Total P	"	NA	0.14	0.05	0.05	0.07
Alkalinity as CaCO ₃	"	NA	783	371	1,099	1,550
Al	"	NA	0.049	0.022	0.036	0.034
Ca	"	NA	451	194	337	302
Cd	"	NA	0.0006	0.0005	< 0.0004	0.0007
Cr	"	NA	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cu	"	NA	< 0.002	< 0.002	< 0.002	< 0.002
Fe	"	NA	0.068	0.018	0.031	14.9
Hg	µg/L	NA	0.13	0.14	0.14	0.15
K	mg/L	NA	19	0.8	1	5
Mg	"	NA	243	53.3	152	186
Mn	"	NA	0.5448	0.0219	0.0854	0.3537
Na	"	NA	87	76	37	54
Ni	"	NA	0.0160	< 0.0004	< 0.0004	0.0034
Pb	"	NA	< 0.004	0.005	< 0.004	< 0.004
Zn	"	NA	0.019	0.009	0.013	0.018

¹pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 7: ANALYSIS OF WATER FROM LYSIMETERS
L-1N THROUGH L-1N-1 AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 27, 2006

Parameter	Unit	Lysimeter No.				
		L-1N	L-1	L-2	L-3	L-1N-1
pH ¹			7.1	7.4	7.3	7.5
EC	mS/m		306	148	194	210
Total Dissolved Solids	mg/L		3,624	1,156	1,792	1,814
Total Dissolved Organic Carbon	"		52	2	7	38
Cl ⁻	"		125	183	109	101
SO ₄ ⁼	"		1,655	174	230	3
TKN	"		101	0.78	0.66	7.9
NH ₃ -N	"	L	90	0.30	< 0.02	4.4
NO ₂ + NO ₃ -N	"	Y	38	0.23	0.31	0.11
Total P	"	S	0.08	< 0.05	< 0.05	0.05
Alkalinity as CaCO ₃	"	I	801	394	1,097	1,510
		M				
Al	"	E	0.053	0.024	0.046	0.042
Ca	"	T	461	181	319	295
Cd	"	E	0.0004	0.0005	0.0006	0.0007
Cr	"	R	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cu	"		< 0.002	< 0.002	< 0.002	< 0.002
		D				
Fe	"	R	0.040	0.017	0.023	9.97
Hg	μg/L	Y	< 0.05	0.09	0.08	0.07
K	mg/L		20	0.4	1	4
Mg	"		247	46.0	140	184
Mn	"		0.4651	0.0287	0.1265	0.3671
Na	"		75	73	40	46
Ni	"		0.0156	< 0.0004	< 0.0004	0.0011
Pb	"		< 0.004	< 0.004	< 0.004	< 0.004
Zn	"		0.010	0.003	0.005	0.022

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 8: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE HARLEM AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2006

Parameter	Unit	Concentration*
pH		8.7
Total Solids	%	19.3
Total Volatile Solids	%	50.7
TKN	mg/kg	52,641
NH ₃ -N	"	16,989
Total P	"	26,106
Al	"	24,867
As	"	1
Ca	"	38,216
Cd	"	5
Cr	"	212
Cu	"	452
Fe	"	18,718
Hg	"	1.4
K	"	5,380
Mg	"	16,465
Mn	"	537
Mo	"	19
Na	"	1,578
Ni	"	67
Pb	"	129
Se	"	< 0.7
Zn	"	894

*Values for one sample only.

TABLE 9: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE HARLEM AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING SEPTEMBER 2006

Parameter	Unit	Concentration*
pH		8.1
Total Solids	%	20.9
Total Volatile Solids	%	54.6
TKN	mg/kg	47,759
NH ₃ -N	"	14,171
Total P	"	24,670
Al	"	22,099
As	"	2
Ca	"	38,110
Cd	"	4
Cr	"	187
Cu	"	497
Fe	"	20,902
Hg	"	0.38
K	"	4,963
Mg	"	15,340
Mn	"	539
Mo	"	19
Na	"	1,432
Ni	"	64
Pb	"	108
Se	"	< 0.7
Zn	"	883

*Values are the means of five samples.