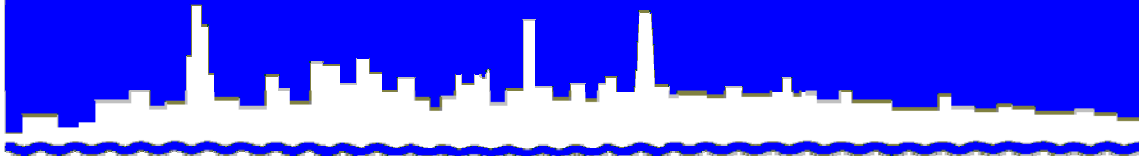


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 06-76

CALUMET EAST SLUDGE DRYING AREA

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: Calumet East Solids Management Area - Stickney WRP, Contract No. 85-273-2P, L170401, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for July, August, and September 2006

The attached seven tables contain the monitoring data for the Calumet East Solids Management Area for July, August, and September 2006 as required by IEPA Operating Permit No. 2005-AO-4281-1. During the months of August and September, no samples were obtained from Lysimeter L-1, but samples were obtained from its replacement, L-1N, on all occasions. The District has submitted a request to the IEPA for approval to terminate the monitoring of L-1.

The data reported are as follows:

Table 1, Analysis of Water from Lysimeters L-1 through L-6 at the Calumet East Solids Management Area Sampled on July 12, 2006

Table 2, Analysis of Water from Lysimeters L-1 through L-6 at the Calumet East Solids Management Area Sampled on August 9, 2006

Table 3, Analysis of Water from Lysimeters L-1 through L-6 at the Calumet East Solids Management Area Sampled on September 6, 2006

Table 4, Analysis of Monthly Compositated Digested Biosolids Placed in the Calumet East Solids Management Drying Area During July 2006

Table 5, Analysis of Monthly Compositated Digested Biosolids Placed in the Calumet East Solids Management Drying Area During September 2006

Subject: Calumet East Solids Management Area - Stickney WRP, Contract No. 85-273-2P, L170401, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for July, August, and September 2006

Table 6, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During July 2006

Table 7, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During August 2006

Biosolids were placed in the solids drying area during the months of July and September. Biosolids were removed from the solids drying area during July and August.

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-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 12, 2006

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-3	L-4
pH ¹		7.6	7.5	7.5	7.6	7.2
EC	mS/m	419	325	361	169	363
Total Dissolved Solids	mg/L	4,908	3,674	4,400	1,710	4,546
Total Dissolved Organic Carbon	"	2	9	3	7	3
Cl ⁻	"	158	144	162	46	449
SO ₄ ⁼	"	2,362	1,612	2,103	591	1,549
TKN	"	1.3	13	0.48	0.28	1.0
NH ₃ -N	"	< 0.04	2.4	< 0.04	< 0.02	0.55
NO ₂ + NO ₃ -N	"	0.24	0.40	0.32	0.35	0.18
Total P	"	0.10	< 0.05	< 0.10	< 0.05	< 0.05
Alkalinity as CaCO ₃	"	516	479	436	460	323
Al	"	0.136	0.056	0.080	0.028	0.052
Ca	"	546	428	575	206	477
Cd	"	0.0008	0.0005	0.0008	< 0.0004	0.0006
Cr	"	< 0.0010	< 0.0005	< 0.0010	< 0.0005	< 0.0005
Cu	"	< 0.004	< 0.002	< 0.004	< 0.002	< 0.002
Fe	"	0.372	5.12	0.020	0.022	14.4
Hg	μg/L	< 0.10	< 0.05	< 0.10	< 0.05	< 0.05
K	mg/L	10	10	6	2	6
Mg	"	331	244	275	131	264
Mn	"	0.0354	0.3457	0.0046	0.0019	0.1206
Na	"	209	156	147	60	144
Ni	"	< 0.0008	< 0.0004	< 0.0008	< 0.0004	< 0.0004
Pb	"	0.012	< 0.004	0.012	0.007	< 0.004
Zn	"	0.042	0.006	0.040	0.015	0.005

TABLE 1 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 12, 2006

Parameter	Unit	Lysimeter No.	
		L-5	L-6
pH ¹		7.6	7.7
EC	mS/m	185	135
Total Dissolved Solids	mg/L	1,946	1,398
Total Dissolved Organic Carbon	"	0.9	1
Cl ⁻	"	224	15
SO ₄ ⁼	"	550	617
TKN	"	0.94	0.15
NH ₃ -N	"	0.39	0.06
NO ₂ + NO ₃ -N	"	0.23	0.47
Total P	"	< 0.05	0.06
Alkalinity as CaCO ₃	"	248	269
Al	"	0.024	0.026
Ca	"	198	169
Cd	"	< 0.0004	< 0.0004
Cr	"	< 0.0005	< 0.0005
Cu	"	< 0.002	< 0.002
Fe	"	1.08	0.169
Hg	μg/L	< 0.05	< 0.05
K	mg/L	4	4
Mg	"	95.5	85.2
Mn	"	0.0466	0.0334
Na	"	87	71
Ni	"	< 0.0004	< 0.0004
Pb	"	0.010	0.008
Zn	"	0.003	0.004

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 9, 2006

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-3	L-4
pH ¹			7.4	7.4	7.5	7.1
EC	mS/m		335	330	157	367
Total Dissolved Solids	mg/L		3,956	NA	1,642	4,628
Total Dissolved Organic Carbon	"		9	3	8	3
Cl ⁻	"		142	187	44	519
SO ₄ ⁼	"		1,834	1,974	570	1,618
TKN	"		13	0.52	0.34	1.3
NH ₃ -N	"	L	3.5	< 0.02	< 0.02	0.52
NO ₂ + NO ₃ -N	"	Y	5.2	0.98	0.59	0.12
Total P	"	S	< 0.05	< 0.05	< 0.05	< 0.05
Alkalinity as CaCO ₃	"	I	445	485	340	354
		M				
Al	"	E	0.054	0.062	0.026	0.050
Ca	"	T	432	508	196	485
Cd	"	E	0.0004	0.0004	< 0.0004	0.0014
Cr	"	R	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cu	"		< 0.002	< 0.002	< 0.002	< 0.002
		D				
Fe	"	R	6.12	0.014	0.071	18.6
Hg	μg/L	Y	< 0.05	< 0.05	< 0.05	< 0.05
K	mg/L		11	6	2	6
Mg	"		243	244	121	259
Mn	"		0.2926	0.0107	0.0033	0.1308
Na	"		159	132	55	144
Ni	"		< 0.0004	0.0037	0.0011	< 0.0004
Pb	"		< 0.004	< 0.004	< 0.004	< 0.004
Zn	"		0.010	0.019	0.009	0.010

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 9, 2006

Parameter	Unit	Lysimeter No.	
		L-5	L-6
pH ¹		7.4	7.6
EC	mS/m	188	135
Total Dissolved Solids	mg/L	1,966	1,410
Total Dissolved Organic Carbon	"	1	1
Cl ⁻	"	194	14
SO ₄ ⁼	"	544	605
TKN	"	0.82	0.63
NH ₃ -N	"	0.39	0.26
NO ₂ + NO ₃ -N	"	0.33	0.33
Total P	"	< 0.05	< 0.05
Alkalinity as CaCO ₃	"	209	242
Al	"	0.043	0.021
Ca	"	203	166
Cd	"	< 0.0004	< 0.0004
Cr	"	< 0.0005	< 0.0005
Cu	"	< 0.002	< 0.002
Fe	"	1.69	0.513
Hg	μg/L	< 0.05	< 0.05
K	mg/L	4	3
Mg	"	96.0	84.2
Mn	"	0.0530	0.0405
Na	"	86	70
Ni	"	< 0.0004	< 0.0004
Pb	"	< 0.004	< 0.004
Zn	"	0.005	0.006

¹pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 6, 2006

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-3	L-4
pH ¹			7.4	7.5	7.5	7.1
EC	mS/m		333	341	176	377
Total Dissolved Solids	mg/L		4,132	4,560	1,740	5,050
Total Dissolved Organic Carbon	"		9	4	7	3
Cl ⁻	"		179	< 0.6	50	545
SO ₄ ⁼	"		1,778	2,142	611	1,624
TKN	"		13	0.68	0.70	1.5
NH ₃ -N	"	L	3.1	< 0.04	0.02	0.64
NO ₂ + NO ₃ -N	"	Y	0.50	0.79	0.74	0.11
Total P	"	S	0.05	< 0.10	< 0.05	< 0.05
Alkalinity as CaCO ₃	"	I	570	510	492	361
		M				
Al	"	E	0.050	0.078	0.029	0.056
Ca	"	T	439	577	201	506
Cd	"	E	0.0005	< 0.0008	0.0004	0.0004
Cr	"	R	< 0.0005	< 0.0010	< 0.0005	< 0.0005
Cu	"		< 0.002	0.006	< 0.002	< 0.002
		D				
Fe	"	R	8.43	0.268	0.048	19.6
Hg	μg/L	Y	< 0.05	< 0.10	< 0.05	0.05
K	mg/L		11	6	3	6
Mg	"		245	273	123	259
Mn	"		0.3319	0.0072	0.0074	0.1367
Na	"		164	146	56	147
Ni	"		< 0.0004	0.0082	0.0016	< 0.0004
Pb	"		< 0.004	0.008	< 0.004	< 0.004
Zn	"		0.005	0.099	0.028	0.033

TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-6 AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 6, 2006

Parameter	Unit	Lysimeter No.	
		L-5	L-6
pH ¹		7.5	7.6
EC	mS/m	174	136
Total Dissolved Solids	mg/L	2,054	1,510
Total Dissolved Organic Carbon	"	2	1
Cl ⁻	"	235	16
SO ₄ ⁼	"	565	630
TKN	"	0.78	0.59
NH ₃ -N	"	0.39	0.28
NO ₂ + NO ₃ -N	"	0.17	0.26
Total P	"	0.06	0.25
Alkalinity as CaCO ₃	"	255	291
Al	"	0.032	0.028
Ca	"	206	164
Cd	"	< 0.0004	< 0.0004
Cr	"	< 0.0005	< 0.0005
Cu	"	< 0.002	< 0.002
Fe	"	2.54	0.815
Hg	μg/L	< 0.05	< 0.05
K	mg/L	4	3
Mg	"	95.2	82.6
Mn	"	0.0524	0.0371
Na	"	85	68
Ni	"	< 0.0004	< 0.0004
Pb	"	< 0.004	< 0.004
Zn	"	0.015	0.013

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 4: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING JULY 2006

Parameter	Unit	Concentration*
pH		7.7
Total Solids	%	9.7
Total Volatile Solids	%	47.9
TKN	mg/kg	39,022
NH ₃ -N	"	13,711

*Values are the means of eight samples.

TABLE 5: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING SEPTEMBER 2006

Parameter	Unit	Concentration*
pH		7.4
Total Solids	%	21.5
Total Volatile Solids	%	42.6
TKN	mg/kg	27,079
NH ₃ -N	"	6,061

*Values are the means of four samples.

TABLE 6: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING JULY 2006

Parameter	Unit	Concentration*
pH		7.0
Total Solids	%	61.4
Total Volatile Solids	%	42.2
TKN	mg/kg	30,635
NH ₃ -N	"	2,452
Total P	"	32,228
Al	"	16,003
As	"	7
Ca	"	48,261
Cd	"	6.6
Cr	"	120
Cu	"	442
Fe	"	31,596
Hg	"	1.5
K	"	3,511
Mg	"	15,021
Mn	"	831
Mo	"	14
Na	"	1,343
Ni	"	40
Pb	"	126
Se	"	13
Zn	"	1,259

*Values are the means of six samples.

TABLE 7: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2006

Parameter	Unit	Concentration*
pH		8.2
Total Solids	%	25.7
Total Volatile Solids	%	41.7
TKN	mg/kg	31,838
NH ₃ -N	"	6,804
Total P	"	23,421
Al	"	17,160
As	"	7
Ca	"	49,866
Cd	"	7.5
Cr	"	145
Cu	"	427
Fe	"	25,558
Hg	"	2.0
K	"	4,255
Mg	"	16,025
Mn	"	812
Mo	"	15
Na	"	1,790
Ni	"	37
Pb	"	112
Se	"	14
Zn	"	1,260

*Values are the means of three samples.