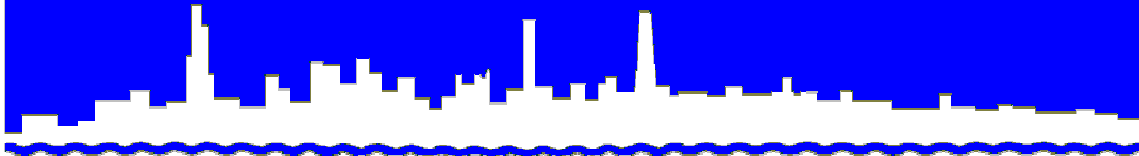


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 09-66

CALUMET EAST SOLIDS MANAGEMENT AREA

MONITORING REPORT FOR

THIRD QUARTER 2009

DECEMBER 2009

Protecting Our Water Environment

Board of Commissioners

Terrence J. O'Brien
President
Kathleen Therese Meany
Vice President
Gloria Alitto Majewski
Chairman of Finance
Frank Avila
Patricia Horton
Barbara J. McGowan
Cynthia M. Santos
Debra Shore
Mariyana T. Spyropoulos

Metropolitan Water Reclamation District of Greater Chicago

100 East Erie Street

Chicago, Illinois 60611-3154

312.751.5190

Louis Kollias, P.E., BCEE

Director of Monitoring and Research

louis.kollias@mwr.org

December 3, 2009

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 - Calumet Water Reclamation Plant, Contract No. 85-273-2P, L170401, Illinois Environmental Protection Agency Permit No. 2005-AO-4281-2, Monitoring Report for July, August, and September 2009

The attached seven tables contain the monitoring data for the Calumet East Solids Management Area for July, August, and September 2009 as required by Illinois Environmental Protection Agency (IEPA) Operating Permit No. 2005-AO-4281-2.

The data reported are as follows:

Table 1, Analysis of Water from Lysimeters L-1N through L-6N at the Calumet East Solids Management Area Sampled on July 8, 2009

Table 2, Analysis of Water from Lysimeters L-1N through L-6N at the Calumet East Solids Management Area Sampled on August 5, 2009

Table 3, Analysis of Water from Lysimeters L-1N through L-6N at the Calumet East Solids Management Area Sampled on September 2, 2009

Table 4, Analysis of Monthly Compositing Digested Biosolids Placed in the Calumet East Solids Management Drying Area During July 2009

Table 5, Analysis of Monthly Compositing Digested Biosolids Placed in the Calumet East Solids Management Drying Area During August 2009

Subject: Calumet East Solids Management Area - Calumet Water Reclamation Plant, Contract No. 85-273-2P, L170401, Illinois Environmental Protection Agency Permit No. 2005-AO-4281-2, Monitoring Report for July, August, and September 2009

Table 6, Analysis of Monthly Composited Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During July 2009

Table 7, Analysis of Monthly Composited Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During August 2009

Four new lysimeters, L-2N, L-3N, L-4N, and L-6N, were installed at this site in September 2008 as replacements for L-2, L-3, L-4, and L-6, respectively. The new and old lysimeters will be monitored simultaneously for one year. A request will then be submitted to the IEPA to terminate monitoring of the old lysimeters.

Biosolids were placed in and removed from the solids drying area during July and August 2009.

Very truly yours,

Louis Kollias
Director
Monitoring and Research

LK:PL:kq
Attachments
cc w/att: Mr. Sulski, IEPA
Records Unit, IEPA
O'Connor/Cox/Lindo

TABLE 1: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 8, 2009

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-2N	L-3	L-3N
pH ²		7.3	7.2	7.9	7.5	7.5
EC	mS/m	420	409	363	141	273
Total Dissolved Solids	mg/L	4,188	4,128	2,700	1,460	2,696
Total Diss. Org. Carbon	"	10	4	24	8	6
Cl ⁻	"	190	182	177	30	56
SO ₄ ⁼	"	2,051	2,116	1,650	556	1,222
TKN	"	12	0.8	5	0.4	1
NH ₃ -N	"	4	<0.1	3	<0.1	0.4
NO ₂ + NO ₃ -N	"	0.09	<0.04	0.15	0.06	0.22
Total P	"	<0.1	<0.1	<0.1	<0.1	0.8
Alkalinity as CaCO ₃	"	597	498	553	483	481
Al	"	0.065	0.061	0.064	0.038	0.055
Ca	"	461	519	470	177	353
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	11	<0.02	0.82	0.14	9.2
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	10	6	14	2	6
Mg	"	261	244	207	109	155
Mn	"	0.301	0.048	0.910	0.037	0.775
Na	"	171	137	107	44	54
Ni	"	<0.002	0.005	0.019	0.007	0.008
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.04	0.02	0.05	<0.01

TABLE 1 (Continued): ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 8, 2009

Parameter	Unit	Lysimeter No.				
		L-4	L-4N	L-5	L-6	L-6N
pH ²		7.3	7.1	7.6	7.7	7.8
EC	mS/m	425	665	154	119	106
Total Dissolved Solids	mg/L	4,444	6,068	1,792	1,340	1,164
Total Diss. Org. Carbon	"	3	14	<1	<1	7
Cl ⁻	"	518	859	237	16	26
SO ₄ ⁼	"	1,703	2,411	561	617	452
TKN	"	1	5	0.3	<0.2	2
NH ₃ -N	"	0.5	3	0.2	0.2	1
NO ₂ + NO ₃ -N	"	0.21	0.31	1.0	0.64	0.12
Total P	"	<0.1	0.2	0.2	<0.1	6
Alkalinity as CaCO ₃	"	412	747	243	286	335
Al	"	0.059	0.068	0.040	<0.035	<0.035
Ca	"	434	611	193	155	147
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	8.0	65	0.19	0.09	1.1
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	6	15	4	3	5
Mg	"	243	270	91	79	58
Mn	"	0.120	0.642	0.051	0.036	0.259
Na	"	151	NA	85	67	62
Ni	"	<0.002	<0.002	<0.002	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.02	<0.01	<0.01	<0.01

¹Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

²pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 2: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 5, 2009

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-2N	L-3	L-3N
pH ²		7.5	7.4	7.5	1,422	7.6
EC	mS/m	417	405	360	138	279
Total Dissolved Solids	mg/L	4,568	4,408	3,928	1,544	2,956
Total Diss. Org. Carbon	"	9	4	23	8	7
Cl ⁻	"	185	192	162	28	60
SO ₄ ⁼	"	2,130	2,192	1,697	554	1,367
TKN	"	12	0.6	5	<0.2	2
NH ₃ -N	"	3	<0.1	3	<0.1	0.5
NO ₂ + NO ₃ -N	"	0.09	0.05	<0.04	<0.04	<0.04
Total P	"	<0.1	<0.1	2	<0.1	0.9
Alkalinity as CaCO ₃	"	588	522	605	495	489
Al	"	0.109	0.119	0.111	0.056	0.098
Ca	"	479	457	479	176	378
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	10	<0.02	26	0.18	10
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	10	6	13	2	6
Mg	"	262	248	209	107	168
Mn	"	0.280	0.022	0.919	0.042	0.716
Na	"	175	140	107	44	59
Ni	"	<0.002	0.004	<0.002	0.007	0.006
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.05	0.03	0.05	<0.01

TABLE 2 (Continued): ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 5, 2009

Parameter	Unit	Lysimeter No.				
		L-4	L-4N	L-5	L-6	L-6N
pH ²		7.4	7.3	7.7	7.8	7.9
EC	mS/m	444	665	167	124	142
Total Dissolved Solids	mg/L	4,492	6,172	1,652	1,436	1,356
Total Diss. Org. Carbon	"	3	14	<1	<1	7
Cl ⁻	"	545	870	237	15	25
SO ₄ ⁼	"	1,754	2,492	590	674	476
TKN	"	1	4	<0.2	<0.2	1
NH ₃ -N	"	0.7	3	<0.1	<0.1	1
NO ₂ + NO ₃ -N	"	0.12	0.07	0.53	0.50	0.12
Total P	"	<0.1	<0.1	<0.1	0.2	5
Alkalinity as CaCO ₃	"	410	754	251	282	349
Al	"	0.113	0.081	0.061	0.054	<0.035
Ca	"	477	557	198	165	161
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	14	64	0.14	0.13	2.0
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	7	15	4	4	5
Mg	"	262	270	94	81	65
Mn	"	0.136	0.623	0.042	0.051	0.274
Na	"	166	560	86	71	65
Ni	"	<0.002	<0.002	<0.002	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	<0.01	<0.01	<0.01	<0.01

¹Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

²pH analyzed beyond recommended holding time of 15 minutes.

TABLE 3: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 2, 2009

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-2N	L-3	L-3N
pH ²		7.4	7.2	7.3	7.5	7.6
EC	mS/m	409	411	366	134	293
Total Dissolved Solids	mg/L	4,292	4,248	3,712	1,388	2,844
Total Diss. Org. Carbon	"	8	4	21	8	7
Cl ⁻	"	186	176	155	29	55
SO ₄ ⁼	"	2,160	2,181	1,720	475	1,283
TKN	"	12	0.7	5	0.3	1
NH ₃ -N	"	4	<0.1	3	<0.1	0.8
NO ₂ + NO ₃ -N	"	0.20	0.25	0.22	0.15	0.32
Total P	"	<0.1	<0.1	3	<0.1	1
Alkalinity as CaCO ₃	"	526	473	584	443	469
Al	"	0.131	0.148	0.124	0.057	0.121
Ca	"	465	NA	481	168	386
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	0.0047	0.0040	0.0049	0.0027	0.0036
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	7.9	<0.02	29	0.28	9.8
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	10	6	13	2	6
Mg	"	NA	245	211	99	167
Mn	"	0.216	0.013	0.902	0.042	0.707
Na	"	172	137	105	42	56
Ni	"	<0.002	0.003	<0.002	0.005	0.005
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.03	<0.01	0.04	<0.01

TABLE 3 (Continued): ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N THROUGH L-6N AT THE CALUMET EAST
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 2, 2009

Parameter	Unit	Lysimeter No.				
		L-4	L-4N	L-5	L-6	L-6N
pH ²		7.3	7.1	7.7	7.7	7.9
EC	mS/m	407	652	176	141	147
Total Dissolved Solids	mg/L	4,136	6,124	1,528	1,412	1,276
Total Diss. Org. Carbon	"	3	13	<1	2	8
Cl ⁻	"	525	818	228	15	24
SO ₄ ⁼	"	1,744	2,460	544	616	487
TKN	"	1	4	<0.2	<0.2	1
NH ₃ -N	"	0.6	3	<0.1	<0.1	1
NO ₂ + NO ₃ -N	"	0.14	0.17	0.52	0.48	0.05
Total P	"	<0.1	<0.1	0.2	<0.1	5
Alkalinity as CaCO ₃	"	381	690	242	274	312
Al	"	0.128	0.146	0.064	0.056	0.053
Ca	"	478	NA	193	162	164
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	0.0036	0.0045	<0.0025	<0.0025	0.0027
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	15	68	0.21	0.10	2.3
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	7	14	4	3	5
Mg	"	NA	NA	89	80	65
Mn	"	0.127	0.607	0.053	0.036	0.271
Na	"	164	619	82	68	66
Ni	"	<0.002	<0.002	<0.002	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	<0.01	<0.01	<0.01	<0.01

¹Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

²pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 4: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING JULY 2009

Parameter	Unit	Concentration ¹
pH		7.7
Total Solids	%	<20.0
Total Volatile Solids ²	%	44.5
TKN	mg/kg	23,942
NH ₃ -N	”	7,737

¹Values for one sample only.

²Total volatile solids as a percentage of total solids.

TABLE 5: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE CALUMET EAST
 SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2009

Parameter	Unit	Concentration ¹
pH		7.9
Total Solids	%	<20.0
Total Volatile Solids ²	%	44.2
TKN	mg/kg	33,567
NH ₃ -N	”	8,465

¹Values are the means of five samples.

²Total volatile solids as a percentage of total solids.

TABLE 6: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE CALUMET EAST SOLIDS MANAGEMENT DRYING AREA DURING JULY 2009

Parameter	Unit	Concentration ¹
pH		7.1
Total Solids	%	67.1
Total Volatile Solids ²	%	39.6
TKN	mg/kg	21,436
NH ₃ -N	”	1,749
Total P	”	19,622
Al	”	15,872
As	”	<8.6
Ca	”	49,430
Cd	”	4
Cr	”	94
Cu	”	459
Fe	”	30,209
Hg	”	0.88
K	”	3,493
Mg	”	17,416
Mn	”	1,120
Mo	”	13
Na	”	964
Ni	”	40
Pb	”	120
Se	”	<11.4
Zn	”	1,139

¹Values are the means of eight samples.

²Total volatile solids as a percentage of total solids.

TABLE 7: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE CALUMET EAST SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2009

Parameter	Unit	Concentration ¹
pH		7.8
Total Solids	%	47.8
Total Volatile Solids ²	%	42.4
TKN	mg/kg	29,342
NH ₃ -N	''	4,052
Total P	''	218
Al	''	13,119
As	''	<8.6
Ca	''	47,481
Cd	''	4
Cr	''	104
Cu	''	418
Fe	''	31,885
Hg	''	1.1
K	''	3,018
Mg	''	16,942
Mn	''	1,185
Mo	''	14
Na	''	1,078
Ni	''	49
Pb	''	107
Se	''	<11.4
Zn	''	1,048

¹Values are the means of five samples.

²Total volatile solids as a percentage of total solids.