

*Protecting Our Water Environment*



**METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO**

***RESEARCH AND DEVELOPMENT  
DEPARTMENT***

***REPORT NO. 08-6***

***CALUMET EAST SOLIDS MANAGEMENT AREA  
MONITORING REPORT FOR  
FOURTH QUARTER 2007***

***MARCH 2008***

**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*

312-751-5190

March 5, 2008

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 WRP, Contract No. 85-273-2P, L170401, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for October, November, and December 2007

The attached five tables contain the monitoring data for the Calumet East Solids Management Area for October, November, and December 2007 as required by IEPA Operating Permit No. 2005-AO-4281-1. In a letter dated January 19, 2007, the IEPA granted permission to terminate the monitoring of lysimeter L-1. Therefore, monitoring data for this lysimeter will not be included in this and subsequent reports.

The data reported are as follows:

Table 1. Analysis of Water from Lysimeters L-1N through L-6 at the Calumet East Solids Management Area Sampled on October 3, 2007

Table 2. Analysis of Water from Lysimeters L-1N through L-6 at the Calumet East Solids Management Area Sampled on November 14, 2007

Table 3. Analysis of Water from Lysimeters L-1N through L-6 at the Calumet East Solids Management Area Sampled on December 13, 2007

Table 4. Analysis of Monthly Composited Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During October 2007

Table 5. Analysis of Monthly Composited Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During November 2007

Mr. S. Alan Keller

2

March 5, 2008

Subject: Calumet East Solids Management Area - Calumet WRP, Contract No. 85-273-2P, L170401, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for October, November, and December 2007

No biosolids were placed in the solids drying area during October, November, and December 2007. Biosolids were removed from the solids drying area during October and November 2007.

Very truly yours,

Louis Kollias  
Director  
Research and Development

LK:PL:spy

Attachments

cc w/att: Mr. Sulski, IEPA  
Records Unit, IEPA  
Stuba/Granato/Cox/Lindo/M. Patel

cc wo/att: Jamjun/Sharma/Garelli/Conway

TABLE 1: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON OCTOBER 3, 2007

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.6	7.6	7.6	7.3	7.7
EC	mS/m	377	404	183	353	199
Total Dissolved Solids	mg/L	4,228	4,340	1,676	4,410	1,722
Total Diss. Org. Carbon	"	8	4	6	2	1
Cl <sup>-</sup>	"	180	186	42	525	227
SO <sub>4</sub> <sup>=</sup>	"	2,299	2,388	692	1,877	627
TKN	"	14	0.50	0.20	1.1	0.41
NH <sub>3</sub> -N	"	3.3	<0.04	<0.02	0.61	0.40
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.53	1.0	0.25	0.29	0.40
Total P	"	<0.05	0.12	<0.05	0.05	0.05
Alkalinity as CaCO <sub>3</sub>	"	565	478	496	377	246
Al	"	0.055	0.076	0.043	0.058	0.030
Ca	"	481	562	198	495	200
Cd	"	<0.0004	<0.0008	0.0004	<0.0004	<0.0004
Cr	"	0.0020	0.0034	0.0014	0.0010	0.0012
Cu	"	<0.002	<0.004	<0.002	<0.002	<0.002
Fe	"	8.79	0.022	0.171	18.5	1.81
Hg	μg/L	<0.05	<0.10	<0.05	0.05	<0.05
K	mg/L	10	6	2	6	4
Mg	"	276	266	121	261	93.8
Mn	"	0.2884	0.0054	0.0017	0.1197	0.0852
Na	"	174	141	52	144	84
Ni	"	<0.0004	0.0028	0.0006	<0.0004	<0.0004
Pb	"	<0.004	<0.008	<0.004	<0.004	<0.004
Zn	"	0.036	0.037	0.014	0.009	0.004

TABLE 1 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON OCTOBER 3, 2007

Parameter	Unit	Lysimeter No. L-6
pH <sup>1</sup>		7.8
EC	mS/m	154
Total Dissolved Solids	mg/L	1,406
Total Diss. Org. Carbon	"	1
Cl <sup>-</sup>	"	15
SO <sub>4</sub> <sup>=</sup>	"	717
TKN	"	0.29
NH <sub>3</sub> -N	"	0.33
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.39
Total P	"	0.06
Alkalinity as CaCO <sub>3</sub>	"	278
Al	"	0.025
Ca	"	164
Cd	"	<0.0004
Cr	"	0.0014
Cu	"	<0.002
Fe	"	0.787
Hg	μg/L	<0.05
K	mg/L	3
Mg	"	82.4
Mn	"	0.0415
Na	"	68
Ni	"	<0.0004
Pb	"	<0.004
Zn	"	0.004

<sup>1</sup>pH analyzed beyond recommended holding time of 15 minutes.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON NOVEMBER 14, 2007

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.3	7.3	7.4	7.0	7.4
EC	mS/m	382	395	183	419	203
Total Dissolved Solids	mg/L	4,272	4,396	1,920	4,644	1,924
Total Diss. Org. Carbon	"	8	3	7	2	1
Cl <sup>-</sup>	"	178	185	49	519	226
SO <sub>4</sub> <sup>=</sup>	"	2,058	2,170	714	1,636	557
TKN	"	13	0.62	1.5	0.93	0.61
NH <sub>3</sub> -N	"	3.5	<0.02	0.30	0.60	0.38
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.41	0.91	0.45	0.36	0.35
Total P	"	0.20	<0.05	<0.05	0.06	<0.05
Alkalinity as CaCO <sub>3</sub>	"	531	464	484	359	241
Al	"	0.063	0.065	0.045	0.055	0.030
Ca	"	471	537	210	468	192
Cd	"	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cr	"	0.0007	0.0008	0.0011	0.0006	0.0007
Cu	"	<0.002	<0.002	<0.002	<0.002	<0.002
Fe	"	10.5	0.026	0.827	14.2	2.11
Hg	μg/L	<0.05	<0.05	<0.05	<0.05	<0.05
K	mg/L	10	6	3	6	4
Mg	"	272	252	130	251	92.3
Mn	"	0.2497	0.0045	0.0218	0.1145	0.0692
Na	"	173	141	60	140	83
Ni	"	<0.0004	0.0025	<0.0004	<0.0004	<0.0004
Pb	"	<0.004	<0.004	<0.004	<0.004	<0.004
Zn	"	0.012	0.038	0.014	0.011	0.006

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON NOVEMBER 14, 2007

Parameter	Unit	Lysimeter No. L-6
pH <sup>1</sup>		7.5
EC	mS/m	138
Total Dissolved Solids	mg/L	1,412
Total Diss. Org. Carbon	"	1
Cl <sup>-</sup>	"	15
SO <sub>4</sub> <sup>=</sup>	"	627
TKN	"	0.46
NH <sub>3</sub> -N	"	0.28
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.42
Total P	"	<0.05
Alkalinity as CaCO <sub>3</sub>	"	271
Al	"	0.031
Ca	"	159
Cd	"	<0.0004
Cr	"	0.0009
Cu	"	<0.002
Fe	"	0.722
Hg	μg/L	<0.05
K	mg/L	3
Mg	"	81.2
Mn	"	0.0372
Na	"	67
Ni	"	<0.0004
Pb	"	<0.004
Zn	"	0.006

<sup>1</sup>pH analyzed beyond recommended holding time of 15 minutes.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON DECEMBER 13, 2007

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.9	8.3	8.1	7.6	8.7
EC	mS/m	350	348	160	351	166
Total Dissolved Solids	mg/L	4,064	4,072	1,730	4,004	1,616
Total Diss. Org. Carbon	"	8	2	6	2	0.8
Cl <sup>-</sup>	"	182	186	40	600	259
SO <sub>4</sub> <sup>=</sup>	"	2,036	2,053	636	1,605	543
TKN	"	13	0.58	0.36	1.1	0.55
NH <sub>3</sub> -N	"	3.0	<0.04	<0.02	0.59	0.42
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.07	0.50	0.71	0.24	0.21
Total P	"	<0.05	<0.10	NA	0.06	<0.05
Alkalinity as CaCO <sub>3</sub>	"	551	454	475	582	708
Al	"	0.055	0.072	0.039	0.054	0.030
Ca	"	467	524	195	476	198
Cd	"	0.0008	<0.0008	0.0006	0.0007	<0.0004
Cr	"	0.0006	0.0012	0.0011	<0.0005	0.0005
Cu	"	<0.002	<0.004	<0.002	<0.002	<0.002
Fe	"	8.18	0.020	0.017	16.4	2.49
Hg	μg/L	<0.05	<0.10	<0.05	<0.05	<0.05
K	mg/L	10	6	2	6	4
Mg	"	268	253	123	253	93.1
Mn	"	0.2921	0.0046	0.0024	0.1121	0.0579
Na	"	172	137	52	142	84
Ni	"	<0.0004	0.0010	0.0004	<0.0004	<0.0004
Pb	"	<0.004	<0.008	0.004	<0.004	<0.004
Zn	"	0.007	0.044	0.015	0.013	0.007



TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON DECEMBER 13, 2007

Parameter	Unit	Lysimeter No. L-6
pH <sup>1</sup>		8.0
EC	mS/m	137
Total Dissolved Solids	mg/L	1,408
Total Diss. Org. Carbon	"	0.9
Cl <sup>-</sup>	"	18
SO <sub>4</sub> <sup>=</sup>	"	647
TKN	"	0.38
NH <sub>3</sub> -N	"	0.28
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.26
Total P	"	0.07
Alkalinity as CaCO <sub>3</sub>	"	272
Al	"	0.031
Ca	"	163
Cd	"	0.0005
Cr	"	0.0008
Cu	"	<0.002
Fe	"	0.772
Hg	μg/L	<0.05
K	mg/L	3
Mg	"	81.0
Mn	"	0.0349
Na	"	67
Ni	"	<0.0004
Pb	"	<0.004
Zn	"	0.008

<sup>1</sup>pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 4: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED  
BIOSOLIDS REMOVED FROM THE CALUMET EAST  
SOLIDS MANAGEMENT DRYING AREA DURING OCTOBER 2007

Parameter	Unit	Concentration <sup>1</sup>
pH		7.0
Total Solids	%	62.7
Total Volatile Solids <sup>2</sup>	%	29.7
TKN	mg/kg	13,543
NH <sub>3</sub> -N	''	746
Total P	''	18,820
Al	''	15,897
As	''	10
Ca	''	54,020
Cd	''	7
Cr	''	120
Cu	''	343
Fe	''	28,763
Hg	''	1.0
K	''	3,865
Mg	''	20,280
Mn	''	836
Mo	''	11
Na	''	506
Ni	''	35
Pb	''	119
Se	''	5.0
Zn	''	967

<sup>1</sup>Values are the means of ten samples.

<sup>2</sup>Total volatile solids as a percentage of total solids.

TABLE 5: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED  
BIOSOLIDS REMOVED FROM THE CALUMET EAST  
SOLIDS MANAGEMENT DRYING AREA DURING NOVEMBER 2007

Parameter	Unit	Concentration <sup>1</sup>
pH		7.0
Total Solids	%	60.5
Total Volatile Solids <sup>2</sup>	%	32.0
TKN	mg/kg	15,775
NH <sub>3</sub> -N	"	1,168
Total P	"	18,194
Al	"	19,169
As	"	10
Ca	"	49,579
Cd	"	4
Cr	"	98
Cu	"	347
Fe	"	33,001
Hg	"	1.1
K	"	4,953
Mg	"	17,830
Mn	"	930
Mo	"	13
Na	"	452
Ni	"	37
Pb	"	104
Se	"	3.0
Zn	"	826

<sup>1</sup>Values are the means of eight samples.

<sup>2</sup>Total volatile solids as a percentage of total solids.