

*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***RESEARCH AND DEVELOPMENT  
DEPARTMENT***

*REPORT NO. 08-43*

*CALUMET EAST SOLIDS MANAGEMENT AREA*

*MONITORING REPORT FOR*

*SECOND QUARTER 2008*

*AUGUST 2008*

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Louis Kollias, P.E., BCEE

August 29, 2008

*Director of Research and Development*

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 - Calumet WRP, Contract No. 85-273-2P, L170401, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for April, May, and June 2008

The attached six tables contain the monitoring data for the Calumet East Solids Management Area for April, May, and June 2008 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 April 2, 2008

Table 2, Analysis of Water from Lysimeters L-1N through L-6 at the Calumet East Solids Management Area Sampled on May 14, 2008

Table 3, Analysis of Water from Lysimeters L-1N through L-6 at the Calumet East Solids Management Area Sampled on June 11, 2008

Table 4, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During April 2008

Table 5, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During May 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 April, May, and June 2008

Table 6, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Calumet East Solids Management Drying Area During June 2008

No biosolids were placed in the solids drying area during April, May, and June 2008. Biosolids were removed from the solids drying area during April, May, and June 2008.

Very truly yours,

Louis Kollias  
Director  
Research and Development

LK:PL:kq  
Attachments

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

cc wo/att: Jamjun/Sharma/Conway

TABLE 1: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON APRIL 2, 2008

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.4	7.7	7.7	7.9	7.6
EC	mS/m	397	372	140	380	168
Total Dissolved Solids	mg/L	4,016	4,024	1,472	3,856	1,544
Total Diss. Org. Carbon	"	8	NA	6	2	0.9
Cl <sup>-</sup>	"	185	187	40	476	218
SO <sub>4</sub> <sup>=</sup>	"	2,042	NA	628	1,582	555
TKN	"	13	0.77	0.41	1.2	0.75
NH <sub>3</sub> -N	"	3.3	0.05	<0.02	0.53	0.43
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.51	1.1	0.31	0.87	0.38
Total P	"	0.05	<0.05	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	547	475	491	379	244
Al	"	0.070	0.076	0.046	0.078	0.043
Ca	"	474	552	194	455	195
Cd	"	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cr	"	<0.0005	<0.0005	0.0006	<0.0005	0.0005
Cu	"	<0.002	<0.002	<0.002	<0.002	<0.002
Fe	"	10.5	0.015	0.014	12.6	2.57
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	10	6	2	6	4
Mg	"	272	259	119	251	92.8
Mn	"	0.2593	0.0076	0.0013	0.1013	0.0465
Na	"	175	145	51	142	85
Ni	"	<0.0004	0.0028	<0.0004	<0.0004	<0.0004
Pb	"	<0.004	<0.004	<0.004	<0.004	<0.004
Zn	"	0.008	0.028	0.012	0.004	0.003

TABLE 1 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON APRIL 2, 2008

Parameter	Unit	Lysimeter No. L-6
pH <sup>1</sup>		7.9
EC	mS/m	127
Total Dissolved Solids	mg/L	1,308
Total Diss. Org. Carbon	"	1
Cl <sup>-</sup>	"	17
SO <sub>4</sub> <sup>=</sup>	"	641
TKN	"	0.20
NH <sub>3</sub> -N	"	0.06
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.66
Total P	"	0.06
Alkalinity as CaCO <sub>3</sub>	"	277
Al	"	0.046
Ca	"	166
Cd	"	<0.0004
Cr	"	0.0006
Cu	"	<0.002
Fe	"	0.170
Hg	μg/L	<0.25 <sup>a</sup>
K	mg/L	4
Mg	"	83.8
Mn	"	0.0283
Na	"	69
Ni	"	<0.0004
Pb	"	<0.004
Zn	"	0.003

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

<sup>a</sup>Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

NA = No analysis; insufficient sample.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON MAY 14, 2008

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.4	7.4	7.5	7.2	7.6
EC	mS/m	314	312	168	316	197
Total Dissolved Solids	mg/L	3,980	4,108	1,892	3,950	1,614
Total Diss. Org. Carbon	"	8	3	7	2	0.8
Cl <sup>-</sup>	"	168	187	57	503	218
SO <sub>4</sub> <sup>=</sup>	"	1,855	2,060	761	1,565	544
TKN	"	13	0.62	2.4	0.86	0.32
NH <sub>3</sub> -N	"	3.1	<0.02	0.27	0.45	0.11
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.04	0.05	0.02	0.04	0.03
Total P	"	<0.05	<0.05	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	514	494	514	392	251
Al	"	0.078	0.052	0.040	0.076	0.046
Ca	"	482	279	194	473	199
Cd	"	0.0006	0.0005	0.0004	0.0006	0.0006
Cr	"	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002	<0.002	<0.002
Fe	"	8.28	0.010	0.012	7.93	0.160
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	11	3	2	6	4
Mg	"	282	134	121	263	95.1
Mn	"	0.2597	0.0038	0.0015	0.1023	0.0365
Na	"	180	71	50	145	86
Ni	"	<0.0004	0.0028	0.0006	<0.0004	<0.0004
Pb	"	<0.004	<0.004	0.004	<0.004	<0.004
Zn	"	0.006	0.024	0.015	0.012	0.005

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON MAY 14, 2008

Parameter	Unit	Lysimeter No. L-6
pH <sup>1</sup>		7.7
EC	mS/m	150
Total Dissolved Solids	mg/L	1,390
Total Diss. Org. Carbon	"	0.9
Cl <sup>-</sup>	"	16
SO <sub>4</sub> <sup>=</sup>	"	611
TKN	"	0.14
NH <sub>3</sub> -N	"	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.05
Total P	"	0.05
Alkalinity as CaCO <sub>3</sub>	"	275
Al	"	0.033
Ca	"	169
Cd	"	0.0006
Cr	"	<0.0005
Cu	"	<0.002
Fe	"	0.077
Hg	μg/L	<0.25 <sup>a</sup>
K	mg/L	3
Mg	"	84.6
Mn	"	0.0323
Na	"	70
Ni	"	<0.0004
Pb	"	0.004
Zn	"	0.005

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

<sup>a</sup>Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON JUNE 11, 2008

Parameter	Unit	Lysimeter No.				
		L-1N	L-2	L-3	L-4	L-5
pH <sup>1</sup>		7.3	7.4	7.4	7.3	7.4
EC	mS/m	414	399	251	398	219
Total Dissolved Solids	mg/L	4,060	4,160	1,560	4,320	1,736
Total Diss. Org. Carbon	"	8	4	7	3	0.9
Cl <sup>-</sup>	"	166	182	38	479	223
SO <sub>4</sub> <sup>=</sup>	"	2,150	2,040	580	1,590	530
TKN	"	NA	0.64	0.32	1.1	0.21
NH <sub>3</sub> -N	"	7.0	<0.04	<0.02	0.44	0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.02	0.05	0.03	0.26	0.45
Total P	"	<0.05	<0.10	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	557	486	496	372	243
Al	"	0.078	0.104	0.040	0.076	0.046
Ca	"	482	557	194	473	199
Cd	"	0.0006	0.0010	0.0004	0.0006	0.0006
Cr	"	<0.0005	<0.0010	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.004	<0.002	<0.002	<0.002
Fe	"	8.28	0.020	0.012	7.93	0.160
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	11	6	2	6	4
Mg	"	282	268	121	263	95.1
Mn	"	0.2597	0.0076	0.0015	0.1023	0.0365
Na	"	180	142	50	145	86
Ni	"	<0.0004	0.0056	0.0006	<0.0004	<0.0004
Pb	"	<0.004	<0.008	0.004	<0.004	<0.004
Zn	"	0.006	0.048	0.015	0.012	0.005



TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1N THROUGH L-6 AT THE CALUMET EAST  
SOLIDS MANAGEMENT AREA SAMPLED ON JUNE 11, 2008

Parameter	Unit	Lysimeter No.
		L-6
pH <sup>1</sup>		7.6
EC	mS/m	171
Total Dissolved Solids	mg/L	1,348
Total Diss. Org. Carbon	"	0.8
Cl <sup>-</sup>	"	15
SO <sub>4</sub> <sup>=</sup>	"	615
TKN	"	0.16
NH <sub>3</sub> -N	"	0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.45
Total P	"	0.05
Alkalinity as CaCO <sub>3</sub>	"	279
Al	"	0.033
Ca	"	169
Cd	"	0.0006
Cr	"	<0.0005
Cu	"	<0.002
Fe	"	0.077
Hg	μg/L	<0.25 <sup>a</sup>
K	mg/L	3
Mg	"	84.6
Mn	"	0.0323
Na	"	70
Ni	"	<0.0004
Pb	"	0.004
Zn	"	0.005

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

<sup>a</sup>Limit of quantitation (LOQ) instead of MDL was used as reporting limit.

NA = No analysis; insufficient sample.

TABLE 4: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED  
BIOSOLIDS REMOVED FROM THE CALUMET EAST  
SOLIDS MANAGEMENT DRYING AREA DURING APRIL 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		6.7
Total Solids	%	68.6
Total Volatile Solids <sup>2</sup>	%	25.8
TKN	mg/kg	12,487
NH <sub>3</sub> -N	"	47
Total P	"	16,666
Al	"	21,381
As	"	11
Ca	"	53,974
Cd	"	4
Cr	"	109
Cu	"	288
Fe	"	35,492
Hg	"	0.818
K	"	6,074
Mg	"	21,061
Mn	"	1,019
Mo	"	12
Na	"	341
Ni	"	39
Pb	"	96
Se	"	2.0
Zn	"	680

<sup>1</sup>Values for one sample only.

<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 MAY 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		6.7
Total Solids	%	69.2
Total Volatile Solids <sup>2</sup>	%	26.0
TKN	mg/kg	12,841
NH <sub>3</sub> -N	"	36
Total P	"	346
Al	"	20,241
As	"	10
Ca	"	53,660
Cd	"	5
Cr	"	96
Cu	"	307
Fe	"	35,147
Hg	"	0.942
K	"	5,715
Mg	"	20,730
Mn	"	892
Mo	"	12
Na	"	198
Ni	"	38
Pb	"	94
Se	"	2.0
Zn	"	720

<sup>1</sup>Values for one sample only.

<sup>2</sup>Total 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 JUNE 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		6.8
Total Solids	%	67.5
Total Volatile Solids <sup>2</sup>	%	26.5
TKN	mg/kg	13,819
NH <sub>3</sub> -N	''	103
Total P	''	530
Al	''	23,875
As	''	10
Ca	''	53,604
Cd	''	5
Cr	''	104
Cu	''	325
Fe	''	35,159
Hg	''	0.924
K	''	7,132
Mg	''	21,012
Mn	''	909
Mo	''	12
Na	''	334
Ni	''	38
Pb	''	97
Se	''	2.0
Zn	''	728

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

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