

*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***RESEARCH AND DEVELOPMENT  
DEPARTMENT***

*REPORT NO. 06-77*

*CALUMET WEST SLUDGE DRYING AREA*

*THIRD QUARTER 2006*

*DECEMBER 2006*

## Protecting Our Water Environment

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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 West Solids Management Area - Stickney WRP, Contract No. 84-270-2P, C175399, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for July, August, and September 2006

The attached nine tables contain the monitoring data for the Calumet West Solids Management Area for July, August, and September 2006 as required by IEPA Operating Permit No. 2005-AO-4281-1.

The data reported are as follows:

Table 1, Analysis of Water from Lysimeters L-1 through L-3 at the Calumet West Solids Management Area Sampled on July 12, 2006

Table 2, Analysis of Water from Lysimeters L-1 through L-3 at the Calumet West Solids Management Area Sampled on August 9, 2006

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

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

Table 5, Analysis of Monthly Compositing Digested Biosolids Placed in the Calumet West Solids Management Drying Area During August 2006

Table 6, Analysis of Monthly Compositing Digested Biosolids Placed in the Calumet West Solids Management Drying Area During September 2006

Subject: Calumet West Solids Management Area - Stickney WRP, Contract No. 84-270-2P, C175399, IEPA Permit No. 2005-AO-4281-1, Monitoring Report for July, August, and September 2006

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

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

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

Biosolids were placed in and removed from the solids drying area during the months of July, 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-1 THROUGH L-3 AT THE CALUMET WEST  
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 12, 2006

Parameter	Unit	Lysimeter No.		
		L-1	L-2	L-3
pH <sup>1</sup>		7.6	7.7	7.7
EC	mS/m	266	274	278
Total Dissolved Solids	mg/L	NA	3,360	3,596
Total Dissolved Organic Carbon	"	1	2	1
Cl <sup>-</sup>	"	142	35	28
SO <sub>4</sub> <sup>=</sup>	"	1,362	1,719	1,840
TKN	"	0.24	0.22	0.22
NH <sub>3</sub> -N	"	0.08	0.06	< 0.04
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.48	0.42	0.46
Total P	"	< 0.10	< 0.10	< 0.10
Alkalinity as CaCO <sub>3</sub>	"	136	162	130
Al	"	0.042	0.038	0.038
Ca	"	316	348	369
Cd	"	< 0.0008	< 0.0008	< 0.0008
Cr	"	< 0.0010	< 0.0010	< 0.0010
Cu	"	< 0.004	< 0.004	< 0.004
Fe	"	0.234	0.030	0.044
Hg	μg/L	< 0.10	< 0.10	< 0.10
K	mg/L	7	8	6
Mg	"	149	185	194
Mn	"	0.0642	0.1878	0.0428
Na	"	194	185	194
Ni	"	< 0.0008	0.0028	< 0.0008
Pb	"	0.018	0.020	0.016
Zn	"	0.008	0.014	0.008

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

NA = No analysis; insufficient sample.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-3 AT THE CALUMET WEST  
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 9, 2006

Parameter	Unit	Lysimeter No.		
		L-1	L-2	L-3
pH <sup>1</sup>		7.4	7.5	7.5
EC	mS/m	265	274	285
Total Dissolved Solids	mg/L	3,102	3,484	3,640
Total Dissolved Organic Carbon	"	1	2	1
Cl <sup>-</sup>	"	113	29	23
SO <sub>4</sub> <sup>=</sup>	"	1,500	1,819	1,895
TKN	"	0.42	0.47	0.24
NH <sub>3</sub> -N	"	0.08	0.13	< 0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.61	0.30	0.44
Total P	"	< 0.05	< 0.05	< 0.05
Alkalinity as CaCO <sub>3</sub>	"	148	156	119
Al	"	0.046	0.058	0.041
Ca	"	326	366	377
Cd	"	< 0.0004	< 0.0004	< 0.0004
Cr	"	< 0.0005	< 0.0005	< 0.0005
Cu	"	< 0.002	< 0.002	< 0.002
Fe	"	0.461	0.263	0.052
Hg	μg/L	< 0.05	< 0.05	< 0.05
K	mg/L	7	8	6
Mg	"	148	186	194
Mn	"	0.1300	0.2067	0.0477
Na	"	194	188	189
Ni	"	< 0.0004	0.0068	< 0.0004
Pb	"	< 0.004	< 0.004	< 0.004
Zn	"	0.005	0.007	0.005

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

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

Parameter	Unit	Lysimeter No.		
		L-1	L-2	L-3
pH <sup>1</sup>		7.5	7.6	7.8
EC	mS/m	265	283	290
Total Dissolved Solids	mg/L	3,226	3,466	3,648
Total Dissolved Organic Carbon	"	1	2	1
Cl <sup>-</sup>	"	120	35	38
SO <sub>4</sub> <sup>=</sup>	"	1,575	1,848	1,972
TKN	"	1.1	0.76	0.46
NH <sub>3</sub> -N	"	0.31	0.30	0.06
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.16	0.22	0.58
Total P	"	0.10	< 0.05	< 0.10
Alkalinity as CaCO <sub>3</sub>	"	159	181	164
Al	"	0.051	0.049	0.052
Ca	"	339	357	374
Cd	"	0.0004	0.0004	< 0.0008
Cr	"	< 0.0005	< 0.0005	< 0.0010
Cu	"	< 0.002	< 0.002	0.046
Fe	"	1.53	1.13	0.092
Hg	μg/L	< 0.05	< 0.05	< 0.10
K	mg/L	7	8	6
Mg	"	156	182	191
Mn	"	0.1414	0.3548	0.0816
Na	"	194	187	185
Ni	"	< 0.0004	0.0060	0.0036
Pb	"	< 0.004	< 0.004	0.009
Zn	"	0.012	0.014	0.046

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

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

Parameter	Unit	Concentration*
pH		8.0
Total Solids	%	9.7
Total Volatile Solids	%	48.5
TKN	mg/kg	38,105
NH <sub>3</sub> -N	"	13,351

\*Values for one sample only.

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

Parameter	Unit	Concentration*
pH		7.8
Total Solids	%	13.6
Total Volatile Solids	%	38.8
TKN	mg/kg	33,725
NH <sub>3</sub> -N	"	9,625

\*Values are the means of five samples.



TABLE 6: ANALYSIS OF MONTHLY COMPOSITED DIGESTED  
 BIOSOLIDS PLACED IN THE CALUMET WEST  
 SOLIDS MANAGEMENT DRYING AREA DURING SEPTEMBER 2006

Parameter	Unit	Concentration*
pH		7.9
Total Solids	%	18.8
Total Volatile Solids	%	34.3
TKN	mg/kg	22,290
NH <sub>3</sub> -N	"	5,672

\*Values are the means of seven samples.

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

Parameter	Unit	Concentration*
pH		7.6
Total Solids	%	51.4
Total Volatile Solids	%	43.4
TKN	mg/kg	27,746
NH <sub>3</sub> -N	"	5,311
Total P	"	28,810
Al	"	16,552
As	"	7
Ca	"	54,538
Cd	"	7.9
Cr	"	150
Cu	"	442
Fe	"	27,890
Hg	"	1.4
K	"	4,205
Mg	"	18,386
Mn	"	843
Mo	"	15
Na	"	2,028
Ni	"	42
Pb	"	122
Se	"	14
Zn	"	1,265

\*Values are the means of ten samples.

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

Parameter	Unit	Concentration*
pH		7.6
Total Solids	%	44.6
Total Volatile Solids	%	44.2
TKN	mg/kg	26,444
NH <sub>3</sub> -N	"	3,603
Total P	"	27,547
Al	"	16,544
As	"	6
Ca	"	54,804
Cd	"	9.2
Cr	"	156
Cu	"	409
Fe	"	27,293
Hg	"	1.2
K	"	4,245
Mg	"	18,699
Mn	"	867
Mo	"	13
Na	"	1,457
Ni	"	40
Pb	"	130
Se	"	11
Zn	"	1,207

\*Values are the means of three samples.

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

Parameter	Unit	Concentration*
pH		6.5
Total Solids	%	62.9
Total Volatile Solids	%	40.9
TKN	mg/kg	13,158
NH <sub>3</sub> -N	"	134
Total P	"	28,192
Al	"	15,822
As	"	8
Ca	"	59,344
Cd	"	8.8
Cr	"	174
Cu	"	506
Fe	"	29,796
Hg	"	1.8
K	"	3,401
Mg	"	18,581
Mn	"	915
Mo	"	13
Na	"	1,444
Ni	"	42
Pb	"	135
Se	"	15
Zn	"	1,554

\*Values are the means of two samples.