

*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***RESEARCH AND DEVELOPMENT  
DEPARTMENT***

*REPORT NO. 08-46*

*HARLEM AVENUE SOLIDS MANAGEMENT AREA*

*MONITORING REPORT FOR*

*SECOND QUARTER 2008*

*AUGUST 2008*

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**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*

August 29, 2008

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: Harlem Avenue Solids Management Area - Stickney WRP, Contract No. 84-111-2P, IEPA Permit No. 2004-AO-2591, Monitoring Report for April, May, and June 2008

The attached twelve tables contain the monitoring data for the Harlem Avenue Solids Management Area for April, May, and June 2008 as required by IEPA Operating Permit No. 2004-AO-2591. In a letter dated January 19, 2007, the IEPA granted permission to terminate the monitoring of lysimeters L-1 and L-1N. Therefore, monitoring data for these lysimeters will not be included in this and subsequent reports.

The data reported are as follows:

Table 1, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on April 10, 2008

Table 2, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on April 23, 2008

Table 3, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on May 7, 2008

Table 4, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on May 21, 2008

Table 5, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on June 5, 2008

Subject: Harlem Avenue Solids Management Area - Stickney WRP, Contract No. 84-111-2P, IEPA Permit No. 2004-AO-2591, Monitoring Report for April, May, and June 2008

Table 6, Analysis of Water from Lysimeters L-1N-1 through L-3 at the Harlem Avenue Solids Management Area Sampled on June 18, 2008

Table 7, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During April 2008

Table 8, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During May 2008

Table 9, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During June 2008

Table 10, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During April 2008

Table 11, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During May 2008

Table 12, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During June 2008

Biosolids were placed in and 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/Garelli

TABLE 1: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON APRIL 10, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.6	7.4	7.5
EC	mS/m	253	248	230
Total Dissolved Solids	mg/L	1,600	1,992	1,588
Total Diss. Org. Carbon	"	41	2	6
Cl <sup>-</sup>	"	103	288	119
SO <sub>4</sub> <sup>=</sup>	"	41	559	283
TKN	"	8.6	0.45	0.77
NH <sub>3</sub> -N	"	5.0	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.36	0.51	2.0
Total P	"	0.05	0.05	0.06
Alkalinity as CaCO <sub>3</sub>	"	1,540	506	987
Al	"	0.048	0.051	0.047
Ca	"	297	353	322
Cd	"	0.0004	<0.0004	0.0006
Cr	"	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	7.12	0.008	0.008
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.4	1
Mg	"	180	87.8	129
Mn	"	0.4163	0.0224	0.7685
Na	"	48	89	47
Ni	"	0.0019	<0.0004	<0.0004
Pb	"	<0.004	<0.004	<0.004
Zn	"	0.013	0.009	0.007

<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 2: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON APRIL 23, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.2	7.0	7.2
EC	mS/m	225	212	165
Total Dissolved Solids	mg/L	1,968	2,292	2,032
Total Diss. Org. Carbon	"	40	2	5
Cl <sup>-</sup>	"	110	281	147
SO <sub>4</sub> <sup>=</sup>	"	4	605	299
TKN	"	8.7	0.49	0.47
NH <sub>3</sub> -N	"	5.3	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.24	0.13	0.44
Total P	"	0.09	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	1,187	528	958
Al	"	0.065	0.069	0.059
Ca	"	317	359	297
Cd	"	0.0006	0.0004	0.0004
Cr	"	0.0012	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	14.7	0.009	0.012
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.3	1
Mg	"	188	90.5	119
Mn	"	0.4161	0.0585	0.6692
Na	"	48	93	54
Ni	"	0.0012	<0.0004	<0.0004
Pb	"	<0.004	<0.004	<0.004
Zn	"	0.016	0.021	0.014

<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-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON MAY 7, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.7	7.6	8.1
EC	mS/m	232	240	200
Total Dissolved Solids	mg/L	1,760	2,068	1,688
Total Diss. Org. Carbon	"	38	2	6
Cl <sup>-</sup>	"	109	294	118
SO <sub>4</sub> <sup>=</sup>	"	9	614	259
TKN	"	8.0	0.43	0.46
NH <sub>3</sub> -N	"	5.0	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.18	0.80	0.27
Total P	"	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	1,146	506	895
Al	"	0.047	0.099	0.045
Ca	"	314	392	321
Cd	"	0.0005	<0.0004	<0.0004
Cr	"	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	1.74	0.009	0.012
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.3	1
Mg	"	186	99.5	134
Mn	"	0.3846	0.1719	0.5890
Na	"	49	94	45
Ni	"	0.0022	0.0008	<0.0004
Pb	"	<0.004	<0.004	<0.004
Zn	"	0.008	0.016	0.012

<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 4: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON MAY 21, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.2	6.9	7.1
EC	mS/m	220	216	203
Total Dissolved Solids	mg/L	1,828	2,052	1,754
Total Diss. Org. Carbon	"	37	3	7
Cl <sup>-</sup>	"	101	274	101
SO <sub>4</sub> <sup>=</sup>	"	11	621	246
TKN	"	9.3	0.46	0.61
NH <sub>3</sub> -N	"	5.1	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.15	0.31	0.30
Total P	"	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	1,470	458	1,050
Al	"	0.053	0.046	0.051
Ca	"	324	384	356
Cd	"	<0.0004	<0.0004	0.0005
Cr	"	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	14.0	0.011	0.012
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.3	1
Mg	"	190	93.9	147
Mn	"	0.4014	0.0113	0.4684
Na	"	49	83	44
Ni	"	0.0018	0.0012	<0.0004
Pb	"	<0.004	<0.004	<0.004
Zn	"	0.009	0.006	0.004

<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 5: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JUNE 5, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.6	7.2	7.3
EC	mS/m	267	250	226
Total Dissolved Solids	mg/L	1,580	2,348	2,052
Total Diss. Org. Carbon	"	39	2	7
Cl <sup>-</sup>	"	103	298	104
SO <sub>4</sub> <sup>=</sup>	"	5	645	253
TKN	"	9.0	0.42	0.71
NH <sub>3</sub> -N	"	5.1	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.65	1.1	0.47
Total P	"	<0.05	<0.05	0.05
Alkalinity as CaCO <sub>3</sub>	"	1,313	455	1,114
Al	"	0.051	0.057	0.052
Ca	"	313	380	329
Cd	"	<0.0004	0.0006	0.0004
Cr	"	<0.0005	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	4.31	0.033	0.010
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.3	1
Mg	"	190	94.5	142
Mn	"	0.3924	0.0107	0.4372
Na	"	49	77	41
Ni	"	0.0015	0.0004	0.0006
Pb	"	<0.004	<0.004	<0.004
Zn	"	0.010	0.017	0.013

<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 6: ANALYSIS OF WATER FROM LYSIMETERS  
L-1N-1 THROUGH L-3 AT THE HARLEM AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JUNE 18, 2008

Parameter	Unit	Lysimeter No.		
		L-1N-1	L-2	L-3
pH <sup>1</sup>		7.4	7.0	7.2
EC	mS/m	199	194	197
Total Dissolved Solids	mg/L	1,780	2,436	2,128
Total Diss. Org. Carbon	"	36	2	7
Cl <sup>-</sup>	"	102	303	108
SO <sub>4</sub> <sup>=</sup>	"	4	672	270
TKN	"	8.0	0.37	0.51
NH <sub>3</sub> -N	"	5.3	<0.02	<0.02
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.07	0.38	0.29
Total P	"	<0.05	<0.05	<0.05
Alkalinity as CaCO <sub>3</sub>	"	1,393	445	1,123
Al	"	0.071	0.078	0.073
Ca	"	307	381	334
Cd	"	<0.0004	<0.0004	<0.0004
Cr	"	0.0012	<0.0005	<0.0005
Cu	"	<0.002	<0.002	<0.002
Fe	"	3.53	0.016	0.011
Hg	μg/L	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>	<0.25 <sup>a</sup>
K	mg/L	4	0.2	1
Mg	"	185	93.8	142
Mn	"	0.3766	0.0114	0.4059
Na	"	48	78	41
Ni	"	0.0004	<0.0004	<0.0004
Pb	"	0.008	0.005	0.007
Zn	"	0.008	0.008	0.006

<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 7: ANALYSIS OF MONTHLY COMPOSITED DIGESTED  
 BIOSOLIDS PLACED IN THE HARLEM AVENUE  
 SOLIDS MANAGEMENT DRYING AREA DURING APRIL 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		8.0
Total Solids	%	24.5
Total Volatile Solids <sup>2</sup>	%	58.2
TKN	mg/kg	32,553
NH <sub>3</sub> -N	”	5,878

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

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

TABLE 8: ANALYSIS OF MONTHLY COMPOSITED DIGESTED  
 BIOSOLIDS PLACED IN THE HARLEM AVENUE  
 SOLIDS MANAGEMENT DRYING AREA DURING MAY 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		8.4
Total Solids	%	19.5
Total Volatile Solids <sup>2</sup>	%	44.8
TKN	mg/kg	45,511
NH <sub>3</sub> -N	”	15,214

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

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

TABLE 9: ANALYSIS OF MONTHLY COMPOSITED DIGESTED  
BIOSOLIDS PLACED IN THE HARLEM AVENUE  
SOLIDS MANAGEMENT DRYING AREA DURING JUNE 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		8.2
Total Solids	%	26.1
Total Volatile Solids <sup>2</sup>	%	50.1
TKN	mg/kg	44,370
NH <sub>3</sub> -N	”	5,506

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

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

TABLE 10: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED  
BIOSOLIDS REMOVED FROM THE HARLEM AVENUE  
SOLIDS MANAGEMENT DRYING AREA DURING APRIL 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		7.7
Total Solids	%	29.5
Total Volatile Solids <sup>2</sup>	%	50.6
TKN	mg/kg	41,505
NH <sub>3</sub> -N	"	9,856
Total P	"	20,252
Al	"	22,609
As	"	<5
Ca	"	37,006
Cd	"	3
Cr	"	156
Cu	"	357
Fe	"	17,084
Hg	"	0.727
K	"	5,266
Mg	"	16,278
Mn	"	575
Mo	"	13
Na	"	1,263
Ni	"	39
Pb	"	106
Se	"	<4
Zn	"	878

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

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

TABLE 11: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE HARLEM AVENUE SOLIDS MANAGEMENT DRYING AREA DURING MAY 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		7.8
Total Solids	%	23.2
Total Volatile Solids <sup>2</sup>	%	52.2
TKN	mg/kg	47,980
NH <sub>3</sub> -N	”	11,258
Total P	”	23,495
Al	”	20,226
As	”	<5
Ca	”	35,707
Cd	”	3
Cr	”	153
Cu	”	408
Fe	”	23,856
Hg	”	0.776
K	”	4,707
Mg	”	14,653
Mn	”	595
Mo	”	14
Na	”	1,938
Ni	”	44
Pb	”	103
Se	”	<4
Zn	”	822

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

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

TABLE 12: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE HARLEM AVENUE SOLIDS MANAGEMENT DRYING AREA DURING JUNE 2008

Parameter	Unit	Concentration <sup>1</sup>
pH		7.8
Total Solids	%	21.0
Total Volatile Solids <sup>2</sup>	%	55.5
TKN	mg/kg	25,292
NH <sub>3</sub> -N	”	11,947
Total P	”	10,868
Al	”	17,592
As	”	<14.29 <sup>a</sup>
Ca	”	34,943
Cd	”	3
Cr	”	133
Cu	”	391
Fe	”	15,542
Hg	”	0.764
K	”	2,688
Mg	”	15,271
Mn	”	576
Mo	”	12
Na	”	2,157
Ni	”	39
Pb	”	108
Se	”	<28.57 <sup>a</sup>
Zn	”	759

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

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

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