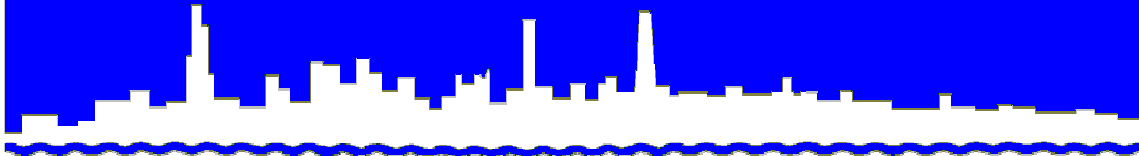


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 09-69

HARLEM AVENUE SOLIDS MANAGEMENT AREA

MONITORING REPORT FOR

THIRD QUARTER 2009

DECEMBER 2009

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: Harlem Avenue Solids Management Area - Stickney Water Reclamation Plant,
Contract No. 84-111-2P, Illinois Environmental Protection Agency Permit No.
2004-AO-2591-1, Monitoring Report for July, August, and September 2009

The attached thirteen tables contain the monitoring data for the Harlem Avenue Solids Management Area for July, August, and September 2009, as required by Illinois Environmental Protection Agency (IEPA) Operating Permit No. 2004-AO-2591-1.

The data reported are as follows:

- Table 1, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on July 1, 2009
- Table 2, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on July 15, 2009
- Table 3, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on July 29, 2009
- Table 4, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on August 12, 2009
- Table 5, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on August 26, 2009
- Table 6, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on September 9, 2009

Subject: Harlem Avenue Solids Management Area - Stickney Water Reclamation Plant, Contract No. 84-111-2P, Illinois Environmental Protection Agency Permit No. 2004-AO-2591-1, Monitoring Report for July, August, and September 2009

Table 7, Analysis of Water from Lysimeters L-1N-1 through L-3N at the Harlem Avenue Solids Management Area Sampled on September 23, 2009

Table 8, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During July 2009

Table 9, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During August 2009

Table 10, Analysis of Monthly Compositated Digested Biosolids Placed in the Harlem Avenue Solids Management Drying Area During September 2009

Table 11, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During July 2009

Table 12, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During August 2009

Table 13, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Harlem Avenue Solids Management Drying Area During September 2009

Two new lysimeters, L-2N and L-3N, were installed at this site in September 2008 as replacements for L-2 and L-3, respectively. The old and new 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, August, and September 2009.

Very truly yours,

Louis Kollias
Director
Monitoring and Research

LK:PL:kq

Attachments

cc w/att: Mr. Sulski, IEPA
Records Unit, IEPA
Granato/O'Connor/Cox/Lindo

TABLE 1: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 1, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.5	7.2	7.5		7.5
EC	mS/m	221	306	338		195
Total Dissolved Solids	mg/L	1,794	3,194	4,122		1,834
Total Diss. Org. Carbon	"	39	5	6	L	9
Cl ⁻	"	106	287	55	Y	135
SO ₄ ⁼	"	9	1,496	1,905	S	219
					I	
TKN	"	9	0.8	0.8	M	2
NH ₃ -N	"	6	<0.1	<0.1	E	0.9
NO ₂ + NO ₃ -N	"	0.13	5.3	85	T	0.34
Total P	"	<0.1	<0.1	<0.1	E	<0.1
Alkalinity as CaCO ₃	"	1,592	572	614	R	933
Al	"	0.056	0.062	0.076	I	0.052
Ca	"	298	570	687	N	286
Cd	"	<0.002	<0.002	<0.002	A	<0.002
Cr	"	<0.0025	<0.0025	<0.0025	C	<0.0025
Cu	"	<0.01	<0.01	<0.01	C	<0.01
					E	
Fe	"	9.6	<0.02	<0.02	S	16
Hg	μg/L	<0.20	<0.20	<0.20	S	<0.20
K	mg/L	4	<1	<1	I	<1
Mg	"	173	139	195	B	101
Mn	"	0.396	0.342	3.39	L	0.885
					E	
Na	"	47	92	23		54
Ni	"	<0.002	0.004	0.010		<0.002
Pb	"	<0.02	<0.02	<0.02		<0.02
Zn	"	<0.01	0.02	0.03		0.02

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

²pH analyzed beyond recommended holding time of 15 minutes.

TABLE 2: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 15, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.6	7.2	7.4	7.5	7.6
EC	mS/m	257	329	360	216	200
Total Dissolved Solids	mg/L	1,892	3,590	4,540	1,836	1,868
Total Diss. Org. Carbon	"	39	4	6	7	8
Cl ⁻	"	106	262	60	124	158
SO ₄ ⁼	"	53	1,401	1,852	233	293
TKN	"	9	0.8	1	0.5	2
NH ₃ -N	"	6	<0.1	<0.1	<0.1	0.8
NO ₂ + NO ₃ -N	"	0.97	4.1	67	0.42	0.46
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,589	541	639	1,057	789
Al	"	0.055	0.064	0.078	0.054	0.046
Ca	"	303	547	670	284	269
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	"	13	<0.02	<0.02	0.29	15
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	177	140	195	120	91
Mn	"	0.394	0.394	3.36	0.756	0.843
Na	"	49	94	24	67	64
Ni	"	0.004	0.003	0.008	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	0.02	0.02	0.03	<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-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON JULY 29, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.7	7.8	7.7	7.7	7.7
EC	mS/m	288	311	390	205	228
Total Dissolved Solids	mg/L	1,776	NA	4,320	1,704	1,712
Total Diss. Org. Carbon	"	34	10	16	6	28
Cl ⁻	"	107	255	55	119	119
SO ₄ ⁼	"	6	1,274	1,852	215	167
TKN	"	9	0.6	0.9	0.5	2
NH ₃ -N	"	6	<0.1	<0.1	<0.1	0.9
NO ₂ + NO ₃ -N	"	0.12	4.0	58	0.43	0.37
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,628	460	603	1,031	967
Al	"	0.054	0.064	0.078	0.049	0.049
Ca	"	297	493	671	268	279
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	<0.02	<0.02	0.15	17
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	174	131	196	115	100
Mn	"	0.378	0.229	3.45	0.813	0.898
Na	"	47	83	23	68	49
Ni	"	0.003	<0.002	0.009	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	0.03	<0.01	0.02	<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: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 12, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.7	7.4	7.5	7.6	7.6
EC	mS/m	272	331	392	225	224
Total Dissolved Solids	mg/L	1,886	NA	4,878	1,766	1,894
Total Diss. Org. Carbon	"	38	4	5	7	12
Cl ⁻	"	114	228	57	110	110
SO ₄ ⁼	"	15	1,182	1,740	181	115
TKN	"	7	0.7	1	0.5	2
NH ₃ -N	"	6	<0.1	<0.1	<0.1	0.8
NO ₂ + NO ₃ -N	"	<0.04	11	60	0.49	0.50
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,436	481	598	1,012	1,085
Al	"	0.085	0.137	0.136	0.084	0.092
Ca	"	309	519	697	273	319
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	"	8.6	0.09	<0.02	0.80	16
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	184	145	210	119	119
Mn	"	0.383	0.699	3.50	0.818	0.967
Na	"	59	76	25	71	43
Ni	"	<0.002	<0.002	0.007	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.02	0.04	<0.01	0.02

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 5: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON AUGUST 26, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.5	7.1	7.4	7.5	7.7
EC	mS/m	254	313	348	216	208
Total Dissolved Solids	mg/L	1,944	3,332	4,568	1,828	1,676
Total Diss. Org. Carbon	"	40	4	13	7	13
Cl ⁻	"	104	257	55	107	110
SO ₄ ⁼	"	3	1,251	1,838	207	105
TKN	"	9	0.8	3	0.5	2
NH ₃ -N	"	6	<0.1	<0.1	<0.1	0.9
NO ₂ + NO ₃ -N	"	0.20	3.8	56	0.39	0.27
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,594	508	534	1,067	1,105
Al	"	0.055	0.064	0.080	0.055	0.052
Ca	"	314	447	683	263	277
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	"	15	<0.02	<0.02	0.22	14
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	186	132	190	114	109
Mn	"	0.382	0.154	3.27	0.760	0.887
Na	"	49	87	23	59	36
Ni	"	<0.002	<0.002	0.007	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	0.02	0.04	<0.01	0.02

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

²pH analyzed beyond recommended holding time of 15 minutes.

TABLE 6: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 9, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.6	7.3	7.5	7.6	7.6
EC	mS/m	231	310	349	203	191
Total Dissolved Solids	mg/L	1,928	3,312	4,592	1,860	1,700
Total Diss. Org. Carbon	"	41	4	6	8	14
Cl ⁻	"	112	270	58	110	110
SO ₄ ⁼	"	4	1,391	2,026	219	122
TKN	"	9	0.6	1	0.7	2
NH ₃ -N	"	6	<0.1	<0.1	<0.1	0.9
NO ₂ + NO ₃ -N	"	0.27	3.4	43	2.8	0.17
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,800	593	569	1,137	1,141
Al	"	0.100	0.147	0.163	0.089	0.101
Ca	"	317	533	691	305	317
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	0.0041	0.0029	0.0044	0.0029	0.0041
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	13	<0.02	<0.02	0.18	14
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	180	139	200	127	116
Mn	"	0.362	0.144	3.31	0.684	0.944
Na	"	47	94	25	58	39
Ni	"	<0.002	<0.002	0.007	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	<0.01	0.02	<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 7: ANALYSIS¹ OF WATER FROM LYSIMETERS
L-1N-1 THROUGH L-3N AT THE HARLEM AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON SEPTEMBER 23, 2009

Parameter	Unit	Lysimeter No.				
		L-1N-1	L-2	L-2N	L-3	L-3N
pH ²		7.4	7.0	7.2	7.3	7.4
EC	mS/m	279	345	364	234	230
Total Dissolved Solids	mg/L	1,640	3,476	4,104	1,580	1,536
Total Diss. Org. Carbon	"	39	5	5	8	13
Cl ⁻	"	99	250	56	104	107
SO ₄ ⁼	"	5	1,337	1,995	195	98
TKN	"	9	1	0.8	0.5	2
NH ₃ -N	"	7	<0.1	<0.1	<0.1	0.9
NO ₂ + NO ₃ -N	"	0.11	6.6	17	0.45	0.12
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO ₃	"	1,498	522	554	1,074	1,080
Al	"	0.104	0.151	0.170	0.092	0.103
Ca	"	321	529	441	298	317
Cd	"	<0.002	<0.002	<0.002	<0.002	<0.002
Cr	"	0.0049	0.0032	0.0043	0.0029	0.0046
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	13	<0.02	<0.02	0.24	15
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	4	<1	<1	<1	<1
Mg	"	183	138	197	126	116
Mn	"	0.369	0.020	3.40	0.639	0.954
Na	"	48	96	25	58	40
Ni	"	<0.002	<0.002	0.007	<0.002	<0.002
Pb	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	<0.01	<0.01	0.02	<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 8: ANALYSIS¹ OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE HARLEM AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING JULY 2009

Parameter	Unit	Concentration
pH		8.2
Total Solids	%	18.9
Total Volatile Solids ²	%	45.0
TKN	mg/kg	48,954
NH ₃ -N	"	16,392

¹Values are the means of five samples.

²Total volatile solids as a percentage of total solids.

TABLE 9: ANALYSIS¹ OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE HARLEM AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2009

Parameter	Unit	Concentration
pH		8.0
Total Solids	%	21.3
Total Volatile Solids ²	%	40.8
TKN	mg/kg	44,426
NH ₃ -N	"	12,730

¹Values are the means of four samples.

²Total volatile solids as a percentage of total solids.

TABLE 10: ANALYSIS¹ OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE HARLEM AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING SEPTEMBER 2009

Parameter	Unit	Concentration
pH		8.2
Total Solids	%	22.2
Total Volatile Solids ²	%	42.7
TKN	mg/kg	41,161
NH ₃ -N	"	12,716

¹Values are the means of three samples.

²Total volatile solids as a percentage of total solids.

TABLE 11: ANALYSIS¹ OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE HARLEM AVENUE SOLIDS MANAGEMENT DRYING AREA DURING JULY 2009

Parameter	Unit	Concentration
pH		7.2
Total Solids	%	43.5
Total Volatile Solids ²	%	45.8
TKN	mg/kg	36,624
NH ₃ -N	"	6,885
Total P	"	24,228
Al	"	15,319
As	"	<10
Ca	"	37,179
Cd	"	<2
Cr	"	161
Cu	"	451
Fe	"	25,924
Hg	"	0.91
K	"	2,169
Mg	"	14,426
Mn	"	641
Mo	"	14
Na	"	<800
Ni	"	45
Pb	"	104
Se	"	<8
Zn	"	854

¹Values are the means of nine samples.

²Total volatile solids as a percentage of total solids.

TABLE 12: ANALYSIS¹ OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE HARLEM AVENUE SOLIDS MANAGEMENT DRYING AREA DURING AUGUST 2009

Parameter	Unit	Concentration
pH		7.5
Total Solids	%	59.8
Total Volatile Solids ²	%	41.6
TKN	mg/kg	31,122
NH ₃ -N	"	5,474
Total P	"	20,969
Al	"	18,818
As	"	<10
Ca	"	38,010
Cd	"	4
Cr	"	160
Cu	"	405
Fe	"	16,633
Hg	"	1.1
K	"	2,644
Mg	"	17,230
Mn	"	583
Mo	"	13
Na	"	1,104
Ni	"	43
Pb	"	120
Se	"	<8
Zn	"	840

¹Values are the means of four samples.

²Total volatile solids as a percentage of total solids.

TABLE 13: ANALYSIS¹ OF MONTHLY COMPOSITED PROCESSED DIGESTED BIOSOLIDS REMOVED FROM THE HARLEM AVENUE SOLIDS MANAGEMENT DRYING AREA DURING SEPTEMBER 2009

Parameter	Unit	Concentration
pH		6.5
Total Solids	%	73.6
Total Volatile Solids ²	%	37.0
TKN	mg/kg	21,814
NH ₃ -N	”	2,097
Total P	”	19,495
Al	”	19,505
As	”	<10
Ca	”	38,753
Cd	”	4
Cr	”	165
Cu	”	448
Fe	”	17,291
Hg	”	1.2
K	”	2,642
Mg	”	16,851
Mn	”	548
Mo	”	12
Na	”	<800
Ni	”	45
Pb	”	129
Se	”	<8
Zn	”	939

¹Values are the means of nine samples.

²Total volatile solids as a percentage of total solids.