

*Protecting Our Water Environment*



*Metropolitan Water Reclamation District of Greater Chicago*

***MONITORING AND RESEARCH  
DEPARTMENT***

*REPORT NO. 09-31*

*LAWNDALE AVENUE SOLIDS MANAGEMENT AREA*

*MONITORING REPORT - REVISED*

*FIRST QUARTER 2009*

*JUNE 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

June 23, 2009

Mr. S. Allan 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: Lawndale Avenue Solids Management Area – Stickney Water Reclamation Plant, Contract No. 80-159-2P, Illinois Environmental Protection Agency Permit No. 2005-AO-4283, Monitoring Report for January, February, and March 2009 - Revised

The attached six tables contain the monitoring data for the Lawndale Avenue Solids Management Area for January, February, and March 2009, as required by Illinois Environmental Protection Agency (IEPA) Operating Permit No. 2005-AO-4283.

The data are as follows:

- Table 1, Analysis of Water from Monitoring Wells M-11 through M-15 at the Lawndale Avenue Solids Management Area Sampled on January 21, 2009
- Table 2, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on January 21, 2009
- Table 3, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on February 10, 2009
- Table 4, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on March 11, 2009

Subject: Lawndale Avenue Solids Management Area – Stickney Water Reclamation Plant, Contract No. 80-159-2P, Illinois Environmental Protection Agency Permit No. 2005-AO-4283, Monitoring Report for January, February, and March 2009 - Revised

Table 5, Analysis of Monthly Composited Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area during January 2009

Table 6, Analysis of Monthly Composited Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area during March 2009

Two new lysimeters, L-1N and L-2N, were installed at this site in September 2008 as replacements for L-1 and L-2, respectively. The new and old 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 the solids drying area during January 2009. Biosolids were removed from the solids drying area during March 2009.

Please replace the May 15, 2009, report with this report. In Table 1, Well 11 was listed as a lysimeter. In addition, the code “NA” was changed to “NM” since there was no recorded depth measurement.

Very truly yours,

Louis Kollias  
Director  
Monitoring and Research

LK:PL:kq

Attachments

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

TABLE 1: ANALYSIS OF WATER FROM MONITORING WELLS  
M-11 THROUGH M-15 AT THE LAWNSDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JANUARY 21, 2009

Parameter	Unit	Monitoring Well No.				
		M-11 <sup>1</sup>	M-12	M-13	M-14	M-15
pH <sup>2</sup>			7.4	7.5	7.2	7.3
EC	mS/m		59	81	51	92
Total Dissolved Solids	mg/L		884	1,308	552	1,768
Total Diss. Org. Carbon	"		2	2	<1	2
Cl <sup>-</sup>	"		16	11	<10	<10
SO <sub>4</sub> <sup>=</sup>	"		350	627	127	830
TKN	"		0.5	0.6	0.3	0.5
NH <sub>3</sub> -N	"		0.3	0.4	0.3	0.5
NO <sub>2</sub> + NO <sub>3</sub> -N	"		0.91	<0.04	<0.04	<0.04
Total P	"		<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	W	314	334	335	364
Al	"	E	<1	<1	<1	<1
As	"	L	<0.05	<0.05	<0.05	<0.05
B	"		1.62	1.40	1.20	1.09
Ca	"		82	178	76	251
Cd	"	I	<0.01	<0.01	<0.01	<0.01
Cr	"	N	<0.003	<0.003	<0.003	<0.003
Cu	"	A	<0.01	<0.01	<0.01	<0.01
Fe	"	C	<0.1	<0.1	<0.1	1
Hg	μg/L	E	<0.20	<0.20	<0.20	<0.20
K	mg/L	S	10	11	8	11
Mg	"	S	38	83	42	112
Mn	"	I	0.004	0.006	<0.003	0.017
Na	"	B	142	98	44	68
Ni	"	L	<0.01	<0.01	<0.01	<0.01
Pb	"	E	0.050	0.054	0.039	0.047
Se	"		<0.1	<0.1	<0.1	<0.1
Zn	"		0.559	1.01	0.413	3.00
FC	MPN		<1	<1	<1	<1
Static H <sub>2</sub> O Elev.	ft		26	23	18	NM

<sup>1</sup>M-11 Pump malfunction.

<sup>2</sup>pH analyzed beyond recommended holding time of 15 minutes.

MPN = Most probable number per 100 mL.

NM = No measurement.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JANUARY 21, 2009

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-2N	L-3N
pH <sup>1</sup>		NA			7.8	
EC	mS/m	117			185	
Total Dissolved Solids	mg/L	NA			2,036	
Total Diss. Org. Carbon	"	7			5	
Cl <sup>-</sup>	"	52			488	
SO <sub>4</sub> <sup>=</sup>	"	515	L	L	497	L
			Y	Y		Y
TKN	"	3	S	S	2	S
NH <sub>3</sub> -N	"	2	I	I	0.6	I
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.83	M	M	0.30	M
Total P	"	<0.1	E	E	<0.1	E
Alkalinity as CaCO <sub>3</sub>	"	333	T	T	389	T
			E	E		E
Al	"	<1	R	R	<1	R
As	"	<0.05			<0.05	
B	"	0.419	I	I	0.259	I
Ca	"	207	N	N	185	N
Cd	"	<0.01	A	A	<0.01	A
			C	C		C
Cr	"	<0.0025	C	C	<0.0025	C
Cu	"	<0.01	E	E	<0.01	E
Fe	"	0.4	S	S	<0.1	S
Hg	μg/L	<0.20	S	S	<0.20	S
K	mg/L	6	I	I	7	I
			B	B		B
Mg	"	95	L	L	121	L
Mn	"	0.060	E	E	0.038	E
Na	"	46			271	
Ni	"	<0.01			<0.01	
Pb	"	0.062			0.066	
Se	"	<0.1			<0.1	
Zn	"	<0.015			<0.015	

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNSDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JANUARY 21, 2009

Parameter	Unit	Lysimeter No.				
		L-4N	L-5N	L-6	L-6N	L-7N
pH <sup>1</sup>					7.7	
EC	mS/m				245	
Total Dissolved Solids	mg/L				3,232	
Total Diss. Org. Carbon	"				59	
Cl <sup>-</sup>	"				94	
SO <sub>4</sub> <sup>=</sup>	"	L	L	L	1,443	L
		Y	Y	Y		Y
TKN	"	S	S	S	14	S
NH <sub>3</sub> -N	"	I	I	I	12	I
NO <sub>2</sub> + NO <sub>3</sub> -N	"	M	M	M	0.42	M
Total P	"	E	E	E	<0.1	E
Alkalinity as CaCO <sub>3</sub>	"	T	T	T	790	T
		E	E	E		E
Al	"	R	R	R	<1	R
As	"				<0.05	
B	"	I	I	I	0.161	I
Ca	"	N	N	N	686	N
Cd	"	A	A	A	<0.01	A
		C	C	C		C
Cr	"	C	C	C	<0.0025	C
Cu	"	E	E	E	<0.01	E
Fe	"	S	S	S	22	S
Hg	μg/L	S	S	S	<0.20	S
K	mg/L	I	I	I	6	I
		B	B	B		B
Mg	"	L	L	L	150	L
Mn	"	E	E	E	0.657	E
Na	"				94	
Ni	"				<0.01	
Pb	"				0.045	
Se	"				<0.1	
Zn	"				<0.015	

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNSDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON JANUARY 21, 2009

Parameter	Unit	Lysimeter No.	
		L-8N	L-9N
pH <sup>1</sup>			
EC	mS/m		
Total Dissolved Solids	mg/L		
Total Diss. Org. Carbon	"		
Cl <sup>-</sup>	"		
SO <sub>4</sub> <sup>=</sup>	"	L	L
		Y	Y
TKN	"	S	S
NH <sub>3</sub> -N	"	I	I
NO <sub>2</sub> + NO <sub>3</sub> -N	"	M	M
Total P	"	E	E
Alkalinity as CaCO <sub>3</sub>	"	T	T
		E	E
Al	"	R	R
As	"		
B	"	I	I
Ca	"	N	N
Cd	"	A	A
		C	C
Cr	"	C	C
Cu	"	E	E
Fe	"	S	S
Hg	µg/L	S	S
K	mg/L	I	I
		B	B
Mg	"	L	L
Mn	"	E	E
Na	"		
Ni	"		
Pb	"		
Se	"		
Zn	"		

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

NA = No analysis; insufficient sample.

Lysimeters inaccessible due to snow accumulation.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON FEBRUARY 10, 2009

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-2N	L-3N
pH <sup>1</sup>		7.4	7.7		7.8	7.4
EC	mS/m	156	232		191	235
Total Dissolved Solids <sup>2</sup>	mg/L	704	1,612		1,616	1,736
Total Diss. Org. Carbon	"	5	15		5	22
Cl <sup>-</sup>	"	34	63		359	164
SO <sub>4</sub> <sup>=</sup>	"	239	559		251	176
TKN	"	2	5		1	3
NH <sub>3</sub> -N	"	1	4	L	0.5	0.9
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.35	0.14	Y	0.87	0.34
Total P	"	<0.1	<0.1	S	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	251	519	I	435	1,208
				M		
Al	"	<1	<1	E	<1	<1
As	"	<0.05	<0.05	T	<0.05	<0.05
B	"	0.257	0.542	E	0.241	0.096
Ca	"	110	212	R	146	320
Cd	"	<0.01	<0.01		<0.01	<0.01
				F		
Cr	"	<0.0025	<0.0025	R	<0.0025	<0.0025
Cu	"	<0.01	<0.01	O	<0.01	<0.01
Fe	"	0.9	<0.1	Z	<0.1	5
Hg	μg/L	<0.20	<0.20	E	<0.20	<0.20
K	mg/L	3	18	N	6	2
Mg	"	49	119		84	128
Mn	"	0.041	0.029		0.026	0.610
Na	"	26	32		203	90
Ni	"	<0.01	<0.01		<0.01	<0.01
Pb	"	0.040	0.048		0.047	0.051
Se	"	<0.1	<0.1		<0.1	<0.1
Zn	"	<0.015	<0.015		<0.015	0.016



TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON FEBRUARY 10, 2009

Parameter	Unit	Lysimeter No.				
		L-4N	L-5N	L-6	L-6N	L-7N
pH <sup>1</sup>		7.4	7.3	7.7	7.2	7.8
EC	mS/m	280	449	124	315	134
Total Dissolved Solids <sup>2</sup>	mg/L	3,008	5,056	812	3,352	1,116
Total Diss. Org. Carbon	"	6	3	2	59	12
Cl <sup>-</sup>	"	44	924	55	128	119
SO <sub>4</sub> <sup>=</sup>	"	1,320	1,491	229	1,277	143
TKN	"	5	3	0.3	17	2
NH <sub>3</sub> -N	"	5	2	<0.1	13	1
NO <sub>2</sub> + NO <sub>3</sub> -N	"	1.2	0.91	0.29	1.1	0.20
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	690	543	243	924	417
Al	"	<1	<1	<1	<1	<1
As	"	<0.05	<0.05	<0.05	<0.05	<0.05
B	"	0.153	0.292	0.133	0.182	0.275
Ca	"	570	551	121	692	148
Cd	"	<0.01	<0.01	<0.01	<0.01	<0.01
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	3	10	<0.1	25	2
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	6	20	4	7	5
Mg	"	130	238	53	152	63
Mn	"	0.749	0.253	<0.003	0.670	0.106
Na	"	126	448	19	97	48
Ni	"	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	"	0.040	0.045	0.052	0.039	0.045
Se	"	<0.1	<0.1	<0.1	<0.1	<0.1
Zn	"	0.016	<0.015	<0.015	<0.015	<0.015

TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNSDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON FEBRUARY 10, 2009

Parameter	Unit	Lysimeter No.	
		L-8N	L-9N
pH <sup>1</sup>		7.7	7.6
EC	mS/m	206	199
Total Dissolved Solids <sup>2</sup>	mg/L	1,692	1,584
Total Diss. Org. Carbon	"	5	30
Cl <sup>-</sup>	"	473	218
SO <sub>4</sub> <sup>=</sup>	"	160	240
TKN	"	3	3
NH <sub>3</sub> -N	"	2	0.6
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.44	0.45
Total P	"	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	423	1,097
Al	"	<1	<1
As	"	<0.05	<0.05
B	"	0.200	0.161
Ca	"	165	238
Cd	"	<0.01	<0.01
Cr	"	<0.0025	<0.0025
Cu	"	<0.01	<0.01
Fe	"	0.8	9
Hg	μg/L	<0.20	<0.20
K	mg/L	5	5
Mg	"	70	133
Mn	"	0.228	0.399
Na	"	243	180
Ni	"	<0.01	<0.01
Pb	"	0.044	0.050
Se	"	<0.1	<0.1
Zn	"	<0.015	<0.015

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

<sup>2</sup>Total dissolved solids analyzed beyond recommended holding time of 7 days.

TABLE 4: ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON MARCH 11, 2009

Parameter	Unit	Lysimeter No.				
		L-1	L-1N	L-2	L-2N	L-3N
pH <sup>1</sup>		7.5	7.8	7.6	8.1	7.3
EC	mS/m	153	187	296	226	147
Total Dissolved Solids	mg/L	1,504	1,812	2,336	1,560	1,676
Total Diss. Org. Carbon	"	6	15	2	3	22
Cl <sup>-</sup>	"	48	57	440	365	131
SO <sub>4</sub> <sup>=</sup>	"	557	624	523	227	204
TKN	"	2	5	<0.2	0.8	3
NH <sub>3</sub> -N	"	1	4	<0.1	0.3	0.9
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.92	0.41	0.27	0.34	0.44
Total P	"	<0.1	<0.1	<0.1	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	475	579	429	438	1,206
Al	"	<1	<1	<1	<1	<1
As	"	<0.05	<0.05	<0.05	<0.05	<0.05
B	"	0.440	0.553	0.191	0.199	0.087
Ca	"	220	240	232	127	320
Cd	"	<0.01	<0.01	<0.01	<0.01	<0.01
Cr	"	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Cu	"	<0.01	<0.01	<0.01	<0.01	<0.01
Fe	"	2	0.6	<0.1	<0.1	9
Hg	μg/L	<0.20	<0.20	<0.20	<0.20	<0.20
K	mg/L	6	20	3	5	2
Mg	"	89	127	99	71	126
Mn	"	0.140	0.028	<0.003	0.024	0.658
Na	"	47	37	274	227	86
Ni	"	<0.01	<0.01	<0.01	<0.01	<0.01
Pb	"	0.061	0.046	0.050	0.061	0.056
Se	"	<0.1	<0.1	<0.1	<0.1	<0.1
Zn	"	<0.015	<0.015	<0.015	0.017	<0.015

TABLE 4 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON MARCH 11, 2009

Parameter	Unit	Lysimeter No.				
		L-4N	L-5N	L-6	L-6N	L-7N
pH <sup>1</sup>		7.3	7.4		7.1	7.9
EC	mS/m	303	546		417	167
Total Dissolved Solids	mg/L	3,072	5,052		3,436	956
Total Diss. Org. Carbon	"	6	3		57	8
Cl <sup>-</sup>	"	36	849		120	111
SO <sub>4</sub> <sup>=</sup>	"	1,456	1,642		1,414	164
TKN	"	6	3		19	1
NH <sub>3</sub> -N	"	5	2	L	12	0.2
NO <sub>2</sub> + NO <sub>3</sub> -N	"	1.1	0.19	Y	0.20	0.06
Total P	"	<0.1	<0.1	S	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	752	541	I	951	388
				M		
Al	"	<1	<1	E	<1	<1
As	"	<0.05	<0.05	T	<0.05	<0.05
B	"	0.132	0.287	E	0.182	0.234
Ca	"	654	561	R	719	111
Cd	"	<0.01	<0.01		<0.01	<0.01
				F		
Cr	"	<0.0025	<0.0025	R	<0.0025	<0.0025
Cu	"	<0.01	<0.01	O	<0.01	<0.01
Fe	"	8	9	Z	29	0.3
Hg	μg/L	<0.20	<0.20	E	<0.20	<0.20
K	mg/L	7	20	N	8	6
Mg	"	127	226		152	61
Mn	"	0.825	0.215		0.613	0.067
Na	"	154	478		113	60
Ni	"	<0.01	<0.01		<0.01	<0.01
Pb	"	0.048	0.060		0.052	0.056
Se	"	<0.1	<0.1		<0.1	<0.1
Zn	"	<0.015	<0.015		<0.015	<0.015

TABLE 4 (Continued): ANALYSIS OF WATER FROM LYSIMETERS  
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE  
SOLIDS MANAGEMENT AREA SAMPLED ON MARCH 11, 2009

Parameter	Unit	Lysimeter No.	
		L-8N	L-9N
pH <sup>1</sup>		7.9	7.8
EC	mS/m	221	257
Total Dissolved Solids	mg/L	1,952	NA
Total Diss. Org. Carbon	"	5	25
Cl <sup>-</sup>	"	518	223
SO <sub>4</sub> <sup>=</sup>	"	261	268
TKN	"	3	2
NH <sub>3</sub> -N	"	2	0.4
NO <sub>2</sub> + NO <sub>3</sub> -N	"	0.13	0.67
Total P	"	<0.1	<0.1
Alkalinity as CaCO <sub>3</sub>	"	371	947
Al	"	<1	<1
As	"	<0.05	<0.05
B	"	0.195	0.184
Ca	"	173	236
Cd	"	<0.01	<0.01
Cr	"	<0.0025	<0.0025
Cu	"	<0.01	<0.01
Fe	"	2	0.2
Hg	μg/L	<0.20	<0.20
K	mg/L	6	6
Mg	"	65	136
Mn	"	0.249	0.141
Na	"	301	196
Ni	"	<0.01	<0.01
Pb	"	0.053	0.050
Se	"	<0.1	<0.1
Zn	"	<0.015	<0.015

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

NA = No analysis; insufficient sample.

TABLE 5: ANALYSIS OF MONTHLY COMPOSITED DIGESTED  
BIOSOLIDS PLACED IN THE LAWNSDALE AVENUE  
SOLIDS MANAGEMENT DRYING AREA DURING JANUARY 2009

Parameter	Unit	Concentration <sup>1</sup>
pH		6.7
Total Solids	%	70.0
Total Volatile Solids <sup>2</sup>	%	39.7
TKN	mg/kg	25,136
NH <sub>3</sub> -N	”	4,227

<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 LAWNSDALE AVENUE  
 SOLIDS MANAGEMENT DRYING AREA DURING MARCH 2009

Parameter	Unit	Concentration <sup>1</sup>
pH		8.4
Total Solids	%	22.7
Total Volatile Solids <sup>2</sup>	%	54.3
TKN	mg/kg	43,015
NH <sub>3</sub> -N	”	8,498
Total P	”	17,284
Al	”	18,484
As	”	<10
Ca	”	34,057
Cd	”	3
Cr	”	181
Cu	”	430
Fe	”	16,450
Hg	”	0.72
K	”	2,434
Mg	”	13,895
Mn	”	621
Mo	”	14
Na	”	916
Ni	”	44
Pb	”	114
Se	”	<8
Zn	”	813

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

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