

Protecting Our Water Environment



METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

***RESEARCH AND DEVELOPMENT
DEPARTMENT***

REPORT NO. 08-9

***LAWNDALE AVENUE SOLIDS MANAGEMENT AREA
MONITORING REPORT FOR
FOURTH QUARTER 2007***

MARCH 2008

March 5, 2008

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: Lawndale Avenue Solids Management Area - Stickney WRP, Contract No. 80-159-2P, IEPA Permit No. 2005-AO-4283, Monitoring Report for October, November, and December 2007

The attached ten tables contain the monitoring data for the Lawndale Avenue Solids Management Area for October, November, and December 2007 as required by IEPA Operating Permit No. 2005-AO-4283. In a letter dated January 19, 2007, the IEPA granted permission to terminate the monitoring of lysimeters L-7 and L-8. Beginning October 2007, permission has also been granted for the abandonment of lysimeters L-3, L-4, and L-5. 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 Monitoring Wells M-11 through M-15 at the Lawndale Avenue Solids Management Area Sampled on October 10, 2007

Table 2, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on October 10, 2007

Table 3, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on November 7, 2007

Table 4, Analysis of Water from Lysimeters L-1 through L-9N at the Lawndale Avenue Solids Management Area Sampled on December 5, 2007

Table 5, Analysis of Monthly Compositing Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area During October 2007

Subject: Lawndale Avenue Solids Management Area - Stickney WRP, Contract No. 80-159-2P, IEPA Permit No. 2005-AO-4283, Monitoring Report for October, November, and December 2007

Table 6, Analysis of Monthly Composited Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area During November 2007

Table 7, Analysis of Monthly Composited Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area During December 2007

Table 8, Analysis of Monthly Composited Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During October 2007

Table 9, Analysis of Monthly Composited Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During November 2007

Table 10, Analysis of Monthly Composited Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During December 2007

Biosolids were placed in and removed from the solids drying area during October, November, and December 2007.

Very truly yours,

Louis Kollias
Director
Research and Development

LK:TCG:AC:PL:spy

Attachments

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

cc wo/att: Jamjun/Sharma/Garelli/Conway

Subject: Lawndale Avenue Solids Management Area - Stickney WRP, Contract No. 80-159-2P, IEPA Permit No. 2005-AO-4283, Monitoring Report for October, November, and December 2007

Table 6, Analysis of Monthly Compositated Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area During November 2007

Table 7, Analysis of Monthly Compositated Digested Biosolids Placed in the Lawndale Avenue Solids Management Drying Area During December 2007

Table 8, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During October 2007

Table 9, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During November 2007

Table 10, Analysis of Monthly Compositated Processed Digested Biosolids Removed from the Lawndale Avenue Solids Management Drying Area During December 2007

Biosolids were placed in and removed from the solids drying area during October, November, and December 2007.

Very truly yours,

Louis Kollias
Director
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LK:PL:spy
Attachments

cc w/att: Mr. Sulski, IEPA
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cc wo/att: Jamjun/Sharma/Garelli/Conway

TABLE 1: ANALYSIS OF WATER FROM MONITORING WELLS
M-11 THROUGH M-15 AT THE LAWNSDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON OCTOBER 10, 2007

Parameter	Unit	Monitoring Well No.				
		M-11	M-12	M-13	M-14	M-15
pH ¹		7.8	7.8	7.7	8.0	7.6
EC	mS/m	38	60	71	48	78
Total Diss. Org. Carbon	mg/L	1	1	1	0.8	2
Cl ⁻	"	10	16	11	9	10
SO ₄ ⁼	"	223	409	736	141	972
TKN	"	1.4	0.51	0.53	0.30	0.56
NH ₃ -N	"	1.2	0.35	0.43	0.26	0.52
NO ₂ + NO ₃ -N	"	0.03	0.03	0.02	0.02	0.03
Total P	"	<0.05	<0.05	<0.05	<0.05	<0.05
Alkalinity as CaCO ₃	"	356	299	328	318	359
Al	"	0.009	<0.007	0.018	<0.007	0.026
As	"	<0.01	<0.01	<0.01	<0.01	<0.01
B	"	1.28	1.74	1.46	1.26	1.13
Ca	"	87	76	161	68	226
Cd	"	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cr	"	<0.0005	0.0006	<0.0005	<0.0005	0.0005
Cu	"	<0.002	<0.002	<0.002	<0.002	<0.002
Fe	"	1.15	0.007	0.054	0.019	1.42
Hg	μg/L	<0.05	<0.05	<0.05	<0.05	<0.05
K	mg/L	8	9	10	8	10
Mg	"	41.8	36.2	76.3	38.1	103
Mn	"	0.0172	0.0035	0.0057	0.0018	0.0137
Na	"	53	131	87	40	61
Ni	"	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Pb	"	0.005	<0.004	0.004	0.005	<0.004
Se	"	<0.02	<0.02	<0.02	<0.02	<0.02
Zn	"	1.66	0.814	1.73	0.691	4.01
FC	MPN*	<1	<1	<1	<1	<1
Static H ₂ O Elev.	ft	628	632	629	623	605

¹pH analyzed beyond recommended holding time of 15 minutes.

*MPN = Most probable number per 100 mL.

TABLE 2: ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON OCTOBER 10, 2007

Parameter	Unit	Lysimeter No.				
		L-1	L-2	L-3N	L-4N	L-5N
pH ¹		7.6	8.0	7.6		7.7
EC	mS/m	173	293	228		544
Total Dissolved Solids	mg/L	1,428	2,344	1,870		4,774
Total Diss. Org. Carbon	"	6	4	21		3
Cl ⁻	"	61	469	137		885
SO ₄ ⁼	"	541	549	279		1,883
TKN	"	4.8	0.92	2.7		3.5
NH ₃ -N	"	3.7	0.08	0.89		2.0
NO ₂ + NO ₃ -N	"	0.27	1.7	0.18		0.60
Total P	"	<0.05	<0.10	<0.05	L	<0.05
Alkalinity as CaCO ₃	"	458	490	1,164	Y	491
Al	"	0.021	0.026	0.039	S	0.053
As	"	<0.01	<0.02	<0.01	I	<0.01
B	"	0.470	0.190	0.107	M	0.306
Ca	"	209	242	333	E	511
Cd	"	<0.0004	<0.0008	<0.0004	T	<0.0004
Cr	"	<0.0005	<0.0010	0.0009	E	<0.0005
Cu	"	<0.002	0.006	<0.002	R	<0.002
Fe	"	3.38	0.586	5.55	D	5.57
Hg	μg/L	<0.05	<0.10	<0.05	R	<0.05
K	mg/L	6	3	2	Y	22
Mg	"	89.9	108	133		266
Mn	"	0.0696	0.0838	0.7601		0.2062
Na	"	47	248	75		444
Ni	"	<0.0004	<0.0008	<0.0004		<0.0004
Pb	"	<0.004	0.017	<0.004		<0.004
Se	"	<0.02	<0.04	<0.02		<0.02
Zn	"	<0.002	0.016	0.007		0.008

TABLE 2 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON OCTOBER 10, 2007

Parameter	Unit	Lysimeter No.				
		L-6	L-6N	L-7N	L-8N	L-9N
pH ¹		7.5	8.0	7.9	7.9	7.9
EC	mS/m	219	330	119	254	254
Total Dissolved Solids	mg/L	NA	3,336	922	1,848	NA
Total Diss. Org. Carbon	"	NA	55	9	11	26
Cl ⁻	"	NA	83	142	386	190
SO ₄ ⁼	"	NA	1,448	96	201	295
TKN	"	NA	22	1.2	4.4	2.7
NH ₃ -N	"	NA	14	0.32	2.9	0.67
NO ₂ + NO ₃ -N	"	NA	0.95	0.53	0.29	1.2
Total P	"	NA	0.09	<0.05	0.29	<0.05
Alkalinity as CaCO ₃	"	NA	889	416	734	1,053
Al	"	NA	0.054	0.015	0.025	0.024
As	"	NA	<0.01	<0.01	<0.01	<0.01
B	"	NA	0.184	0.261	0.208	0.186
Ca	"	NA	630	113	213	214
Cd	"	NA	<0.0004	<0.0004	<0.0004	<0.0004
Cr	"	NA	0.0009	<0.0005	0.0006	0.0009
Cu	"	NA	<0.002	<0.002	<0.002	<0.002
Fe	"	NA	22.1	0.356	0.863	1.31
Hg	μg/L	NA	<0.05	<0.05	0.13	<0.05
K	mg/L	NA	8	7	5	6
Mg	"	NA	148	62.0	103	116
Mn	"	NA	0.5484	0.0852	0.3436	0.2526
Na	"	NA	73	56	189	249
Ni	"	NA	0.0058	<0.0004	<0.0004	<0.0004
Pb	"	NA	<0.004	0.005	<0.004	0.005
Se	"	NA	<0.02	<0.02	<0.02	<0.02
Zn	"	NA	0.010	0.007	0.006	<0.002

¹pH analyzed beyond recommended holding time of 15 minutes.

NA = No analysis; insufficient sample.

TABLE 3: ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON NOVEMBER 7, 2007

Parameter	Unit	Lysimeter No.				
		L-1	L-2	L-3N	L-4N	L-5N
pH ¹		7.7	8.0	7.4	7.6	7.6
EC	mS/m	168	297	216	352	541
Total Dissolved Solids	mg/L	1,476	2,288	1,712	3,500	4,836
Total Diss. Org. Carbon	"	7	3	19	6	2
Cl ⁻	"	56	524	157	77	947
SO ₄ ⁼	"	528	649	215	1,709	1,803
TKN	"	5.3	0.66	3.0	8.9	3.1
NH ₃ -N	"	4.2	0.12	1.4	6.3	2.0
NO ₂ + NO ₃ -N	"	0.04	0.10	0.10	0.05	0.14
Total P	"	<0.05	<0.10	1.1	0.23	<0.05
Alkalinity as CaCO ₃	"	508	424	1,018	731	519
Al	"	0.034	0.046	0.047	0.069	0.062
As	"	<0.01	<0.02	<0.01	<0.01	<0.01
B	"	0.443	0.168	0.081	0.135	0.301
Ca	"	217	242	299	569	614
Cd	"	0.0004	0.0008	0.0008	0.0006	0.0006
Cr	"	0.0006	0.0012	0.0011	0.0006	<0.0005
Cu	"	<0.002	<0.004	<0.002	<0.002	<0.002
Fe	"	3.39	0.220	13.5	10.8	8.15
Hg	μg/L	<0.05	<0.10	<0.05	<0.05	<0.05
K	mg/L	6	4	2	7	23
Mg	"	94.5	111	120	150	315
Mn	"	0.1053	0.0144	0.6221	1.045	0.2141
Na	"	43	262	86	146	464
Ni	"	<0.0004	<0.0008	<0.0004	<0.0004	0.0004
Pb	"	<0.004	<0.008	<0.004	<0.004	<0.004
Se	"	<0.02	<0.04	<0.02	<0.02	<0.02
Zn	"	0.004	0.012	0.007	0.014	0.012

TABLE 3 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON NOVEMBER 7, 2007

Parameter	Unit	Lysimeter No.				
		L-6	L-6N	L-7N	L-8N	L-9N
pH ¹			7.4	7.9	7.8	7.9
EC	mS/m		324	125	246	241
Total Dissolved Solids	mg/L		3,392	880	1,820	1,980
Total Diss. Org. Carbon	"		57	8	11	27
Cl ⁻	"		74	161	426	188
SO ₄ ⁼	"		1,413	109	255	332
TKN	"		21	1.3	4.5	2.8
NH ₃ -N	"		13	0.43	2.7	0.67
NO ₂ + NO ₃ -N	"		0.05	0.11	0.17	0.22
Total P	"	L	<0.05	<0.05	0.07	<0.05
Alkalinity as CaCO ₃	"	Y	898	451	708	1,116
		S				
Al	"	I	0.075	0.019	0.034	0.038
As	"	M	<0.01	<0.01	<0.01	<0.01
B	"	E	0.169	0.258	0.188	0.164
Ca	"	T	602	115	205	215
Cd	"	E	0.0006	0.0006	0.0007	0.0008
		R				
Cr	"		0.0007	0.0006	0.0005	0.0012
Cu	"	D	<0.002	<0.002	<0.002	<0.002
Fe	"	R	29.3	1.73	5.44	5.79
Hg	μg/L	Y	<0.05	<0.05	<0.05	<0.05
K	mg/L		8	7	5	6
Mg	"		146	63.9	100	121
Mn	"		0.5300	0.0908	0.3206	0.2685
Na	"		71	64	210	249
Ni	"		0.0066	0.0009	<0.0004	0.0018
Pb	"		<0.004	<0.004	<0.004	<0.004
Se	"		<0.02	<0.02	<0.02	<0.02
Zn	"		0.013	0.013	0.015	0.023

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 4: ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON DECEMBER 5, 2007

Parameter	Unit	Lysimeter No.				
		L-1	L-2	L-3N	L-4N	L-5N
pH ¹		7.6		7.6	7.1	
EC	mS/m	152		231	316	
Total Dissolved Solids	mg/L	1,420		1,884	3,344	
Total Diss. Org. Carbon	"	7		20	6	
Cl ⁻	"	45		149	70	
SO ₄ ⁼	"	540		236	1,571	
TKN	"	4.6		2.7	7.8	
NH ₃ -N	"	3.7		0.96	5.8	
NO ₂ + NO ₃ -N	"	0.42		0.59	0.76	
Total P	"	0.05	L	0.10	0.06	L
Alkalinity as CaCO ₃	"	408	Y S	1,020	600	Y S
Al	"	0.029	I	0.040	0.058	I
As	"	<0.01	M	<0.01	<0.01	M
B	"	0.465	E	0.083	0.134	E
Ca	"	217	T	346	580	T
Cd	"	<0.0004	E R	<0.0004	<0.0004	E R
Cr	"	0.0012		0.0021	0.0015	
Cu	"	<0.002	D	<0.002	<0.002	D
Fe	"	3.47	R	5.98	9.44	R
Hg	μg/L	<0.05	Y	<0.05	<0.05	Y
K	mg/L	6		2	7	
Mg	"	93.1		135	143	
Mn	"	0.0662		0.7397	0.9550	
Na	"	41		88	148	
Ni	"	<0.0004		<0.0004	<0.0004	
Pb	"	<0.004		<0.004	<0.004	
Se	"	<0.02		<0.02	<0.02	
Zn	"	0.005		0.009	0.012	

TABLE 4 (Continued): ANALYSIS OF WATER FROM LYSIMETERS
L-1 THROUGH L-9N AT THE LAWNDALE AVENUE
SOLIDS MANAGEMENT AREA SAMPLED ON DECEMBER 5, 2007

Parameter	Unit	Lysimeter No.				
		L-6	L-6N	L-7N	L-8N	L-9N
pH ¹			7.8	8.1	8.1	
EC	mS/m		306	117	249	
Total Dissolved Solids	mg/L		3,176	856	1,736	
Total Diss. Org. Carbon	"		55	9	7	
Cl ⁻	"		66	116	416	
SO ₄ ⁼	"		1,428	107	242	
TKN	"		20	1.1	3.5	
NH ₃ -N	"		13	0.44	2.5	
NO ₂ + NO ₃ -N	"		0.51	0.36	0.32	
Total P	"	L	0.05	<0.05	<0.05	L
Alkalinity as CaCO ₃	"	Y	699	375	512	Y
		S				S
Al	"	I	0.060	0.017	0.023	I
As	"	M	<0.01	<0.01	<0.01	M
B	"	E	0.187	0.274	0.213	E
Ca	"	T	670	118	196	T
Cd	"	E	0.0004	<0.0004	0.0004	E
		R				R
Cr	"		0.0019	0.0010	0.0013	
Cu	"	D	<0.002	<0.002	<0.002	D
Fe	"	R	22.3	0.902	1.75	R
Hg	μg/L	Y	<0.05	<0.05	<0.05	Y
K	mg/L		7	7	5	
Mg	"		151	60.9	88.1	
Mn	"		0.5758	0.0763	0.2897	
Na	"		74	49	221	
Ni	"		0.0063	0.0011	<0.0004	
Pb	"		<0.004	<0.004	<0.004	
Se	"		<0.02	<0.02	<0.02	
Zn	"		0.010	0.005	0.005	

¹pH analyzed beyond recommended holding time of 15 minutes.

TABLE 5: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
 BIOSOLIDS PLACED IN THE LAWNSDALE AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING OCTOBER 2007

Parameter	Unit	Concentration ¹
pH		7.8
Total Solids	%	11.6
Total Volatile Solids ²	%	47.4
TKN	mg/kg	42,505
NH ₃ -N	”	12,228

¹Values are the means of nine samples.

²Total volatile solids as a percentage of total solids.

TABLE 6: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
BIOSOLIDS PLACED IN THE LAWNSDALE AVENUE
SOLIDS MANAGEMENT DRYING AREA DURING NOVEMBER 2007

Parameter	Unit	Concentration ¹
pH		7.7
Total Solids	%	15.0
Total Volatile Solids ²	%	47.6
TKN	mg/kg	44,758
NH ₃ -N	”	9,352

¹Values are the means of three samples.

²Total volatile solids as a percentage of total solids.

TABLE 7: ANALYSIS OF MONTHLY COMPOSITED DIGESTED
BIOSOLIDS PLACED IN THE LAWNSDALE AVENUE
SOLIDS MANAGEMENT DRYING AREA DURING DECEMBER 2007

Parameter	Unit	Concentration ¹
pH		7.9
Total Solids	%	22.5
Total Volatile Solids ²	%	57.4
TKN	mg/kg	49,353
NH ₃ -N	"	5,975

¹Values for one sample only.

²Total volatile solids as a percentage of total solids.

TABLE 8: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE LAWNSDALE AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING OCTOBER 2007

Parameter	Unit	Concentration ¹
pH		7.4
Total Solids	%	56.6
Total Volatile Solids ²	%	37.0
TKN	mg/kg	24,141
NH ₃ -N	”	5,364
Total P	”	17,992
Al	”	24,365
As	”	<5
Ca	”	41,783
Cd	”	5
Cr	”	219
Cu	”	369
Fe	”	19,994
Hg	”	1.0
K	”	4,914
Mg	”	20,412
Mn	”	565
Mo	”	14
Na	”	944
Ni	”	48
Pb	”	125
Se	”	<4
Zn	”	838

¹Values are the means of twenty-six samples.

²Total volatile solids as a percentage of total solids.

TABLE 9: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE LAWNSDALE AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING NOVEMBER 2007

Parameter	Unit	Concentration ¹
pH		7.3
Total Solids	%	55.7
Total Volatile Solids ²	%	30.3
TKN	mg/kg	22,292
NH ₃ -N	”	4,138
Total P	”	17,239
Al	”	25,257
As	”	<5
Ca	”	42,426
Cd	”	6
Cr	”	198
Cu	”	332
Fe	”	21,004
Hg	”	0.91
K	”	5,636
Mg	”	21,846
Mn	”	536
Mo	”	12
Na	”	770
Ni	”	45
Pb	”	123
Se	”	<4
Zn	”	776

¹Values are the means of thirteen samples.

²Total volatile solids as a percentage of total solids.

TABLE 10: ANALYSIS OF MONTHLY COMPOSITED PROCESSED DIGESTED
 BIOSOLIDS REMOVED FROM THE LAWNSDALE AVENUE
 SOLIDS MANAGEMENT DRYING AREA DURING DECEMBER 2007

Parameter	Unit	Concentration ¹
pH		6.4
Total Solids	%	65.2
Total Volatile Solids ²	%	22.0
TKN	mg/kg	10,734
NH ₃ -N	”	164
Total P	”	14,122
Al	”	24,621
As	”	<5
Ca	”	54,154
Cd	”	9
Cr	”	250
Cu	”	321
Fe	”	21,678
Hg	”	0.78
K	”	5,828
Mg	”	27,819
Mn	”	518
Mo	”	13
Na	”	<600
Ni	”	46
Pb	”	132
Se	”	<4
Zn	”	808

¹Values are the means of two samples.

²Total volatile solids as a percentage of total solids.