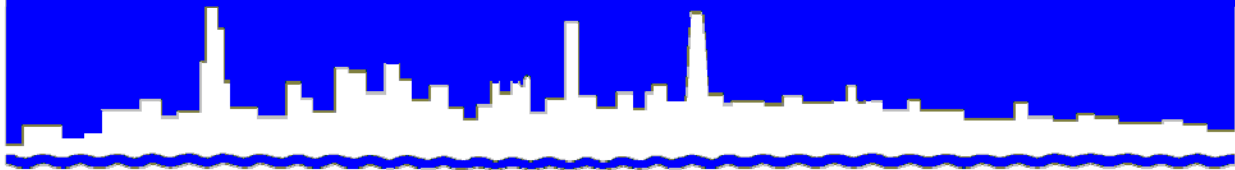


*Protecting Our Water Environment*



***Metropolitan Water Reclamation District of Greater Chicago***

*MONITORING AND RESEARCH  
DEPARTMENT*

***REPORT NO. 16-05***

***ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR  
2015***

***February 2016***

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**Metropolitan Water Reclamation District of Greater Chicago**

**CECIL LUE-HING RESEARCH AND DEVELOPMENT COMPLEX  
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**THOMAS C. GRANATO, Ph.D., BCES**  
Director of Monitoring and Research

February 17, 2015

USEPA, Region 7  
Attention: Biosolids Center  
WWPD/WENF  
11201 Renner Boulevard  
Lenexa, Kansas 66219

Dear Sir or Madam:

Subject: 2015 Reporting Requirements Under the United States Environmental Protection Agency Code of Federal Regulations Title 40 Part 503

The Metropolitan Water Reclamation District of Greater Chicago (District) herein submits the 2015 records required under the United States Environmental Protection Agency Code of Federal Regulations Title 40 Part 503 (Part 503) at Section 503.18 entitled "Annual Biosolids Management Report for 2015."

We believe this report satisfies the reporting requirements under Part 503.

Certification Statement Required for Record Keeping

"I certify under penalty of law, that the information that will be used to determine compliance with the Class A pathogen requirements, Class B pathogen requirements, vector attraction reduction requirements, management practices, site restrictions, and requirements to obtain information as described in Sections 503.32(a)(5), 503.32(a)(6), 503.32(a)(7), 503.32(a)(8), 503.32(b)(2), 503.32(b)(3), 503.32(b)(5), 503.33(b)(1), 503.33(b)(5), 503.33(b)(9), 503.33(b)(10), 503.13, 503.14, and 503.16 for the District's land application sites was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

If you have any questions, please telephone me at (312) 751-5190.

Very truly yours,

Thomas C. Granato, Ph.D., BCES  
Director  
Monitoring and Research

TCG:HZ:PL:cm

Attachment

cc w/att: V. Aistars (USEPA)/T. Bramscher (USEPA)/A. Keller (IEPA)  
B. Yurdin (IEPA)/M. Garretson (IEPA)/J. Patel (IEPA)

**ANNUAL BIOSOLIDS MANAGEMENT REPORT  
FOR 2015**

**By**

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## LIST OF ACRONYMS

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Abbreviation/Acronym	Definition
CALSMA	Calumet Solids Management Area
CFR	Code of Federal Regulations
District	Metropolitan Water Reclamation District of Greater Chicago
DT	dry tons
Egan	John E. Egan Water Reclamation Plant
EQ	Exceptional Quality Biosolids
HASMA	Harlem Avenue Solids Management Area
IEPA	Illinois Environmental Protection Agency
Kirie	James C. Kirie Water Reclamation Plant
LASMA	Lawndale Avenue Solids Management Area
MGD	million gallons per day
O'Brien	Terrence J. O'Brien Water Reclamation Plant
Part 503	United States Environmental Protection Agency's Code of Federal Regulations Title 40 Part 503
PFRP	Process to Further Reduce Pathogens
USEPA	United States Environmental Agency
WRP	water reclamation plant

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## **ACKNOWLEDGEMENT**

The assistance of the following individuals is greatly appreciated: Mr. Daniel Collins, Supervising Civil Engineer, Mr. Ahmad Laban, Principal Civil Engineer, Ms. Elizabeth Tijerina, Senior Civil Engineer (retired), and Mr. Richard Kuzminski, Associate Civil Engineer, Lawndale Avenue Solids Management Area; Ms. Jacquelyn Caston, Engineering Technician V, and Mr. Jamaal Kendrick, Engineering Technician V, Calumet Solids Management Areas; Ms. Katarzyna Lai, Principal Civil Engineer, John E. Egan (Egan) Water Reclamation Plant (WRP); Mr. Robert Podgorny, Engineering Technician V, Hanover Park WRP; Dr. Geeta Rijal, Supervising Environmental Microbiologist, Analytical Microbiology and Biomonitoring Section; Mr. John Chavich, Supervising Environmental Chemist, Egan Analytical Laboratory Section; Ms. Donna Coolidge, Assistant Director of Monitoring and Research, Analytical Laboratories Division.

Special thanks are given to Ms. Coleen Maurovich for typing this report.

## **DISCLAIMER**

Mention of proprietary equipment and chemicals in this report does not constitute endorsement by the Metropolitan Water Reclamation District of Greater Chicago (District).

## **FOREWORD**

The data and information in this report fulfill the frequency of monitoring and the reporting requirements for 2015 for Biosolids Management by the District, as specified in the United States Environmental Protection Agency's (USEPA's) Code of Federal Regulations (CFR) Title 40 Part 503 (Part 503).

## INTRODUCTION

This District's report presents the 2015 records required under Part 503 at Section 503.18.

The District has four Illinois Environmental Protection Agency (IEPA) permitted biosolids management programs that must comply with Part 503 requirements. These programs are:

1. Fulton County Dedicated Biosolids Application to Land (IEPA Permit No. 2013-SC-58146).
2. Hanover Park Fischer Farm Biosolids Application to Land (IEPA Permit No. 2012-SC-2255).
3. Controlled Solids Distribution Program (Biosolids Application to Land in the Chicago Area under IEPA Permit No. 2010-SC-0200 and 2015-SC-59620).
4. Farmland Application Program (Biosolids Application to Farmland from the Calumet, Stickney, and Egan WRPs under IEPA Permit No. 2014-SC-58425).

In the following sections, we have prepared a short description of the sludge processing and biosolids management operations at the District's seven WRPs. The Lemont, James C. Kirie (Kirie), and Terrence J. O'Brien (O'Brien) WRPs do not produce a final biosolids product, while the Calumet, Stickney and Hanover Park WRPs produced final biosolids products that were beneficially used in 2015. The Egan WRP did not produce final biosolids products in 2015 due to scheduled digester maintenance. In addition, we discuss the utilization of the biosolids, outline the data-reporting requirements under Part 503, and present the required monitoring data in summary tables. The 2015 production and utilization of sludges and biosolids generated by the District are summarized in Table 1. It should be noted that the total biosolids production in any given year may not equal the amount of the final biosolids product utilized, since biosolids may be utilized from production inventory for a previous year or biosolids produced in a given year may be stored or aged for utilization at a later time.

TABLE 1: PRODUCTION AND UTILIZATION OF SLUDGE AND BIOSOLIDS DURING 2015

Production and Utilization	Water Reclamation Plants						
	Stickney <sup>1</sup>	Calumet <sup>1</sup>	O'Brien	Egan <sup>1</sup>	Hanover Park <sup>1</sup>	Kirie	Lemont
	----- Dry Tons -----						
Production <sup>2</sup>	103,199	21,756	34,881	7,823	821	6,511	320
Land Application	54,879	16,142	-	0	999	-	-
Agricultural land	44,517 <sup>3</sup>	7,222	-	0	-	-	-
Urban land	10,362 <sup>4</sup>	8,920 <sup>5</sup>	-	-	-	-	-
Landfill (Total)	1,006	647	-	-	-	-	-
Co-disposal	1,006 <sup>6</sup>	224	-	-	-	-	-
Daily cover	-	-	-	-	-	-	-
Final cover	-	423	-	-	-	-	-
To Other WRPs <sup>7</sup>	-	-	34,881	7,823 <sup>8</sup>	-	6,511	320
Temporary Storage	-	-	-	-	-	-	-
Other <sup>9</sup>	37,750	-	-	-	-	-	-

<sup>1</sup>Differences between biosolids production and total use or disposal in 2015 were due to a net withdrawal or storage in lagoons or drying areas, and processing of biosolids imported from other WRPs.

<sup>2</sup>Stickney, Calumet, and Hanover Park WRPs produced biosolids while O'Brien, Kirie, Egan, and Lemont produced undigested or partially digested sludge. Figures represent total solids generated at the end of each plant's processing train plus those imported from other plants for further processing.

<sup>3</sup>Includes 7 DT used on Fulton County research plots.

<sup>4</sup>Includes 6,531 DT of air-dried exceptional quality (EQ) and 1,661 DT of air-dried Class B biosolids applied to urban land and District property, respectively, plus 2,170 DT of air-dried composted EQ biosolids applied to urban land.

<sup>5</sup>Includes 8,320 DT of air-dried EQ biosolids and 600 DT of composted biosolids applied to urban land and District property.

<sup>6</sup>Includes 157 DT of Egan WRP solids from digester cleaning trucked to LASMA before landfill co-disposal.

<sup>7</sup>For further processing.

<sup>8</sup>Includes 15 DT of centrate and 7,650 DT of solids pumped to the O'Brien WRP and 157 DT of unsuitable solids trucked to LASMA for landfill co-disposal.

<sup>9</sup>Sent to Stickney WRP pelletizing facility owned and operated by Metropolitan Biosolids Management, LLC, Lyons, IL 60534 (Contract No. 98-RFP-10).

## LEMONT WATER RECLAMATION PLANT

The Lemont WRP, located in Lemont, Illinois, has a design average flow of 2.3 million gallons per day (MGD). The annual average treated flow in 2015 was 2.40 MGD. Wastewater reclamation processes include both primary (primary settling) and secondary (activated sludge process) treatments. In 2015, the Lemont WRP produced 320 dry tons (DT) of solids (Table 1), which were gravity concentrated and transported to the Stickney WRP for further processing.

No final biosolids product is generated at this WRP.

## JAMES C. KIRIE WATER RECLAMATION PLANT

The Kirie WRP, located in Des Plaines, Illinois, has a design average flow of 52 MGD. The annual average treated flow in 2015 was 29.3 MGD. Wastewater reclamation processes include grit tanks, secondary (activated sludge process), and tertiary (sand filtration) treatments. In 2015, the Kirie WRP produced 6,511 DT of solids (Table 1), which were sent via force main to the Egan WRP, then to the O'Brien WRP, then to the Stickney WRP for further processing.

No final biosolids product is generated at this WRP.

## TERRENCE J. O'BRIEN WATER RECLAMATION PLANT

The O'Brien WRP, located in Skokie, Illinois, has a design average flow of 333 MGD. The annual average treated flow in 2015 was 233 MGD. Wastewater reclamation processes at the O'Brien WRP include primary (primary settling) and secondary (activated sludge process) treatments. In 2015, the O'Brien WRP produced 34,881 DT of solids (Table 1), which were sent via pipeline to the Stickney WRP for further treatment. This total includes solids generated from water reclamation at the O'Brien WRP and solids conveyed from the Egan WRP to the O'Brien WRP via sewer, which is described in the next section.

No final biosolids product is generated at this WRP.



## **JOHN E. EGAN WATER RECLAMATION PLANT**

### **Treatment Plant and Biosolids Process Train Description**

The Egan WRP, located in Schaumburg, Illinois, has a design average flow of 30 MGD. The annual average treated flow in 2015 was 24.7 MGD. Wastewater reclamation processes include primary (primary settling), secondary (activated sludge process), and tertiary (sand filtration) treatments. All solids generated at the Egan WRP, including solids conveyed from the Kirie WRP, are anaerobically digested. During some winters or when the centrifuges are not operating, liquid digested solids are sent via sewers to the O'Brien WRP. Centrifuge centrate is also sent via sewers to the O'Brien WRP.

In 2015, the total solids production at the Egan WRP was 7,823 DT (Table 1). All solids generated at the Egan WRP, except 157 DT of unsuitable solids (resulted from digester cleaning) shipped to the Lawndale Avenue Solids Management Area (LASMA) for landfill co-disposal, were pumped to the O'Brien WRP and then to the Stickney WRP for digestion and further processing.

Solids were digested at the Egan WRP for most of the year, but during July through December at least one digester was temporarily out of service. However, except for the 157 dry tons of solids from digester cleaning trucked to LASMA before landfill disposal, no further reporting is required because all solids generated at the Egan WRP were sent to the Stickney WRP via the O'Brien WRP for digestion and further processing.

### **Summary of Biosolids Use and Disposal at Landfills**

In 2015, 157 DT of solids from digester cleaning were trucked from the Egan WRP to LASMA and then sent to the Laraway landfill in Joliet for co-disposal.

### **Biosolids Conveyed to Other Water Reclamation Plants for Further Processing**

In 2015, a total of 7,650 DT of solids and 15 DT of centrifuge centrate were pumped to the O'Brien WRP for further processing. In addition, a total of 157 DT of unsuitable solids from digester cleaning were trucked to LASMA for co-disposal in a landfill.

## HANOVER PARK WATER RECLAMATION PLANT

### **Treatment Plant and Biosolids Process Train Description**

The Hanover Park WRP, located in Hanover Park, Illinois, has a design average flow of 12 MGD. The annual average treated flow in 2015 was 9.0 MGD. Wastewater reclamation processes at this WRP include primary (primary settling), secondary (activated sludge process), and tertiary (sand filtration) treatments. All solids produced at the Hanover Park WRP are anaerobically digested and stored in lagoons and later land-applied by injection at the on-site Fischer Farm.

In 2015, the total biosolids production at this WRP was 821 DT (Table 1).

### **Land Application of Class B Liquid Biosolids**

In 2015, the Hanover Park WRP land-applied a total of 999 DT of biosolids at the on-site Fischer Farm under IEPA Permit No. 2012-SC-2255. The quantity of land-applied biosolids (999 DT) was higher than the quantity produced (821 DT) in 2015, due to the use of 178 DT from lagoon storage. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

All Hanover Park WRP lagoon biosolids land-applied in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 for all metals (Table 2). All biosolids also met the anaerobic digestion time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 3), and the vector attraction reduction requirements of Section 503.33(b)(1) (Table 4). Management practices at this land-application site complied with Section 503.14 as previously described in a letter to the USEPA dated January 28, 1994 (Appendix I).

TABLE 2: CONCENTRATIONS OF NITROGEN AND METALS IN BIOSOLIDS<sup>1</sup> GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----										
04/18/15	395,071	346,321	36	<1	76	<0.20	7	22	14	16	115
04/25/15	463,375	424,344	31	<1	127	<0.20	6	18	13	11	166
05/16/15	445,071	362,679	36	<1	83	<0.20	7	20	14	15	126
06/06/15	371,393	285,143	36	<1	49	<0.20	7	21	19	5	74
07/11/15	342,500	259,464	36	<1	41	<0.20	7	18	14	<4	62
∞ 08/01/15	297,200	242,233	33	<1	47	<0.20	7	34	13	4	75
08/15/15	274,000	229,500	29	<1	37	<0.20	6	21	12	13	53
09/05/15	332,735	289,618	29	<1	43	<0.20	6	16	12	<4	64
09/19/15	356,941	310,794	29	<1	51	<0.20	6	27	12	18	74
09/26/15	409,786	363,357	36	<1	6	<0.20	7	4	14	11	21
11/21/15	450,677	404,000	38	<1	64	<0.20	8	21	15	4	82
12/19/15	82,550	29,900	<5	1	825	1.2	13	32	24	5	1,102
Minimum	82,550	29,900	<5	<1	6	<0.20	6	4	12	<4	21
Mean <sup>2</sup>	351,775	295,613	31	<1	121	<0.20	7	21	15	9	168
Maximum	463,375	424,344	38	1	825	1.2	13	34	24	18	1,102
503 Limit	NL <sup>3</sup>	NL	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>Biosolids applied as supernatant 4/18 through 11/21/15 and as biosolids on 12/19/15.

<sup>2</sup>In computing each mean, any value less than the reporting limit was considered the reporting limit.

<sup>3</sup>No limit.

TABLE 3: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2015

Month	Average Temperature	Average Detention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32(b)(3) <sup>1</sup>
	----- °F -----	----- days -----		----- days -----
January	95.0	32.4	yes	15.0
February	95.0	36.3	yes	15.0
March	95.0	38.0	yes	15.0
April	95.0	25.5	yes	15.0
May	95.0	25.0	yes	15.0
June	95.0	24.0	yes	15.0
July	95.0	18.8	yes	15.0
August	95.0	19.4	yes	15.0
September	95.0	22.5	yes	15.0
October	95.0	26.1	yes	15.0
November	95.0	25.9	yes	15.0
December	95.0	23.1	yes	15.0

<sup>1</sup>For anaerobic digestion at average temperature achieved.

TABLE 4: VOLATILE SOLIDS REDUCTION IN BIOSOLIDS GENERATED  
 AT THE HANOVER PARK WATER RECLAMATION PLANT  
 AND APPLIED AT THE FISCHER FARM SITE IN 2015

Month	Digester Feed	Digester Draw	Lagoon Biosolids <sup>1</sup>	Volatile Solids Reduction <sup>2</sup>
	----- % Total Volatile Solids -----			----- % -----
April	85.6	74.9	52.4	81.5
May	84.1	73.3	49.6	81.4
June	84.4	72.8	51.6	80.3
July	84.2	72.0	57.2	74.9
August	85.9	73.0	59.2	76.2
September	84.7	74.1	58.2	74.7
November	85.7	76.0	57.5	77.5
December	84.8	74.0	59.2	70.7

<sup>1</sup>Biosolids applied as supernatant from 4/18 through 12/19/2015; liquid biosolids applied on 12/19/2015.

<sup>2</sup>Volatile solids reduction computed using total volatile solids for digester feed and lagoon biosolids.

## CALUMET WATER RECLAMATION PLANT

### Treatment Plant and Biosolids Process Train Description

The Calumet WRP, located in Chicago, Illinois, has a design average flow of 354 MGD. The annual average treated flow in 2015 was 225 MGD. Wastewater reclamation processes at this WRP include primary settling and secondary activated sludge processes. All solids produced at the Calumet WRP are anaerobically digested. Calumet WRP biosolids are then:

1. Placed in lagoons for dewatering, aging, and stabilization and then transported to paved cells and air-dried prior to:
  - a) Application to urban land under the District's Controlled Solids Distribution Program.
  - b) Use at local municipal solid waste landfills as final cover.
2. Placed in lagoons for dewatering, transported to paved cells for air-drying, and then applied to farmland as semi-dried Class B biosolids by a private contractor or used as daily landfill cover.

Biosolids that are unsuitable for beneficial reuse are co-disposed in local municipal solid waste landfills.

In 2015, a total of 21,756 DT of biosolids was produced at the Calumet WRP (Table 1). The quantity of biosolids used and disposed (16,142 DT) was less than the total 2015 production for the Calumet WRP. Hence, a total of 5,614 DT was stored in lagoons or on drying cells for further processing and/or later use.

### Summary of Biosolids Use and Disposal at Landfills

In 2015, a total of 423 DT of biosolids generated at the Calumet WRP was used as final cover at the River Bend Prairie Landfill, Dolton, Illinois. A total of 224 DT of unsuitable solids was co-disposed with municipal solid wastes in Laraway Landfill, Joliet, Illinois. No biosolids were used as daily cover.

### Land Application of Class B Biosolids

In 2015, the Calumet WRP land-applied 7,222 DT of semi-dried Class B biosolids to farmland under IEPA Permit No. 2014-SC-58425 through contracts with Synagro Midwest, Inc. (Contract No. 14-692-12) and Stewart Environmental, Inc. (Contract No. 14-690-11). During 2015, no centrifuge cake biosolids were transported from the Egan WRP to the CALSMA sites for land application. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

All Calumet WRP semi-dried Class B biosolids land-applied in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 5), the vector attraction reduction requirements of Section 503.33(b)(10) (by incorporation in soil within six hours after application), and the anaerobic digestion time and temperature requirements of the Class B pathogen standard of Section 503.32(b)(3) (Table 6). The biosolids nitrogen concentrations (Table 5) were used to compute the agronomic rates for farmland application.

### **Application of Biosolids to Urban Land**

In 2015, a total of 8,920 DT of air-dried and composted EQ biosolids generated at the Calumet WRP was applied to urban land and District property through the District's Controlled Solids Distribution Program under IEPA Permit Nos. 2010-SC-0200 and 2015-SC-59620 for maintenance of golf courses and recreation fields, landscaping, and for the construction of new recreation fields. The sites and method of utilization of these biosolids under the Controlled Solids Distribution Program are listed in Table 7.

**Air-Dried Exceptional Quality Biosolids.** In 2015, a total of 8,320 DT of air-dried EQ biosolids generated at the Calumet WRP was applied to urban land. All Calumet WRP air-dried, EQ biosolids land-applied in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 8), the vector attraction reduction requirements of Section 503.33(b)(1) (Table 8), and the Class A pathogen limits of Section 503.32(a)(5) (Tables 9 and 10). Enteric viruses and helminth ova were analyzed before biosolids were dried (Table 9). The fecal coliform analysis was performed after the biosolids were dried and prior to utilization on urban land (Table 10). Management practices complied with Section 503.14 as previously described in a letter to the USEPA dated January 28, 1994 (Appendix I). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

**Composted Exceptional Quality Biosolids.** During 2014 and 2015, semi-dried biosolids generated at the Calumet and Egan WRPs were composted with woodchips and cured at the Calumet Solids Management Area (CALSMA) East and utilized in 2015. The Egan WRP biosolids were from 2014 production that were stored at the Calumet WRP solids drying sites. The composted biosolids applied to urban land in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 11). The fecal coliform analysis was performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 12). Class A pathogen reduction was achieved using open windrow composting process by meeting requirements of Section 503.32(a)(7). The temperature of the compost pile was maintained at  $\geq 55^{\circ}\text{C}$  for at least 15 days and the compost pile was turned five times during this period (Table 13). Vector attraction reduction was achieved by using the open windrow composting meeting requirements of Section 503.33(b)(5), i.e. by fulfilling the temperature and time requirements ( $\geq 45^{\circ}\text{C}$  for at least 14 days) in the open windrows (Table 13).

In 2015, a total of 600 DT of composted EQ biosolids generated at the Calumet WRP was applied to urban land through the District's Controlled Solids Distribution Program. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

TABLE 5: CONCENTRATIONS OF NITROGEN AND METALS IN SEMI-DRIED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	-----mg/dry kg-----										
05/29/15	27,888	4,528	8	2	394	0.86	11	28	87	<5	1,163
06/03/15	25,483	3,959	9	1	367	0.81	10	26	82	<5	1,067
06/03/15	21,862	8,905	9	1	373	0.69	10	26	84	<5	1,071
08/13/15	23,692	5,307	10	2	375	0.77	8	28	88	<5	1,139
08/13/15	26,182	7,013	12	2	412	0.77	7	30	93	<5	1,210
08/19/15	26,171	7,514	13	2	406	0.99	9	30	95	<5	1,228
08/27/15	23,177	1,605	12	2	348	0.73	7	25	81	<5	992
11/19/15	28,393	4,141	9	2	378	0.83	12	28	73	<5	1,138
Minimum	21,862	1,605	8	<2	348	0.69	7	25	73	<5	992
Mean <sup>1</sup>	25,356	5,372	10	2	382	0.81	9	28	85	<5	1,126
Maximum	28,393	8,905	13	2	412	0.99	12	30	95	<5	1,228
503 Limit	NL <sup>2</sup>	NL	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit.

<sup>2</sup>No Limit.



TABLE 6: DIGESTER<sup>1</sup> TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Month	Average Temperature	Average Detention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32(b)(3) <sup>2</sup>
	---- °F ----	----- days -----		----- days -----
January	97.6	60.0	yes	15.0
February	97.6	53.4	yes	15.0
March	97.6	58.1	yes	15.0
April	97.7	57.9	yes	15.0
May	97.7	54.1	yes	15.0
June	97.6	50.9	yes	15.0
July	97.8	64.1	yes	15.0
August	97.6	64.1	yes	15.0
September	97.3	60.4	yes	15.0
October	97.4	69.4	yes	15.0
November	97.5	69.4	yes	15.0
December	97.8	59.1	yes	15.0

<sup>1</sup>Temperatures and detention times are for primary digesters 1 through 12 at the Calumet WRP.

<sup>2</sup>For anaerobic digestion at average temperature achieved.

TABLE 7: SITES THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION PROGRAM IN 2015

User	Use/Location
Chicago Park District, Chicago	Athletic fields - 10 Parks <sup>1</sup>
Evergreen Park High School, Evergreen Park	Athletic fields – Baseball field
De La Salle High School, Chicago	Athletic fields – Baseball field
Burbank Park District, Burbank	Athletic fields – Narragansett Park
Cinder Ridge Golf Course, Wilmington	Golf course
MWRD - Calumet WRP, Calumet <sup>2</sup>	Landscaping
MWRD - Stickney WRP, Cicero <sup>2</sup>	Landscaping
Brandenburg (Shell), Bedford Park	Landscaping
Twin Oaks Landscaping Co., Oswego	Landscaping

<sup>1</sup>Centennial, Maggie Daley, Dawes, Douglas, Harrison, Horner, Lincoln, Northerly Island, Portage, Seward, Taylor, Warren, and Welles Parks.

<sup>2</sup>District property.

TABLE 8: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	TVS <sup>2</sup> Reduction	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		----- % -----		----- mg/dry kg -----								
04/24/15	29,775	3,032	47.4	69.8	8	<2	361	0.59	9	25	73	<5	1,030
05/05/15	28,394	3,798	46.0	71.5	10	<2	363	0.54	9	24	68	<5	1,028
05/22/15	23,277	1,311	48.4	68.6	8	2	396	0.59	10	25	67	<5	1,102
05/28/15	11,397	2,526	47.2	70.1	9	2	419	0.45	12	27	73	<5	1,249
06/19/15	11,982	1,439	41.5	65.8	8	<2	412	0.76	8	27	90	<5	1,284
07/02/15	24,773	1,072	45.9	59.1	8	2	381	<0.25	9	26	75	<5	1,134
07/10/15	24,540	1,790	40.7	67.0	12	2	372	1.9	10	28	90	<5	1,159
07/17/15	24,142	2,594	40.7	77.0	11	2	396	0.86	10	30	93	<5	1,250
07/17/15	24,554	1,634	40.3	67.5	12	2	365	0.59	8	27	87	<5	1,138
07/24/15	22,807	1,633	41.2	66.3	11	2	363	0.51	9	27	88	<5	1,123
08/06/15	23,011	1,381	40.3	67.6	11	2	382	1.2	9	28	90	<5	1,172
10/02/15	16,992	1,834	47.3	74.5	<5	<2	320	0.72	5	26	71	<5	822
10/10/15	35,804	2,519	47.2	66.4	9	2	395	0.74	11	28	79	<5	1,152
10/16/15	30,219	2,053	47.1	63.6	9	2	402	0.65	12	28	80	<5	1,204
11/04/15	31,011	2,507	46.9	58.5	6	<2	297	0.73	10	21	61	<5	901

TABLE 8 (Continued): CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	TVS <sup>2</sup> Reduction	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		----- % -----		----- mg/dry kg -----								
Minimum	11,397	1,072	40.3	58.5	<5	<2	297	<0.25	5	21	61	<5	822
Mean <sup>3</sup>	24,179	2,075	44.5	67.5	9	2	375	0.77	9	26	79	<5	1,117
Maximum	35,804	3,798	48.4	77.0	12	2	419	1.9	12	30	93	<5	1,284
503 Limit	NL <sup>4</sup>	NL	NL	38.0	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>Total volatile solids.

<sup>2</sup>Total volatile solids for digester feed during 2013-2014 were used to calculate TVS reductions.

<sup>3</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit.

<sup>4</sup>No limit.

TABLE 9: MICROBIOLOGICAL ANALYSIS OF BIOSOLIDS<sup>1</sup> AT THE CALUMET WATER RECLAMATION PLANT THAT WERE APPLIED TO URBAN LAND DURING AUGUST 2014 THROUGH JULY 2015

Sample Date <sup>2</sup>	Total Solids	Fecal Coliform	Sample Date <sup>3</sup>	Helminth Ova	Enteric Virus
	---- % ----	----- MPN <sup>4</sup> /g -----		--- No./4g ---	--- PFU <sup>5</sup> /4g ---
09/10/14	48.7	100	07/17/14	<0.0800	<0.8000
04/15/15	46.5	210	08/07/14	<0.0800	<0.8000
04/29/15	46.1	170	08/28/14	<0.0800	<0.8000
06/24/15	69.1	55	03/10/15	<0.0800	<0.8000
08/05/15	75.0	510	05/20/15	<0.0800	<0.8000
08/05/15	75.0	510	06/16/15	<0.0133 <sup>6</sup>	<0.8000

<sup>1</sup>All biosolids satisfied Part 503 Class A requirements.

<sup>2</sup>Sample dates apply to FC samples only.

<sup>3</sup>Non-PFRP biosolids sampled before the material was dried and subsequently used in 2015.

<sup>4</sup>Most probable number.

<sup>5</sup>Plaque-forming unit.

<sup>6</sup>Sample weight = 300 g; for all others, sample weight = 50 g.

TABLE 10: MICROBIOLOGICAL ANALYSIS OF CLASS A BIOSOLIDS  
 GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND  
 TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2015

Sample Date	Lagoon	Total Solids	Fecal Coliform
		---- % ----	---- MPN <sup>1</sup> /g ----
04/15/15	2	47.5	120
04/15/15	2	46.5	210
04/29/15	2	46.1	170
04/29/15	2	44.5	180
05/19/15	17	66.9	87
06/03/15	2	62.4	80
06/09/15	2	45.9	110
06/09/15	2	48.2	300
06/23/15	17	74.4	780
06/23/15	17	70.1	540
06/24/15	17	69.1	55
07/16/15	17	62.4	140
07/16/15	2	70.0	970
07/22/15	2	48.3	110
08/05/15	7	75.0	510
08/25/15	17	61.5	47
09/10/15	2	60.1	110
10/01/15	18	66.6	150
10/01/15	18	62.5	180
10/01/15	17	68.9	990
10/01/15	18	73.2	93

<sup>1</sup>Most probable number.

TABLE 11: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PROCESSED IN 2014 AT THE CALUMET SOLIDS MANAGEMENT AREA EAST AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- mg/dry kg -----											
07/10/15	23,751	101	8	2	389	0.79	10	26	75	<5	1,180
08/06/15	21,867	179	10	2	375	0.79	9	25	71	<5	1,121
08/06/15	21,306	175	11	2	368	0.97	9	28	87	<5	1,083
08/06/15	21,212	173	8	2	396	0.81	9	28	82	<5	1,206
10/01/15	17,447	468	<5	2	334	0.56	5	27	76	<5	895
10/10/15	15,874	132	9	2	377	0.96	8	28	87	<5	1,064
10/12/15	18,715	194	<5	2	321	0.60	6	26	80	<5	917
11/20/15	36,947	192	<5	<2	352	0.45	6	26	75	<5	913
Minimum	15,874	101	<5	<2	321	0.45	5	25	71	<5	895
Mean <sup>1</sup>	22,140	202	9	2	364	0.74	8	27	79	<5	1,047
Maximum	36,947	468	11	2	396	0.97	10	28	87	<5	1,206
503 Limit	NL <sup>2</sup>	NL	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit.

<sup>2</sup>No limit.

TABLE 12: MICROBIOLOGICAL ANALYSIS OF COMPOSTED  
EXCEPTIONAL QUALITY BIOSOLIDS PROCESSED AT THE  
CALUMET SOLIDS MANAGEMENT AREA EAST IN 2014 PRIOR TO  
UTILIZATION ON URBAN LAND IN 2015

Sample Date	Total Solids	Fecal Coliform
	----- %-----	----- MPN <sup>1</sup> /g -----
05/13/15	49.5	58
07/22/15	57.0	88
07/22/15	52.0	860
08/11/15	62.0	7
08/11/15	64.9	580
09/23/15	48.8	160

<sup>1</sup>Most probable number.



TABLE 13: DAILY MEAN TEMPERATURE READINGS OF OPEN WINDROW, BATCHES 14-01 AND 15-01, DURING PRODUCTION OF COMPOSTED BIOSOLIDS AT THE CALUMET SOLIDS MANAGEMENT AREA EAST IN 2014 AND 2015 AND APPLIED TO URBAN LAND IN 2015

Batch 14-01		Batch 15-01	
Date	Daily Mean Temperature ( $^{\circ}$ C) <sup>1</sup>	Date	Daily Mean Temperature ( $^{\circ}$ C) <sup>1</sup>
14-Oct	55.6	12-May	57.2
15-Oct	55.5	13-May	57.4
16-Oct	55.3	14-May	58.7
17-Oct*	55.0	15-May*	60.8
18-Oct	58.1	16-May	61.3
19-Oct	55.0	17-May	61.6
20-Oct*	54.4	18-May*	61.8
22-Oct	56.3	19-May	62.2
23-Oct	56.4	20-May	62.8
24-Oct*	56.6	21-May*	63.1
25-Oct	56.2	22-May	63.4
26-Oct	56.3	23-May*	63.7
27-Oct*	56.2	24-May	64.0
28-Oct	56.1	25-May	63.9
29-Oct	56.0	26-May	64.1
30-Oct*	55.3	27-May*	64.6
31-Oct	52.2	28-May	65.5
01-Nov	52.3	29-May	66.1
02-Nov	52.5	30-May*	66.3
03-Nov	52.8	31-May	66.4
04-Nov	53.0	01-Jun	66.6
05-Nov	54.5	02-Jun	58.2
06-Nov	55.7	03-Jun	68.1
07-Nov*	56.3	04-Jun	68.0
08-Nov	56.7		
09-Nov	57.1		
10-Nov*	57.4		
07-Dec	55.2		
08- Dec	56.0		
09- Dec	56.1		

<sup>1</sup>Windrow time and temperature requirement (minimum of 55 $^{\circ}$ C for three consecutive days) achieved at least five times and turned a minimum of five times during the composting period.

\*Windrow turning date.

### **Site-Specific Process to Further Reduce Pathogens**

The USEPA Region 5 designated, on a site-specific basis for the Calumet and Stickney WRPs, two of the District's biosolids processing trains as equivalent to PFRP according to Section 503.32(a)(8). The PFRP equivalency commenced on August 1, 2002 (Appendix II). The current renewable certification of the PFRP designation is valid from August 1, 2012, through July 31, 2017, and requires analysis of six samples for helminth ova and enteric viruses annually during this period.

All of the Calumet WRP EQ biosolids generated or utilized in 2015 were not PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months) due to operational constraints. Therefore, no PFRP-compliant biosolids were available for sampling and analysis. All biosolids utilized as EQ material in 2015 were tested for pathogen compliance according to Section 503.32(a)(5).

## STICKNEY WATER RECLAMATION PLANT

### Treatment Plant and Biosolids Process Train Description

The Stickney WRP, located in Stickney, Illinois, has a design average flow of 1,200 MGD. The annual average treated flow in 2015 was 728 MGD. Wastewater reclamation processes include primary (Imhoff and primary settling) and secondary (activated sludge process) treatments. All solids produced at this WRP and coming from the O'Brien, Egan, Kirie, and Lemont WRPs are anaerobically digested. Stickney WRP biosolids are then:

1. Placed in lagoons for dewatering, aging, and stabilization and then transported to paved cells and air-dried prior to:
  - a. Application to urban land under the District's permitted Controlled Solids Distribution Program.
  - b. Use at local municipal solid waste landfills as final landfill cover.
2. Dewatered by centrifuging to approximately 25 percent solids content and then applied to farmland as Class B biosolids by a private contractor.
3. Dewatered by centrifuging to approximately 25 percent solids content, transported to paved cells, and air-dried prior to use as daily landfill cover.
3. Dewatered by centrifuging to approximately 25 percent solids content and conveyed to Metropolitan Biosolids Management, LLC, for further processing under Contract 98-RFP-10.
4. Dewatered by centrifuging to approximately 25 percent solids content and transported to Harlem Avenue Solids Management Area (HASMA) for co-composting with woodchips and yardwaste prior to:
  - a. Application to urban land under the District's permitted Controlled Solids Distribution Program.
5. Dewatered by centrifuging to approximately 25 percent solids content, placed in lagoons for aging and stabilization, and transported to paved cells and air-dried prior to:
  - b. Application to urban land under the District's permitted Controlled Solids Distribution Program.
  - c. Application to farmland as semi-dried Class B biosolids.
  - d. Use at local municipal solid waste landfills as final landfill cover.
  - e. Disposal in local municipal solid waste landfills.

Biosolids that are unsuitable for beneficial reuse are co-disposed in local municipal solid waste landfills.

In 2015, the Stickney WRP produced a total of 103,199 DT of biosolids (Table 1). This total includes biosolids generated by processing sludge originating at the Stickney WRP as well as the sludge imported from the O'Brien, Egan, Kirie, and Lemont WRPs for further processing. The quantity of biosolids used and disposed of (93,635 DT) was lower than the total 2015 production (103,199 DT) for the Stickney WRP. Hence, 9,564 DT were stored in lagoons and/or on drying cells for further processing or later use.

### **Summary of Biosolids Use and Disposal at Landfills**

In 2015, a total of 849 DT of biosolids generated at the Stickney WRP and 157 DT unsuitable solids (resulted from digester cleaning) trucked from the Egan WRP to LASMA were co-disposed with municipal solid wastes at the Laraway Landfill, Joliet, Illinois (Heartland Recycling, LLC). No biosolids were used as landfill final or daily cover during the year.

### **Application of Class B Biosolids to Farmland**

In 2015, a total of 44,517 DT of centrifuge cake and semi-dried biosolids generated at the Stickney WRP was applied to agricultural land under IEPA Permit No. 2014-SC-58425. This total includes 7 DT that was applied to research plots at the Fulton County site. Application to agricultural land was done through contracts with Synagro Midwest, Inc. (Contract No. 14-692-12) and Stewart Environmental, Inc. (Contract No. 14-690-11). During 2015, no centrifuge cake biosolids were shipped from the Egan WRP to the Lawndale or Harlem Avenue Solids Management Areas. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is 12 times per year.

All Stickney WRP centrifuge cake and semi-dried biosolids land applied in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 14), the vector attraction reduction requirements of Section 503.33(b)(10) (by incorporation in soil within six hours after application), and the anaerobic digestion time and temperature requirements of the Class B pathogen standard of Section 503.32(b)(3) (Table 15). The biosolids nitrogen concentrations (Table 14) were used to compute the agronomic rates for farmland application.

### **Application of Biosolids to Urban Land**

In 2015, through the District's Controlled Solids Distribution Program, a total of 8,701 DT of Stickney WRP air-dried and composted EQ biosolids was applied under IEPA Permit Nos. 2010-SC-0200 and 2015-SC-59620 to urban land for the construction and maintenance of golf courses, recreation fields, and parks. In addition, 1,661 DT of Stickney's air-dried or composted biosolids that did not meet Class A requirements were applied to District property for construction and landscaping. The sites and method of utilization of these biosolids under the program are listed in Table 16.

TABLE 14: CONCENTRATIONS OF NITROGEN AND METALS IN CENTRIFUGE CAKE AND SEMI-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		%	-----mg/dry kg -----								
05/26/15	18,965	5,161	34.6	<5	9	462	1.2	11	48	128	<5	765
05/26/15	11,992	2,118	38.5	8	9	470	0.96	12	45	124	<5	834
05/26/15	26,830	4,158	38.8	6	9	486	1.1	11	47	126	<5	863
05/26/15	25,189	4,223	37.8	6	8	482	1.1	12	47	128	<5	836
05/26/15	22,957	4,159	39.4	7	9	472	0.98	12	46	130	<5	856
06/02/15	26,136	4,964	36.9	6	8	437	0.99	11	46	120	<5	782
06/02/15	29,671	5,793	40.4	5	9	481	1.0	13	47	125	<5	885
06/02/15	25,930	5,281	35.3	5	8	436	0.81	12	45	122	<5	761
06/09/15	29,487	5,174	40.0	9	9	464	1.1	11	45	123	<5	830
06/17/15	32,737	5,156	39.4	5	9	480	0.75	13	49	129	<5	902
06/17/15	52,822	10,558	48.6	<5	3	409	0.46	12	43	96	<5	803
07/28/15	44,641	10,687	47.4	<5	3	416	0.42	12	46	103	<5	854
07/28/15	37,984	4,977	41.7	7	11	431	0.66	12	46	109	<5	815
08/04/15	47,237	12,257	48.2	5	4	438	0.78	11	47	108	<5	860
08/04/15	32,292	4,386	42.4	5	11	475	1.1	14	50	117	<5	918
08/04/15	30,940	4,047	42.4	6	12	486	1.0	12	49	116	<5	871
08/11/15	44,316	9,266	49.3	5	3	454	0.94	11	47	102	<5	857
08/11/15	24,441	3,304	43.1	6	13	505	1.1	13	52	122	<5	914
08/11/15	21,211	2,042	36.7	6	11	501	1.3	12	51	139	<5	915
08/18/15	47,508	12,428	49.8	5	3	433	0.43	11	47	94	<5	855

TABLE 14 (Continued): CONCENTRATIONS OF NITROGEN AND METALS IN CENTRIFUGE CAKE AND SEMI-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		%	-----mg/dry kg -----								
08/25/15	34,331	16,086	55.4	<5	4	456	0.65	11	45	79	<5	807
09/01/15	26,902	2,045	44.6	7	5	409	0.78	8	40	105	<5	777
09/01/15	53,959	15,481	53.3	5	4	418	0.69	10	40	71	<5	723
09/01/15	43,108	8,576	49.3	5	8	439	0.59	11	45	84	<5	800
09/08/15	30,351	3,593	43.5	7	5	392	0.80	8	40	105	<5	793
09/08/15	49,882	13,352	49.6	5	5	387	0.70	7	39	86	<5	729
09/15/15	45,164	8,196	48.8	6	8	473	0.36	12	48	89	<5	885
09/22/15	41,557	11,033	46.2	<5	5	427	0.96	10	43	107	<5	835
09/29/15	37,931	9,107	46.2	<5	5	419	0.77	12	43	109	<5	874
10/06/15	37,889	6,602	46.8	5	8	495	0.68	13	50	97	<5	917
10/06/15	46,120	9,698	47.8	<5	6	462	0.81	12	46	115	<5	894
10/13/15	48,187	10,464	48.9	<5	6	424	0.99	15	44	101	<5	794
10/20/15	49,334	9,039	47.7	<5	5	406	0.58	16	40	99	<5	772
10/20/15	42,573	6,898	46.8	6	7	457	0.60	13	46	90	<5	859
10/28/15	36,979	6,720	48.2	<5	7	426	0.87	13	46	87	<5	852
10/28/15	45,227	6,520	49.8	<5	5	428	0.70	18	41	90	<5	767
11/17/15	42,154	8,776	46.6	<5	7	473	0.65	13	48	96	<5	892
11/17/15	54,364	11,304	52.1	<5	5	432	0.63	20	43	90	<5	779
11/24/15	50,181	9,962	53.5	<5	4	406	0.78	21	41	81	<5	735

TABLE 14 (Continued): CONCENTRATIONS OF NITROGEN AND METALS IN CENTRIFUGE CAKE AND SEMI-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		%	-----mg/dry kg -----								
Minimum	11,992	2,042	34.6	<5	3	387	0.36	7	39	71	<5	723
Mean <sup>2</sup>	37,166	7,528	45.0	6	7	447	0.82	12	45	106	<5	832
Maximum	54,364	16,086	55.4	9	13	505	1.3	21	52	139	<5	918
503 Limit	NL <sup>3</sup>	NL	NL	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>Total volatile solids.

<sup>2</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit.

<sup>3</sup>No limit.

TABLE 15: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2015

Month	Average Temperature	Average Retention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32(b)(3) <sup>1</sup>
	---- °F ----	--- days ---		--- days ---
January	97.0	20.4	yes	15.0
February	96.3	27.8	yes	15.0
March	96.5	25.2	yes	15.0
April	96.9	26.7	yes	15.0
May	98.2	27.1	yes	15.0
June	97.6	39.3	yes	15.0
July	99.0	28.8	yes	15.0
August	98.0	26.5	yes	15.0
September	97.8	22.8	yes	15.0
October	97.7	18.8	yes	15.0
November	96.6	20.5	yes	15.0
December	97.3	20.2	yes	15.0

<sup>1</sup>For anaerobic digestion at average temperature achieved.



TABLE 16: SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT  
AIR-DRIED AND COMPOSTED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION  
PROGRAM IN 2015

User	Use/Location
Inspired Community Garden, Chicago	Garden
Pleasant Farms Landscaping, Chicago	Garden
Plant Chicago	Garden - Chicago
Tinley Park Park District, Tinley Park	Athletic fields - Dog Park
Chicago Park District, Chicago	Athletic fields - six Parks <sup>1</sup>
Oak Forest Park District, Oak Forest	Athletic fields - three Parks <sup>2</sup>
Hickory Hills Park District, Hickory Hills	Athletic fields - Martin and Kasey Meadow Parks
Oak Lawn Park District, Oak Lawn	Athletic fields - Memorial and Worthbrook Parks
Evanston High School, Evanston	Athletic fields - Baseball field
Village of Lyons, Lyons	Athletic fields - Smith Park
Burbank Park District, Burbank	Athletic fields - McArthur and Michael Looney Park
Park Forest Park District, Park Forest	Athletic fields - Central Park
Westside Baseball of Oak Lawn, Oak Lawn	Athletic fields - Baseball field
Village of Richton Park, Richton Park	Athletic fields - Richton Park
Park District of Franklin Park	Athletic fields - North Park
Lemont Park District, Lemont	Athletic fields - Centennial Park
Summit Park District, Summit	Athletic fields - Summit Park
Piper & Sons Landscaping, Naperville	Landscaping
MWRD - Stickney WRP, Cicero <sup>3</sup>	Landscaping
MWRD - Calumet WRP, Calumet <sup>3</sup>	Landscaping
MWRD - Mainstream Pumping Station <sup>3</sup>	Landscaping
Republic Landscaping, Hillside	Landscaping
Brandenburg (Shell), Bedford Park	Landscaping

TABLE 16 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION PROGRAM IN 2015

User	Use/Location
Twin Oaks Landscaping Co, Oswego	Landscaping
Beary Landscaping, Lockport	Landscaping
Mid Iron Golf Club, Lemont	Golf course
Gleneagles Golf Course, Lemont	Golf course
North Shore Country Club, Glenview	Golf course
Stony Creek Golf Course, Oak Lawn	Golf course
Cinder Ridge Golf Course, Coal City	Golf course
Canal Shore Golf Course, Evanston	Golf course
Coyote Run Golf Course, Flossmoor	Golf course
City of Northlake, Northlake	Center Point Preserve
Home Owner, Lemont	Landscaping
Home Owner, Homer Glen	Landscaping
Home Owner, La Grange Highlands	Landscaping
Home Owner, Justice	Landscaping
Home Owner, Chicago	Landscaping
Home Owner, Tinley Park	Landscaping
Home Owner, Willow Springs	Landscaping
Pizzo Native Plant Nursery, Leland	Landscaping

<sup>1</sup>Maggie Daley, Holstein, Portage, Pottawatomie, Pulaski, Rogers, Welles, and Winnemac Parks.

<sup>2</sup>Gene Leonard, Convent, and El Morro Parks.

<sup>3</sup>District property- limited public-access site received composted biosolids that did not meet Class A requirement.

**Air-dried Exceptional Quality Biosolids.** In 2015, a total of 8,192 DT of Stickney WRP air-dried EQ biosolids was applied to urban land. All Stickney air-dried biosolids applied to urban land in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 17) and the vector attraction reduction requirements of Section 503.33(b)(1) (Table 17). The 6,531 DT of air-dried, EQ biosolids met the Class A pathogen limits of Section 503.32(a)(5) (Tables 18 and 19). The remaining air-dried Class B biosolids (1,661 DT) met the anaerobic digestion time and temperature requirements of the Class B pathogen standard of Section 503.32(b)(3) (Table 15). These Class B biosolids were applied to the District's property with limited public access for landscaping purposes. Vector attraction reduction requirement was met by incorporation into the soil after biosolids application as per Section 503.32(b)(10). These limited public-access sites are fenced and therefore met public access requirements of Section 503.32(b). Management practices complied with Section 503.14, as previously described in a letter to the USEPA dated January 28, 1994 (Appendix I). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

**Composted Exceptional Quality Biosolids.** During the year, centrifuge cake biosolids generated at the Stickney and Egan WRPs were composted with woodchips and cured at the Harlem Avenue Solids Management Area. The Egan WRP biosolids were from 2014 production that was stored at HASMA. The composted biosolids applied to urban land in 2015 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 20). The fecal coliform analysis was performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 21). Class A pathogen reduction was achieved using open windrow composting process by meeting requirements of Section 503.32(a)(7). The temperature of the compost pile was maintained at  $\geq 55^{\circ}\text{C}$  for at least 15 days and the compost pile was turned five times during this period (Table 22). Vector attraction reduction was achieved by using open windrow composting meeting requirements of Section 503.33(b)(5), i.e. by fulfilling the temperature and time requirements ( $\geq 45^{\circ}\text{C}$  for at least 14 days) in the open windrows (Table 22).

In 2015, a total of 2,170 DT of composted EQ biosolids generated at the Stickney WRP was applied to urban land through the District's Controlled Solids Distribution Program. In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

TABLE 17: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2015

Sample	TVS <sup>2</sup>												
Date	TKN	NH <sub>3</sub> -N	TVS <sup>1</sup>	Reduction	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----		----- % -----		-----mg/dry kg -----								
05/05/15	22,140	3,306	38.0	50.2	<5	9	489	1.0	11	47	130	<5	894
05/05/15	21,013	2,512	37.3	51.7	6	8	486	1.0	11	46	127	<5	866
05/05/15	21,437	3,857	39.0	48.2	<5	9	495	0.87	12	47	127	<5	895
05/12/15	25,902	4,353	39.3	47.6	<5	9	479	1.1	12	46	122	<5	837
05/19/15	21,260	3,835	38.7	48.8	7	9	477	1.0	12	46	127	<5	859
06/02/15	24,910	3,335	38.0	50.2	6	8	455	0.89	11	44	119	<5	819
06/09/15	23,636	3,718	38.6	49.1	10	8	464	1.1	10	45	124	<5	849
06/09/15	23,332	2,258	37.2	52.0	9	4	422	1.1	12	43	105	<5	793
06/17/15	24,449	2,273	35.4	55.6	8	5	437	0.63	13	44	111	<5	839
08/04/15	26,665	4,761	39.1	48.8	5	11	480	0.82	11	49	114	<5	868
08/11/15	30,777	6,666	40.9	44.7	6	12	505	1.0	13	51	117	<5	906
09/01/15	23,132	1,933	39.0	41.0	6	10	432	1.1	10	44	104	<5	752
09/08/15	26,266	2,466	40.3	46.1	8	11	462	1.1	9	48	110	<5	838

TABLE 17 (Continued): CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	TVS <sup>2</sup>		As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
			TVS <sup>1</sup>	Reduction									
----- mg/dry kg -----		----- % -----		----- mg/dry kg -----									
10/13/15	27,172	3,298	39.7	39.4	<5	8	469	0.79	11	46	91	<5	850
10/13/15	29,653	3,778	40.3	37.8	5	8	491	0.80	12	49	96	<5	883
10/13/15	33,885	4,861	40.9	36.2	5	8	484	0.73	13	49	93	<5	881
10/20/15	36,090	6,122	39.9	38.9	<5	8	473	<0.25	14	49	93	<5	873
10/20/15	28,015	5,144	42.2	32.7	5	8	469	0.61	13	48	92	<5	880
10/28/15	36,790	6,508	45.5	23.0	<5	8	494	0.72	14	52	96	<5	948
11/03/15	38,527	8,258	45.0	24.8	<5	7	466	0.54	11	47	92	<5	873
Minimum	21,013	1,933	35.4	23.0	<5	4	204	<0.25	5	22	51	<5	395
Mean <sup>3</sup>	27,293	4,194	39.7	43.5	6	8	459	0.89	11	46	107	<5	838
Maximum	38,527	8,258	45.5	55.6	10	12	505	1.1	14	52	130	<5	948
503 Limit	NL <sup>4</sup>	NL	NL	38.0	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>Total volatile solids.

<sup>2</sup>Total volatile solids for digester feed during 2013-2014 were used to calculate TVS reductions.

<sup>3</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit.

<sup>4</sup>No limit.

TABLE 18: MICROBIOLOGICAL ANALYSIS OF BIOSOLIDS<sup>1</sup> GENERATED AT THE STICKNEY WATER RECLAMATION PLANT THAT WERE APPLIED TO URBAN LAND DURING AUGUST 2014 THROUGH JULY 2015

Sample Date <sup>2</sup>	Total Solids	Fecal Coliform	Sample Date <sup>3</sup>	Helminth Ova	Enteric Virus
	--- % ---	---- MPN <sup>4</sup> /g ----		--- No./4g ---	--- PFU <sup>5</sup> /4g ---
04/23/15	48.2	79	08/21/14	<0.0800	<0.8000
04/23/15	53.6	53	09/16/14	<0.0133 <sup>6</sup>	<0.8000
04/23/15	53.6	53	12/09/14	<0.0800	<0.8000
04/28/15	55.7	120	03/25/15	<0.0800	<0.8000
06/18/15	47.6	800	04/22/15	<0.0800	<0.8000
07/28/15	80.9	15	05/07/15	<0.0800	<0.8000

<sup>1</sup>All biosolids satisfied Part 503 Class A requirements.

<sup>2</sup>Sample dates apply to FC samples only.

<sup>3</sup>Non-PFRP biosolids sampled before the material was dried and subsequently used in 2015.

<sup>4</sup>Most probable number.

<sup>5</sup>Plaque-forming unit.

<sup>6</sup>Sample weight = 300 g; for all others, sample weight = 50 g.

TABLE 19 MICROBIOLOGICAL ANALYSIS OF CLASS A BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND SAMPLED PRIOR TO UTILIZATION ON URBAN LAND IN 2015

Sample Date	Lagoon	Total Solids	Fecal Coliform
		----- % -----	----- MPN <sup>1</sup> /g -----
04/23/15	23	53.6	53
04/28/15	23	55.7	120
06/11/15	23	69.5	72
06/18/15	28	47.6	800
07/28/15	25	80.9	15
09/28/15	30	64.0	78
09/29/15	30	65.8	76

<sup>1</sup>Most probable number.

TABLE 20: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS<sup>1</sup> PROCESSED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2014 AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- mg/dry kg -----											
04/16/15	16,048	31	<5	<2	477	0.85	4	41	59	<5	574
04/28/15	18,132	17	<5	<2	466	1.0	4	42	58	<5	534
04/28/15	19,076	173	5	3	246	0.53	5	24	73	<5	456
05/12/15	17,285	69	<5	<2	459	0.78	4	39	56	<5	529
05/12/15	16,373	25	<5	3	246	0.34	6	24	70	<5	452
05/19/15	18,599	48	<5	<2	518	0.80	5	45	61	<5	607
05/19/15	21,660	65	<5	<2	506	0.60	5	56	42	<5	562
05/26/15	16,094	86	<5	<2	475	0.81	4	41	56	<5	563
06/17/15	24,579	174	<5	<2	494	0.42	6	55	42	<5	563
06/30/15	18,372	54	<5	3	357	1.1	6	40	72	<5	582
06/30/15	18,952	54	<5	2	469	<0.25	5	54	53	<5	602
07/07/15	26,225	122	<5	2	476	0.66	4	58	41	<5	601
07/14/15	11,124	14	<5	2	505	0.85	4	59	44	<5	596
07/28/15	29,876	2,252	<5	<2	455	<0.25	5	57	35	<5	544
07/28/15	23,525	191	<5	2	501	0.39	5	60	43	<5	587
08/11/15	21,991	82	<5	2	576	0.93	5	65	48	<5	637
08/18/15	20,590	2,789	<5	2	208	<0.25	5	21	47	<5	379
08/18/15	21,209	40	<5	2	520	0.78	3	61	44	<5	610
08/18/15	22,503	338	<5	2	545	0.74	4	57	49	<5	573
08/25/15	19,220	31	<5	2	557	0.91	4	65	49	<5	650



TABLE 20 (Continued): CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS<sup>1</sup> PROCESSED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2014 AND APPLIED TO URBAN LAND IN 2015

Sample Date	TKN	NH <sub>3</sub> -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	-----mg/dry kg-----										
09/01/15	23,540	3,664	<5	3	258	0.51	3	28	76	<5	528
09/08/15	22,306	262	<5	2	517	0.90	<2	60	43	<5	576
09/22/15	22,115	62	<5	2	530	0.70	2	61	47	<5	598
09/29/15	20,132	1,658	<5	<2	451	0.73	5	55	34	<5	535
10/07/15	30,733	3,057	<5	2	566	0.80	5	63	41	<5	637
10/13/15	27,635	2,051	<5	2	540	0.83	4	59	41	<5	619
11/03/15	24,358	357	<5	2	612	1.0	6	68	49	<5	740
11/09/15	24,546	272	<5	<2	470	1.10	4	54	42	<5	538
11/17/15	23,027	877	<5	2	557	0.61	7	61	41	<5	634
11/24/15	29,456	877	<5	2	540	0.84	7	58	40	<5	598
Minimum	11,124	14	<5	<2	208	<0.25	<2	21	34	<5	379
Mean <sup>1</sup>	21,643	660	<5	2	470	0.76	5	51	50	<5	573
Maximum	30,733	3,664	5	3	612	1.1	7	68	76	<5	740
503 Limit	NL <sup>2</sup>	NL	41	39	1,500	17	75	420	300	100	2,800

<sup>1</sup>In calculating each mean, any value less than the reporting limit was considered the reporting limit..

<sup>2</sup>No limit.

TABLE 21: MICROBIOLOGICAL ANALYSIS OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PROCESSED AT THE HARLEM AVENUE SOLIDS MANGEMENT AREA IN 2014 AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2015

Sample Date	Total Solids	Fecal Coliform
	----- % -----	----- MPN <sup>1</sup> /g -----
02/10/15	46.6	810
02/10/15	51.9	55
02/10/15	48.4	590
02/10/15	50.5	57
02/25/15	48.5	78
06/18/15	47.6	800
08/20/15	58.6	25
09/10/15	50.9	99
11/09/15	52.2	<1

<sup>1</sup>Most probable number.

TABLE 22: DAILY MEAN TEMPERATURE READINGS  
 OF AN OPEN WINDROW, BATCH 14-01, DURING  
 PRODUCTION OF COMPOSTED BIOSOLIDS AT  
 HARLEM AVENUE SOLIDS MANAGEMENT AREA  
 IN 2014 AND APPLIED TO URBAN LAND IN 2015

Date	Daily Mean Temperature ( <sup>0</sup> C) <sup>1</sup>
20-Jun	56.2
21-Jun	55.9
22-Jun	55.6
23-Jun*	55.5
24-Jun	60.5
25-Jun	59.3
26-Jun*	57.4
27-Jun	55.4
28-Jun	55.2
29-Jun	50.1
30-Jun	49.5
1-Jul*	56.1
2-Jul	57.0
3-Jul	57.8
4-Jul	57.5
5-Jul*	57.1
6-Jul	56.7
7-Jul	55.0
9-Jul	54.2
10-Jul	54.3
11-Jul*	55.0
12-Jul	56.7
13-Jul	60.3
14-Jul	56.2

<sup>1</sup>Windrow time and temperature requirement (minimum of 55°C for three consecutive days) achieved at least five times and turned a minimum of five times during the composting period.

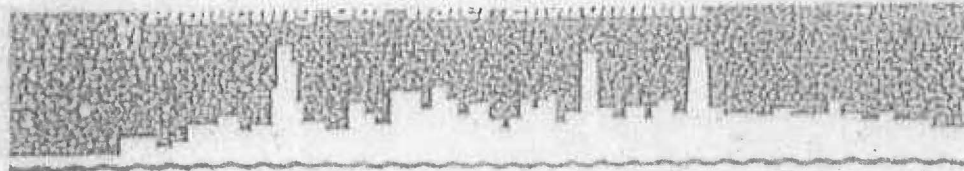
\*Windrow turning date.

**BIOSOLIDS SENT TO LANDFILLS FOR CO-DISPOSAL UNDER 40 CODE OF  
FEDERAL REGULATIONS PARTS 258 AND 261**

Biosolids from the District's Stickney and Calumet WRPs were sent to landfills in 2015 for disposal. All biosolids sent to these landfills were analyzed as specified in 40 CFR Part 261 to establish the nonhazardous nature of these biosolids for co-disposal. Analytical results, including toxic characteristic leaching procedure constituents, polychlorinated biphenyls, cyanide, sulfide, and paint filter test, were submitted to the landfill company to satisfy the requirements of their IEPA permit. District sludge has always met the requirements of 40 CFR Parts 258 and 261, and the Illinois nonhazardous waste landfill regulations (Title 35, Subtitle G, Chapter I, Subchapter H, Part 810). In 2015, a total of 1,230 DT of District biosolids (849 DT from the Stickney WRP, 157 DT from the Egan WRP, and 224 DT from the Calumet WRP) was co-disposed with municipal solid wastes at a non-hazardous waste landfill (Laraway Landfill, Joliet, Illinois).

APPENDIX I

BIOSOLIDS MANAGEMENT PROGRAMS OF THE METROPOLITAN WATER  
RECLAMATION DISTRICT OF GREATER CHICAGO UNDER  
40 CODE OF FEDERAL REGULATIONS PART 503



BOARD OF COMMISSIONERS  
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**Metropolitan Water Reclamation District of Greater Chicago**

100 EAST ERIE STREET CHICAGO, ILLINOIS 60611 312/751-5600

Cecil Lutz-Hing  
Director of R & D  
312/751-5100

January 28, 1994

Mr. Michael J. Mikulka  
Chief of Compliance Section  
United States Environmental  
Protection Agency  
Region V  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590

Dear Mr. Mikulka:

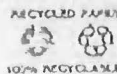
Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503.

The Metropolitan Water Reclamation District of Greater Chicago (District) has three sludge management programs that employ sewage sludge applications to land under the 40 CFR Part 503 Regulations. These programs are the Fulton County, Illinois land application site, the Hanover Park Fischer Farm at the Hanover Park Water Reclamation Plant, and the Controlled Solids Distribution Program. The District feels that it is important to define its interpretation of the 40 CFR Part 503 Regulations with respect to each of these programs.

On July 22, 1993, we sent Mr. John Colletti, then Acting Sludge Coordinator, a letter (copy attached) expressing our concerns regarding compliance monitoring, record keeping and reporting under 40 CFR Part 503 for each of these programs.

The District believes that its existing sludge management programs are conservative; and that monitoring and environmental protection measures far exceed the requirements of the Part 503 Regulations. This letter is designed to inform you of the conservative nature of these sludge management programs, and the fact that they are in complete compliance with the spirit and specific language of the Part 503 Regulations.

AI-1



Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

Fulton County Illinois Site

The District considers the application of sewage sludge at its Fulton County, Illinois site to be under "Land Application" section (subpart B) of the Part 503 Regulations. Sewage sludge is applied at rates approved by the Illinois Environmental Protection Agency (IEPA) for reclamation of disturbed strip-mine spoils. Under the current permit with the IEPA (Permit No. 1993-SC-4294 issued December 3, 1993), sewage sludge is being applied at an agronomic rate to supply nutrients for productive crop yields.

Sewage sludge applied at the site will contain metal concentrations below the pollutant limits established in Table 3 of Part 503.13, subsection b(3) of the regulations. As a result, the Part 503 cumulative pollutant limits in Table 4 of Part 503.13 subsection b(4) will not apply to future applications of sewage sludge at the Fulton County site.

Sewage sludge applied at the Fulton County site will far exceed the Class B pathogen requirements by conservatively achieving operating temperature and detention times in excess of the Part 503 anaerobic digester operating requirements (§503.32b3).

The Part 503 vector attraction reduction requirements will be easily met since the District consistently reduces the volatile solids content of the Fulton County sludge far greater than the required 38 percent (§503.33b1).

The Part 503 Regulations do not specify what kind of crop can be grown under land application. Crops typically grown at the site are corn, winter wheat, and hay. Corn and winter wheat grown on sludge application fields are sold for ethanol production, and animal feed. Hay grown on application fields receiving supernatant from on-site lagoons containing sewage sludge is currently harvested three times per year, as specified under the existing IEPA permit. This hay is used as animal feed or mulch for project reclamation activities.

Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

The Class B pathogen requirements for the supernatant application field where hay is grown will be met by ensuring that supernatant application ceases 30 days before hay crop harvesting.

The Part 503 Regulations do not specify what kind of surface water protection system is required for land application. The permitting authority, on a case-by-case basis, may impose more stringent requirements when necessary to protect the public health and the environment. Sewage sludge application fields at the Fulton County site are bermed, and have runoff retention basins designed to capture all runoff.

Waters released from the 65 retention basins at the site must, and do meet standards specified in the existing IEPA discharge permit for pH, total suspended solids, fecal coliforms, and biochemical oxygen demand. Although not required in the Part 503 Regulations, these restrictions show that District operations at the Fulton County site are designed to minimize contamination of surface waters.

Supernatant application fields at the site are not bermed. However, supernatant application in the fields is controlled so that it does not contaminate indigenous ponds and strip-mined reservoirs. Although such restrictions are not required in the Part 503 Regulations, they prevent contamination of waters used by wildlife and water fowl.

The Class B pathogen requirements in the Part 503 Regulations dictate that public access to application fields be limited. The District will comply with the Class B pathogen requirement for restricted public access by a combination of fencing, posted signs, locked gates, and security guards. These measures are conservative and far exceed the public access requirements in the Part 503 Regulations.

The Part 503 Regulations prohibit the adverse modification or destruction of endangered species or their critical habitat. The District has no evidence to indicate that sludge applications have affected the habitat of wildlife species at the site.



Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

The Part 503 Regulations do not specifically prohibit bulk sewage sludge application to flooded, frozen, or snow covered lands. The regulations state, however, that any sludge applied to these lands may not enter surface waters or wet lands. The District does not apply sewage sludge to floodplains, frozen, or snow covered ground at the Fulton County site. The site permit with the IEPA prohibits applying sewage sludge under these conditions.

The Part 503 Regulations state that bulk sewage sludge may not be applied within 10 meters of a surface water body unless authorized by a permit. The District does not apply sewage sludge within 10 meters of the waters of the state. The District's IEPA permit specifies that sludge shall not be applied to land which lies within 200 feet (61 meters) of surface waters.

The Part 503 Regulations require that the land application of bulk sewage sludge may not exceed the agronomic rate for the particular agricultural, forest, or public contact site. In some cases, the permitting authority may specifically authorize the application of sludge to a reclamation site at an annual rate that exceeds the agronomic rate. The District is currently applying sewage sludge at an application rate of 57 dry tons per acre per year on bermed sludge application fields, and 25 dry tons per acre per year on nonbermed fields. Technical justification for the sludge application rate of 57 dry tons per acre per year is given in the attachment entitled "Fulton County." This application rate is approved under the IEPA permit.

#### Hanover Park Fischer Farm

The District considers the application of sewage sludge at its Hanover Park Fischer Farm site to fall under the "Land Application" section (subpart B) of the Part 503 Regulations. Sewage sludge is applied at a rate of 20 dry tons per acre per year as specified in the IEPA permit (Permit No. 1992-SC-0942 issued August 18, 1992) for the site.

Sewage sludge applied at the site is far below the pollutant concentration limits established in Table 3 of Part 503.13, subsection b(3) of the regulations for metals.

Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

Sewage sludge applied at the Hanover Park Fischer Farm site conservatively meets the Class B pathogen requirements by either fecal coliform analysis (§503.32b2), or by meeting the Part 503 anaerobic digester operating temperature and detention time requirements (§503.32b3).

The District will ensure that the Part 503 vector attraction reduction requirements are met by electing to sub-surface inject all sludge applied to the site.

The Part 503 Regulations do not specify what kind of crop can be grown under land application. A straw crop is currently being grown at the site, with the straw removed and the grain left in the field.

The Part 503 Regulations do not state what type of surface and groundwater protection system is required. All fields at the site are bermed and all surface water is collected. The entire site is endowed with an extensive system of drainage tile, which collects all the soil percolate. The runoff and percolate are returned to the water reclamation plant for tertiary treatment.

The District's sludge application to land program at the Hanover Park Water Reclamation Plant far exceed any surface water and groundwater protection requirement specified in the Part 503 Regulations.

The Part 503 Class B pathogen requirements limit public access to the sludge application fields. The District operations at Hanover Park far exceed the Part 503 requirements since the entire site is fenced with locked gates and security guards.

The Part 503 Regulations prohibit the adverse modification or destruction of endangered species or their critical habitat. The District has no evidence that sludge applications have affected the habitat of wildlife species at the site.

The Part 503 Regulations do not prohibit bulk sewage sludge application to flooded, frozen, or snow covered lands.

January 28, 1994

Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

The regulations state, however, that any sludge applied to these lands may not enter surface waters or wetlands. The District does not apply sewage sludge to floodplains, frozen, or snow covered ground at the Hanover Park Fischer Farm. The site IEPA permit prohibits the application of sewage sludge under these conditions.

The Part 503 Regulations state that bulk sewage sludge may not be applied within 10 meters of a surface water body unless authorized by a permit. The District does not apply sewage sludge within 10 meters of the waters of the state. The site application fields are bermed and surface runoff is collected and returned to the plant for tertiary treatment. This management practice far exceeds the Part 503 requirements.

The Part 503 Regulations require that the land application of bulk sewage sludge may not exceed the agronomic rate for the particular agricultural, forest, or public contact site. The District is applying sewage sludge at an annual application rate of 20 dry tons per acre. Technical justification for this application rate is given in the attachment entitled "Hanover Park," and is approved under the IEPA permit.

#### Controlled Solids Distribution

The District has a sludge management program called the Controlled Solids Distribution Program. Sewage sludge under this program is given away for beneficial use at selected sites for landscaping and soil enrichment. The application of sewage sludge under this program is covered by IEPA Permit No. 1990-SC-1100.

Through the District's efforts to reduce the metals in the sludge with a vigorous industrial waste control program, the District's sewage sludge will be well below the metal limits specified in Part 503.13, subsection b(3), (Table 3). The anaerobic digesters producing sewage sludge for the District's Controlled Solids Distribution Program have detention times and operating temperatures which easily satisfy the Part 503 Class B pathogen requirements. The sewage sludge

Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

destined for the Controlled Solids Distribution Program receives extensive treatment to reduce its volatile solids content, which far exceed the 38 percent volatile solids reduction requirement of the Part 503 vector attraction reduction requirements.

The Part 503 Regulations for land application of sewage sludge do not specify what kind of vegetation can be grown at sites receiving sludge. The District requires that only nonfood chain vegetation be grown at all sites receiving sludge under the Controlled Solids Distribution Program. This far exceeds the Part 503 requirements.

The Part 503 Regulations under 503.32(b) for Class B pathogen reduction requires that public access be restricted for one year if the site has a high potential for public exposure; and public access be restricted for 30 days at a site with a low potential for public exposure. The District will post signs and/or other means to restrict public access to these sites.

The Part 503 Regulations prohibit the adverse modification or destruction of endangered species or their critical habitat. The District has no evidence that endangered species are present in areas receiving sewage sludge under the Controlled Solids Distribution Program.

The Part 503 Regulations do not prohibit bulk sewage sludge application to flooded, frozen, or snow covered lands. The regulations state, however, that any sludge application to these lands may not enter surface waters or wetlands. The District does not apply sewage sludge to floodplains, frozen, or snow covered ground at sites receiving sludge under its Controlled Solids Distribution Program. The District's IEPA permit prohibits these activities.

The Part 503 Regulations has a specific management practice that bulk sewage sludge may not be applied within 10 meters of a surface water body unless authorized by a permit. The District does not apply sewage sludge within 10 meters of the waters of the state. The District's IEPA permit is more restrictive in that it specifies that sludge cannot be applied to land which lies within 200 feet (61 meters) of surface waters.

Mr. Michael J. Mikulka

-8-

January 28, 1994

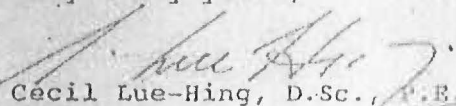
Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

The Part 503 Regulations require that the land application of bulk sewage sludge may not exceed the agronomic rate for a particular agricultural, forest, or public contact site. In some instances, the permitting authority for a reclamation site may specifically authorize the application of sludge at an annual rate that exceeds the agronomic rate. At these sites, sewage sludge will either be applied at an agronomic application rate, or a reclamation rate depending upon the needs of the site. The District's current permit with the IEPA allows for a higher application rate related to site needs. Under the Part 503 Regulations, as noted in the attachment entitled "Fulton County," the permitting authority may authorize a variance from the agronomic rate by permit. The District has received this variance from the IEPA in its current permit for the Controlled Solids Distribution Program.

The above mentioned sludge management programs are an important part of the District's operations and planning requirements for future sludge management activities. As described, the District feels that these programs comply with the requirements described in the Part 503 Regulations.

If you require additional information or have questions, don't hesitate to telephone me at (312) 751-5190.

Very truly yours,

  
Cecil Lue-Hing, D.Sc., P.E.  
Director  
Research and Development

CLH:RIP:ns  
Attachments  
cc: Dalton  
O'Connor  
DiVita  
Murray  
Alan Keller, IEPA  
Tim Kluge, IEPA  
Ken Rogers, IEPA  
Ash Sajjad, USEPA  
Bill Tong, USEPA

APPENDIX II

DESIGNATION OF SITE-SPECIFIC EQUIVALENCY TO PROCESS TO FURTHER  
REDUCE PATHOGENS FOR METROPOLITAN WATER RECLAMATION  
DISTRICT OF GREATER CHICAGO BIOSOLIDS PROCESSING TRAINS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

JUN 20 2002

REPLY TO THE ATTENTION OF:

WN-16J

Mr. Jack Faman  
General Superintendent  
Metropolitan Water Reclamation  
District of Greater Chicago  
100 East Erie Street  
Chicago, Illinois 60611

REF: Mr. Richard Lanyon's November 30, 2001, Letter Request for Site-specific Equivalency Certification for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Waste Water Treatment Plants.

Dear Mr. Faman:

We acknowledge receipt of the referenced letter request along with attachments A through I. This request conforms with the requirements of the Federal rules for the use and disposal of biosolids codified at 40 CFR part 503. These rules designate the Regional permitting authority to be responsible for determining equivalency, and require generators of biosolids to formally seek an equivalency certification of their process to further reduce pathogens (PFRP) from the permitting authority. To be equivalent, a treatment process must be able to consistently reduce pathogens to levels comparable to the other PFRP processes listed in part 503, Appendix B.

The granting of a site-specific equivalency designation by the Regional permitting authority—based on a thorough review of the adequacy of the process trains to consistently reduce pathogens in biosolids as indicated by the pathogen data, and in consultation with the Pathogen equivalency Committee (PEC)—certifies the biosolids generated by using a PFRP equivalent process is Class A with respect to pathogens. The pathogen standards are specified in section 503.32(a)(7)(i). However, the granting of a site-specific equivalency is limited to the set of process and operating conditions in use at the Stickney and Calumet waste water treatment plants at the time of the application for equivalency designation (Appendix B of the November 30, 2001, Letter Request), and as described by MWRDGC in its application for equivalency submitted to the PEC. The PEC is an US Environmental Protection Agency resource to provide technical assistance and recommendations to Regional permitting authorities regarding pathogen reduction equivalency in implementing the part 503 standards for use and disposal of biosolids.

We are familiar with the MWRDGC's request for equivalency because our biosolids team members participated in numerous phone conversations and meetings with the PEC and Dr. Prakasam Tata of your staff, and both were extremely helpful in explaining and clarifying various issues related to the subject.

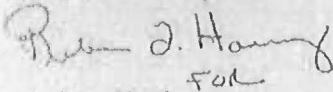
Our review of the MWRDGC's biosolids data submitted for 1994 to 2001 indicates Class A biosolids were produced at the Stickney and Calumet plants as they operated their respective low- and high-solids sludge processing trains (SPTs) according to codified protocols delineated in Attachment B of Mr. Lanyon's letter request, dated November 30, 2001. The part 503 rules for PFRP equivalency require that enteric viruses and viable helminth ova are reduced to below detection level. The pathogen data obtained from actual measurements and the statistical treatment of that data by MWRDGC indicated reductions of greater than two logs. We appreciate the MWRDGC's effort in analyzing 1,400 discrete samples of biosolids for pathogens, and the professionalism and patience displayed by Dr. Prakasam Tata of your staff in responding to our queries pertaining to this matter.

In consideration of the quality of data provided for our review, the consistent achievement of a Class A product, we are pleased to grant a conditional site-specific certification of equivalency to the MWRDGC's SPTs at Stickney and Calumet waste water treatment plants for a period of two years effective August 1, 2002 to July 30, 2004, provided the following conditions are met.

- 1) The Stickney and Calumet plants must operate at all times according to the codified process and operating protocols referred to in the letter request dated November 30, 2001.
- 2) Monitor biosolids (treated sludge) at Stickney and Calumet plants once per month for the first year and subsequently, once every other month for enteric viruses and helminth ova, and certify the MWRDGC is in compliance with Class A standards and report the results semi-annually to the attention of Mr. Valdis Aistars, Mail Drop WC-15J, 77 West Jackson, Chicago, Illinois 60604.

We appreciate MWRDGC's ongoing efforts to improve the quality of its biosolids. If you have any further questions about this matter, please contact Ash Sajjad of my staff at 312-886-6112.

Sincerely yours,

  
for

Jo Lynn Traub  
Director, Water Division

cc: Dick Lanyon, MWRDGC  
Dr. Prakasam Tata, MWRDGC ✓  
Dr. James Smith Jr., ORD, Cincinnati





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

JUL 30 2012

REPLY TO THE ATTENTION OF:

WN-16J

Thomas C. Granato, Ph.D.  
Director of Monitoring and Research  
Metropolitan Water Reclamation  
District of Greater Chicago  
100 East Erie Street  
Chicago, Illinois 60611-3154

Re: June 1, 2012, Request for Renewal of Site-Specific Equivalency Determination for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Wastewater Treatment Plants

Dear Dr. Granato:

We have received the above-referenced request on June 6, 2012, along with microbiological analyses of biosolids generated by MWRDGC between August 2002 and December 2011. We appreciate your interest in seeking renewal of MWRDGC's equivalency certification. You have also requested that data reporting be reduced and the sampling frequency for enteric viruses and helminth ova be retained at six times per year if your equivalency certification is renewed. The following discussion highlights the regulatory requirements of establishing equivalency, memorializes past Agency decisions, and provides Region 5's decision on your requests.

Biosolids are a product of wastewater treatment and are suitable for beneficial reuse in agriculture and other applications, subject to conformance with the Federal biosolids rules at 40 Code of Federal Regulations Part 503 (503 Rules) addressing disease-causing organisms (pathogens) in biosolids. The 503 Rules establish requirements for classifying biosolids as either a Class A or Class B product with respect to pathogens. Class A requirements are met by treating the sewage sludge to reduce pathogens below detection levels, while the Class B requirements rely on a combination of treatment and site restrictions to reduce pathogens and potential exposure to pathogens. The 503 Rules provide a series of options for meeting the specific requirements for the two classes of biosolids.

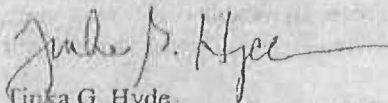
One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the 503 Rules, the permitting authority (in this case, EPA Region 5) is responsible for determining equivalency.

MWRDGC's sewage sludge processing trains differ from those listed in Appendix B. In March 1998, MWRDGC submitted an equivalency application to EPA's Pathogen Equivalency Committee (PEC) and the Region for approval. The Region and the PEC reviewed MWRDGC's initial request and granted a site-specific and conditional equivalency in June 2002, for a period of 2 years. Subsequently, the Region granted four 2-year extensions, in effect until August 1, 2012.

We have reviewed your most recent renewal request and request for reporting and sampling frequency reduction. Based on the microbiological data provided to us, I am approving your equivalency renewal request for a period of five years, until August 1, 2017. This approval is subject to all conditions that were included in the initial approval and all subsequent extensions except as it relates to reporting. As part of your equivalency approval, you were required to submit semi-annual reports to EPA. Based on your past performance, we agree that annual reporting as required by the Part 503 rules is sufficient and therefore, approve the reduction to annual reporting. Regarding the retention of the reduction in sampling frequency for enteric viruses and helminth ova to six times per-year, we would like to provide some clarification. This reduction is only allowed when MWRDGC's sewage sludge processing trains are not meeting the approved conditions for equivalency and you are analyzing the sewage sludge in accordance with 40 CFR 503.32(a)(5)(ii) and (a)(5)(iii) to meet Class A. Monthly sampling for enteric viruses and helminth ova is still required as part of your equivalency approval.

If you have any further questions about this matter, please contact Mr. John Colletti of my staff, at (312) 886-6106.

Sincerely,



Tinka G. Hyde  
Director, Water Division

cc: Albert Cox, MWRDGC  
Al Keller, IEPA

*Protecting Our Water Environment*

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**Metropolitan Water Reclamation District of Greater Chicago**  
100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3154 312.751.5150 f.312.751.5194

**THOMAS C. GRANATO, Ph.D.**  
Director of Monitoring and Research Department

thomas.granato@mwrtd.org

September 14, 2012

Ms. Tinka Hyde  
Director, Water Division  
United States Environmental  
Protection Agency  
Region 5  
77 West Jackson Boulevard  
Chicago, IL 60604-3590

Dear Ms. Hyde:

**Subject: Clarification on July 30, 2012, Letter: Renewal of Site-Specific Equivalency to Process to Further Reduce Pathogens Designation of the Metropolitan Water Reclamation District of Greater Chicago's Biosolids Processing Trains at the Stickney and Calumet Water Reclamation Plants**

In a letter dated July 30, 2012 (attached), the United States Environmental Protection Agency (USEPA) notified the Metropolitan Water Reclamation District of Greater Chicago (District) that the site-specific equivalency to process to further reduce pathogens (PFRP) designation of the District's low- and high-solids biosolids processing trains at the Stickney and Calumet Water Reclamation Plants was renewed for a period of five years, until August 1, 2017. Based on a discussion with Mr. John Colletti of your staff, the District will operate as specified in this renewal letter and with the following clarifications:

- Sampling for enteric viruses and helminth ova will be done six times per year as part of the PFRP equivalency as approved in the 2010 renewal (attached) of the two-year certification.
- Since the reporting frequency is changed from semi-annual to annual, and monitoring data will be included in the annual USEPA 40 Code of Federal Regulations Part 503 Rule (Part 503) report to the USEPA, the annual reporting begins with the 2012 calendar year. As such, no more semi-annual reports will be submitted from now onwards. The monitoring data for the period January through July 2012 of the previous certification period (August 2010 to July 2012) will be reported in the 2012 Part 503 report.

Ms. Tinka Hyde

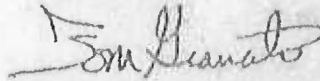
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September 14, 2012

Subject: Clarification on July 30, 2012, Letter: Renewal of Site-Specific Equivalency to Process to Further Reduce Pathogens Designation of the Metropolitan Water Reclamation District of Greater Chicago's Biosolids Processing Trains at the Stickney and Calumet Water Reclamation Plants

For additional information, please contact Dr. Albert Cox, Supervising Environmental Soil Scientist, at 708.588.4063.

Very truly yours,



Thomas C. Granato, Ph.D.  
Director  
Monitoring and Research

TCG:AC:cm  
Attachment  
cc w/att: S. A. Keller, IEPA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3500

JUL 20 2010

REPLY TO THE ATTENTION OF: WN-16J

Mr. Louis Kollias  
Director of Monitoring and Research  
Metropolitan Water Reclamation  
District of Greater Chicago  
100 East Erie Street  
Chicago, Illinois 60611-3154

Re: May 17 2010, Request for Renewal of Site-specific Equivalency Determination for the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) Biosolids Processing Trains at the Stickney and Calumet Wastewater Treatment Plants.

Dear Mr. Kollias:

We have received the above-referenced request on May 20, 2010, along with microbiological analyses of biosolids generated by MWRDGC between August 2002 and December 2009. We appreciate your interest in seeking renewal of MWRDGC's equivalency certification. You have also requested the sampling frequency for enteric viruses and helminth ova be reduced if your equivalency certification is renewed. The following discussion highlights the regulatory requirements of establishing equivalency, memorializes past Agency decisions, and provides Region 5's decision on your requests.

Biosolids are a product of wastewater treatment and are suitable for beneficial reuse in agriculture and other applications, subject to conformance with the Federal biosolids rules at 40 Code of Federal Regulations Part 503 (503 Rules) addressing disease-causing organisms (pathogens) in biosolids. The 503 Rules establish requirements for classifying biosolids as either a Class A or Class B product with respect to pathogens. Class A requirements are met by treating the sewage sludge to reduce pathogens below detection levels, while the Class B requirements rely on a combination of treatment and site restrictions to reduce pathogens and potential exposure to pathogens. The 503 Rules provide a series of options for meeting the specific requirements for the two classes of biosolids.


One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the 503 Rules, the permitting authority

(in this case, EPA Region 5) is responsible for determining equivalency. MWRDGC's sewage sludge processing trains differ from those listed in Appendix B. In March 1998, MWRDGC submitted an equivalency application to EPA's Pathogen Equivalency Committee (PEC) and the Region for approval. The Region and the PEC reviewed MWRDGC's initial request and granted a site-specific and conditional equivalency in June 2002, for a period of 2 years. Subsequently, the Region granted three 2-year extensions, in effect until July 31, 2010.

We have reviewed your most recent renewal request and request for sampling frequency reduction. Based on the microbiological data provided to us, I am approving your equivalency renewal request for a period of two years, until August 1, 2012. This approval is subject to all conditions that were included in the initial approval and all subsequent extensions except as it relates to sampling frequency. With this approval, the sampling frequency for enteric viruses and helminth ova is reduced to six times per year.

If you have any further questions about this matter, please contact Mr. John Colletti of my staff, at (312) 886-6106.

Sincerely,



*fd* Tinka G. Hyde  
Director, Water Division