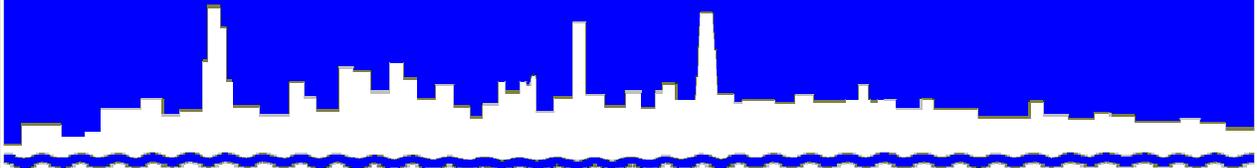


Protecting Our Water Environment



Metropolitan Water Reclamation District of Greater Chicago

***MONITORING AND RESEARCH
DEPARTMENT***

REPORT NO. 18-31

***ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR
2017***

October 2018

Metropolitan Water Reclamation District of Greater Chicago

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**ANNUAL BIOSOLIDS MANAGEMENT REPORT
FOR 2017**

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LIST OF ACRONYMS

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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Special thanks are given to Ms. Coleen Maurovich for typing and formatting 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

This report serves as a record of the data and information that fulfills the frequency of monitoring and the reporting requirements for 2017 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). The Part 503 reporting was done as required through the USEPA's online reporting system in February 2018.

INTRODUCTION

This District report presents the 2017 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. 2016-61315).
3. Controlled Solids Distribution Program (Biosolids Application to Land in the Chicago Area under IEPA Permit No. 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 addition, the District has two IEPA permits for composting biosolids at the Calumet East Solids Management Area (Permit No. 2017-017-DE/OP) and the Harlem Avenue Solids Management Area (Permit No. 2017-017-DE/OP). The biosolids composts are distributed for use as a soil amendment under Illinois Department of Agriculture registration (Registration No. License No. 100181).

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 2017. The Egan WRP did not produce final biosolids products in 2017 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 production and utilization of sludges and biosolids by the District in 2017 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 2017

Production and Utilization	Water Reclamation Plants						
	Stickney ¹	Calumet ¹	O'Brien	Egan ¹	Hanover Park ¹	Kirie	Lemont
	----- Dry Tons (Metric Tons)-----						
Production ²	121,081 (109,820)	20,916 (18,971)	39,227 (35,579)	6,954 (6,307)	861 (781)	7,371 (6,685)	381 (346)
Utilization	95,716 (86,814)	17,077(15,489)	-	-	698 (633)	-	-
Agricultural land	47,412 ³ (43,003)	8,198 (7,436)	-	-	-	-	-
Urban land (total)	9,720 (8,816)	3,866 (3,506)	-	-	-	-	-
air-dried	8,607 (7,807)	3,866 (3,506)	-	-	-	-	-
composted	1,113 (1,009)	-	-	-	-	-	-
to District property	-	-	-	-	-	-	-
Landfill (total)	468 (424)	5,013 (4,547)	-	-	-	-	-
Co-disposal	468 (424)	208 (189)	-	-	-	-	-
Daily cover	-	-	-	-	-	-	-
Final cover	-	4,805 (4,358)	-	-	-	-	-
To Other WRPs ³	-	-	39,227 (35,579)	6,957 ⁴ (6,310)	-	7,371 (6,685)	381 (346)
Temporary Storage	-	-	-	-	-	-	-
Pelletizing facility ⁵	38,116 (34,571)	-	-	-	-	-	-

¹Differences between biosolids production and total use or disposal in 2017 were due to a net withdrawal or storage in lagoons or drying areas, and processing of biosolids imported from other WRPs.

²Stickney, 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.

³For further processing.

⁴Includes centrate and solids pumped to the O'Brien WRP for further processing, and centrifuge cake trucked to CALSMA and HASMA for additional processing. The 3 DT discrepancy between biosolids production and utilization was due to the different procedures used to track the quantities of biosolids production and utilization.

⁵Sent to Stickney WRP pelletizing facility owned and operated by Metropolitan Biosolids Management, LLC, 6001 W. Pershing Road, Cicero, IL 60804 (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 2017 was 2.56 MGD. Wastewater reclamation processes include both primary (primary settling) and secondary (activated sludge process) treatments. In 2017, the Lemont WRP produced 381 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 2017 was 38.3 MGD. Wastewater reclamation processes include grit tanks, secondary (activated sludge process), and tertiary (sand filtration) treatments. In 2017, the Kirie WRP produced 7,371 DT of solids (Table 1), which were sent via force main to the Egan WRP, then to the O'Brien WRP, and finally 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 2017 was 234 MGD. Wastewater reclamation processes at the O'Brien WRP include primary (primary settling) and secondary (activated sludge process) treatments. In 2017, the O'Brien WRP produced 39,227 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 2017 was 24.7 MGD. Wastewater reclamation processes include primary (primary settling), secondary (activated sludge process), and tertiary (sand filtration) treatments. Under normal operations, 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 2017, the total solids production at the Egan WRP was 6,954 DT ([Table 1](#)). Of that total, 4,683 DT (4,455 DT of biosolids and 228 DT of centrate) were pumped to the O'Brien WRP and then to the Stickney WRP for digestion and further processing. A total of 2,263 DT of biosolids was shipped to the Harlem Avenue Solids Management Area (HASMA) and Calumet Solids Management Area (CALSMA) site for composting, temporary storage, and utilization, while the remaining 11 DT were recycled to the Egan WRP for use in the ANITA™ MOX ammonia removal process.

Solids were digested at the Egan WRP for most of the year, but at least one digester was temporarily out of service. 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 2017, no Egan biosolids were co-disposed in landfill.

Biosolids Conveyed to Other Water Reclamation Plants for Further Processing

In 2017, a total of 4,683 DT of solids and 228 DT of centrifuge centrate were pumped to the O'Brien WRP for further processing. In addition, a total of 2,263 DT of centrifuge cake biosolids were trucked from the Egan WRP to the HASMA and CALSMA sites for additional processing and storage.

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 2017 was 10.8 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 2017, the total biosolids production at this WRP was 861 DT (Table 1).

Land Application of Class B Liquid Biosolids

In 2017, the Hanover Park WRP land-applied a total of 698 DT of biosolids at the on-site Fischer Farm under IEPA Permit No. 2016-61315. The quantity of land-applied biosolids (698 DT) was lower than the quantity produced (861 DT) in 2017; hence 163 DT were stored in storage lagoons for later use. 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 2017 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 BIOSOLIDS¹ GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISHER FARM SITE IN 2017

Sample Date	TKN	NO ₂ +NO ₃ -N	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
Supernatant												
----- mg/L -----												
07/08/17	285	6.74	240	<0.020	<0.0010	0.049	0.07	<0.0050	0.020	<0.010	0.012	0.082
07/29/17	180	1.23	146	<0.020	<0.0010	0.037	0.06	<0.0050	0.016	<0.010	0.020	0.048
08/05/17	215	2.27	169	<0.020	<0.0010	0.027	<0.05	<0.0050	0.020	<0.010	0.014	0.035
08/26/17	199	9.51	157	<0.020	<0.0010	0.046	<0.05	<0.0050	0.019	<0.010	<0.005	0.030
09/09/17	222	5.07	169	<0.020	<0.0010	0.025	0.05	<0.0050	0.020	<0.010	0.008	0.018
10/21/17	313	0.73	248	<0.020	<0.0010	0.067	0.09	<0.0050	0.023	<0.010	<0.005	0.087
11/04/17	383	0.40	314	<0.020	<0.0010	0.088	0.08	<0.0050	0.024	<0.010	<0.005	0.098
Liquid Biosolids ²												
----- mg/kg -----												
12/09/17	80979	26	29,834	<5	2	827	0.81	13	32	22	5	820
Minimum	80979	26	29,834	<5	2	827	0.81	13	32	22	5	820
Mean	80979	26	29,834	<5	2	827	0.81	13	32	22	5	820
Maximum	80979	26	29,834	<5	2	827	0.81	13	32	22	5	820
503 Limit	NL	NL	NL	41	39	1,500	17	75	420	300	100	2,800

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 2017

Month	Average Temperature	Average Detention Retention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32(b)(3) ¹
	----- °F -----	----- days-----		----- days -----
January	95	23.7	Yes	15.0
February	95	23.1	Yes	15.0
March	95	22.2	Yes	15.0
April	95	24.7	Yes	15.0
May	95	27.0	Yes	15.0
June	95	22.0	Yes	15.0
July	95	23.9	Yes	15.0
August	95	21.4	Yes	15.0
September	95	19.0	Yes	15.0
October	95	16.1	Yes	15.0
November	95	15.6	Yes	15.0
December	95	17.0	Yes	15.0

¹For 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 2017

Month	Digester Feed	Digester Draw	Lagoon Biosolids ¹	Volatile Solids Reduction ²
	----- % Total Volatile Solids -----			----- % -----
January	85.6	74.4	75.7	47.6
February	87.7	74.8	74.7	58.7
March	87.3	75.3	75.0	56.4
April	84.1	73.9	76.0	40.2
May	84.0	72.8	75.8	40.4
June	85.0	72.2	74.9	47.5
July	81.8	71.2	62.7	62.6
August	84.2	72.3	66.7	62.3
September	86.5	74.4	59.6	77.0
October	84.5	76.2	65.9	64.6
November	85.1	74.4	68.4	62.1
December	87.2	76.1	66.7	70.6

¹Biosolids applied as supernatant 7/8 through 11/4/2017; liquid biosolids applied 12/9/17.

²Volatile solids reduction computed using total volatile solids data 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 2017 was 255 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 2017, a total of 20,916 DT of biosolids was produced at the Calumet WRP (Table 1). The total quantity of 17,077 DT of biosolids utilized (12,064 DT land-applied and 5,013 DT disposed of at landfills), which includes 595 DT of the Egan WRP biosolids, was less than the total 2017 production for the Calumet WRP. Hence, a total of 3,234 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 2017, a total of 4,805 DT of biosolids generated at the Calumet WRP was applied as final cover at the Land and Lakes Landfill, Dolton, Illinois. A total of 208 DT of unsuitable solids, which includes solids from the Egan WRP, was co-disposed with municipal solid wastes at the Waste Management's Laraway Landfill site, Joliet, Illinois. No biosolids were used as daily cover.

Land Application of Class B Biosolids

In 2017, the Calumet WRP land-applied 8,198 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 2017, approximately 1,500 DT centrifuge cake biosolids were transported from the Egan WRP to the CALSMA sites for storage and later 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 2017 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 2017, a total of 3,866 DT of air-dried Class A 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 No. 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 2017, a total of 3,866 DT of air-dried Class A EQ biosolids generated at the Calumet WRP was applied to urban land. All Calumet WRP air-dried, EQ biosolids land-applied in 2017 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 2017, 340 DT of centrifuge cake from the Egan WRP was composted with woodchips and cured at the Calumet East Solids Management Area (CALSMA). The fecal coliform analysis was performed after the composted EQ biosolids were cured and prepared for later utilization on urban land (Table 11). Class A pathogen reduction was achieved using the open windrow composting process through which all the requirements of Section 503.32(a)(7) were met. The temperature of the compost piles was maintained at $\geq 55^{\circ}\text{C}$ for at least 15 days and the piles were turned five times during this period (Table 12). Vector attraction reduction was achieved through the same open windrow composting process and met the requirements of Section 503.33(b)(5) by fulfilling the temperature and time requirements ($\geq 45^{\circ}\text{C}$ for at least 14 days) in the open windrows (Table 12). No Calumet composted biosolids were applied to urban land in 2017. The composted EQ biosolids generated at the Calumet WRP in 2017 will be applied to urban land in 2018. Provided all composting requirements of Sections 503.32(a)(7) and 503.33(b)(5) are met; no additional monitoring is required.

TABLE 5: CONCENTRATIONS OF NITROGEN AND METALS IN SEMI-DRIED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2017

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- mg/dry kg -----											
05/15	14,250	740	9	3	312	0.50	1	29	73	<5	889
05/15	18,349	5,795	9	2	448	<0.25	6	29	67	<5	1,305
06/29	31,674	14,094	11	3	389	0.44	5	29	76	<5	1,151
07/05	18,395	3,514	10	3	452	0.61	3	29	76	<5	1,313
08/02	29,777	3,126	10	3	429	0.44	5	29	68	<5	1,280
08/02	26,697	3,036	11	2	389	0.45	5	28	74	<5	1,128
09/07	33,018	6,874	10	2	388	0.58	7	28	69	<5	1,175
10/17	22,031	3,168	10	2	380	0.55	1	29	74	<5	1,152
10/17	57,507	8,926	<5	9	693	0.72	<1	63	25	<5	753
11/28	28,062	2,028	12	3	414	0.73	14	31	82	<5	1,307
11/28	39,416	3,425	<5	1	784	0.56	14	33	18	<5	774
12/04	48,795	7,313	<5	10	770	0.99	14	62	26	<5	824
Minimum	14,250	740	<5	1	312	<0.25	1	28	18	<5	753
Mean ¹	30,664	5,170	9	4	487	0.57	6	35	61	<5	1,088
Maximum	57,507	14,094	12	10	784	0.99	14	63	82	<5	1,313
503 Limit	NL ²	NL	41	39	1,500	17	75	420	300	100	2,800

¹In calculating the mean, values less than the detection limit were considered as the detectable limit.

²NL = No limit.

TABLE 6: DIGESTER¹ TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2017

Month	Average Temperature	Average Detention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32b3*
	---- °F ----	----- days -----		----- days -----
January	95.1	57.6	yes	15.0
February	94.9	57.2	yes	15.2
March	95.0	67.6	yes	15.0
April	95.2	63.3	yes	15.0
May	94.3	52.4	yes	16.1
June	94.4	63.7	yes	16.0
July	95.4	39.0	yes	15.0
August	92.6	37.2	yes	19.0
September	86.9	35.8	yes	28.5
October	86.6	38.9	yes	29.0
November	88.4	47.9	yes	26.0
December	88.1	48.9	yes	26.5

*For anaerobic digestion at average temperature achieved.

TABLE 7: SITES THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION PROGRAM IN 2017

User	Use Location
A B Sanchez Landscaping, Markham	Landscaping
Chicago Park District, Chicago	Athletic fields - 19 parks ¹
Rich Central High School, Olympia Fields	Athletic fields
Thornton Fractional South High School, Lansing	Athletic fields
Wilmette Golf Club, Wilmette	Golf course

¹Horner, Norwood, Pottawatamie, Warren, Welles, Oriole, Addams/Medill, Calumet, Dawes, Gately, Hamilton, Jackie Robinson, La Villita, Lindblom, Marquette, McKinley, Midway Plaisance, Palmer, Washington.

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 2017

Sample Date	TKN	NO ₃ ¹	NH ₃ -N	TVS ²	TVS ³		As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
					Reduction										
		----- mg/dry kg -----			%	%	----- mg/dry kg -----								
06/09/17	17,542	1,622	605	34.5	83.5	10	3	435	0.83	3	29	81	<5	1,235	
07/05/17	20,097	1,874	775	36.1	82.2	10	3	439	0.54	2	31	87	<5	1,245	
08/02/17	27,246	1,295	2,458	37.1	69.9	11	3	458	0.58	5	29	73	<5	1,274	
09/06/17	29,046	38	3,043	37.4	65.6	10	2	415	0.70	7	27	71	<5	1,090	
09/07/17	25,794	432	2,262	35.9	67.7	10	3	359	0.39	5	28	73	<5	1,032	
09/07/17	15,468	642	1,476	27.1	78.6	9	2	246	0.44	2	25	51	<5	713	
09/08/17	18,762	35	3,269	27.8	79.2	8	2	253	0.50	3	26	51	<5	746	
09/09/17	14,998	2,543	90	35.7	70.1	10	3	393	0.83	3	27	88	<5	1,036	
10/27/17	16,232	1,872	31	30.9	75.9	12	3	403	0.76	13	30	97	<5	1,162	
12/07/17	28,145	29	3,229	37.4	75.7	12	3	418	0.44	14	29	76	<5	1,271	
Minimum	14,998	29	31	27.1	65.6	8	2	246	0.39	2	25	51	<5	713	
Mean ⁴	21,333	1,038	1,724	34.0	74.8	10	3	382	0.60	6	28	75	<5	1,080	
Maximum	29,046	2,543	3,269	37.4	83.5	12	3	458	0.83	14	31	97	<5	1,274	
503 Limit	NL ⁵	NL	NL	NL	38	41	39	1,500	17	75	420	300	100	2,800	

¹Includes nitrite.

²TVS = Total Volatile Solids.

³ Total volatile solids for digester feed during 2015 - 2016 were used to calculate TVS reduction.

⁴In calculating the mean, values less than the detection limit were considered as the detection limit.

⁵NL = No limit.

TABLE 9: MICROBIOLOGICAL ANALYSIS OF BIOSOLIDS¹ GENERATED BY NON-COMPLIANT PROCESS TO FURTHER REDUCE PATHOGENS-EQUIVALENT CODIFIED PROCESSING TRAINS AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND DURING 2017

Sample Date ²	Total Solids	Fecal Coliform	Sample Date ³	Enteric Virus	Helminth Ova
	--- % ---	---MPN ⁴ /g---		--- PFU ⁵ /4g ---	-- V. Ova/4g --
09/13/16	71.7	95	08/24/16	<0.8000	<0.0800
09/20/16	80.2	360	10/20/16	<0.8000	<0.0800
10/20/16	70.8	140	12/07/16	<0.8000	<0.0133 ⁶
04/25/17	83.5	45	04/19/17	<0.8000	<0.0800
05/17/17	76.3	38	05/17/17	<0.8000	<0.0800
07/12/17	72.1	420	06/20/17	<0.8000	<0.0800

¹All biosolids satisfied Part 503 Class A requirements.

²Sample dates apply to FC samples only.

³Non-PFRP biosolids sampled before the material was dried and subsequently used in 2017.

⁴Most probable number.

⁵Plaque-forming unit.

⁶Sample weight = 300 g; for all others, sample weight = 50 g.

TABLE 10: FECAL COLIFORM ANALYSIS OF CLASS A BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2017

Sample Date	Lagoon Source	Total Solids	Fecal Coliform
		%	MPN ¹ /dry g
04/25/17	14	83.5	45
05/17/17	14	76.3	38
05/31/17	14	57.4	21
06/15/17	14	75.0	150
07/12/17	3	72.1	420
08/15/17	4	81.8	61
08/15/17	4	79.8	12
11/29/17	8	48.6	59

¹Most probable number.

TABLE 11: FECAL COLIFORM ANALYSIS OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA AND TESTED AFTER THE COMPLETION OF CURING IN 2017

Sample Date	Total Solids	Fecal Coliform
02/15/17	----- % ----- 36.3	----- MPN ¹ /g ----- 5

¹Most probable number.

TABLE 12: SUMMARY OF TEMPERATURE READINGS AND TURNING OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED BIOSOLIDS AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2017

Pile ID Number ¹	Composting Date (Range) ²	Turning Date					Composting Temperature °C (Range)
		1 st	2 nd	3 rd	4 th	5 th	
16-19	10/09-11/20	10/13	10/18	10/24	11/02	11/14	56 - 71
17-01	10/06-10/25	10/06	10/10	10/16	10/21	10/25	66 - 80
17-02	10/06-10/25	10/05	10/09	10/13	10/18	10/21	55 - 78
17-03	10/06-10/29	10/09	10/13	10/18	10/21	10/25	55 - 78
17-04	10/06-10/29	10/09	10/13	10/18	10/21	10/25	64 - 79
17-05	10/11-11/18	10/16	10/21	10/25	11/02	11/14	55 - 77
17-06	10/15-12/03	10/21	10/25	11/02	11/14	11/30	57 - 76
17-07	10/18-12/04	10/21	10/25	11/02	11/14	11/30	55 - 75
17-08	10/15-12/05	10/21	10/25	11/02	11/14	11/30	55 - 77

¹All piles reported fulfill the temperature and turning requirements.

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, 2017 through July 31, 2022, and requires analysis of six samples for helminth ova and enteric viruses annually during this period and the submission of these data together with the annual Part 503 report.

All of the Calumet WRP EQ biosolids generated or utilized in 2017 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 2017 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 2017 was 685 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. Application to farmland as semi-dried Class B biosolids.
 - c. 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.
4. Dewatered by centrifuging to approximately 25 percent solids content and conveyed to Metropolitan Biosolids Management, LLC, for further processing under Contract 98-RFP-10.
5. Dewatered by centrifuging to approximately 25 percent solids content and transported to HASMA for co-composting with woodchips and yardwaste prior to application to urban land under the District's permitted Controlled Solids Distribution Program.
6. 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:
 - 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.

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

In 2017, the Stickney WRP produced a total of 121,081 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 (95,716 DT) was lower than the total 2017 production (121,081 DT) for the Stickney WRP. Hence, 25,365 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 2017, a total of 468 DT of biosolids, generated at the Stickney WRP that includes unsuitable solids generated by digester cleaning and trucked from the Egan WRP to LASMA, were co-disposed with municipal solid wastes at the Laraway Landfill, Joliet, Illinois. No biosolids were used as final cover.

Application of Class B Biosolids to Farmland

In 2017, a total of 47,412 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. Application to agricultural land was done through contracts with Synagro Midwest, Inc. and Stewart Environmental, Inc. 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 2017 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 13), 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 14). The biosolids nitrogen concentrations (Table 13) were used to compute the agronomic rates for farmland application.

Application of Biosolids to Urban Land

In 2017, a total of 9,720 DT of Stickney WRP air-dried (8,607 DT) and composted EQ (1,113 DT) biosolids was applied to urban land for the construction and maintenance of golf courses, recreation fields, and parks. The sites and method of utilization of these biosolids under the program are listed in Table 15.

TABLE 13: CONCENTRATIONS OF NITROGEN AND METALS IN CENTRIFUGE CAKE AND SEMI-DRIED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2017

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----										
3/24	44,931	12,840	7	4	428	0.75	8	44	116	<5	899
3/24	28,265	4,102	8	6	467	1.10	8	46	116	<5	985
3/24	58,480	11,557	5	3	367	0.52	9	39	87	<5	755
3/24	35,934	4,579	8	6	464	0.94	7	46	115	<5	989
4/21	36,792	12,705	7	4	441	0.63	6	45	122	<5	945
4/21	46,060	11,764	6	3	392	0.45	9	43	98	<5	824
4/21	30,667	6,433	8	7	458	0.90	7	48	121	<5	1,018
4/21	19,196	2,608	8	7	488	0.73	6	51	136	<5	1,071
5/10	38,133	10,397	7	4	441	1.09	6	43	110	<5	911
5/10	27,690	5,772	<5	2	268	0.46	3	28	63	<5	535
5/10	24,031	2,559	8	6	470	0.90	5	47	121	<5	1,001
5/10	23,596	3,008	9	6	465	0.87	5	47	118	<5	1,002
5/23	39,835	558	7	4	438	0.88	6	43	115	<5	917
6/6	43,450	12	7	3	385	0.60	7	45	98	<5	778
6/7	40,288	13,819	8	3	395	0.53	6	40	98	<5	799
6/7	24,876	6,957	9	6	456	0.75	6	46	118	<5	976
6/7	27,977	6,645	10	6	445	0.69	6	46	113	<5	963
6/13	27,408	5,946	10	6	455	0.86	5	46	115	<5	974
6/13	48,877	16,025	7	3	386	0.56	6	46	93	<5	791
6/20	40,894	15,254	8	3	388	0.75	5	42	95	<5	762
6/27	27,119	6,079	9	5	426	0.80	5	43	117	<5	935
6/27	49,666	16,016	9	3	385	0.66	5	41	89	<5	767
7/17	14,263	1,442	9	5	441	0.56	7	43	146	<5	869
7/17	38,896	11,834	8	4	456	0.46	7	46	121	<5	963
7/17	32,793	8,045	8	4	451	0.41	6	44	112	<5	884

TABLE 13 (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 2017

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- mg/dry kg -----											
7/17	16,729	2,961	9	5	458	0.59	7	46	121	<5	952
7/19	40,603	11,656	7	4	421	0.51	7	41	107	<5	853
7/19	48,871	14,004	7	3	424	0.42	10	44	88	<5	831
8/8	26,491	5,600	9	6	427	0.53	5	45	116	<5	944
8/8	30,237	7,377	9	8	436	0.88	5	47	114	<5	938
8/18	27,062	5,305	9	5	416	0.52	7	42	109	<5	878
8/18	14,256	2,213	10	6	465	0.56	7	46	116	<5	978
8/18	46,657	16,519	9	3	394	0.34	7	41	93	<5	778
8/22	26,817	5,888	9	6	440	0.52	6	44	119	<5	928
8/22	51,483	20,082	9	3	380	<0.25	9	39	74	<5	730
8/22	36,109	11,556	8	4	400	0.39	6	40	96	<5	809
9/12	17,963	1,102	9	6	453	0.77	6	44	110	<5	938
9/12	49,336	16,548	8	3	387	0.33	8	39	84	<5	749
9/12	39,398	12,369	8	3	428	0.53	7	42	101	<5	837
9/12	34,670	9,088	7	4	415	0.73	6	41	106	<5	829
9/26	15,495	2,638	9	6	448	1.03	6	44	112	<5	933
10/3	37,808	7,356	9	5	465	0.75	9	46	108	<5	903
10/17	25,992	8,223	8	4	459	0.45	4	46	103	<5	894
10/20	25,444	2,545	9	4	471	0.77	3	48	108	<5	931
10/20	47,170	15,830	9	3	416	0.46	3	44	96	<5	833
10/20	33,345	6,909	9	5	474	0.77	3	50	112	<5	959
10/20	34,312	7,716	9	5	480	0.95	3	49	118	<5	972
10/31	41,032	11,732	10	3	412	0.64	13	41	93	<5	811
10/31	32,717	7,459	11	5	453	0.61	13	46	102	<5	877
10/31	27,672	5,582	11	5	468	0.73	14	48	110	<5	911
11/14	30,607	5,857	10	5	468	0.80	13	46	109	<5	915

TABLE 13 (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 2017

Date	TKN	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- dry kg -----											
11/17	31,845	7,084	10	5	490	0.64	14	49	123	<5	946
11/17	28,484	3,443	9	3	462	0.54	14	44	94	<5	926
11/17	31,776	6,699	10	5	482	0.55	14	50	113	<5	948
12/5	46,307	11,291	10	4	488	0.61	12	48	111	<5	956
12/5	33,469	6,015	9	3	468	0.91	15	46	101	<5	950
12/12	42,866	9,852	7	4	429	0.45	16	44	90	<5	872
12/12	30,466	7,593	9	5	466	0.53	13	46	103	<5	883
12/19	32,377	6,682	9	5	477	0.57	13	49	112	<5	965
12/19	46,479	10,405	8	4	431	0.54	17	46	93	<5	905
12/20	49,528	12,166	9	4	385	0.42	14	45	100	<5	854
12/20	42,845	7,750	9	5	460	0.55	13	49	109	<5	899
12/20	34,525	6,533	9	5	455	0.57	13	47	105	<5	916
12/26	48,653	11,787	9	4	372	0.73	14	43	98	<5	822
Minimum	14,256	12	5	2	268	0.3	3	28	63	<5	535
Mean ¹	34,813	8,256	8	5	436	0.7	8	45	107	<5	892
Maximum	58,480	20,082	11	8	490	1.1	17	51	146	<5	1,071
503 Limit	NL ²	NL	41	39	1,500	17	75	420	300	100	2,800

¹In calculating the mean, values less than the detection limit were considered as the detectable limit.

²NL = No limit.

TABLE 14: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2017

Month	Average Temperature	Average Retention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32b3*
	---- °F ----	--- days ---		----- days -----
January	97	20	yes	15.0
February	98	19	yes	15.0
March	97	19	yes	15.0
April	98	22	yes	15.0
May	98	23	yes	15.0
June	98	27	yes	15.0
July	98	26	yes	15.0
August	99	29	yes	15.0
September	99	30	yes	15.0
October	100	25	yes	15.0
November	98	23	yes	15.0
December	99	35	yes	15.0

*For anaerobic digestion at average temperature achieved.

TABLE 15: SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION PROGRAM IN 2017

User	Use
<u>Composted Biosolids</u>	
Alliance Brewery, Chicago Ridge	Trees and landscaping
Beary Landscaping, Inc., Lockport	Landscaping
Chicago Urban Farms, Chicago	Gardens
City Colleges of Chicago, Chicago	Trees and landscaping
Dariusz (Derek) Ciucias, Willow Springs	Trees and landscaping
Cog Hill Golf Course, Lemont	Trees and landscaping
Coyote Run Golf Course, Flosmoor	Trees and landscaping
Dahm Enterprises, Wonder Lake	Landscaping
Des Plaines Park District, Des Plaines	Trees and landscaping
Ford Heights Park District, Ford Heights	Trees and landscaping
Glen Oaks Country Club, Glen Ellyn	Trees and landscaping
GMI Packaging Co., Chicago	Trees and landscaping
Gould Landscaping, Burr Ridge	Landscaping
Hinsdale Adventist Academy, Hinsdale	Trees and landscaping
Ed Jankun, Tinley Park	Landscaping
Kautz Farm Co-operative Organization, West Chicago	Trees and landscaping
MWRD, Hanover Park, Skokie, Cicero	Landscaping
Midlothian Park District, Midlothian	Trees and landscaping
Joe Miller, Justice	Trees
Naperville Park District, Naperville	Trees and landscaping
Northeastern Illinois University, Chicago	Trees and landscaping
Jay Patel, Westmont	Garden
Michael Politis, Morton Grove	Trees and garden
RR Landscape Supply, Markham	Landscaping
Skokie Park District, Skokie	Trees and landscaping
Village of Hanover Park, Hanover Park	Trees and landscaping
Village of La Grange Park, La Grange Park	Landscaping
Village of Midlothian, Midlothian	Trees and landscaping
Village of Oak Forest, Oak Forest	Trees and landscaping
Village of Oak Lawn, Oak Lawn	Trees and landscaping
Village of Park Forest, Park Forest	Trees and landscaping
Westmont Park District, Westmont	Trees and landscaping

TABLE 15 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED BIOSOLIDS UNDER THE CONTROLLED SOLIDS DISTRIBUTION PROGRAM IN 2017

User	Use
<u>Air Dried Biosolids</u>	
AB Sanchez Landscaping, Markham Bolingbrook Park District, Bolingbrook	Landscaping Athletic fields - Lily Cache Park
Chicago Park District, Chicago	Athletic fields - 11 parks ¹
Cinder Ridge Golf Course, Wilmington	Golf course
East Leyden High School, Franklin Park	Athletic fields
Fairway Custom Landscaping, Inc., Melrose Park	Landscaping
Harvey Park District, Harvey	Athletic fields- 3 parks ²
Mid Iron Golf Club , Lemont	Golf course
Oak Lawn High School, Oak Lawn	Athletic fields
Park Ridge Recreation, Park Ridge	Athletic fields
Republic Services, Hillside	Landscaping
Riverdale Park District, Riverdale	Athletic fields- 5 parks ³
Sportsman Country Club, Northbrook	Golf course
St. Laurence High School, Burbank	Athletic fields
Stanley Janik, Lockport	Landscaping
Tim Cooling & Sons Inc., Cherry Valley	Landscaping
Twin Oaks Landscaping, Oswego	Landscaping
Village Greens of Woodridge, Woodridge	Athletic fields
Wilmette Golf Course, Wilmette	Golf course

¹Archer, Garfield, Adams, Medill, Calumet, Douglas, Dunbar, Humboldt, Kelvyn, Marquette, Piotrowski, and Washington Parks.

²Martin L. King Jr., Lexington Park, and Medgar Evers Parks.

³Prairie, Cooper, Pekny, Riverdale, and School Street Parks.

Air-Dried Exceptional Quality Biosolids. In 2017, a total of 8,607 DT of Stickney WRP air-dried, EQ biosolids was applied to urban land. All Stickney air-dried biosolids applied to urban land in 2017 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 16) and the vector attraction reduction requirements of Section 503.33(b)(1) (Table 16). All of the air-dried, EQ biosolids met the Class A pathogen limits of Section 503.32(a)(5) (Tables 17 and 18). Enteric viruses and helminth ova were analyzed before biosolids were dried (Table 17). The fecal coliform analysis was performed after the biosolids were dried and prior to utilization on urban land (Table 18). 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 WRP, including 69 DT of centrifuge cake from the Egan WRP, were composted with woodchips and cured at the HASMA. The cured composted EQ biosolids were tested for chemical constituents and fecal coliform prior to utilization on urban land in 2017 and to validate the composting process. This material met the pollutant concentration limits in Table 3 of Section 503.13 (Table 19) and fecal coliform requirements for EQ biosolids (Table 20). Class A pathogen reduction was achieved using the open windrow composting process through which all the requirements were met. The temperature of the compost piles was maintained at $\geq 55^{\circ}\text{C}$ for at least 15 days, and the piles were turned five times during this period (Table 21). Vector attraction reduction was achieved through the same open windrow composting process and met the requirements of Section 503.33(b)(5), by fulfilling the temperature and time requirements ($\geq 45^{\circ}\text{C}$ for at least 14 days) in the open windrows (Table 21).

In 2017, a total of 1,113 DT of composted EQ biosolids generated at the Stickney WRP was applied to urban land. Provided all composting requirements of Sections 503.32(a)(7) and 503.33(b)(5) are met, no additional monitoring is required.

All of the Stickney WRP EQ biosolids generated or utilized in 2017 were not PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months), as required for the District's PFRP-equivalent biosolids processing (see pg. 21 "Site-Specific Process to Further Reduce Pathogens"), due to operational constraints. Therefore, no PFRP-compliant biosolids were available for sampling and analysis. All biosolids utilized as EQ material in 2017 were tested for pathogen compliance according to Section 503.32 (a)(5).

TABLE 16: 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 2017

Date	TKN	NO ₂ +NO ₃	NH ₃ -N	TVS ¹	TVS REDUCTION	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	----- mg/dry kg -----			%	%	----- mg/dry kg -----								
05/19/18	16,453	7	72	37.0	51.2	9	5	463	<0.25	7	46	131	<5	1,037
06/13/18	13,134	1,100	676	35.5	54.1	9	6	464	1.02	5	47	115	<5	971
06/26/18	6,951	1,359	5	37.2	50.7	11	6	478	0.54	5	48	119	<5	1,015
07/05/18	14,218	826	2,160	35.4	60.1	10	6	480	0.49	6	48	122	<5	1,026
07/12/18	12,214	1,349	1,602	36.5	57.2	9	6	455	0.92	8	46	110	<5	957
07/18/18	13,853	1,354	2,020	35.7	58.6	9	6	450	0.85	8	45	111	<5	948
07/26/18	21,700	704	1,050	36.1	58.0	10	6	456	0.93	6	46	114	<5	955
08/01/18	18,146	1,775	1,988	35.1	59.7	10	7	463	0.62	5	47	119	<5	1,003
08/09/18	22,407	217	2,494	33.7	62.1	9	5	432	0.70	6	44	121	<5	927
08/16/18	17,343	592	3,423	36.9	56.4	9	5	421	0.65	6	42	111	<5	882
08/24/18	23,010	180	5,072	34.5	61.7	9	5	429	0.54	8	41	126	<5	888
08/30/18	17,288	235	3,933	36.1	58.9	9	5	432	0.92	7	43	116	<5	883
09/06/18	24,506	943	3,530	36.5	58.2	9	6	439	0.80	7	44	118	<5	908
09/14/18	21,448	1,353	3,620	36.5	58.2	8	5	438	1.41	6	43	115	<5	879
09/20/18	22,365	99	4,828	36.0	59.0	8	5	425	<0.25	6	43	110	<5	877
09/28/18	21,949	652	3,553	35.3	60.3	9	6	443	0.73	8	46	119	<5	933
10/03/18	18,866	970	3,206	36.5	58.1	10	5	431	0.62	13	45	113	<5	912
10/10/18	22,681	484	4,045	34.2	62.2	10	6	445	<0.25	3	44	118	<5	930
Minimum	6,951	7	5	33.7	50.7	8	5	421	0.25	3	41	110	<5	877
Mean ²	18,252	789	2,626	35.8	58.0	9	6	447	0.71	7	45	117	<5	941
Maximum	24,506	1,775	5,072	37.2	62.2	11	7	480	1.41	13	48	131	<5	1,037
503 Limit	NL ³	NL	NL	NL	38	41	39	1,500	17	75	420	300	100	2,800

TABLE 17: MICROBIOLOGICAL ANALYSIS OF BIOSOLIDS¹ GENERATED BY NON-COMPLIANT PROCESS TO FURTHER REDUCE PATHOGENS-EQUIVALENT CODIFIED PROCESSING TRAINS AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND DURING 2017

Sample Date ²	Total Solids	Fecal Coliform	Sample Date ³	Enteric Virus	Helminth Ova
	---- % ----	----- MPN ⁴ /g -----		----PFU ⁵ /4g----	--V. Ova/4g---
09/28/16	71.0	30	08/30/16	<0.8000	<0.0800
10/20/16	63.6	120	10/26/16	<0.8000	<0.0800
11/17/16	66.7	15	12/07/16	<0.8000	<0.0800
05/17/17	63.2	11	03/22/17	<0.8000	<0.0800
06/15/17	81.6	120	04/19/17	<0.8000	<0.0800
07/05/17	76.8	<1	05/17/17	<0.8000	<0.0133 ⁶

¹All biosolids satisfied Part 503 Class A requirements.

²Sample dates apply to FC samples only.

³Non-PFRP biosolids sampled before the material was dried and subsequently used in 2017.

⁴Most probable number.

⁵Plaque-forming unit.

⁶Sample weight = 300g; for all others, sample weight = 50g.

TABLE 18: FECAL COLIFORM ANALYSIS OF CLASS A BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2017

Sample Date	Lagoon Source	Total Solids	Fecal Coliform
		---- % ----	----- MPN ¹ /g -----
05/17/17	24	63.2	11
06/15/17	27	81.6	120
07/05/17	1	76.8	<1
08/02/17	1	68.1	74
08/23/17	27	77.2	17
09/20/17	27	71.3	12
11/01/17	27	63.1	160
12/13/17	27	76.7	10

¹Most probable number.

TABLE 19: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA AND APPLIED TO URBAN LAND IN 2017

Date	TKN	NO ₃ -N ²	NH ₃ -N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
----- mg/dry kg -----												
02/03	15,637	30	33	<5	2	190	0.28	2	21	66	<5	380
04/18	14,403	81	41	<5	2	226	<0.25	1	23	64	<5	449
04/24	17,690	12	25	<5	2	184	0.33	1	19	65	<5	405
05/03	16,128	9	25	<5	2	212	0.32	1	24	75	<5	429
05/06	15,348	41	48	5	2	231	0.38	1	24	73	<5	499
05/10	15,369	82	17	<5	2	199	0.30	1	20	56	<5	379
05/16	16,115	8	21	<5	2	203	0.30	1	22	64	<5	406
05/23	14,886	7	20	<5	2	213	0.26	1	23	71	<5	463
05/30	17,363	10	37	<5	2	220	0.37	<1	23	74	<5	474
06/13	14,149	21	22	5	2	254	0.48	3	27	78	<5	537
06/21	15,534	26	80	5	3	268	0.55	1	28	83	<5	587
07/19	16,797	10	73	5	2	236	0.40	3	24	77	<5	503
07/28	17,185	14	24	<5	2	247	0.44	3	27	77	<5	534
08/01	15,633	34	25	<5	3	245	0.34	1	26	80	<5	547
08/09	15,270	20	31	<5	2	202	0.28	2	20	66	<5	431
08/15	14,666	44	37	<5	2	207	<0.25	1	20	67	<5	407
08/25	14,053	21	30	<5	2	211	0.32	3	21	64	<5	426
09/07	14,317	8	33	<5	2	201	0.27	1	20	65	<5	421
09/14	14,176	14	38	<5	2	192	<0.25	<1	20	65	<5	390
10/03	15,487	23	23	6	3	217	0.30	4	23	217	<5	432
11/06	15,436	2	3	8	3	221	0.28	4	23	72	<5	433
11/14	14,447	37	28	7	2	219	0.46	5	24	72	<5	429
Minimum	14,053	2	3	5	2	184	<0.25	1	19	56	<5	379
Mean ¹	15,459	25	32	5	2	218	0.34	2	23	77	<5	453
Maximum	17,690	82	80	8	3	268	0.55	5	28	217	<5	587
503 Limit	NL ³	NL	NL	41	39	1,500	17	75	420	300	100	2,800

¹In calculating the mean, values less than the detection limit were considered as the detectable limit.

² Includes nitrite.

³NL = No limit.

TABLE 20: MICROBIOLOGICAL ANALYSIS OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA AND SAMPLED PRIOR TO UTILIZATION ON URBAN LAND IN 2017

Sample Date	Total Solids	Fecal Coliform
	----- % -----	----- MPN ¹ /g -----
02/15/17	41.7	7
04/19/17	34.0	29
11/02/17	42.0	230
11/02/17	49.7	760
12/06/17	53.3	940

¹Most probable number.

TABLE 21: SUMMARY OF TEMPERATURE READINGS AND TURNING OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED BIOSOLIDS AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2017

Pile ID Number ¹	Composting Date (Range) ²	Turning Date					Composting Temperature °C (Range)
		1st	2nd	3rd	4th	5th	
17-01	06/03 - 07/07	06/13	06/19	06/23	06/27	07/03	58 - 76
17-02	06/09 - 07/07	06/13	06/19	06/23	06/27	07/03	57 - 75
17-03	06/20 - 07/14	06/23	06/27	07/03	07/07	07/11	60 - 77
17-04	06/12 - 07/11	06/19	06/23	06/27	07/03	07/07	60 - 81
17-05	06/29 - 07/24	07/03	07/07	07/11	07/15	07/19	55 - 80
17-06	09/06 - 10/02	09/11	09/15	09/19	09/22	09/26	58 - 78
17-07	07/07 - 08/01	07/11	07/15	07/19	07/24	07/28	62 - 74
17-08	07/07 - 08/01	07/11	07/15	07/19	07/24	07/28	59 - 79
17-09	07/07 - 08/03	07/12	07/19	07/24	07/28	08/01	55 - 74
17-10	07/07 - 08/03	07/12	07/19	07/24	07/28	08/01	62 - 78
17-11	07/06 - 08/03	07/12	07/19	07/24	07/28	08/01	57 - 77
17-12	07/06 - 08/03	07/12	07/17	07/21	07/26	07/31	57 - 75
17-13	06/30 - 08/03	07/12	07/17	07/21	07/26	07/31	57 - 71
17-14	06/30 - 08/03	07/12	07/17	07/21	07/26	07/31	56 - 76
17-15	07/26 - 08/23	07/31	08/04	08/08	08/14	08/18	56 - 71
17-16	08/06 - 09/05	08/14	08/18	08/24	08/28	09/01	57 - 71
17-17	08/19 - 09/15	08/24	08/28	09/01	09/06	09/11	57 - 73
17-18	08/05 - 09/03	08/09	08/16	08/21	08/25	08/30	61 - 78
17-19	09/21 - 10/18	09/26	09/29	10/02	04/18	10/13	55 - 71
17-20	08/05 - 09/03	08/09	08/16	08/21	08/25	08/30	60 - 76
17-21	08/10 - 09/06	08/16	08/21	08/25	08/30	09/03	60 - 78
17-22	08/05 - 09/16	08/23	08/30	09/05	09/09	09/13	59 - 78
17-23	08/23 - 09/22	08/30	09/05	09/09	09/13	09/18	58 - 76
17-24	08/23 - 09/25	08/30	09/05	09/13	09/18	09/21	59 - 78
17-25	09/03 - 09/25	09/05	09/09	09/13	09/18	09/21	57 - 77
17-26	09/05 - 09/25	09/05	09/09	09/13	09/18	09/21	62 - 78
17-27	09/09 - 10/03	09/12	09/16	09/20	09/23	09/27	57 - 79
17-28	09/16 - 10/06	09/20	09/23	09/27	09/30	10/03	57 - 80
17-29	09/19 - 10/18	09/23	09/27	09/30	10/03	10/09	57 - 79
17-30	09/23 - 10/17	09/27	09/30	10/03	10/09	10/13	55 - 80
17-31	09/23 - 10/21	09/30	10/03	10/09	10/13	10/17	61 - 80
17-32	09/27 - 10/21	09/30	10/03	10/09	10/13	10/17	56 - 77
17-33	10/03 - 10/27	10/09	10/13	10/17	10/21	10/24	55 - 79
17-34	10/09 - 11/02	10/13	10/17	10/21	10/24	10/30	58 - 77
17-38	11/03 - 12/06	11/07	11/13	11/17	11/21	11/27	56 - 78
17-40	11/23 - 12/25	11/28	12/02	12/07	12/16	12/19	56 - 81
17-41	11/07 - 12/06	11/09	11/14	11/20	11/28	12/02	56 - 80
17-42	11/09 - 12/19	11/14	11/20	11/28	12/02	12/16	55 - 76
17-45	11/25 - 12/25	11/28	12/02	12/07	12/16	12/19	55 - 76

TABLE 21 (Continued): SUMMARY OF TEMPERATURE READINGS AND TURNING OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED BIOSOLIDS AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2017

Pile ID Number ¹	Composting Date (Range) ²	Turning Date					Composting Temperature °C (Range)
		1st	2nd	3rd	4th	5th	
17-46	11/18 - 12/23	11/22	11/29	12/04	12/11	12/18	55 - 77
17-47	11/21 - 12/25	11/29	12/04	12/11	12/18	12/21	57 - 77
17-48	11/19 - 12/21	11/22	11/29	12/04	12/11	12/18	55 - 81
17-49	11/19 - 12/25	11/22	11/29	12/04	12/11	12/18	55 - 78
17-50	12/01 - 12/28	12/04	12/11	12/18	12/21	12/24	55 - 79
17-51	11/26 - 12/25	11/29	12/04	12/11	12/18	12/21	55 - 79

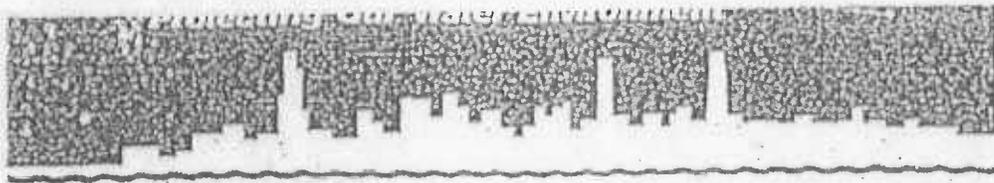
¹All piles reported fulfill the temperature and turning requirements.

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

In 2017, a total of 676 DT of District biosolids (468 DT from the Stickney WRP and 208 DT from the Calumet WRP) was co-disposed with municipal solid wastes at two non-hazardous waste landfills (Land and Lakes in Dolton and Laraway in Joliet, Illinois). All biosolids sent to landfills are usually 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 tests, were submitted in 2015 to the landfill company to satisfy the requirements of their IEPA permit. No analyses were performed in 2017 since the analytical data are usually valid for two to three years. The analytical data generated in 2015 are still valid, and they should be updated in 2018. 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).

APPENDIX I

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



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Metropolitan Water Reclamation District of Greater Chicago

100 EAST ERIE STREET CHICAGO, ILLINOIS 60611 312/751-5800

Cecil Lue-Hing
 Director of R & D
 312/751-5180

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:

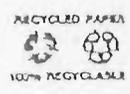
Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503.

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.

January 28, 1994

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.

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

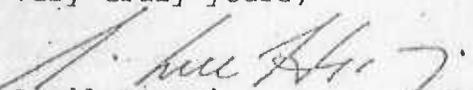
Subject: Sludge Management Programs of the Metropolitan Water Reclamation District of Greater Chicago Under 40 CFR Part 503

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 Farnan
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. Farnan:

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.

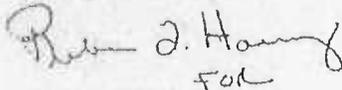
Our review of the MWRDGC's biosolids data submitted for 1994 to 2001 indicates Class A biosolids were produced at the Stickney and Calumet plants as they operated their respective low-and high-solids sludge processing trains (SPTs) according to codified protocols delineated in Attachment B of Mr. Lanyon's 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 discreet 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.

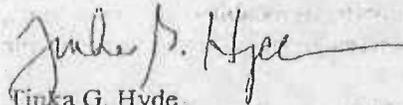
One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the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



Tirka G. Hyde
Director, Water Division

cc: Albert Cox, MWRDGC
Al Keller, IEPA

Protecting Our Water Environment

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100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3184 312.751.5190 F: 312.751.5194

THOMAS C. GRANATO, Ph.D.
Director of Monitoring and Research Department
thomas.granato@mwrdd.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

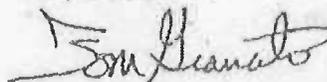
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September 14, 2012

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.

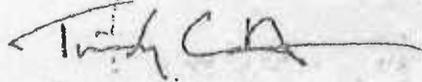
One of the Class A options is to treat the sewage sludge by a process equivalent to a process listed in the 503 Rules, Appendix B. To be equivalent, a sewage sludge treatment process must be able to consistently reduce pathogens to levels comparable with the processes listed in Appendix B. Under the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



for Tinka G. Hyde
Director, Water Division