Metropolitan Water Reclamation District of Greater Chicago

MONITORING AND RESEARCH DEPARTMENT

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ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR 2022

August 2023

Metropolitan Water Reclamation District of Greater Chicago
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ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR 2022

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LIST OF ABBREVIATIONS

Abbreviation	Definition
°C	degrees Celsius
°F	degrees Fahrenheit
As	arsenic
Cd	cadmium
CFR	*Code of Federal Regulations*
Co	cobalt
CSD	Controlled Solids Distribution
Cu	copper
District	Metropolitan Water Reclamation District of Greater Chicago
DT	dry tons
Egan	John E. Egan
EQ	"Exceptional Quality"
Hg	mercury
IDOA	Illinois Department of Agriculture
IEPA	Illinois Environmental Protection Agency
kg	kilogram
Kirie	James C. Kirie
L	liter
MBM	Metropolitan Biosolids Management, LLC
mg	milligram
MGD	million gallons per day
Mo	molybdenum
N	nitrogen
NH_3-N	ammonia nitrogen
Ni	nickel
NO_3^-+NO_2^--N	nitrate plus nitrite nitrogen
NO_3^--N	nitrate nitrogen
O'Brien	Terrence J. O'Brien
Part 503	Title 40 Part 503
Pb	lead
PFRP	Process to Further Reduce Pathogens
Se	selenium
SMA	Solids Management Area
TKN	total Kjeldahl nitrogen
TVS	total volatile solids
USEPA	United States Environmental Protection Agency
VAR	vector attraction reduction
WRP	water reclamation plant
Zn	zinc

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DISCLAIMER

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

FOREWORD

This report serves as a record of the data and information that fulfills the frequency of monitoring and the reporting requirements for 2022 for biosolids management by the Metropolitan Water Reclamation District of Greater Chicago (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 2023.

OVERVIEW OF METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO BIOSOLIDS PRODUCTS AND UTILIZATION PROGRAM

The District operates seven water reclamation plants (WRPs), namely the Stickney, Calumet, Terrence J. O'Brien (O'Brien), John E. Egan (Egan), Hanover Park, James C. Kirie (Kirie), and Lemont WRPs. Four WRPs, Stickney, Calumet, Egan, and Hanover Park, produce final biosolids products. Under normal operations, the untreated sludge generated at the Kirie WRP is sent to the Egan WRP, and sludge from the O'Brien and Lemont WRPs is sent to the Stickney WRP for processing into final products. The processing of biosolids at the four WRPs that generate final biosolids products includes anaerobic digestion at 35°C for at least 15 days of detention time to meet the 40 *CFR* Part 503 Class B pathogen reduction requirements. The metal concentrations in all biosolids produced at the District are well below the pollutant concentration limits established in Table 3 of Part 503.13(b)(3). The additional processing to achieve the final products varies between the four WRPs as indicated in the description of the biosolids products outlined below.

Biosolids Products at the Metropolitan Water Reclamation District of Greater Chicago

- **Dewatered Class B Biosolids:** These biosolids are produced primarily by centrifugation of anaerobically digested liquid biosolids (~5 percent solids content) to approximately 25 percent solids content (centrifuge cake). Alternatively, the anaerobically digested liquid biosolids are stored temporarily in lagoons, then placed on drying beds for partial (semi) drying (>20 percent solids content) through mechanical agitation before use. These dewatered biosolids meet the Class B pathogen standards of the United States Environmental Protection Agency (USEPA) Part 503 biosolids rule and meet vector attraction reduction (VAR) requirements through timely incorporation into land. This product is produced at the Stickney and Calumet WRPs, and sometimes at the Egan WRP (centrifuged biosolids), and commonly applied to farmland as a fertilizer.

- **Air-dried Exceptional Quality Biosolids:** These biosolids are produced through the aging (typically for over one year) of centrifuge cake biosolids or digested sludge in lagoons followed by air-drying to at least 65 percent solids content. This air-dried material meets the "Exceptional Quality" (EQ) standards of the USEPA Part 503 biosolids rule, which designates biosolids that meet the strictest trace metals, pathogen, and VAR requirements. This product is produced at the Stickney and Calumet WRPs, and since the early 1990s, it has been used under a Controlled Solids Distribution (CSD) program as a fertilizer or soil amendment on areas such as recreational fields and golf courses and for reclamation of urban soils. The material is currently voluntarily registered as a soil amendment with the Illinois Department of Agriculture (IDOA).

- **Composted Exceptional Quality Biosolids:** The composted biosolids are produced at the Stickney WRP Harlem Avenue and at the Calumet East Solids Management Areas (SMAs) under permits issued by the Illinois Environmental

Protection Agency (IEPA) Bureau of Land and according to operational standards of the Federal 40 *CFR* Part 503 Process to Further Reduce Pathogens (PFRP) protocol (USEPA, 1993). The composting recipe consists of one part centrifuge cake biosolids and two or three parts woodchips. The composting process used is open windrow composting for a minimum of 23 days, a minimum of five turnings, temperature maintained at a minimum of 55°C, and then followed by 16 weeks of curing. The product produced is currently voluntarily registered as a soil amendment with the IDOA.

- **Liquid Class B Biosolids:** The digested biosolids produced at the Hanover Park WRP are stored and thickened (~5 percent solids content) in lagoons on the grounds of the Hanover Park WRP. This material meets the 40 *CFR* Part 503 Class B pathogen and VAR requirements and is applied through subsurface injection at the on-site Fischer Farm as a fertilizer for crops, mainly corn. The Fisher Farm has an underdrain system that returns drainage from the fields back to the WRP.

- **Biosolids Pellets:** The product is produced by heat-drying at a pelletizer facility located at the Stickney WRP that is owned and operated by Metropolitan Biosolids Management, LLC (MBM), a subsidiary of Veolia Water North America. The operation generates fertilizer pellets that meet EQ biosolids standards with a solids content greater than 90 percent.

Metropolitan Water Reclamation District of Greater Chicago Site-Specific Designations and Adjusted Standards for Biosolids Quality and Utilization

- **Illinois Pollution Control Board Adjusted Standards (AS 95-4 and 02-03):** This adjusted standard, originally granted to the District in 1995 by the Illinois Pollution Control Board, allows the use of lagoon-aged (at least 1.5 years) air-dried (at least 65 percent solids content) biosolids for establishing the final vegetative layer on landfills as a landfill final cover. Class A status is not necessary for lagoon-aged air-dried biosolids used for final cover.

- **United States Environmental Protection Agency Site-Specific Process to Further Reduce Pathogens Certification:** This site-specific certification of the Calumet and Stickney WRPs' biosolids processing trains was granted in 2002. The certification specifies that biosolids produced by these processing trains in accordance with all parameters specified in the certification are designated Class A. The codified operational parameters are related to digestion time and temperature, lagoon storage time, loading rates, and frequency of agitation on drying cells. Any biosolids which do not comply with any of the codified parameters for the biosolids processing trains are to be isolated from PFRP-compliant biosolids and must be tested to meet the Part 503 pathogen (virus and helminth) requirements to be designated Class A. This certification was renewable every five years. Over the past ten years, due to operational efficiencies related to lagoon storage time and air-drying operations, biosolids processing at both the Calumet and Stickney WRPs have not been operated to

follow the codified parameters; therefore, all air-dried EQ biosolids are tested for helminth ova and viruses. The site-specific certification for Calumet and Stickney WRP air-dried biosolids was also not renewed after it expired in 2022.

Requirements for Co-Disposal of Unsuitable Biosolids Materials at Landfills

Some biosolids are considered as unsuitable for land application because they contain gravel, wood debris, and dust from the sweeping of roads at biosolids processing sites. These materials are co-disposed with municipal solid wastes at a nonhazardous waste landfill according to the federal requirements in 40 *CFR* Parts 258 and 261 and the Illinois nonhazardous waste landfill regulations (Illinois Administrative Code Title 35, Subtitle G, Chapter I, Subchapter H, Part 810). The biosolids are certified for co-disposal at landfills through analysis as specified in 40 *CFR* Part 261 to establish their nonhazardous nature. District biosolids have always met these requirements. Analytical results required for the landfill company's IEPA permits, including toxic characteristic leaching procedure constituents, polychlorinated biphenyls, cyanide, sulfide, and paint filter tests, were updated in October 2021 and should be valid until 2024. Some unsuitable biosolids can be also used as daily cover on landfills.

Total Biosolids Produced at the Metropolitan Water Reclamation District of Greater Chicago

A total of 145,565 dry tons (DT) of biosolids was produced at District WRPs in 2022 based on the total of amounts at the Calumet and Stickney WRPs (which received all solids produced at the Egan, O'Brien, Kirie, and Lemont WRPs) and Hanover Park WRP (Table 1). The Stickney WRP produced 122,556 DT of biosolids from processing of solids generated at the plant and solids transported from the Egan, O'Brien, Kirie, and Lemont WRPs. The Calumet WRP produced 22,208 DT. The Hanover Park WRP produced 801 DT, all of which was land applied at the on-site Fischer Farm or stored on site. This brings the District's five- and ten-year biosolids production running averages to 140,467 and 139,955 DT/year, respectively.

Biosolids Utilization Outlets

The District's Biosolids Management Program is designed to manage all the biosolids for beneficial reuse. There are five main outlets for the beneficial utilization of District biosolids: (1) the Farmland Application Program, (2) the Urban Utilization Program, (3) the Fischer Farm Utilization Program, (4) pelletizing at the MBM facility, and (5) landfill final cover. In 2022, a total of 115,473 DT of biosolids were utilized through these outlets (Table 1). During 2022, no biosolids were co-disposed with municipal solid wastes at landfill sites (Figure 1).

Farmland Application Program. In this program, dewatered Class B biosolids are utilized as a fertilizer for production of row crops in nearby counties in northeastern Illinois. Under this program, land application companies are contracted by the District through the competitive bidding process. The contractor is responsible for enrolling farmers in the program and for hauling and applying the biosolids to the farm fields. The farmland application program is conducted under separate permits issued by the IEPA to the District and the contractor. The District provides oversight of the program to ensure that the land application of biosolids is conducted in accordance

TABLE 1: PRODUCTION AND UTILIZATION OF SLUDGE AND BIOSOLIDS DURING 2022[1]

Production and Utilization	Water Reclamation Plants						
	Stickney	Calumet	Hanover Park	Egan	O'Brien	Kirie	Lemont
	Dry Tons (Metric Tons)						
Production[2]	122,556 (111,181)	22,208 (20,147)	801 (727)	5,898 (5,351)	32,304 (29,306)	5,866 (5,321)	328 (298)
Outlets							
Utilization							
Agricultural land	47,291 (42,902)	11,716 (10,629)	1,038 (941)	0	0	0	0
Urban land (total)	11,095 (10,065)	4,178[3] (3,790)	0	0	0	0	0
air-dried	6,397 (5,804)	3,580 (3,247)	0	0	0	0	0
composted	4,698 (4,262)	599 (543)	0	0	0	0	0
Pelletizing facility[4]	40,155 (36,428)	0	0	0	0	0	0
Landfill (total)[5]	0	0	0	0	0	0	0
To Other WRPs[6]	0	0	0	5,898 (5,351)	32,304 (29,306)	5,866 (5,321)	328 (298)

[1]Differences between biosolids production and total use or disposal in 2022 were due to a net withdrawal or storage in lagoons or drying areas and processing of biosolids imported from other WRPs.

[2]Stickney, Calumet, and Hanover Park WRPs produced biosolids, while the Egan, O'Brien, Kirie, and Lemont WRPs 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.

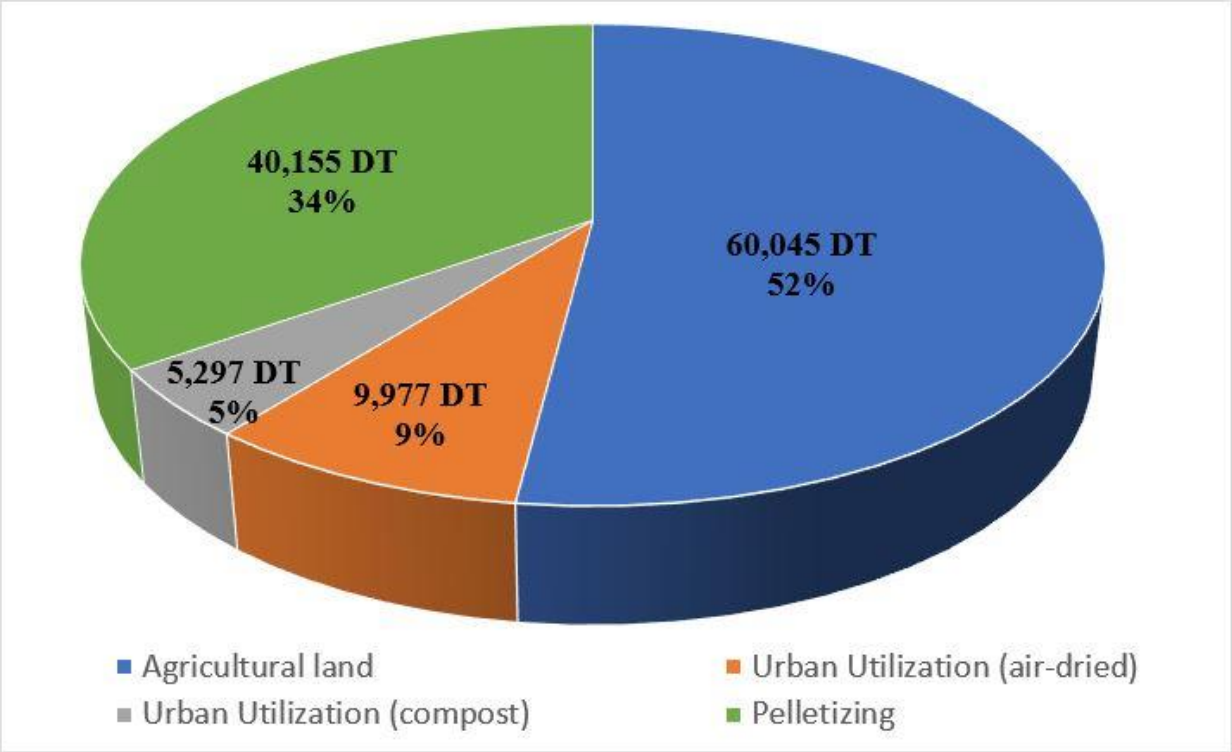
[3]Difference from sum of air-dried and composted utilization is due to rounding.

[4]Sent 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).

[5]Includes co-disposal and daily cover.

[6]For further processing.

FIGURE 1: OUTLETS OF BIOSOLIDS UTILIZATION AND DISPOSAL AT THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO IN 2022



with regulations and permits and that the contractor's operations are consistent with the District's goal of improving the public's awareness of the benefits of the farmland application program to the farming community. This District oversight is done by requiring the land application contractor to comply with hauling and field operation specifications and to execute a Public Relations Program, and by District staff who conduct additional activities to complement the activities of the contractors. The District continually evaluates and modifies the program as needed to improve public awareness, benefits, and long-term sustainability of the program. In 2022, a total of 59,007 DT of dewatered Class B biosolids from the Stickney and Calumet WRPs were applied to farmland as fertilizer, which is a major portion of total farmland application of 60,045 DT (Figure 1).

Urban Utilization Program. Air-dried and composted EQ biosolids are applied to recreational areas (e.g., parks, golf courses, and athletic fields) and residential properties within the Chicago metropolitan area. The air-dried biosolids are typically used as topdressing on established turfgrass or blended into topsoil as a soil amendment. The composted biosolids are typically applied to land as a soil amendment or as mulch on planter beds. This program has traditionally been done under a CSD Permit issued by the IEPA Bureau of Water. In 2015, the Illinois General Assembly amended the Illinois Environmental Protection Act to adopt the USEPA EQ standard in the state and recognize biosolids as a safe, beneficial, and renewable resource. This legislative change eased state regulations that were stricter than federal restrictions on the use of EQ biosolids, and the CSD permit is no longer relevant for utilization of EQ biosolids. In 2022, 9,977 DT of air-dried biosolids and 5,297 DT of composted biosolids from the Stickney and Calumet WRPs were used in the metropolitan Chicago area (Figure 1).

Fischer Farm Utilization Program. The liquid Class B biosolids produced at the Hanover Park WRP are stored and thickened in lagoons and are utilized as fertilizer for application to farmland by a subsurface injection at the Fischer Farm located at the WRP. The supernatant from the settling of the biosolids and the settled biosolids are applied separately. In 2022, a total of 1,038 DT of biosolids as liquid biosolids and lagoon supernatant was applied to the farm (included in the 60045 DT of total amount applied to agricultural land shown in Figure 1). The application of the biosolids and production of the row crops at that site are done by a contractor under separate contracts awarded through the competitive bidding process.

Pelletizing Facility. Anaerobically digested centrifuge-dewatered biosolids are delivered to the MBM facility located at the Stickney WRP, where they are dried to at least 90 percent solids, pelletized, and sold as a fertilizer product by MBM. In 2022, 40,155 DT of pelletized biosolids were generated from anaerobically digested biosolids produced at the Stickney WRP (Figure 1).

Biosolids to Landfills. In 2022, no biosolids were sent to landfills for co-disposal with municipal solid wastes or used as daily or final landfill cover.

The following sections provide a short description of the sludge processing and biosolids management operations at each of the District's seven WRPs. 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 sludge and biosolids by the District in 2022 are summarized in Table 1. All utilization of biosolids in 2022 complied with the management practices specified in Section 503.14. 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 in subsequent years.

This report documents the production and utilization of the District's biosolids in 2022 records required under Part 503 at Section 503.18.

The District has four 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. 2018-SC-63477). Biosolids have not been applied to this site under this permit since 2004.

2. Hanover Park Fischer Farm Biosolids Application to Land (IEPA Permit No. 2022-SC-66896).

3. The CSD Program (Biosolids Application to Land in the Chicago Area under IEPA Permit No. 2019-SC-64906).

4. Farmland Application Program (Biosolids Application to Farmland from the Calumet, Stickney, and the Egan WRPs under IEPA Permit No. 2018-SC-63703).

In addition, the District has two IEPA permits for composting biosolids, at the Calumet East SMA (Permit No. 2017-017-DE/OP updated in 2021-403-SP) and at the Harlem Avenue SMA (Permit No. 2017-013-DE/OP updated in 2021-440-SP), and an IEPA Beneficial Use Determination for compost generated at both Calumet East and Harlem Avenue SMAs (BUD21-001). The biosolids compost is distributed for use as a soil amendment under Illinois Department of Agriculture registration (License No. 100181).

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 million gallons per day (MGD). The annual average treated flow in 2022 was 665 MGD. Wastewater reclamation processes include primary (Imhoff and primary settling) and secondary (activated sludge process) treatments. All solids produced at this WRP, solids directly transported from the Lemont WRP, and solids pipelined from the O'Brien WRP, which received processed solids generated at the Egan and Kirie WRPs, are anaerobically digested at the Stickney WRP. Stickney WRP biosolids are then handled as follows:

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 as EQ biosolids.

    b. Application to farmland as dewatered Class B biosolids.

    c. Use at local municipal solid waste landfills as final landfill cover. No biosolids were utilized through this outlet in 2022 (Table 1).

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. No biosolids were utilized this way in 2022 (Table 1).

4. Dewatered by centrifuging to approximately 25 percent solids content and transported to the Harlem Avenue SMA for co-composting with woodchips and yard waste prior to application to urban land as composted EQ biosolids. 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 in 2022 was maintained at ≥ 55°C for at least 15 days, and the piles were turned five times during this period (Table 2). The VAR requirement was achieved through the same open windrow composting process and met the established standards of Section 503.33(b)(5) by fulfilling the temperature and time requirements (≥ 45°C for at least 14 days) in the open windrows (Table 2).

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:

    a. Application to urban land as EQ biosolids.

    b. Use at local municipal solid waste landfills as final landfill cover. No biosolids were utilized through this outlet in 2022 (Table 1).

TABLE 2: SUMMARY OF TEMPERATURE READINGS AND TURNING DATES OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2022

Pile ID Number[1]	Composting Date (Range)[2]	Turning Date[2]					Composting Temperature °C (Range)
22-1	04/12–05/02	04/15	04/18	04/21	04/25	04/28	55–62
22-2	04/12–05/02	04/15	04/18	04/21	04/25	04/28	55–66
22-3	04/21–05/12	04/25	04/28	05/02	05/05	05/09	55–59
22-4	04/21–05/12	04/25	04/28	05/02	05/05	05/09	55–69
22-5	04/21–05/12	04/25	04/28	05/02	05/05	05/09	55–63
22-6	04/21–05/12	04/25	04/28	05/02	05/05	05/09	55–74
22-7	04/25–05/15	04/28	05/02	05/05	05/09	05/12	58–75
22-8	04/23–05/15	04/25	04/28	05/02	05/05	05/09	55–72
22-9	04/30–05/19	05/02	05/05	05/09	05/12	05/16	56–72
22-10	05/02–05/19	05/02	05/05	05/09	05/12	05/16	55–75
22-11	06/01–6/20	06/03	06/07	06/10	06/13	06/17	55–73
22-12	06/08–07/01	06/13	06/15	06/21	06/24	06/28	58–76
22-13	06/11–07/01	06/13	06/15	06/21	06/24	06/28	59–73
22-14	06/18–07/08	06/21	06/24	06/28	07/01	07/05	62–76
22-15	06/28–07/18	07/01	07/05	07/08	07/12	07/15	58–77
22-16	07/01–07/20	07/05	07/08	07/12	07/15	07/17	62–79
22-17	07/05–07/25	07/08	07/12	07/15	07/19	07/22	56–76
22-18	07/12–08/02	07/15	07/19	07/22	07/26	07/30	61–77
22-19	07/20–08/08	07/22	07/26	07/30	08/02	08/05	56–77
22-20	07/17–08/05	07/19	07/22	07/26	07/30	08/02	56–72
22-21	07/20–08/08	07/22	07/26	07/30	08/02	08/05	58–75
22-22	07/27–08/15	07/30	08/02	08/05	08/09	08/12	59–77
22-23	07/27–08/15	07/30	08/02	08/05	08/09	08/12	56–71
22-24	07/27–08/15	07/30	08/02	08/05	08/09	08/12	57–76
22-25	07/30–08/19	08/02	08/05	08/09	08/12	08/16	65–75
22-26	07/30–08/19	08/02	08/05	08/09	08/12	08/16	59–75
22-27	07/30–08/19	08/02	08/05	08/09	08/12	08/16	64–75
22-28	07/30–08/19	08/02	08/05	08/09	08/12	08/16	56–72
22-29	08/02–08/22	08/05	08/09	08/12	08/16	08/19	64–75
22-30	08/02–08/22	08/05	08/09	08/12	08/16	08/19	57–73
22-31	08/05–08/25	08/09	08/12	08/16	08/19	08/22	58–74
22-32	08/05–08/25	08/09	08/12	08/16	08/19	08/22	55–74
22-33	08/08–08/28	08/12	08/16	08/19	08/22	08/25	57–73
22-34	08/08–08/28	08/12	08/16	08/19	08/22	08/25	63–76
22-35	08/16–09/09	08/22	08/25	08/29	09/01	09/06	66–79

TABLE 2 (Continued): SUMMARY OF TEMPERATURE READINGS AND TURNING DATES OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2022

Pile ID Number[1]	Composting Date (Range)[2]	Turning Date[2]					Composting Temperature °C (Range)
22-36	08/25–09/16	08/29	09/01	09/06	09/09	09/13	58–75
22-37	08/25–09/16	08/29	09/01	09/06	09/09	09/13	55–77
22-38	08/25–09/16	08/29	09/01	09/06	09/09	09/13	63–76
22-39	08/31–09/23	09/06	09/09	09/13	09/16	09/20	62–76
22-40	08/31–09/23	09/06	09/09	09/13	09/16	09/20	59–72
22-41	09/11–09/30	09/13	09/16	09/20	09/23	09/27	59–73
22-42	09/11–09/30	09/13	09/16	09/20	09/23	09/27	56–76
22-43	09/16–10/07	09/20	09/23	09/27	09/30	10/04	55–73
22-44	09/16–10/07	09/20	09/23	09/27	09/30	10/04	59–74
22-45	09/23–10/14	09/27	09/30	10/04	10/07	10/11	67–76
22-46	09/23–10/14	09/27	09/30	10/04	10/07	10/11	62–76

[1]All piles reported are certified in accordance with the temperature and turning time requirements.
[2]Dates are month/day in 2022.

6. Dewatered by centrifuging to approximately 25 percent solids content and conveyed to MBM to produce heat-dried biosolids pellets under Contract 98-RFP-10. The biosolids pellets were marketed to users by MBM. The analysis of these biosolids (provided by MBM) is presented in Table 3.

In 2022, the Stickney WRP produced a total of 122,556 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 Egan, O'Brien, Kirie, and Lemont WRPs for further processing. The quantity of biosolids beneficially utilized (98,541 DT) was less than the total 2022 production (122,556 DT) for the Stickney WRP. Hence, 24,015 DT of the biosolids generated in 2022 were stored in lagoons and/or on drying cells for further processing and future use.

Biosolids to Landfills

In 2022, no biosolids produced at the Stickney WRP were sent to landfill for co-disposal with municipal solid wastes or used as daily or final landfill cover (Table 1).

Application of Class B Biosolids to Farmland

In 2022, a total of 47,291 DT of dewatered Class B biosolids (centrifuge cake and semi-dried biosolids) generated at the Stickney WRP was applied to agricultural land under IEPA Permit No. 2018-SC-63703. 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 dewatered Class B biosolids land applied in 2022 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 4), the VAR 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 5). The biosolids nitrogen concentrations (Table 4) were used to compute the agronomic rates for farmland application.

Application of Exceptional Quality Biosolids to Urban Land

In 2022, a total of 11,095 DT of Stickney WRP air-dried EQ (6,397 DT) and composted EQ (4,698 DT) biosolids were applied to urban land for various uses such as the construction and maintenance of golf courses, recreation fields, and parks. The sites and methods of utilization of these biosolids under the program are listed in Table 6.

Air-Dried Exceptional Quality Biosolids. In 2022, a total of 6,397 DT of Stickney WRP air-dried EQ biosolids was applied to urban land. All Stickney air-dried biosolids applied to urban land in 2022 met the pollutant concentration limits in Table 3 of Section 503.13 and the VAR requirements of Section 503.33(b)(1) (Table 7).

All of the air-dried EQ biosolids met the Class A pathogen limits of Section 503.32(a)(5) (Tables 8 and 9). Enteric viruses and helminth ova were analyzed before biosolids were dried

TABLE 3: CONCENTRATIONS OF NITROGEN AND METALS IN HEAT-DRIED BIOSOLIDS PELLETS GENERATED BY METROPOLITAN BIOSOLIDS MANAGEMENT FACILITIES AT THE STICKNEY WATER RECLAMATION PLANT IN 2022[1]

Date	Total N	NO_3^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
01/04/22	41,200	<7.9	3,150	8.7	2.9	467	0.49	20.2	47.8	68.2	5.5	761
02/02/22	33,700	<37.5	4,200	7.7	3.1	477	0.59	24.4	54.3	56.0	4.8	937
03/04/22	46,300	<7.9	4,050	7.8	3.6	449	0.39	22.2	50.9	68.8	4.1	793
04/06/22	29,500	<8.0	4,510	9.5	2.9	430	0.87	17.6	51.9	81.5	4.7	787
05/04/22	34,000	<7.9	5,690	10.2	2.7	428	0.53	14.6	45.7	85.2	4.9	789
06/01/22	30,100	<15.5	3,950	9.5	8.8	413	0.44	13.3	39.4	86.8	4.3	784
07/06/22	27,100	<7.9	2,610	9.5	5.1	457	0.62	14.4	40.8	91.3	5.3	894
08/03/22	29,000	<7.7	3,520	7.9	6.3	477	0.45	15.4	41.4	102	4.1	923
09/07/22	11,600	<38.7	3,640	7.4	4.2	479	0.57	17.4	46.7	112	<4.2	1,000
10/05/22	33,300	<7.9	2,500	8.3	2.9	460	0.56	15.7	43.7	100	4.8	933
11/02/22	33,400	<7.9	2,630	9.1	2.7	453	0.42	17.5	47.5	85.8	<4.1	863
12/07/21	22,500	<15.8	2,590	7.6	2.5	558	0.53	18.9	54.3	67.7	6.0	835
Minimum	11,600	NC[2]	2,500	7.4	2.5	413	0.39	13.3	39.4	56.0	<4.1	761
Mean[3]	30,975	NC	3,587	8.6	4.0	462	0.54	17.6	47.0	83.8	4.4	858
Maximum	46,300	NC	5,690	10.2	8.8	558	0.87	24.4	54.3	112	6.0	1,000
503 Limit[4]	NL[5]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Data provided by Metropolitan Biosolids Management, LLC.
[2]Minimum, mean, and maximum were not calculated because all reported values were below the laboratory practical quantitation limit.
[3]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[4]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[5]No limit established under Part 503.

TABLE 4: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2022

Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/L											
03/09/22	48,802	34	11,280	<10.0	3.76	403	0.52	14.7	41.3	81.9	<10.0	793
03/09/22	48,086	379	11,329	<10.0	3.71	385	0.53	15.4	41.3	74.3	<10.0	732
03/16/22	20,975	27	5,489	<10.0	3.83	428	1.12	12.4	41.1	99.8	<10.0	897
04/05/22	46,012	36	11,320	<10.0	3.28	361	0.48	13.6	38.0	67.0	<10.0	684
04/05/22	47,064	29	9,075	<10.0	3.42	363	0.47	12.5	37.0	76.1	<10.0	716
04/20/22	36,508	26	5,941	<10.0	3.82	385	0.55	9.9	33.6	72.2	<10.0	712
04/20/22	22,709	50	6,216	<10.0	4.24	430	0.75	12.1	39.3	96.8	<10.0	847
04/27/22	28,490	24	6,559	<10.0	5.36	446	1.07	10.3	41.0	100	<10.0	835
04/27/22	54,356	29	15,268	10.1	3.55	372	0.36	11.8	40.7	70.1	<10.0	725
05/04/22	49,048	38	12,662	<10.0	3.39	364	0.32	13.7	37.3	64.8	<10.0	667
05/10/22	31,232	24	5,558	<10.0	3.55	436	0.63	12.7	42.2	102	<10.0	864
05/17/22	19,205	<17	7,316	<10.0	3.35	429	1.12	11.6	38.9	83.4	<10.0	799
06/06/22	33,370	44	15,290	<10.0	3.65	368	0.39	13.8	38.0	64.9	<10.0	663
06/06/22	16,600	35	6,174	<10.0	4.09	413	0.69	11.3	38.8	94.5	<10.0	825
06/14/22	37,285	23	9,250	<10.0	3.70	413	0.44	12.0	37.0	71.0	<10.0	711
06/14/22	34,580	22	9,217	<10.0	5.54	426	0.67	11.1	41.2	97.0	<10.0	826
06/22/22	56,684	30	19,060	<10.0	3.23	354	0.54	10.7	38.1	68.2	<10.0	684
07/07/22	38,527	23	11,784	<10.0	4.34	453	0.53	19.3	46.8	63.9	<10.0	847
07/07/22	40,006	25	11,341	<10.0	3.86	466	0.53	13.9	40.7	80.2	<10.0	788
07/14/22	29,564	40	5,493	<10.0	3.37	414	0.81	12.2	41.4	101	<10.0	869
07/20/22	23,061	18	5,256	<10.0	3.65	412	0.69	12.3	40.3	91.2	<10.0	835
07/29/22	47,654	28	16,913	<10.0	2.65	389	0.46	12.4	42.2	77.3	<10.0	765
08/12/22	57,543	31	18,061	<10.0	2.52	380	0.29	11.8	40.7	73.3	<10.0	740
08/12/22	58,641	39	22,910	<10.0	3.47	409	0.52	17.6	48.0	67.0	<10.0	774
08/18/22	30,462	34	7,002	<10.0	3.31	415	0.54	12.9	41.6	91.2	<10.0	829
08/18/22	30,625	59	5,794	<10.0	3.72	437	0.65	13.2	43.9	105	<10.0	926

TABLE 4 (Continued): CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2022

Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/L											
08/25/22	32,594	32	9,897	<10.0	2.91	416	0.41	11.5	36.2	75.2	<10.0	749
08/31/22	43,710	45	14,674	<10.0	2.78	375	0.42	15.5	41.2	74.5	<10.0	755
09/09/22	52,023	27	19,344	<10.0	5.79	413	0.38	16.1	38.8	81.5	<10.0	821
09/09/22	33,437	<16	8,777	<10.0	3.27	428	0.57	16.0	40.5	87.5	<10.0	818
09/16/22	20,478	22	5,063	<10.0	3.13	443	0.85	13.9	43.1	111	<10.0	897
09/23/22	37,058	31	9,429	<10.0	3.04	416	0.57	15.9	43.4	80.7	<10.0	811
10/05/22	35,293	38	9,571	<10.0	3.79	446	0.57	13.0	43.5	90.3	<10.0	874
10/05/22	46,774	61	13,960	<10.0	5.56	451	0.40	14.7	42.5	92.3	<10.0	949
10/18/22	42,977	34	12,669	<10.0	2.87	425	0.39	13.8	46.4	85.4	<10.0	816
10/18/22	41,639	43	10,497	<10.0	3.45	451	0.49	16.7	47.6	87.0	<10.0	860
10/21/22	43,160	27	8,494	<10.0	2.89	477	0.72	13.3	42.5	79.6	<10.0	780
11/03/22	32,307	22	7,721	<10.0	3.21	488	0.64	13.9	44.9	96.3	<10.0	884
11/03/22	41,095	36	13,645	<10.0	4.33	461	0.52	13.2	39.1	95.3	<10.0	950
11/10/22	44,447	35	13,152	<10.0	5.75	482	0.73	14.2	40.8	99.1	<10.0	1,004
11/10/22	37,190	435	6,197	<10.0	3.56	491	0.59	16.7	48.3	95.2	<10.0	924
Minimum	16,600	<16	5,063	<10.0	2.52	354	0.29	9.9	33.6	63.9	<10.0	663
Mean[1]	38,324	50	10,601	<10.0	3.72	420	0.58	13.5	41.2	84.5	<10.0	811
Maximum	58,641	435	22,910	10.1	5.79	491	1.12	19.3	48.3	111	<10.0	1,004
503 Limit[2]	NL[3]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[2]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[3]No limit established under Part 503.

TABLE 5: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT IN 2022

Month	Average Temperature °F	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3)[1]	Meets Part 503 Class B Requirements
		days		
January	97.9	28.3	15.0	Yes
February	97.3	24.0	15.0	Yes
March	96.6	21.3	15.0	Yes
April	96.7	21.8	15.0	Yes
May	97.9	22.0	15.0	Yes
June	98.3	22.9	15.0	Yes
July	98.4	23.9	15.0	Yes
August	98.5	28.0	15.0	Yes
September	98.4	23.2	15.0	Yes
October	97.8	24.3	15.0	Yes
November	98.0	23.6	15.0	Yes
December	97.4	22.2	15.0	Yes

[1]For anaerobic digestion at average temperature achieved.

TABLE 6: PROFILE OF USERS THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2022[1]

User Type	Use	Number of Users
Composted Biosolids		
Park districts and municipalities	Landscaping	11
Schools and universities	Landscaping	14
Golf courses and athletic clubs	Landscaping	4
Landscaping and construction companies	Landscaping	2
Nongovernmental organizations	Landscaping	7
Park districts and municipalities	Gardening	1
Nongovernmental organizations	Gardening	13
Landscaping and construction companies	Brownfields and construction sites	4
Distribution at Metropolitan Water Reclamation District of Greater Chicago Water Reclamation Plants[2]	Direct pickup by residents	NA
Residents of Metropolitan Chicago area	Private residential use	327
Air-Dried Biosolids		
Park districts and municipalities	Landscaping	11
Landscaping and construction companies	Landscaping	1
Nongovernmental organizations	Landscaping	2
Park districts and municipalities	Topdressing	2
Golf courses and athletic clubs	Topdressing	5
Landscaping and construction companies	Topdressing	1
Landscaping and construction companies	Brownfields and construction sites	2
Residents of Metropolitan Chicago area	Private residential use	1

[1]Individual users and organizations on file.
[2]Hanover Park, James C. Kirie, John E. Egan, Stickney, and Terrence J. O'Brien Water Reclamation Plants.

TABLE 7: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2022

Date	TVS[1]	TVS[2] Reduction	TKN	$NO_3^-+NO_2^-$-N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	%		mg/dry kg											
05/18/22	38.2	52.7	24,979	945	1,890	<10.0	3.31	403	0.92	11.0	39.1	95.0	<10.0	805
06/22/22	37.9	53.4	17,994	1,841	935	<10.0	3.94	392	0.83	10.6	36.6	91.3	<10.0	757
07/27/22	33.1	62.2	18,702	376	1,718	<10.0	3.45	452	0.89	13.2	43.0	104	<10.0	934
08/09/22	35.3	58.2	NRR[3]	87	1,451	<10.0	3.46	455	0.79	13.9	44.4	108	<10.0	937
08/17/22	36.7	61.0	23,519	7	4,475	<10.0	5.02	447	0.75	13.3	45.9	109	<10.0	912
09/21/22	35.4	63.1	15,911	647	4,582	<10.0	4.99	447	0.90	12.5	45.8	110	<10.0	884
10/19/22	33.8	65.5	19,759	1,020	5,283	<10.0	5.11	456	0.98	13.0	46.4	114	<10.0	887
Minimum	33.1	52.7	15,911	7	935	<10.0	3.31	392	0.75	10.6	36.6	91.3	<10.0	757
Mean	35.8	59.4	20,144	703	2,905	<10.0	4.18	436	0.87	12.5	43.0	104	<10.0	874
Maximum	38.2	65.5	24,979	1,841	5,283	<10.0	5.11	456	0.98	13.9	46.4	114	<10.0	937
503 Limit[4]	NL[5]	≥38.0	NL	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Total volatile solids as percentage of total solids.
[2]For calculating TVS reduction, TVS for digester feed during months when lagoon 27 was loaded from 2017 to 2020 was used for samples from 05/18/22 through 08/09/22, and that for digester feed during months from September 2006 through October 2022 was used to for samples collected from the South Desilting Pond from 08/17/22 through 10/19/22.
[3]No reportable result due to possible incomplete digestion.
[4]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[5]No limit established under Part 503.

TABLE 8: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2022

Sample Date	Lagoon No.	Enteric Virus PFU[1]/4g	Helminth Ova Viable Ova/4g
08/10/21	27	<0.8000	<0.0800
09/14/21	27	<0.8000	<0.0800
10/12/21	27	<0.8000	<0.0800
04/12/22	27	<0.8000	<0.0800
05/10/22	SDP[2]	<0.8000	<0.0800
06/14/22	27	<0.8000	<0.0800

[1]Plaque-forming unit.
[2]South desilting pond.

TABLE 9: FECAL COLIFORM ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2022

Sample Date	Lagoon No.	Total Solids %	Fecal Coliform MPN[1]/g
05/18/22	27	68.7	42
06/22/22	27	74.0	13
07/27/22	27	71.2	16
08/17/22	SDP[2]	70.5	41
09/21/22	SDP	69.4	98
10/19/22	SDP	60.1	48

[1]Most probable number.
[2]South desilting pond.

(Table 8). The fecal coliform analyses were performed after the biosolids were dried and prior to utilization on urban land (Table 9). Management practices complied with Section 503.14. 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. In 2022, a total of 4,698 DT of composted EQ biosolids generated at the Stickney WRP during 2021 was applied to urban land. The composted EQ biosolids applied to urban land in 2022 met composting temperature and time requirements in 2021 and met the pollutant concentration limits in Table 3 of Section 503.13 prior to utilization in 2022 (Table 10). The fecal coliform analyses were performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 11). In accordance with Table 1 of Section 503.16, the frequency of monitoring for the biosolids is six times per year.

Site-Specific Process to Further Reduce Pathogens

For the Calumet and Stickney WRPs, the USEPA Region 5 designated, on a site-specific basis, the District's two biosolids processing trains as equivalent to PFRP, according to Section 503.32(a)(8). The PFRP equivalency commenced on August 1, 2002 (Appendix). The renewable certification of the PFRP designation was valid from August 1, 2017, through July 31, 2022, and required the analysis of six samples annually for helminth ova and enteric viruses during this period and the submittal of the data together with the annual Part 503 report. The District opted to not renew the certification after it expired.

None of the Stickney WRP air-dried EQ biosolids generated or utilized in 2022 were PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months) due to operational constraints. Therefore, all air-dried biosolids utilized as EQ material in 2022 were tested for helminth ova and enteric virus compliance in August, September, and October 2021 and April, May, and June 2022 (Table 8), and for fecal coliform compliance in May, June, July, August, September, and October 2022 (Table 9), according to Section 503.32(a)(5).

TABLE 10: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2021 AND APPLIED TO URBAN LAND IN 2022[1]

Date[1]	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
03/23/22	19,164	150	66.5	11.2	3.72	370	0.73	6.37	32.3	70.0	<10.0	573
03/23/22	18,551	140	73.1	<10.0	3.21	319	0.72	6.45	27.9	68.0	<10.0	494
05/17/22	13,064	285	47.7	10.1	1.74	191	0.27	3.74	16.5	108	<10.0	364
06/14/22	10,508	515	21.5	13.9	3.07	231	0.36	5.27	21.1	111	<10.0	463
06/14/22	10,912	707	41.1	<10.0	3.83	271	0.39	6.26	25.0	74.0	<10.0	589
08/23/22	18,546	216	29.8	24.1	2.06	235	0.25	4.60	19.9	157	<10.0	425
08/23/22	14,220	215	26.5	27.1	2.17	244	0.29	5.29	21.0	163	<10.0	453
09/22/22	16,597	99.4	<14.1	13.5	2.05	280	0.38	6.12	49.4	156	<10.0	531
09/22/22	12,335	86.1	<13.5	15.8	2.07	282	0.36	6.69	27.4	166	<10.0	533
10/27/22	15,705	321	39.8	19.1	2.60	299	0.38	6.52	28.5	199	<10.0	584
10/27/22	20,678	295	35.1	19.7	2.65	317	0.35	6.51	29.9	203	<10.0	614
Minimum	10,508	86.1	<13.5	<10.0	1.74	191	0.25	3.74	16.5	68.0	<10.0	364
Mean[2]	15,480	275	36.4	15.3	2.49	276	0.41	5.80	27.2	134	<10.0	511
Maximum	20,678	707	73.1	27.1	3.83	370	0.73	6.69	49.4	203	<10.0	614
503 Limit[3]	NL[4]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Materials produced in 2021 and tested in 2022 prior to utilization.
[2]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[3]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[4]No limit established under Part 503.

TABLE 11: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2021 AND SAMPLED PRIOR TO UTILIZATION ON URBAN LAND IN 2022

Sample Date[1]	Total Solids %	Fecal Coliform MPN[2]/g
03/23/22	41.3	7
05/17/22	45.8	9
06/14/22	52.8	950
06/14/22	50.9	13
08/23/22	50.2	10
09/22/22	42.2	24
10/27/22	44.3	9

[1]Materials produced in 2021 and tested in 2022 prior to utilization.
[2]Most probable number.

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 2022 was 236 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. The 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 as EQ biosolids.

    b. Use at local municipal solid waste landfills as final cover. No biosolids were utilized through this outlet in 2022.

2. Placed in lagoons for dewatering and transported to paved cells for air-drying prior to:

    a. Application to farmland as dewatered Class B biosolids by a private contractor.

    b. Use as daily landfill cover. No biosolids were utilized through this outlet in 2022.

Composted EQ biosolids are also produced at the Calumet SMA by co-composting biosolids with woodchips and curing. 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 in 2022 was maintained at ≥ 55°C for at least 15 days, and the piles were turned five times during this period (Table 12). The VAR requirement was achieved through the same open windrow composting process and met the established standards of Section 503.33(b)(5) by achieving the temperature and time requirements (≥ 45°C for at least 14 days) in the open windrows (Table 12).

In 2022, a total of 22,208 DT of biosolids was produced at the Calumet WRP (Table 1). The total quantity of biosolids utilized (15,895 DT) was less than the total 2022 production for the Calumet WRP (22,208 DT). Hence, 6,313 DT of biosolids were stored in lagoons and/or on drying cells for further processing and later use.

Biosolids to Landfills

In 2022, no biosolids produced at the Calumet WRP were sent to landfill for co-disposal with municipal solid wastes or used as daily or final landfill cover (Table 1).

TABLE 12: SUMMARY OF TEMPERATURE READINGS AND TURNING DATES OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2022

Pile ID Number[1]	Composting Date (Range)[2]	Turning Date[2]					Composting Temperature, °C (range)
22-1	07/07–08/12	07/12	07/18	07/25	08/01	08/09	57–70
22-2	07/07–08/12	07/12	07/18	07/25	08/01	08/09	55–74
22-3	08/15–09/28	08/23	09/01	09/10	09/15	09/25	57–70

[1]All piles reported are certified in accordance with the temperature and turning time requirements.
[2]Dates are month/day in 2022.

Application of Class B Biosolids to Farmland

In 2022, the Calumet WRP land-applied 11,716 DT of dewatered (semi-dried) Class B biosolids to farmland (Table 1) under IEPA Permit No. 2018-SC-63703 through contracts with Synagro Midwest, Inc. (Contract No. 18-692-11) and Stewart Environmental, Inc. (Contract No. 14-690-11). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is six times per year.

All Calumet WRP dewatered Class B biosolids land-applied in 2022 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 13), the VAR 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 Exceptional Quality Biosolids to Urban Land

In 2022, a total of 4,178 DT of air-dried (3,580 DT) and composted (599 DT) EQ biosolids generated at the Calumet WRP was applied to urban land for various uses such as maintenance of golf courses and recreation fields, landscaping, and the construction of new recreation fields. The sites and method of utilization of these biosolids are listed in Table 15.

Air-Dried Exceptional Quality Biosolids. In 2022, a total of 3,580 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 2022 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 16), the VAR requirements of Section 503.33(b)(1) (Table 16), and the Class A pathogen limits of Section 503.32(a)(5) (Tables 17 and 18). Enteric viruses and helminth ova (Table 17) were analyzed before biosolids were dried. The fecal coliform analyses (Table 18) were performed after the biosolids were dried and prior to utilization on urban land. 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. In 2022, a total of 599 DT of composted EQ biosolids generated at the Calumet WRP during 2021 was applied to urban land. No composted EQ biosolids generated during 2022 were land applied in 2022. All composted biosolids land-applied in 2022 met composting temperature and time requirements in 2021 and met the pollutant concentration limits in Table 3 of Section 503.13 prior to utilization in 2022 (Table 19). The fecal coliform analyses were performed after the composted EQ biosolids were cured and prior to utilization on urban land (Table 20). In accordance with Table 1 of Section 503.16, the frequency of monitoring for these biosolids is four times per year.

Site-Specific Process to Further Reduce Pathogens

For the Calumet and Stickney WRPs, USEPA Region 5 designated, on a site-specific basis, the District's two biosolids processing trains as equivalent to PFRP, according to Section 503.32(a)(8). The PFRP equivalency commenced on August 1, 2002 (Appendix). The

TABLE 13: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2022

Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
06/14/22	36,903	36	5,468	<10.0	3.65	350	0.42	12.7	27.1	61.6	<10.0	892
06/14/22	28,782	34	4,989	<10.0	3.85	358	0.57	12.2	27.3	68.1	<10.0	947
07/11/22	39,511	<14	5,943	<10.0	2.61	364	0.51	14.2	29.7	68.6	<10.0	1,003
07/29/22	32,091	24	6,432	<10.0	2.58	376	0.57	15.0	30.5	69.0	<10.0	1,012
07/29/22	41,161	29	4,915	<10.0	2.43	396	0.44	17.2	32.2	70.7	<10.0	1,021
08/24/22	28,863	34	5,221	<10.0	2.61	368	0.46	13.7	29.3	68.9	<10.0	1,008
08/24/22	31,707	27	4,953	<10.0	2.47	376	0.29	15.9	30.7	66.4	<10.0	988
09/28/22	NRR[1]	<22	NRR	<10.0	2.03	376	0.42	18.5	32.0	61.3	<10.0	974
09/28/22	34,493	<19	5,515	<10.0	2.13	381	0.45	17.4	31.6	69.3	<10.0	1,000
11/29/22	36,475	47	5,080	<10.0	3.05	430	0.39	19.2	41.2	73.5	<10.0	1,125
Minimum	28,782	<14	4,915	<10.0	2.03	350	0.29	12.2	27.1	61.3	<10.0	892
Mean[2]	34,443	27	5,391	<10.0	2.74	378	0.45	15.6	31.2	67.7	<10.0	997
Maximum	41,161	47	6,432	<10.0	3.85	430	0.57	19.2	41.2	73.5	<10.0	1,125
503 Limit[3]	NL[4]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]No reportable result due to possible instrument malfunction.
[8]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[3]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[4]No limit established under Part 503.

TABLE 14: DIGESTER[1] TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT IN 2022

Month	Average Temperature °F	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3)[2]	Meets Part 503 Class B Requirements
		days		
January	97.1	37.4	15.0	Yes
February	95.6	30.0	15.0	Yes
March	96.4	25.3	15.0	Yes
April	96.2	25.3	15.0	Yes
May	96.0	28.0	15.0	Yes
June	96.1	22.9	15.0	Yes
July	96.8	21.0	15.0	Yes
August	97.1	25.9	15.0	Yes
September	97.0	28.8	15.0	Yes
October	96.6	28.9	15.0	Yes
November	97.0	32.6	15.0	Yes
December	96.7	38.9	15.0	Yes

[1]Temperatures and detention times are for primary digesters 1 through 12 at the Calumet WRP.
[2]For anaerobic digestion at average temperature achieved.

TABLE 15: PROFILE OF USERS THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2022[1]

User Type and Number of Users	Use	Number of Users
Composted Biosolids		
Schools and universities	Landscaping	1
Nongovernmental organization	Landscaping	1
Landscaping and construction companies	Landscaping	1
Distribution at Metropolitan Water Reclamation District of Greater Chicago Water Reclamation Plants[2]	Direct pickup by residents	NA
Air-Dried Biosolids		
Park districts, municipalities, governments	Topdressing	3
Schools and universities	Topdressing	2
Landscaping and construction companies	Topdressing	2

[1]Individual users and organizations on file.
[2]Calumet, Hanover Park, James C. Kirie, John E. Egan, Stickney, and Terrence J. O'Brien Water Reclamation Plants.

TABLE 16: CONCENTRATIONS OF NITROGEN AND METALS AND VOLATILE SOLIDS REDUCTION IN AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2022

Date	TVS[1]	TVS[2] Reduction	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	%		mg/dry kg											
05/10/22	70.8	62.1	27,092	40	2,209	<10.0	2.67	381	0.43	13.8	30.3	64.5	<10.0	994
05/17/22	79.3	65.6	23,143	126	941	<10.0	3.02	402	0.57	12.5	31.0	77.9	<10.0	1,120
06/14/22	70.2	71.0	26,190	516	1,110	<10.0	4.03	378	0.46	13.3	29.8	65.0	<10.0	973
06/17/22	79.8	78.6	22,896	665	329	<10.0	4.08	374	0.66	13.6	29.4	68.2	<10.0	1,017
06/30/22	90.7	71.8	28,462	8	4,302	10.4	4.45	418	0.63	16.1	31.6	75.0	<10.0	1,090
07/12/22	75.8	68.4	23,011	2,491	1,230	<10.0	2.93	397	0.65	16.8	34.7	77.7	<10.0	1,142
07/15/22	75.6	74.1	30,834	116	2,485	<10.0	2.67	374	0.45	14.2	30.2	68.1	<10.0	1,008
09/20/22	68.3	63.1	13,496	96	4,450	<10.0	2.34	420	0.50	16.7	33.5	73.5	<10.0	1,041
09/20/22	68.5	63.7	19,024	59	5,089	<10.0	2.31	415	0.62	16.7	33.1	72.3	<10.0	1,062
11/29/22	64.4	73.3	27,196	923	2,972	<10.0	3.37	471	0.54	20.6	38.7	88.0	<10.0	1,211
Minimum	64.4	62.1	13,496	8	329	<10	2.31	374	0.43	12.5	29.4	64.5	<10.0	973
Mean	74.3	69.2	24,134	504	2,512	<10	3.19	403	0.55	15.4	32.2	73.0	<10.0	1,066
Maximum	90.7	78.6	30,834	2,491	5,089	10.4	4.45	471	0.66	20.6	38.7	88.0	<10.0	1,211
503 Limit[3]	NL[4]	≥38	NL	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Total volatile solids as percentage of total solids.
[2]Total volatile solids for digester feed during months when lagoons were loaded from 2017 to 2021 was used to calculate TVS reduction.
[3]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[4]No limit established under Part 503.

TABLE 17: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2022

Sample Date	Lagoon No.	Enteric Virus PFU[1]/4g	Helminth Ova Viable Ova/4g
08/10/21	14	<0.8000	<0.0800
09/15/21	8	<0.8000	<0.0800
10/12/21	8	<0.8000	<0.0800
04/12/22	8	<0.8000	<0.0800
05/10/22	8	<0.8000	<0.0800
06/14/22	7	<0.8000	<0.0800

[1]Plaque-forming unit.

TABLE 18: FECAL COLIFORM ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2022

Sample Date	Lagoon No.	Total Solids %	Fecal Coliform MPN[1]/dry g
05/17/22	8	74.0	13
05/17/22	8	71.6	40
06/08/22	8	73.6	680
06/08/22	8	68.7	140
06/15/22	14	71.2	7
06/28/22	17	72.4	7
06/30/22	7	84.2	53
07/13/22	7	86.4	580
09/20/22	18	59.4	6
10/18/22	18	66.8	87

[1]Most probable number.

TABLE 19: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2021 AND APPLIED TO URBAN LAND IN 2022

Sample Date[1]	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
03/22/22	15,970	126	69.3	<10.0	1.84	169	0.38	2.86	20.0	64.4	<10.0	339
03/22/22	14,269	411	75.7	<10.0	2.02	178	0.43	2.61	18.8	61.7	<10.0	350
05/11/22	10,743	522	80.1	<10.0	1.86	219	0.26	3.76	22.8	81.2	<10.0	402
05/11/22	13,397	195	54.3	<10.0	1.56	182	<0.25	3.21	22.1	70.1	<10.0	337
06/23/22	17,022	320	48.2	<10.0	2.04	170	0.35	2.19	16.8	59.3	<10.0	308
06/23/22	14,967	60.2	32.9	<10.0	2.12	184	0.35	2.13	21.0	64.8	<10.0	340
08/31/22	15,617	412	27.0	<10.0	1.81	178	0.32	4.77	18.1	56.0	<10.0	381
08/31/22	14,709	388	21.2	<10.0	2.15	214	0.31	5.77	22.1	67.3	<10.0	451
09/20/22	12,732	574	<10.2	<10.0	1.37	156	0.37	3.12	15.7	49.5	<10.0	327
09/20/22	13,717	546	<9.9	<10.0	1.54	168	0.37	3.53	17.0	54.4	<10.0	352
10/26/22	11,311	519	49.2	<10.0	2.54	243	0.41	4.99	26.1	80.2	<10.0	516
10/26/22	13,611	543	17.8	<10.0	2.57	244	0.37	5.18	27.0	81.3	<10.0	521
Minimum	10,743	60.2	<9.9	<10.0	1.37	156	<0.25	2.13	15.7	49.5	<10.0	308
Mean[2]	14,005	385	40.8	<10.0	1.95	192	0.34	3.68	20.6	65.8	<10.0	385
Maximum	17,022	574	80.1	<10.0	2.57	244	0.43	5.77	27.0	81.3	<10.0	521
503 Limit[3]	NL[4]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Materials produced in 2021 and tested in 2022 prior to utilization.
[2]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[3]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[4]No limit established under Part 503.

TABLE 20: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET EAST SOLIDS MANAGEMENT AREA IN 2021 AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2022

Sample Date[1]	Total Solids %	Fecal Coliform MPN[2]/dry g
03/22/22	48.9	0
05/11/22	46.1	0
05/11/22	47.9	6
06/23/22	50.8	6
06/23/22	60.5	6
08/31/22	59.3	5
09/20/22	67.5	42
10/26/22	54.6	7

[1]Materials produced in 2021 and tested in 2022 prior to utilization.
[2]Most probable number.

renewable certification of the PFRP designation was valid from August 1, 2017, through July 31, 2022, and required the analysis of six samples annually for helminth ova and enteric viruses during this period and the submittal of the data together with the annual Part 503 report. The District opted to not renew the certification after it expired.

None of the Calumet WRP air-dried EQ biosolids generated or utilized in 2022 were PFRP-compliant with respect to the minimum required duration of lagoon aging (18 months) due to operational constraints. Therefore, all air-dried biosolids utilized as EQ material in 2022 were tested for helminth ova and enteric virus compliance in August, September, and October 2021 and April, May, and June 2022 (Table 17), and for fecal coliform compliance in May, June, July, September, and October 2022 (Table 18), according to Section 503.32(a)(5).

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 2022 was 7.04 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 2022, the total biosolids production at this WRP was 801 DT (Table 1).

Land Application of Class B Liquid Biosolids

In 2022, the Hanover Park WRP land-applied a total of 1,038 DT of lagooned biosolids and lagoon supernatant at the on-site Fischer Farm under IEPA Permit No. 2022-61315. The total quantity of biosolids utilized (1,038 DT) was more than the total 2022 production for the Hanover Park WRP (801 DT) with the excess coming from the on-site storage lagoons. Hence, net storage of biosolids in lagoons was reduced by 237 DT in 2022. 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 2022 met the pollutant concentration limits in Table 3 of Section 503.13 for all metals (Table 21), the anaerobic digestion time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 22), and the VAR requirements of Section 503.33(b)(1) (Table 23). Management practices at this land-application site complied with Section 503.14.

TABLE 21: CONCENTRATIONS OF NITROGEN AND METALS IN BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2022

Sample Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	Supernatant, mg/L											
07/30/22	703	0.282	706	0.014	<0.002	0.111	<0.0005	0.006	0.024	0.002	0.006	0.188
10/15/22	777	<0.25	709	0.015	<0.002	0.115	<0.0005	0.006	0.028	0.002	0.005	0.214
Minimum	703	<0.25	706	0.014	<0.002	0.111	<0.0005	0.006	0.024	0.002	0.005	0.188
Mean[1]	740	0.229	707	0.014	<0.002	0.113	<0.0005	0.006	0.026	0.002	0.006	0.201
Maximum	777	0.282	709	0.015	<0.002	0.115	<0.0005	0.006	0.028	0.002	0.006	0.214
	Liquid Biosolids, mg/kg											
11/05/22	95,098	<205	41,754	<10.0	1.40	757	0.87	13.1	28.9	21.4	<10.0	876
11/12/22	88,274	<181	35,437	<10.0	1.29	731	0.62	12.4	26.5	18.5	<10.0	843
Minimum	88,274	NC[2]	35,437	<10.0	1.29	731	0.62	12.4	26.5	18.5	<10.0	843
Mean	91,686	NC	38,595	<10.0	1.35	744	0.74	12.7	27.7	19.9	<10.0	860
Maximum	95,098	NC	41,754	<10.0	1.40	757	0.87	13.1	28.9	21.4	<10.0	876
503 Limit[3]	NL[4]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]In calculating each mean, any value less than the reporting limit was treated as equal to the reporting limit divided by the square root of two.
[2]Minimum, mean, and maximum were not calculated because all reported values were below the laboratory practical quantitation limit.
[3]Regulatory limit established under United States *Code of Federal Regulations* Title 40 Part 503.
[4]No limit established under Part 503.

TABLE 22: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT IN 2022

Month	Average Temperature °F	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3)[1]	Meets Part 503 Class B Requirements
		days		
January	97.4	26.8	15.0	Yes
February	98.0	28.6	15.0	Yes
March	98.0	28.2	15.0	Yes
April	98.0	28.1	15.0	Yes
May	98.0	28.4	15.0	Yes
June	98.0	29.9	15.0	Yes
July	98.0	29.7	15.0	Yes
August	98.0	29.4	15.0	Yes
September	98.0	32.6	15.0	Yes
October	98.0	33.1	15.0	Yes
November	98.0	30.7	15.0	Yes
December	98.0	29.5	15.0	Yes

[1]For anaerobic digestion at average temperature achieved.

TABLE 23: VOLATILE SOLIDS REDUCTION IN BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2022

Month[1]	Digester Feed	Digester Draw	Applied Biosolids	Volatile Solids Reduction[2]
	% Total Volatile Solids			%
July	85.1	72.7	59.6	74.2
October	87.0	72.4	59.7	77.8
November	88.2	70.6	70.9	67.6

[1]Biosolids applied as lagoon supernatant in July and October, and as liquid biosolids in November.
[2]Volatile solids reduction computed using total volatile solids data for digester feed and applied biosolids.

JOHN E. EGAN WATER RECLAMATION PLANT

The Egan WRP, located in Schaumburg, Illinois, has a design average flow of 30 MGD. The annual average treated flow in 2022 was 22.4 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. Because the centrifuges were not operating in 2022, liquid digested biosolids are sent via sewers to the O'Brien WRP.

In 2022, a total amount of 5,898 DT biosolids were produced at the Egan WRP, all of which were pumped to the O'Brien WRP and then to the Stickney WRP for further processing, storage, and utilization (Table 1). Anaerobic digestion at the Egan WRP in 2022 met the time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 24).

TABLE 24: DIGESTER[1] TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2022

Month	Average Temperature °F	Average Detention Time	Minimum Detention Time Required by 503.32(b)(3)[2]	Meets Part 503 Class B Requirements
		days		
January	97.3	33.1	15.0	Yes
February	96.8	28.2	15.0	Yes
March	96.1	26.4	15.0	Yes
April	96.5	27.7	15.0	Yes
May	97.1	28.4	15.0	Yes
June	96.7	31.0	15.0	Yes
July	97.7	29.6	15.0	Yes
August	98.2	34.6	15.0	Yes
September	98.6	38.7	15.0	Yes
October	97.3	30.5	15.0	Yes
November	96.3	30.7	15.0	Yes
December	95.8	27.9	15.0	Yes

[1]Temperatures and detention times are for primary digesters A and C at the Egan WRP.
[2]For anaerobic digestion at average temperature achieved.

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 2022 was 208 MGD. Wastewater reclamation processes at the O'Brien WRP include primary (primary settling) and secondary (activated sludge process) treatments. In 2022, the O'Brien WRP produced 32,304 DT of solids (Table 1), which were sent via pipeline to the Stickney WRP where they were commingled with the solids from that WRP for anaerobic digestion and further processing, storage, and utilization. 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 includes solids generated at the Kirie WRP, as described in the next section.

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 2022 was 36.12 MGD. Wastewater reclamation processes include grit tanks, secondary (activated sludge process), and tertiary (sand filtration) treatments. In 2022, the Kirie WRP produced 5,866 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 and were commingled with the solids from these WRPs for anaerobic digestion and further processing, storage, and utilization.

LEMONT WATER RECLAMATION PLANT

The Lemont WRP, located in Lemont, Illinois, has a design average flow of 2.3 million MGD. The annual average treated flow in 2022 was 2.63 MGD. Wastewater reclamation processes include both primary (primary settling) and secondary (activated sludge process) treatments. In 2022, the Lemont WRP produced 328 DT of solids (Table 1), which were gravity concentrated and transported to the Stickney WRP where they were commingled with the solids from that WRP for anaerobic digestion and further processing, storage, and utilization.

APPENDIX

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,

[signature] 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

Metropolitan Water Reclamation District of Greater Chicago
100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3154 312.751.5190 f: 312.751.5194

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

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 60604-3590

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

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.

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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,

Robert J. Haney
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.

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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

Metropolitan Water Reclamation District of Greater Chicago
100 EAST ERIE STREET CHICAGO, ILLINOIS 60611-3154 312.751.5190 f: 312.751.5194

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

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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 60604-3590

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:

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(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.

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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