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ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR 2020

August 2021

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ANNUAL BIOSOLIDS MANAGEMENT REPORT FOR 2020

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TABLE OF CONTENTS

	Page
LIST OF TABLES	iii
LIST OF FIGURES	vi
LIST OF ACRONYMS AND ABBREVIATIONS	vii
ACKNOWLEDGEMENT	viii
DISCLAIMER	viii
FOREWORD	ix
OVERVIEW OF METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO BIOSOLIDS PRODUCTS AND UTILIZATION PROGRAM	1
Biosolids Products at the Metropolitan Water Reclamation District	1
Metropolitan Water Reclamation District of Greater Chicago Site-Specific Designations and Adjusted Standards for Biosolids Quality and Utilization	2
Total Biosolids Produced at the District	3
Biosolids Utilization Outlets	3
Farmland Application Program	3
Urban Utilization Program	6
Fischer Farm Utilization Program	6
Pelletizing Facility	6
Landfill Final Cover	6
STICKNEY WATER RECLAMATION PLANT	8
Treatment Plant and Biosolids Process Train Description	8
Biosolids Disposal at Landfills	11
Application of Class B Biosolids to Farmland	11
Application of Exceptional Quality Biosolids to Urban Land	11

TABLE OF CONTENTS (Continued)

	Page
Air-Dried Exceptional Quality Biosolids	18
Composted Exceptional Quality Biosolids	18
Site-Specific Process to Further Reduce Pathogens	18
CALUMET WATER RECLAMATION PLANT	24
Treatment Plant and Biosolids Process Train Description	24
Biosolids Disposal at Landfills	24
Application of Class B Biosolids to Farmland	24
Application of Exceptional Quality Biosolids to Urban Land	26
Air-Dried Exceptional Quality Biosolids	26
Composted Exceptional Quality Biosolids	26
Site-Specific Process to Further Reduce Pathogens	26
HANOVER PARK WATER RECLAMATION PLANT	36
Treatment Plant and Biosolids Process Train Description	36
Land Application of Class B Liquid Biosolids	36
JOHN E. EGAN WATER RECLAMATION PLANT	41
Treatment Plant and Biosolids Process Train Description	41
Biosolids Disposal at Landfills	41
Biosolids Conveyed to Other Water Reclamation Plants for Further Processing	41
TERRENCE J. O'BRIEN WATER RECLAMATION PLANT	43
JAMES C. KIRIE WATER RECLAMATION PLANT	44
LEMONT WATER RECLAMATION PLANT	45
BIOSOLIDS SENT TO LANDFILLS FOR CO-DISPOSAL UNDER 40 CODE OF FEDERAL REGULATIONS PARTS 258 AND 261	46

LIST OF TABLES

Table No.		Page
1	Production and Utilization of Sludge and Biosolids During 2020	4
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 2020	9
3	Concentrations of Nitrogen and Metals in Heat-Dried Biosolids Pellets Generated by Metropolitan Biosolids Management Facilities at the Stickney Water Reclamation Plant in 2020	12
4	Concentrations of Nitrogen and Metals in Dewatered Biosolids Generated at the Stickney Water Reclamation Plant and Applied to Farmland in 2020	13
5	Digester Temperatures and Detention Times During Processing of Biosolids Generated at the Stickney Water Reclamation Plant and Applied to Farmland in 2020	14
6	Sites That Utilized Stickney Water Reclamation Plant Air-Dried and Composted Exceptional Quality Biosolids in 2020	15
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 2020	19
8	Pathogen Analysis of Air-Dried Exceptional Quality Biosolids Generated at the Stickney Water Reclamation Plant and Applied to Urban Land in 2020	20
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 2020	21
10	Concentrations of Nitrogen and Metals in Composted Exceptional Quality Biosolids Produced at the Harlem Avenue Solids Management Area in 2019 and Applied to Urban Land in 2020	22
11	Fecal Coliform Analysis of Cured Composted Exceptional Quality Biosolids Produced at the Harlem Avenue Solids Management Area in 2019 and Sampled Prior to Utilization on Urban Land in 2020	23

LIST OF TABLES (Continued)

Table No.		Page
12	Summary of Temperature Readings and Turning Dates of Open Windrows During Production of Composted Exceptional Quality Biosolids at the Calumet Water Reclamation Plant East Solids Management Area in 2020	25
13	Concentrations of Nitrogen and Metals in Dewatered Biosolids Generated at the Calumet Water Reclamation Plant and Applied to Farmland in 2020	27
14	Digester Temperatures and Detention Times During Processing of Biosolids Generated at the Calumet Water Reclamation Plant and Applied to Farmland in 2020	28
15	Sites That Utilized Calumet Water Reclamation Plant Air-Dried and Composted Exceptional Quality Biosolids in 2020	29
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 2020	30
17	Pathogen Analysis of Air-Dried Exceptional Quality Biosolids Generated at the Calumet Water Reclamation Plant and Applied to Urban Land in 2020	31
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 2020	32
19	Concentrations of Nitrogen and Metals in Composted Exceptional Quality Biosolids Produced at the Calumet Water Reclamation Plant East Solids Management Area in 2019 and Applied to Urban Land in 2020	33
20	Fecal Coliform Analysis of Cured Composted Exceptional Quality Biosolids Produced at the Calumet Water Reclamation Plant East Solids Management Area in 2019 and Tested Prior to Utilization on Urban Land in 2020	34
21	Concentrations of Nitrogen and Metals in Biosolids Generated at the Hanover Park Water Reclamation Plant and Applied at the Fischer Farm Site in 2020	37

LIST OF TABLES (Continued)

Table No.		Page
22	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 2020	39
23	Volatile Solids Reduction in Biosolids Generated at the Hanover Park Water Reclamation Plant and Applied at the Fischer Farm Site in 2020	40
24	Digester Temperatures and Detention Times During Processing of Biosolids Generated at the John E. Egan Water Reclamation Plant in 2020	42

LIST OF FIGURES

Figure No.		Page
1	Outlets of Biosolids Utilization and Disposal at the Metropolitan Water Reclamation District of Greater Chicago in 2020	5

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Meaning
°C	degrees Celsius
°F	degrees Fahrenheit
As	arsenic
Cd	cadmium
CFR	Code of Federal Regulations
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
IDA	Illinois Department of Agriculture
IEPA	Illinois Environmental Protection Agency
kg	kilogram
Kirie	James C. Kirie
MBM	Metropolitan Biosolids Management, LLC
mg	milligram
MGD	million gallons per day
Mo	molybdenum
MPN	most probable number
N	nitrogen
NH_3-N	ammonia nitrogen
NH_4-N	ammonium 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
PFU	plaque-forming unit
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 2020 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 2021.

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

- **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 USEPA Part 503 biosolids rule and meet vector attraction reduction (VAR) requirements through timely incorporation into land. This product is produced at the Stickney, Calumet, and Egan (centrifuged biosolids only) WRPs and commonly applied to farmland as a fertilizer.

- **Air-Dried Exceptional Quality Biosolids:** These biosolids are produced through the aging of centrifuge cake biosolids or digested sludge in lagoons for at least 1.5 years 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 (IDA).

- **Composted Exceptional Quality Biosolids:** The composted biosolids are produced at the Stickney WRP Harlem Avenue and Calumet WRP 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 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, followed by 16 weeks of curing. The product produced is currently voluntarily registered as a soil amendment with the IDA.

- **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 a requirement for this standard. Therefore, lagoon-aged air-dried biosolids used for landfill final cover are not tested to confirm Class A status.

- **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. Currently, this certification is renewable every five years. Over the past nine 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.

Total Biosolids Produced at the District

A total of 147,445 dry tons (DT) of biosolids was produced at District WRPs in 2020 based on the total of amounts at the Stickney and Calumet WRPs (which received all solids produced at the Egan, O'Brien, Kirie, and Lemont WRPs) and the Hanover Park WRP, which did not transport any solids to another WRP (Table 1). The Stickney WRP produced 120,866 DT of biosolids from processing of solids generated at the plant and solids transported from the Egan, O'Brien, Kirie, and Lemont WRPs, and 443 DT of centrifuge cake biosolids from the Egan WRP. The Calumet WRP produced 25,812 DT. The Hanover Park WRP produced 767 DT, all of which was retained or applied on-site. This brings the District's five- and ten-year biosolids production running averages to 138,749 and 138,975 DT/year, respectively.

Biosolids Utilization Outlets

The District's Biosolids Management Program is designed to manage all the biosolids for beneficial reuse. During 2020, less than 1 percent of biosolids (745 DT) was unsuitable for land application and was co-disposed with municipal solid wastes at Waste Management's Laraway Landfill site, Joliet, Illinois (Figure 1). The unsuitable materials generally contain gravel, wood debris, and dust from sweeping of roads at biosolids drying sites. There are five main outlets for the beneficial utilization of District biosolids: (1) farmland application, (2) urban utilization of air-dried and composted EQ biosolids, (3) the Fischer Farm Utilization Program, (4) pelletizing at the MBM facility, and (5) landfill final cover. In 2020, a total of 133,907 DT of biosolids were utilized through these outlets (Table 1).

Farmland Application Program. In this program, dewatered Class B biosolids are utilized as a fertilizer for the 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 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 2020, a total of 73,149 DT of dewatered Class B biosolids from the Stickney and Calumet WRPs were applied to farmland as fertilizer (Figure 1).

TABLE 1: PRODUCTION AND UTILIZATION OF SLUDGE AND BIOSOLIDS DURING 2020[1]

Production and Utilization	Water Reclamation Plants						
	Stickney	Calumet	Hanover Park	Egan	O'Brien	Kirie	Lemont
	Dry Tons (Metric Tons)						
Production[2]	120,866 (109,648)	25,812 (23,416)	767 (696)	5,860 (5,316)	37,641 (34,147)	5,718 (5,187)	407 (369)
Outlets	116,103 (105,327)	17,868 (16,210)	681 (618)	—	—	—	—
Utilization	115,506 (104,785)	17,720 (16,075)	681 (618)	—	—	—	—
Agricultural Land	63,556 (57,657)	9,593 (8,703)	681 (618)	—	—		
Urban Land (Total)	12,038 (10,921)	8,127 (7,373)	—	—	—	—	—
Air-Dried	5,419 (4,916)	7,267 (6,593)	—	—	—	—	—
Composted	6,619 (6,005)	860 (780)	—	—	—	—	—
Pelletizing Facility[3]	39,912 (36,208)	—	—	—	—	—	—
Landfill (Co-Disposal)	597 (542)	148 (134)	—	—	—	—	—
To Other WRPs[4]	—	—	—	5,859[5] (5,316)	37,641 (34,147)	5,718 (5,187)	407 (369)

[1]Differences between biosolids production and total use or disposal in 2020 were due to a net withdrawal or storage in lagoons or drying areas and processing of biosolids imported from other WRPs.

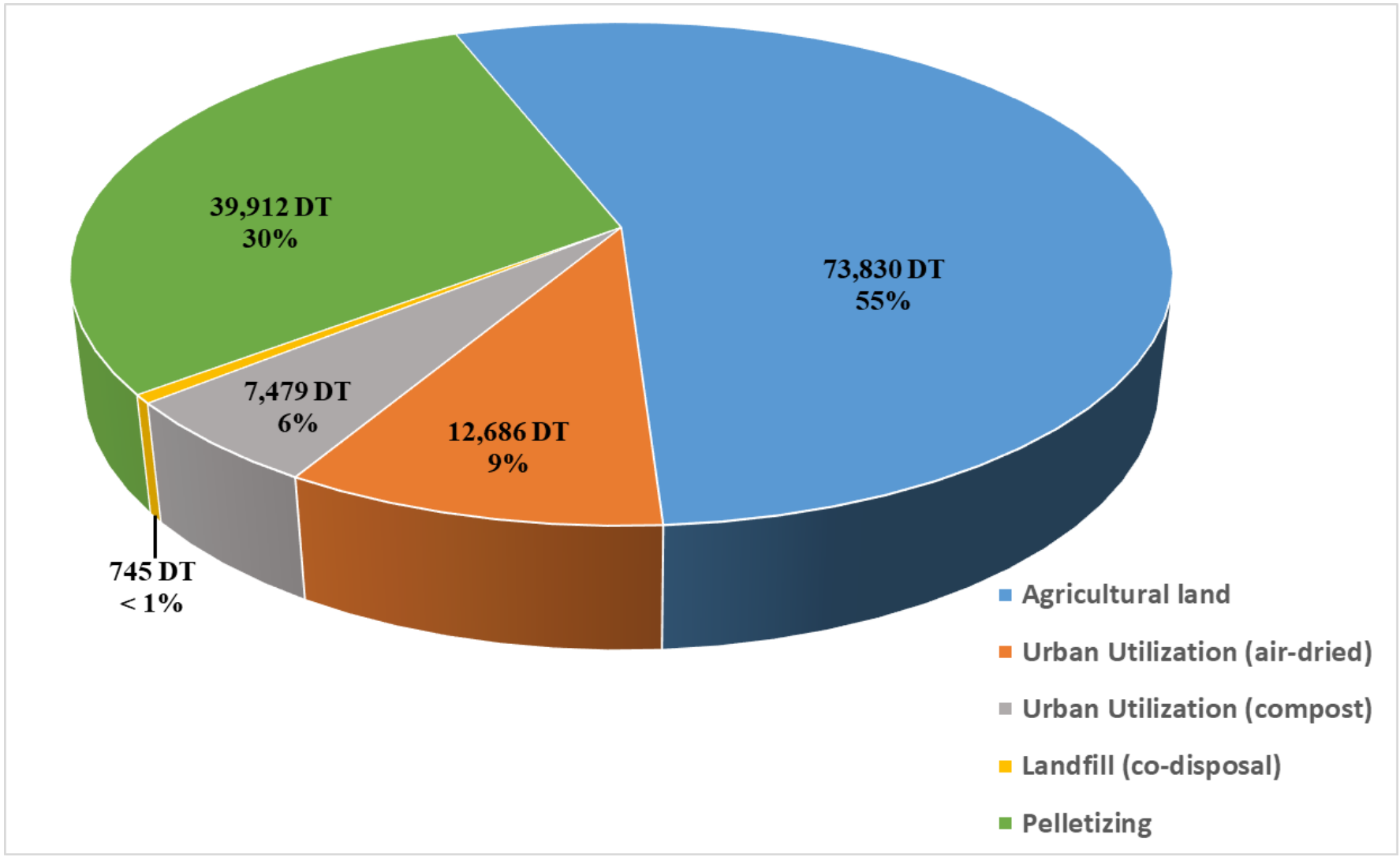
[2]The Stickney, Calumet, and Hanover Park WRPs produced biosolids, while the O'Brien, Kirie, and Lemont WRPs produced undigested or partially digested sludge, and the Egan WRP produced both. Figures represent total solids generated at the end of each plant's processing train plus those imported from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

[3]Sent to the Stickney WRP pelletizing facility owned and operated by Metropolitan Biosolids Management, LLC, 6001 W. Pershing Road, Cicero, Illinois 60804 (Contract No. 98-RFP-10).

[4]For further processing or distribution.

[5]Includes centrate and solids pumped to the O'Brien WRP for further processing, and centrifuge cake trucked to the Lawndale Avenue Solids Management Area for application to farmland and the Halem Avenue Solids Management Area for composting.

FIGURE 1: OUTLETS OF BIOSOLIDS UTILIZATION AND DISPOSAL AT THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO IN 2020



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 2020, 12,686 DT of air-dried biosolids and 7,479 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 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 2020, a total of 681 DT of biosolids as liquid biosolids and lagoon supernatant was applied to the farm (part of biosolids applied to agricultural land 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 the MBM. In 2020, 39,912 DT of pelletized biosolids were generated from anaerobically digested biosolids produced at the Stickney WRP (Figure 1).

Landfill Final Cover. No biosolids were applied as landfill final cover in 2020.

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 2020 are summarized in Table 1. All utilization of biosolids in 2020 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 2020 and presents the 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).

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. 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 WRP East SMA (Permit No. 2017-017-DE/OP) and the Harlem Avenue SMA (Permit No. 2017-017-DE/OP). The biosolids compost is distributed for use as a soil amendment under IDA 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 2020 was 696 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 2020 (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 2020 (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 2020 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.

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 2020

Pile ID Number[1]	Composting Date (range)[2]	Turning Date[2]					Composting Temperature, °C (range)
20-1	07/18–08/06	07/21	07/23	07/27	07/31	08/04	55–68
20-2	07/28–08/18	07/31	08/04	08/07	08/10	08/13	57–75
20-3	07/28–08/18	07/31	08/04	08/07	08/10	08/13	59–70
20-4	08/01–08/27	08/04	08/07	08/10	08/13	08/20	61–75
20-5	08/01–08/20	08/04	08/07	08/10	08/13	08/15	55–76
20-6	08/05–08/27	08/07	08/10	08/13	08/17	08/20	61–74
20-7	08/06–08/27	08/10	08/13	08/17	08/20	08/24	56–79
20-8	08/13–09/08	08/17	08/20	08/24	08/27	09/04	55–74
20-9	08/14–09/09	08/18	08/21	08/25	08/28	09/05	59–78
20-10	08/13–09/09	08/18	08/21	08/25	08/28	09/05	65–78
20-11	08/13–09/08	08/18	08/21	08/25	08/28	09/05	68–78
20-12	08/13–09/08	08/18	08/21	08/25	08/28	09/05	63–76
20-13	08/18–09/05	08/21	08/25	08/28	08/31	09/03	64–79
20-14	08/13–09/08	08/18	08/21	08/25	08/28	09/05	70–76
20-15	08/18–09/05	08/21	08/25	08/28	08/31	09/03	56–75
20-16	08/18–09/08	08/21	08/25	08/28	08/31	09/03	59–74
20-17	08/18–09/08	08/21	08/25	08/28	08/31	09/03	60–75
20-18	08/18–09/08	08/21	08/25	08/28	08/31	09/03	60–78
20-19	08/18–09/08	08/21	08/25	08/28	08/31	09/03	60–76
20-20	08/27–09/22	09/02	09/05	09/09	09/14	09/17	57–79
20-21	08/27–09/22	09/02	09/05	09/09	09/14	09/17	60–78
20-22	08/28–09/22	09/02	09/05	09/09	09/14	09/17	57–77
20-23	08/30–09/24	09/02	09/05	09/09	09/14	09/17	58–78
20-24	08/30–09/22	09/02	09/05	09/09	09/14	09/17	57–74
20-25	08/30–09/22	09/02	09/05	09/09	09/14	09/17	57–76
20-26	08/30–09/24	09/02	09/05	09/09	09/14	09/17	55–74
20-27	08/30–09/24	09/02	09/05	09/10	09/15	09/18	57–74
20-28	09/02–09/24	09/05	09/10	09/15	09/18	09/22	57–73
20-29	08/27–09/24	09/02	09/05	09/10	09/15	09/18	56–74
20-30	09/05–09/28	09/10	09/15	09/18	09/22	09/25	56–72
20-31	09/08–09/28	09/10	09/15	09/18	09/22	09/25	58–73
20-32	09/03–10/01	09/09	09/16	09/22	09/25	09/28	57–76
20-33	09/03–09/28	09/06	09/09	09/16	09/22	09/25	55–75
20-34	09/16–10/13	09/23	09/28	10/02	10/05	10/08	60–73
20-35	09/16–10/13	09/23	09/28	10/02	10/05	10/08	55–78
20-36	09/28–10/29	10/02	10/05	10/08	10/16	10/20	57–76

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 2020

Pile ID Number[1]	Composting Date (range)[2]	Turning Date[2]					Composting Temperature, °C (range)
20-37	09/27–10/15	09/29	10/02	10/05	10/08	10/12	61–74
20-38	09/29–10/20	10/02	10/05	10/08	10/12	10/15	60–76
20-39	09/29–10/20	10/02	10/05	10/08	10/12	10/15	58–76
20-40	09/27–10/20	09/29	10/02	10/05	10/08	10/12	58–71
20-41	09/29–10/20	10/02	10/05	10/08	10/12	10/15	62–78
20-42	09/30–10/20	10/02	10/05	10/08	10/12	10/15	62–74
20-43	10/01–10/22	10/05	10/08	10/12	10/15	10/19	58–77
20-44	10/01–10/22	10/05	10/08	10/12	10/15	10/19	64–78
20-45	10/11–11/01	10/14	10/19	10/22	10/26	10/29	56–69
20-46	10/11–11/01	10/14	10/19	10/22	10/26	10/29	55–70
20-47	10/11–11/01	10/14	10/19	10/22	10/26	10/29	55–77
20-48	10/11–11/01	10/14	10/19	10/22	10/26	10/29	57–74
20-49	10/11–11/01	10/14	10/19	10/22	10/26	10/29	59–73
20-50	10/11–11/01	10/14	10/19	10/22	10/26	10/29	59–77
20-51	10/11–11/05	10/14	10/19	10/22	10/26	10/29	58–73
20-52	10/11–11/05	10/14	10/19	10/22	10/26	10/29	55–71
20-53	10/16–11/05	10/19	10/22	10/26	10/29	11/02	56–80
20-54	10/16–11/05	10/19	10/22	10/26	10/29	11/02	59–77
20-55	10/19–11/12	10/22	10/26	10/29	11/02	11/05	57–74
20-56	10/19–11/12	10/22	10/26	10/29	11/02	11/05	58–68
20-57	11/02–11/23	11/05	11/09	11/12	11/16	11/19	55–61
20-58	10/30–11/23	11/02	11/05	11/09	11/12	11/16	59–71
20-59	10/30–11/23	11/02	11/05	11/09	11/12	11/16	62–76
20-60	10/30–11/23	11/02	11/05	11/09	11/12	11/16	58–75
20-61	10/30–11/23	11/02	11/05	11/09	11/12	11/16	58–76
20-62	11/02–11/25	11/05	11/09	11/12	11/16	11/19	61–77
20-63	11/12–12/05	11/16	11/19	11/23	11/30	12/03	60–70
20-64	11/12–12/05	11/16	11/19	11/23	11/30	12/03	63–74
20-65	11/20–12/13	11/23	11/30	12/03	12/07	12/10	57–78

[1]All piles reported are certified in accordance with the temperature and turning time requirements.
[2]Dates are month/day in 2020.

b. Use at local municipal solid waste landfills as final landfill cover. No biosolids were utilized through this outlet in 2020 (Table 1).

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 2020, the Stickney WRP produced a total of 120,866 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, and 443 DT of centrifuge cake biosolids from the Egan WRP sent to the Lawndale Avenue SMA. The quantity of biosolids used and disposed of (116,103 DT) was lower than the total 2020 production (120,866 DT) for the Stickney WRP. Hence, 4,763 DT were stored in lagoons and/or on drying cells for further processing or later use.

Biosolids Disposal at Landfills

In 2020, a total of 597 DT of biosolids produced at the Stickney WRP was 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 2020, a total of 63,556 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 2020 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 (N) concentrations (Table 4) were used to compute the agronomic rates for farmland application.

Application of Exceptional Quality Biosolids to Urban Land

In 2020, a total of 12,038 DT of Stickney WRP air-dried EQ (5,419 DT) and composted EQ (6,619 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.

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 2020[1]

Date	Total N	NO_3^--N	NH_4-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
01/14/20	47,500	<100	3,000	6.7	2.1	477	0.53	15.1	42.7	68.3	4.9	679
02/11/20	46,100	<100	2,500	9.8	2.1	434	0.50	15.0	39.3	72.8	5.3	649
03/10/20	50,600	800	3,000	8.1	2.4	448	0.39	14.3	37.0	59.6	4.5	649
04/14/20	44,900	<100	2,800	8.2	2.0	414	0.30	13.8	36.5	67.1	5.0	667
05/12/20	39,800	<100	2,500	8.4	2.2	412	0.46	12.0	36.9	81.4	4.2	663
06/09/20	37,200	<100	2,500	12	2.4	416	0.40	11.5	38.7	89.4	4.7	670
07/14/20	31,100	<100	1,700	9.8	2.7	421	0.56	12.2	38.2	113	5.1	712
08/04/20	28,800	<100	900	8.4	2.6	425	0.51	11.5	36.4	122	3.7	768
09/01/20	33,000	<100	1,400	8.1	2.5	473	0.57	15.4	40.0	112	5.9	851
10/06/20	40,500	<100	1,500	8.0	2.2	461	0.50	17.8	44.1	88.2	5.4	748
11/03/20	42,100	<100	1,400	5.9	2.4	473	0.68	19.1	50.6	87.8	4.5	778
12/15/20	45,800	<100	2,100	7.2	2.0	445	0.49	14.6	51.0	80.5	4.0	687
Minimum	28,800	<100	900	5.9	2	412	0.30	11.5	36.4	59.6	3.7	649
Mean[2]	40,617	131	2,108	8.4	2.3	442	0.49	14.4	41.0	86.8	4.8	710
Maximum	50,600	800	3,000	12	2.7	477	0.68	19.1	51.0	122	5.9	851
503 Limit	NL[3]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Data provided by Metropolitan Biosolids Management, LLC.
[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]No limit.

TABLE 4: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2020

Date	TKN	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg										
03/25/20	29,944	7,026	11.5	3.38	422	0.53	10.7	43.7	94.2	<5.0	854
03/25/20	31,953	5,587	11.8	4.58	465	0.62	13.9	47.8	110	<5.0	918
04/22/20	31,933	8,036	10.3	3.37	429	0.56	12.9	41.3	98.1	<5.0	835
04/22/20	29,048	6,308	10.9	4.18	476	0.67	13.8	46.7	105	<5.0	905
05/12/20	42,576	8,965	13.3	3.08	437	0.32	11.8	39.8	93.1	<5.0	799
05/12/20	30,545	5,557	15.9	3.47	448	0.45	11.2	43.6	107	<5.0	863
06/02/20	38,365	9,109	12.9	3.23	441	0.57	12.1	44.3	92.2	<5.0	882
06/04/20	46,554	14,512	8.3	3.12	434	0.46	14.8	41.5	84.9	<5.0	782
06/04/20	30,102	6,605	10.7	4.26	464	0.61	13.4	46.3	105	<5.0	917
06/09/20	NRR[1]	8,582	<5.0	5.32	791	0.48	13.8	66.9	32.8	<5.0	835
07/07/20	36,334	7,530	11.6	4.19	474	0.55	14.1	46.0	111	<5.0	883
07/07/20	33,792	6,568	15.8	3.20	443	0.41	13.0	44.4	91.2	<5.0	848
07/07/20	41,706	12,378	10.9	2.97	439	0.38	15.5	42.7	88.2	<5.0	763
08/03/20	31,740	7,035	14.3	3.45	467	0.47	15.7	47.4	93.0	<5.0	909
08/03/20	45,497	15,369	11.6	3.00	433	0.45	12.4	40.5	87.7	<5.0	793
08/10/20	33,329	8,664	14.4	4.65	469	0.53	15.9	49.2	113	<5.0	960
08/17/20	25,702	8,194	13.9	3.33	436	0.42	14.0	43.9	109	<5.0	953
09/10/20	34,310	9,438	15.2	3.68	453	0.76	14.5	45.5	99.6	<5.0	883
09/10/20	32,285	9,314	11.8	4.35	484	0.71	14.5	47.6	109	<5.0	929
09/15/20	37,376	11,418	15.4	3.20	407	0.58	13.6	41.7	95.1	<5.0	829
09/18/20	39,989	11,010	12.4	3.19	461	0.79	14.8	42.8	104	<5.0	873
10/02/20	29,590	8,937	13.9	3.12	444	0.68	14.7	45.5	95.6	<5.0	889
10/05/20	42,471	9,833	12.0	2.96	455	0.70	16.1	47.0	91.9	<5.0	877
10/12/20	45,955	11,877	14.5	2.90	397	0.62	11.7	38.4	77.3	<5.0	763
10/19/20	45,928	9,361	8.0	2.46	432	0.46	16.4	42.4	78.1	<5.0	758
11/05/20	53,626	13,000	15.2	3.06	413	0.39	13.9	39.0	97.9	<5.0	826
11/12/20	66,039	13,351	12.8	2.61	411	0.48	15.9	43.0	71.7	<5.0	715
Minimum	25,702	5,557	<5.0	2.46	397	0.32	10.7	38.4	32.8	<5.0	715
Mean[2]	37,950	9,391	12.3	3.49	457	0.54	13.9	44.8	93.8	<5.0	853
Maximum	66,039	15,369	15.9	5.32	791	0.79	16.4	66.9	113	<5.0	960
503 Limit	NL[3]	NL	41	39	1,500	17	75	420	300	100	2,800

[1]No reportable result because samples were held beyond the holding time.
[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]No limit.

TABLE 5: DIGESTER TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2020

Month	Average Temperature °F	Average Detention Time days	Minimum Detention Time Required by 503.32(b)(3)[1] days	Meets Part 503 Class B Requirements
January	96.7	25.4	15.0	Yes
February	96.7	29.9	15.0	Yes
March	96.1	22.8	15.0	Yes
April	97.0	24.8	15.0	Yes
May	97.8	32.0	15.0	Yes
June	98.0	27.8	15.0	Yes
July	99.4	26.8	15.0	Yes
August	98.3	26.3	15.0	Yes
September	97.9	26.3	15.0	Yes
October	98.1	30.8	15.0	Yes
November	96.9	27.2	15.0	Yes
December	97.0	21.6	15.0	Yes

[1]For anaerobic digestion at average temperature achieved.

TABLE 6: SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2020

User	Use
Composted Biosolids	
A2 Landscape Contractors – Gordon Wu	Landscaping
Aimtron Foundation	Landscaping
AMS Elite	Landscaping
Child Earth Foundation	Landscaping
Cinder Ridge Golf Course	Landscaping
Commodore Green Briar Condo Association	Landscaping
Decoma Day Camp	Landscaping
Ecology Center	Landscaping
Harrington Site Services Co.	Landscaping
Human Scale	Landscaping
Illinois Tollway	Landscaping
Midwest Baggers	Landscaping
Misericordia	Landscaping
Moore's Landscaping	Landscaping
District (Channel Maintenance)	Landscaping
North Shore Country Club	Landscaping
Oswego East High School	Landscaping
Park Boulevard Apartments	Landscaping
Park Manor Christian Church	Landscaping
Reclaim Roots	Landscaping
South Chicago Parents & Friends	Landscaping
St. Zachary School/Parrish	Landscaping
Temple Church	Landscaping
United Human Service	Landscaping
Urban Prairie Waldorf School	Landscaping
Utility Transport – Billy Goetz	Landscaping
Village of Park Forest	Landscaping
Village Oak Park	Landscaping
Village Of Lagrange	Landscaping
Village of Skokie	Landscaping
Wat Dhammaram – Thai Temple	Landscaping
Wat Phrasriratanamahatatu Temple	Landscaping
Westmoreland Golf Club	Landscaping
Berwyn Park District	Landscaping and trees
Chicago Park District[1]	Landscaping and trees
Northlake Public Works Department	Landscaping and trees
Park District of LaGrange	Landscaping and trees

TABLE 6 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2020

User	Use
Composted Biosolids	
Skokie Park District	Landscaping and trees
Western Springs Park District – Spring Rock Park	Landscaping and trees
Chicago Urban Farms	Gardening
Dunning Community Garden	Gardening
Englewood Heritage Station	Gardening
Oak Lawn Community Garden	Gardening
Spaulding Memorial Garden	Gardening
Distribution at the District's Water Reclamation Plants	Direct pick-up by residents
140 residents in Metropolitan Chicago areas (on file)	Private residential use
Air-Dried Biosolids	
Humphrey Middle School	Landscaping
Koppers, Inc.	Landscaping
Larry's Lawn Care	Landscaping
Moody Bible Institute	Landscaping
Village of Oak Lawn	Landscaping
Village of Franklin Park	Landscaping
Westmont High School	Landscaping
Chicago Heights Park District	Landscaping and trees
Homer Glen Park District	Landscaping and trees
Lemont Park District – Mayfair Park	Landscaping and trees
Northfield Park District	Landscaping and trees
Park District of LaGrange	Landscaping and trees
West Chicago Park District – Cornerstone Lakes Park	Landscaping and trees
Olde English Gardens	Gardening
12 residents in Metropolitan Chicago Areas (on file)	Private residential use
A.J. Farm	Topdressing
Cog Hill Golf Course	Topdressing
Costco Plainfield	Topdressing
West Spring Park District	Topdressing
J. Haran Farms, Hayfield	Topdressing

TABLE 6 (Continued): SITES THAT UTILIZED STICKNEY WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2020

User	Use
Composted Biosolids	
Kellogg Farms, Hayfield	Topdressing
Kinz Farms, Hayfield	Topdressing
Levis Farms, Hayfield	Topdressing
North Shore Country Club	Topdressing
Roma Sports Field	Topdressing

[1]Big Marsh and Marian Byrnes Parks.

Air-Dried Exceptional Quality Biosolids. In 2020, a total of 5,419 DT of Stickney WRP air-dried EQ biosolids was applied to urban land. All Stickney WRP air-dried biosolids applied to urban land in 2020 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 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 2020, a total of 6,619 DT of composted EQ biosolids generated at the Stickney WRP during 2019 was applied to urban land. The composted EQ biosolids applied to urban land in 2020 met composting temperature and time requirements in 2019, and they met the pollutant concentration limits in Table 3 of Section 503.13 (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 current renewable certification of the PFRP designation is valid from August 1, 2017, through July 31, 2022, and requires the analysis of six samples (three each from the Calumet and Stickney WRPs) annually for helminth ova and enteric viruses during this period and the submittal of the data together with the annual Part 503 report.

None of the Stickney WRP air-dried EQ biosolids generated in 2020 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 2020 were tested for pathogen compliance in August, September, and October 2019 and April, May, and June 2020 (Tables 8 and 9), according to Section 503.32(a)(5). As can been seen from the data in these tables, Stickney WRP air-dried EQ biosolids met the Class A standards for pathogen reduction in each of the tests.

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 2020

Date	Percent TVS[1]	Percent TVS[2] Reduction	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
			mg/dry kg											
07/14/20	38.4	51.9	21,812	401	3,294	14.7	4.39	478	0.57	14.4	47.5	146	<5.0	915
07/23/20	38.0	52.7	14,626	858	2,468	13.3	4.10	462	0.52	13.4	45.1	103	<5.0	885
08/20/20	37.2	54.3	17,400	69	4,261	13.0	4.91	498	0.62	16.3	53.1	119	<5.0	1,077
09/03/20	41.1	54.3	24,221	11	5,807	14.5	3.45	473	0.69	15.8	48.2	96.0	<5.0	934
09/17/20	41.6	53.4	28,950	38	5,505	16.4	3.55	470	0.79	14.7	47.7	99.6	<5.0	939
09/24/20	39.1	58.0	22,941	282	6,198	13.6	3.66	442	0.66	14.0	45.9	95.0	<5.0	872
10/15/20	41.2	54.1	26,158	360	6,385	14.0	3.30	439	0.84	14.1	45.1	89.5	<5.0	864
Minimum	37.2	51.9	14,626	11	2,468	13.0	3.30	439	0.52	13.4	45.1	89.5	<5.0	864
Mean	39.5	54.1	22,301	289	4,846	14.2	3.91	466	0.67	14.7	47.5	107	<5.0	927
Maximum	41.6	58.0	28,950	858	6,385	16.4	4.91	498	0.84	16.3	53.1	146	<5.0	1,077
503 Limit	NL[3]	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 2016 to 2019 was used to calculate TVS reduction.
[5]No limit.

TABLE 8: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2020

Date	Lagoon Number	Enteric Viruses PFU[1]/4 g	Helminth Ova Viable Ova/4 g
08/06/19	25	<0.8000	<0.0800
09/11/19	25	<0.8000	<0.0800
10/08/19	25	<0.7692	<0.0800
04/22/20	30	<0.8000	<0.0800
05/12/20	30	<0.8000	<0.0800
06/09/20	30	<0.8000	<0.0800

[1]Plaque-forming units.

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 2020

Date	Lagoon Number	Percent Total Solids	Fecal Coliform MPN[1]/dry g
05/07/20	30	62.0	46
06/04/20	30	73.2	110
06/23/20	30	63.8	790
07/23/20	30	62.5	460
08/20/20	30	76.2	50
09/24/20	24	71.1	71
10/15/20	24	69.1	55

[1]Most probable number.

TABLE 10: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2019 AND APPLIED TO URBAN LAND IN 2020

Date[1]	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
04/22/20	13,803	180	67.6	13.1	2.22	264	0.30	6.69	27.0	95.4	<5.0	542
05/04/20	16,961	365	25.4	11.0	2.93	339	0.47	7.54	37.3	135	<5.0	682
05/04/20	6,777	250	18.8	18.6	2.37	277	0.34	6.59	31.3	106	<5.0	580
05/13/20	20,361	126	42.7	19.1	1.78	260	0.34	5.10	29.6	110	<5.0	541
05/13/20	21,082	114	40.9	19.8	1.78	253	0.34	4.96	28.3	104	<5.0	533
07/14/20	14,905	9.12	27.4	18.3	2.11	265	0.30	6.92	26.3	128	<5.0	541
08/03/20	16,503	189	27.6	18.2	2.48	291	0.32	6.47	30.0	109	<5.0	608
08/03/20	16,389	215	30.9	15.8	2.39	281	0.36	6.56	29.1	105	<5.0	590
09/25/20	11,455	747	39.7	12.1	2.34	294	0.55	7.62	28.8	84.9	<5.0	595
Minimum	6,777	9.12	18.8	11.0	1.78	253	0.30	4.96	26.3	84.9	<5.0	533
Mean	15,360	244	35.7	16.2	2.27	280	0.37	6.50	29.7	109	<5.0	579
Maximum	21,082	747	67.6	19.8	2.93	339	0.55	7.62	37.3	135	<5.0	682
503 Limit	NL[2]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Materials produced in 2019 and tested in 2020 prior to utilization.
[2]No limit.

TABLE 11: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE HARLEM AVENUE SOLIDS MANAGEMENT AREA IN 2019 AND SAMPLED PRIOR TO UTILIZATION ON URBAN LAND IN 2020

Date[1]	Percent Total Solids	Fecal Coliform MPN[2]/dry g
03/04/20	41.97	16
03/04/20	41.72	160
03/11/20	42.79	140
03/12/20	37.00	180
03/12/20	38.25	260
05/07/20	44.17	6
05/07/20	43.88	3
07/22/20	54.84	820
07/22/20	53.08	48
07/28/20	45.61	8
09/28/20	67.01	10

[1]Materials produced in 2019 and tested in 2020 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 2020 was 264 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 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. Use at local municipal solid waste landfills as final cover. No biosolids were utilized through this outlet in 2020.

2. Placed in lagoons for dewatering and transported to paved cells for air-drying, then applied to farmland as dewatered Class B biosolids by a private contractor or used as daily landfill cover.

Composted EQ biosolids are also produced at the Calumet WRP 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 2020 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 2020, a total of 25,812 DT of biosolids was produced at the Calumet WRP (Table 1). The total quantity of 17,868 DT of biosolids sent to outlets, including utilization (17,720 DT) and co-disposal at landfills (148 DT), was less than the total 2020 production for the Calumet WRP. Hence, 7,944 DT was stored in lagoons or on drying cells for further processing and/or later use.

Biosolids Disposal at Landfills

In 2020, a total of 148 DT of unsuitable biosolids was co-disposed with municipal solid wastes at the Waste Management's Laraway Landfill site, Joliet, Illinois. No biosolids were used as daily cover or final cover at landfill sites in 2020.

Application of Class B Biosolids to Farmland

In 2020, the Calumet WRP land-applied 9,593 DT of dewatered (semi-dried) Class B biosolids to farmland (Table 1) under IEPA Permit No. 2018-SC-63703 through contracts with

TABLE 12: SUMMARY OF TEMPERATURE READINGS AND TURNING DATES OF OPEN WINDROWS DURING PRODUCTION OF COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS AT THE CALUMET WATER RECLAMATION PLANT EAST SOLIDS MANAGEMENT AREA IN 2020

Pile ID Number[1]	Composting Date (range)[2]	Turning Date[2]					Composting Temperature, °C (range)
20-1	10/02–11/02	10/06	10/10	10/14	10/20	10/27	59–75
20-2	10/02–11/02	10/06	10/10	10/14	10/20	10/27	64–78
20-3	10/02–11/02	10/06	10/10	10/14	10/20	10/27	59–75

[1]All piles reported are certified in accordance with the temperature and turning time requirements.
[2]Dates are month/day in 2020.

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 2020 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 TKN and NH_3-N concentrations (Table 13) were used to compute the agronomic rates for farmland application.

Application of Exceptional Quality Biosolids to Urban Land

In 2020, a total of 8,127 DT of air-dried and composted EQ biosolids generated at the Calumet WRP was applied to urban land and District property for various uses such as 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 are listed in Table 15.

Air-Dried Exceptional Quality Biosolids. In 2020, a total of 7,267 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 2020 met the pollutant concentration limits in Table 3 of Section 503.13 (Table 16), the vector attraction reduction 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 four times per year.

Composted Exceptional Quality Biosolids. In 2020, a total of 860 DT of composted EQ biosolids generated at the Calumet WRP during 2019 was applied to urban land. No composted EQ biosolids generated during 2020 was land-applied in 2020. All composted biosolids land-applied in 2020 met composting temperature and time requirements in 2019, and they met the pollutant concentration limits in Table 3 of Section 503.13 (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, 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 current renewable certification of the PFRP designation is valid from August 1, 2017, through July 31, 2022, and requires 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.

TABLE 13: CONCENTRATIONS OF NITROGEN AND METALS IN DEWATERED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2020

Date	TKN	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg										
04/01/20	26,345	3,965	14.9	2.88	417	0.72	15.5	35.1	80.9	<5.0	1,388
04/01/20	26,388	5,613	<5.0	NRR[1]	798	0.63	14.1	77.4	35.5	<5.0	938
04/01/20	37,082	6,213	14.9	2.90	417	0.50	13.9	35.2	81.0	<5.0	1,323
04/14/20	31,299	6,433	12.1	2.64	417	0.44	15.2	32.6	75.6	<5.0	1,213
07/06/20	34,915	6,213	14.6	2.28	370	0.37	16.7	32.3	62.2	<5.0	983
08/04/20	27,156	2,120	15.8	2.85	389	0.53	14.3	32.8	75.5	<5.0	1,000
09/14/20	43,126	5,239	14.3	2.64	389	0.62	15.6	31.9	63.1	<5.0	1,053
10/01/20	32,203	5,397	17.4	3.26	427	0.62	17.6	39.4	79.5	<5.0	1,152
Minimum	26,345	2,120	<5.0	2.28	370	0.37	13.9	31.9	35.5	<5.0	938
Mean[2]	32,314	5,149	13.4	2.78	453	0.55	15.4	39.6	69.2	<5.0	1,131
Maximum	43,126	6,433	17.4	3.26	798	0.72	17.6	77.4	81.0	<5.0	1,388
503 Limit	NL[3]	NL	41	39	1,500	17	75	420	300	100	2,800

[1]No reportable result due to possible data recording error.
[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]No limit.

TABLE 14: DIGESTER[1] TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2020

Month	Average Temperature ºF	Average Detention Time days	Minimum Detention Time Required by 503.32(b)(3)[2] days	Meets Part 503 Class B Requirements
January	95.5	53.6	15.0	Yes
February	96.8	52.6	15.0	Yes
March	96.8	40.0	15.0	Yes
April	96.9	43.2	15.0	Yes
May	95.4	40.0	15.0	Yes
June	97.1	29.4	15.0	Yes
July	97.0	29.2	15.0	Yes
August	96.2	28.4	15.0	Yes
September	97.0	28.4	15.0	Yes
October	97.0	19.6	15.0	Yes
November	96.4	22.3	15.0	Yes
December	95.2	22.7	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: SITES THAT UTILIZED CALUMET WATER RECLAMATION PLANT AIR-DRIED AND COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS IN 2020

User	Use
Composted Biosolids	
City of Northlake	Landscaping
LaGrange Park District	Landscaping
Riverdale Materials	Landscaping
Skokie Park District – Hamlin Park	Landscaping
Skokie Sports	Landscaping
Thornwood High School	Landscaping
Village of Skokie	Landscaping
Distribution at the District's Water Reclamation Plants	Direct pick-up by residents
21 residents in Metropolitan Chicago Areas (on file)	Private residential use
Air Dried Biosolids	
Palos Baseball Organization	Landscaping
Riverdale Materials	Landscaping
Village of Mt. Prospect	Landscaping
Blacks in Green	Gardening
CostCo Plainfield	Topdressing
Crocker Farms, Hayfield	Topdressing
Illinois International Port District	Topdressing
J. Haran Farms, Hayfield	Topdressing
Kinz Farms, Hayfield	Topdressing
Levis Farms, Hayfield	Topdressing
Mansell Farms, Hayfield	Topdressing
Midlothian Park District	Topdressing
Millennium Elementary School	Topdressing
Seitz Farms, Hayfield	Topdressing
Thornwood High School	Topdressing
Tinley Park District – Veteran's Park	Topdressing

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 2020

Date	Percent TVS[1]	Percent TVS[2] Reduction	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
			mg/dry kg											
06/15/20	43.4	66.1	34,056	23.8	2,899	12.3	2.14	275	0.45	3.62	25.6	62.6	<5.0	571
07/01/20	44.9	67.2	26,451	<78.2	4,143	20.8	2.18	411	0.57	13.8	34.9	73.2	<5.0	1,135
07/13/20	44.9	67.2	14,006	12.9	5,051	14.0	2.63	381	0.49	15.1	33.4	68.1	<5.0	1,053
07/13/20	42.9	69.7	17,408	466	3,830	13.7	2.77	393	0.46	13.5	34.0	71.5	<5.0	1,101
07/30/20	48.3	60.1	33,018	29.3	5,351	15.1	2.95	434	0.41	17.2	36.7	69.5	<5.0	1,048
07/30/20	48.2	60.4	36,558	26.4	6,613	14.9	2.75	407	0.36	16.4	34.8	71.0	<5.0	1,040
08/13/20	47.9	60.9	14,703	79.1	3,363	15.7	2.97	422	NRR[3]	17.8	37.6	71.8	<5.0	1,155
08/13/20	45.8	64.0	17,137	34.6	3,007	15.5	2.92	416	NRR	16.9	36.7	84.7	<5.0	1,208
08/20/20	47.6	61.3	6,018	101	1,878	15.6	2.97	439	0.39	17.3	38.5	71.5	<5.0	1,096
08/25/20	45.9	63.7	7,992	55.6	3,403	15.5	2.73	425	0.44	17.2	36.6	75.4	<5.0	1,109
09/03/20	45.8	63.0	11,454	<6.0	4,845	16.7	2.95	404	0.53	16.6	36.4	75.5	<5.0	1,073
09/03/20	45.6	63.3	27,207	13.8	5,902	15.8	2.93	421	0.70	17.0	38.4	78.4	<5.0	1,121
Minimum	42.9	60.1	6,018	<6.0	1,878	12.3	2.14	275	0.36	3.62	25.6	62.6	<5.0	571
Mean[4]	45.9	63.9	20,500	75.1	4,190	15.5	2.74	402	0.48	15.2	35.3	72.8	<5.0	1,059
Maximum	48.3	69.7	36,558	466	6,613	20.8	2.97	439	0.70	17.8	38.5	84.7	<5.0	1,208
503 Limit	NL[5]	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 that lagoons were loaded from 2016 to 2019 was used to calculate TVS reduction.
[3]No reportable result due to quality assurance/quality control failure. Analysis could not be rerun before holding time expired.
[4]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.
[5]No limit.

TABLE 17: PATHOGEN ANALYSIS OF AIR-DRIED EXCEPTIONAL QUALITY BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO URBAN LAND IN 2020

Date	Lagoon Number	Enteric Viruses PFU[1]/4 g	Helminth Ova Viable Ova/4 g
08/08/19	18	<0.8000	<0.0800
09/10/19	2	<0.8000	<0.0800
10/08/19	18	<0.8000	<0.0800
04/22/20	6	<0.8000	<0.0800
05/12/20	6	<0.8000	<0.0800
06/09/20	19	<0.8000	<0.0800

[1]Plaque-forming units.

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 2020

Date	Lagoon Number	Percent Total Solids	Fecal Coliform MPN[1]/dry g
04/22/20	18	67.5	10
04/22/20	6	86.5	33
04/23/20	18	58.4	5
06/04/20	18	77.1	13
06/09/20	19	88.9	32
06/09/20	19	86.4	33
06/17/20	19	70.4	640
06/17/20	Egan	75.4	380
06/18/20	19	83.6	110
06/23/20	18	62.4	410
07/07/20	19	82.0	200
07/07/20	19	79.0	16
07/09/20	19	91.4	160
07/09/20	19	86.5	670
08/20/20	1	83.4	150
08/25/20	1	79.7	98
09/16/20	3	79.1	360
09/17/20	3	69.1	110
09/22/20	3	87.0	330
09/24/20	4	87.6	110
10/15/20	4	84.7	120

[1]Most probable number.

TABLE 19: CONCENTRATIONS OF NITROGEN AND METALS IN COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET WATER RECLAMATION PLANT EAST SOLIDS MANAGEMENT AREA IN 2019 AND APPLIED TO URBAN LAND IN 2020

Date[1]	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	mg/dry kg											
05/04/20	NRR[2]	NRR	NRR	11.0	2.78	292	0.35	5.23	29.1	70.7	<5.0	625
05/13/20	16,546	104	24.8	10.4	2.35	307	0.36	4.21	30.5	70.8	<5.0	621
05/13/20	13,947	96.9	28.5	11.0	2.29	299	0.40	3.99	28.7	71.2	<5.0	615
06/12/20	10,316	70.6	12.7	17.7	2.18	426	0.53	13.2	34.0	82.4	<5.0	1,270
08/03/20	15,424	243	14.4	8.9	4.80	342	0.40	5.72	33.2	81.9	<5.0	656
08/03/20	15,144	259	14.6	11.0	4.54	321	0.43	4.84	31.2	73.9	<5.0	614
08/25/20	20,947	207	28.1	7.1	3.98	391	0.46	6.90	37.5	26.4	<5.0	425
09/11/20	9,998	91.4	<12.8	9.1	2.84	266	0.56	5.04	24.2	46.6	<5.0	478
09/15/20	14,345	86.1	25.8	9.6	3.94	356	0.56	6.80	34.3	57.9	<5.0	616
09/17/20	13,681	154	56.4	9.8	4.66	403	0.37	6.40	40.3	52.0	<5.0	601
09/17/20	15,365	186	37.6	7.6	4.46	406	0.54	6.59	39.7	52.1	<5.0	607
Minimum	9,998	70.6	<12.8	7.1	2.18	266	0.35	3.99	24.2	26.4	<5.0	425
Mean[3]	14,571	150	25.2	10.3	3.53	346	0.45	6.26	33.0	62.3	<5.0	648
Maximum	20,947	259	56.4	17.7	4.80	426	0.56	13.2	40.3	82.4	<5.0	1,270
503 Limit	NL[4]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]Materials produced in 2019 and tested in 2020 prior to utilization.
[2]No reportable result. Sample stored in refrigerator too long (for two months) prior to the analysis due to COVID-19 pandemic.
[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]No limit.

TABLE 20: FECAL COLIFORM ANALYSIS OF CURED COMPOSTED EXCEPTIONAL QUALITY BIOSOLIDS PRODUCED AT THE CALUMET WATER RECLAMATION PLANT EAST SOLIDS MANAGEMENT AREA IN 2019 AND TESTED PRIOR TO UTILIZATION ON URBAN LAND IN 2020

Date[1]	Percent Total Solids	Fecal Coliform MPN[2]/dry g
02/27/20	41.8	12
02/27/20	40.1	9
05/06/20	40.9	12
07/23/20	51.8	1
07/23/20	52.3	1
09/17/20	57.6	66
09/17/20	56.7	100

[1]Materials produced in 2019 and tested in 2020 prior to utilization.
[2]Most probable number.

None of the Calumet WRP air-dried EQ biosolids generated in 2020 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 2020 were tested for pathogen compliance in August, September, and October 2019, and April, May, and June 2020 (Tables 17 and 18), according to Section 503.32(a)(5). As can been seen from the data in these tables, Calumet WRP air-dried EQ biosolids met the Class A standards for pathogen reduction in each of the tests.

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 2020 was 8.41 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 2020, the total biosolids production at this WRP was 767 DT (Table 1).

Land Application of Class B Liquid Biosolids

In 2020, the Hanover Park WRP land-applied a total of 681 DT of lagooned biosolids and lagoon supernatant at the on-site Fischer Farm under IEPA Permit No. 2016-61315. The total quantity of biosolids utilized (681 DT) was less than the total 2020 production for the Hanover Park WRP (767 DT). Hence, a total of 86 DT was stored in 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 2020 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 vector attraction reduction 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 2020

Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	Supernatant, mg/L											
02/15/20	474	0.26	391	0.007	<0.001	0.155	<0.50	0.008	0.020	0.005	0.005	0.267
02/22/20	603	0.39	510	0.009	<0.001	0.202	<0.50	0.011	0.022	0.006	0.006	0.338
03/07/20	669	0.41	536	0.008	<0.001	0.192	<0.50	0.014	0.018	<0.001	0.006	0.326
03/28/20	606	<0.25	555	0.011	<0.001	0.269	<0.50	0.010	0.023	0.007	0.006	0.408
04/04/20	605	0.32	561	0.011	<0.001	0.241	<0.50	0.010	0.022	0.006	0.006	0.402
04/11/20	613	0.26	524	0.008	<0.001	0.224	<0.50	0.009	0.022	0.005	0.006	0.380
04/18/20	577	<0.25	544	0.011	<0.001	0.245	<0.50	0.009	0.021	0.005	0.006	0.377
04/25/20	590	<0.25	566	0.011	<0.001	0.234	<0.50	0.009	0.025	0.006	0.007	0.394
05/02/20	695	<0.25	593	0.009	<0.001	0.222	<0.50	0.011	0.021	0.006	0.006	0.401
05/09/20	628	0.26	537	0.009	<0.001	0.214	<0.50	0.009	0.020	0.005	0.006	0.341
05/16/20	605	NRR[1]	517	0.010	<0.001	0.200	<0.50	0.009	0.020	0.005	0.006	0.326
05/23/20	441	NRR[2]	NRR[2]	0.007	<0.001	0.149	<0.50	0.008	0.015	0.004	0.005	0.283
06/06/20	480	<0.25	460	0.007	<0.001	0.103	<0.50	0.005	0.016	0.002	0.005	0.145
07/04/20	344	4.85	256	0.009	<0.002	0.059	<0.50	0.007	0.013	0.003	<0.004	0.158
07/11/20	261	17.69	216	0.008	<0.002	0.025	<0.50	0.005	0.019	<0.002	<0.004	0.031
07/25/20	508	0.31	440	0.011	<0.002	0.088	<0.50	0.004	0.020	0.002	0.006	0.149
08/08/20	309	0.70	265	0.008	<0.002	0.058	<0.50	0.005	0.021	<0.002	<0.004	0.077
08/15/20	231	<0.25	182	0.007	<0.002	0.019	<0.50	0.005	0.025	<0.002	<0.004	0.030
08/22/20	534	<0.25	484	0.012	<0.002	0.111	<0.50	0.005	0.024	0.003	0.006	0.201
08/29/20	212	0.78	186	0.007	<0.002	0.018	<0.50	0.005	0.029	<0.002	<0.004	0.038
09/12/20	525	<2.5	485	0.012	<0.002	0.130	<0.50	0.005	0.024	0.003	0.005	0.232
09/27/20	298	<0.25	289	0.008	<0.002	0.044	<0.50	0.009	0.038	<0.002	0.005	0.069
11/07/20	611	NRR[1]	547	0.011	<0.002	0.169	<0.50	0.009	0.036	0.004	0.006	0.251
12/13/20[3]	545	<5.0	469	0.024	0.003	1.3	NRR[4]	0.025	0.056	0.035	0.013	1.51

TABLE 21 (CONTINUED): CONCENTRATIONS OF NITROGEN AND METALS IN BIOSOLIDS GENERATED AT THE HANOVER PARK WATER RECLAMATION PLANT AND APPLIED AT THE FISCHER FARM SITE IN 2020

Date	TKN	NO_3^-+NO_2^--N	NH_3-N	As	Cd	Cu	Hg	Mo	Ni	Pb	Se	Zn
	Liquid Biosolids, mg/kg											
12/19/20	70,947	<164	26,558	<10.0	1.70	898	NRR[4]	15.2	41.0	27.0	<10.0	989
12/26/20	50,029	<123	16,498	ND[5]	ND	ND	ND	ND	ND	ND	ND	ND
Minimum[6]	50,029	<123	16,498	<10	1.70	898	NRR	15.2	41.0	27.0	<10	989
Mean	60,488	<144	21,528	<10	1.70	898	NRR	15.2	41.0	27.0	<10	989
Maximum	70,947	<164	26,558	<10	1.70	898	NRR	15.2	41.0	27.0	<10	989
503 Limit	NL[7]	NL	NL	41	39	1,500	17	75	420	300	100	2,800

[1]No reportable result because an inappropriate dilution factor was used during sample preparation.
[2]No reportable result due to cold room temperature exceeding requirement.
[3]Metals concentrations in mg/L were calculated using data generated on a dry mass basis and the solids content as reported by the laboratory.
[4]No reportable result because the digestion thermometer was not calibrated.
[5]No data. The sample could not be analyzed due to incorrect drying during sample preparation.
[6]Minimum, mean, and maximum values are applicable only to the liquid biosolids.
[7]No limit..

TABLE 22: 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 2020

Month	Average Temperature °F	Average Detention Time days	Minimum Detention Time Required by 503.32(b)(3)[1] days	Meets Part 503 Class B Requirements
January	98.0	28.8	15.0	Yes
February	98.0	27.2	15.0	Yes
March	98.0	26.0	15.0	Yes
April	98.0	24.5	15.0	Yes
May	98.0	26.6	15.0	Yes
June	98.0	30.2	15.0	Yes
July	98.0	27.5	15.0	Yes
August	98.0	27.3	15.0	Yes
September	98.0	27.8	15.0	Yes
October	98.0	27.5	15.0	Yes
November	98.0	29.8	15.0	Yes
December	98.0	26.2	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 2020

Month[1]	Percent Total Volatile Solids			Percent Volatile Solids Reduction[2]
	Digester Feed	Digester Draw	Applied Biosolids	
February	87.7	73.2	56.5	81.3
March	87.3	74.7	62.3	75.9
April	86.5	73.4	59.9	76.6
May	82.7	71.1	62.6	64.3
June	84.1	70.2	51.6	79.9
July	85.8	73.5	90.6	73.8
August	87.4	70.8	52.6	83.9
September	86.9	76.0	61.0	75.2
November	87.9	75.3	56.8	81.9
December	88.7	76.3	66.4	74.3

[1]Biosolids applied as lagoon supernatant during February through November and as liquid biosolids in December.
[2]Volatile solids reduction computed using total volatile solids data for digester feed and applied biosolids.

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 2020 was 24.3 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 biosolids are sent via sewers to the O'Brien WRP. Centrifuge centrate is also sent via sewers to the O'Brien WRP.

In 2020, the Egan WRP produced a total of 5,860 DT of biosolids, almost all of which (5,859 DT) were conveyed to other WRPs for further processing and storage (Table 1). A 0.6 DT of centrate were recycled to the Egan WRP for use in the ANITA™ MOX ammonia removal process. Anaerobic digestion at the Egan WRP in 2020 met the time and temperature requirements of the Class B pathogen standards of Section 503.32(b)(3) (Table 24).

Biosolids Disposal at Landfills

In 2020, no Egan biosolids were co-disposed in landfills.

Biosolids Conveyed to Other Water Reclamation Plants for Further Processing

In 2020, 5,417 DT of biosolids (5,385 DT as liquid biosolids/sludge and 32 DT as centrifuge centrate) were pumped to the O'Brien WRP for further processing. In addition, a total of 443 DT of centrifuge cake biosolids was trucked from the Egan WRP to the Lawndale Avenue SMA site for temporary storage prior to farmland utilization and to the Harlem Avenue SMA site for composting.

TABLE 24: DIGESTER[1] TEMPERATURES AND DETENTION TIMES DURING PROCESSING OF BIOSOLIDS GENERATED AT THE JOHN E. EGAN WATER RECLAMATION PLANT IN 2020

Month	Average Temperature °F	Average Detention Time days	Minimum Detention Time Required by 503.32(b)(3)2 days	Meets Part 503 Class B Requirements
January	96.7	28.3	15.0	Yes
February	97.1	29.1	15.0	Yes
March	97.1	25.2	15.0	Yes
April	96.7	31.6	15.0	Yes
May	96.6	28.6	15.0	Yes
June	96.8	28.0	15.0	Yes
July	97.3	37.0	15.0	Yes
August	97.0	30.8	15.0	Yes
September	97.4	35.3	15.0	Yes
October	96.8	32.0	15.0	Yes
November	96.7	32.6	15.0	Yes
December	96.0	32.8	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 2020 was 207 MGD. Wastewater reclamation processes at the O'Brien WRP include primary (primary settling) and secondary (activated sludge process) treatments. In 2020, the O'Brien WRP produced 37,641 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. 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.

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 2020 was 35.3 MGD. Wastewater reclamation processes include grit tanks, secondary (activated sludge process), and tertiary (sand filtration) treatments. In 2020, the Kirie WRP produced 5,718 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 at the Stickney WRP and further processing.

No final biosolids product is generated at this WRP.

LEMONT WATER RECLAMATION PLANT

The Lemont WRP, located in Lemont, Illinois, has a design average flow of 2.3 MGD. The annual average treated flow in 2020 was 2.56 MGD. Wastewater reclamation processes include both primary (primary settling) and secondary (activated sludge process) treatments. In 2020, the Lemont WRP produced 407 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.

No final biosolids product is generated at this WRP.

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

In 2020, a total of 745 DT of the District's biosolids (597 DT from the Stickney WRP and 148 DT from the Calumet WRP) was classified as unsuitable for land application because they contained gravel, wood debris, and dust from the sweeping of roads at biosolids processing sites. These materials were co-disposed with municipal solid wastes at a nonhazardous waste landfill, Laraway Landfill, 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 August 2018 to the landfill company to satisfy the requirements of their IEPA permit. The analytical data generated in 2018 should be valid until 2021. 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

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.

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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,

Robert J. Hanny
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.

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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

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

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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.

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