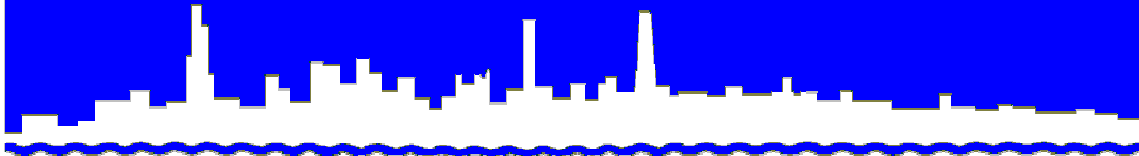


*Protecting Our Water Environment*



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

***MONITORING AND RESEARCH  
DEPARTMENT***

***REPORT NO. 11-16***

***BIOSOLIDS FARMLAND APPLICATION PROGRAM -  
SUMMARY OF BIOSOLIDS QUALITY FIELD OPERATIONS  
AND PUBLIC RELATIONS PROCEDURES***

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AND PUBLIC RELATIONS PROCEDURES

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## SUMMARY

The Metropolitan Water Reclamation District of Greater Chicago's (District) land application program began in 1997. In this program, anaerobically digested biosolids, which meet the United States Environmental Protection Agency (USEPA) 40 CFR Part 503 regulations, are utilized as a nutrient source for crops in Cook and nearby counties in Illinois. The biosolids are mainly in the form of centrifuge cake, but biosolids that have been partially dried through mechanical agitation on paved drying beds are also used. Under this program, land application companies are contracted by the District through the competitive bidding process to enroll farmers in the program and to haul and apply the biosolids to the farm fields. The farmland application program is conducted under separate permits issued by the Illinois Environmental Protection Agency (IEPA) to the District and the contractor. The land application contractor takes ownership of the biosolids under the contract. However, the District provides oversight of the program to ensure that the contractor's operations are consistent with the District's goal to generate and utilize all biosolids in a responsible manner which comply with all requirements of the District's permits and applicable federal, state, and local regulations. This oversight is done by: (1) requiring the land application contractor to comply with hauling and field operation specifications and execute a Public Relations (PR) Program; and (2) District staff who conducts additional activities to complement the activities of the contractor. The District continually evaluates and modifies the program to improve public awareness, benefits, and long-term sustainability of the program. The District operates an environmental management system for biosolids that is certified by the National Biosolids Partnership (NBP) and adheres to the NBP Code of Good Practice:

- **Compliance:** To commit to compliance with all applicable federal, state, and local requirements regarding operations and reclaimed water production at the wastewater treatment facility; and management, transportation, storage, and use or disposal of biosolids away from the facility.
- **Product:** To provide biosolids that meet the applicable standards for their intended use or disposal.
- **Environmental Management System (EMS):** To develop an environmental management system for biosolids that includes a method of independent third party verification to ensure effective on-going biosolids operations.
- **Quality Monitoring:** To enhance the monitoring of biosolids production and management practices.
- **Quality Practices:** To require good housekeeping practices for biosolids production, processing, transport, storage, and during final use or disposal operations.

- Contingency and Emergency Response Plans: To develop response plans for unanticipated events such as inclement weather, spills, and equipment malfunctions.
- Sustainable Management Practices and Operations: To enhance the environment by committing to sustainable, environmentally acceptable biosolids management practices and operations through an environmental management system.
- Preventive Maintenance: To prepare and implement a plan for preventive maintenance for equipment used to manage biosolids and wastewater solids.
- Continual Improvement: To seek continual improvement in all aspects of biosolids management.
- Communications: To provide methods of effective communications with gatekeepers, stakeholders, and interested citizens on key elements of each EMS including information relative to system performance.

## INTRODUCTION

Biosolids are a nutrient-rich organic material that is produced when the solids in municipal wastewater are separated from the water and treated. The treatment of these solids consists of a set of rigorous processes based on the USEPA and state regulations to remove contaminants and destroy microorganisms. The USEPA standards for biosolids are established in the 40 CFR Part 503 rule (Part 503 rule), and are based on a rigorous science-based risk assessment to ensure that the use of biosolids on land has no negative impact on human health and the environment.

Land application of biosolids that are produced and managed according to federal and state regulations is the most beneficial method of recycling. About 55 percent of the biosolids generated in the country is beneficially used in this manner. The District's biosolids land application program consists of two components: (1) a Controlled Solids Distribution Program in which air-dried biosolids are used as soil amendment or fertilizer on golf courses, school athletics fields, parks and other recreational facilities in the City of Chicago and the metropolitan area; and (2) a Farmland Application Program in which biosolids are used to fertilize row crops on farm fields in Cook and nearby counties in Illinois. The Farmland Application Program began in 1997 and most of the biosolids used in the program since then have been applied to fields located in Kankakee and Will Counties.

The farmers and the community receive a wide range of benefits from using biosolids in place of chemical fertilizer to fertilize crops. These benefits include lower crop production cost, higher crop yields, and crops of higher nutritional value. The benefits of applying biosolids on farm fields are also evidenced by the increasing demand of biosolids by farmers. A major component of the farmland application program to increase the benefits of the program to the farming community and the long-term sustainability of the land application practice is continuous education of the farming community.

The District has operated a comprehensive industrial waste pretreatment program for decades and enforces local limits on industrial discharges to ensure that the biosolids are safe for beneficial use. The District maintains a staff of approximately 140 employees in its Industrial Waste Division and conducts nearly one million analyses annually to monitor industrial dischargers and biosolids.

In addition, the District operates an EMS which is certified by the National Biosolids Partnership and subject to rigorous external audits biannually. The EMS commits the District to continuously improve its biosolids management operations.

This report documents the quality of biosolids utilized in the farmland application program, the general requirements of land application contractors who land apply the biosolids, and the PR program that is used in the program.

## DISCUSSION

### **Characteristics of Biosolids Used in the Farmland Application Program**

The monitoring of constituents in biosolids is conducted to comply with the requirements of the USEPA Part 503 rule and permits issued by the IEPA (see Appendix 1 for an example of the IEPA permit). The Part 503 quality standards include criteria for reduction of pathogens or disease causing organisms (Sections 503.32b3, and 503.33b10) and limits on trace metal concentrations (Section 503.13). The Part 503 rule requires that biosolids that are applied to land be monitored for these constituents up to 12 times per year, depending on the amount of biosolids applied to land. The IEPA permit requires monthly monitoring during the periods that biosolids are being hauled for land application.

The monitoring program employed at the District complies with the regulatory requirements and exceeds them with respect to the monitoring frequency and the number of parameters monitored. The District's biosolids process trains include anaerobic digestion to stabilize biosolids organic matter and kill pathogens. This entails holding biosolids in large heated digesters for over three weeks which produces a product with consistent properties not subject to daily variation in treatment plant influent quality. For this reason the monthly sampling and analysis of biosolids as they are shipped to farmland is adequate to characterize the biosolids. The analytical data are provided to the land application contractor to comply with the "notice and necessary information" requirement of the Part 503 rule.

**Production of Class B Biosolids.** The biosolids used in the farmland application program are generated at three of the District's seven water reclamation plants (WRPs) - John E. Egan (Egan), Calumet, and Stickney WRPs. Wastewater entering the WRPs goes through a screen to remove debris, and then receives primary and secondary (activated sludge) treatment. The sludge from the secondary treatment is then sent to digesters, where it is stabilized by anaerobic digestion. The liquid digested biosolids leaving the digesters are sent to centrifuges, where they are dewatered to produce centrifuge cake biosolids (> 20 percent solids content). Alternatively, the liquid biosolids are pumped to lagoons, where they are held for several months for dewatering. The centrifuge cake biosolids are either trucked directly to farmland or are placed temporarily on paved beds before hauling. The biosolids from the lagoons are placed on paved beds for further air-drying before being hauled to farmland.

**Biosolids Processing to Meet Class B Pathogen Requirement.** The process of stabilization in the digesters must be done for a period of at least 15 days at a temperature of 95 F or greater. This digestion process destroys organic constituents and pathogenic microorganisms and complies with Section 503.32b3 of the Part 503 rule and the resulting biosolids meet the Class B pathogen standard. A summary of the digester detention times and temperature demonstrating compliance of the Calumet, Egan, and Stickney WRPs with the Part 503 rule is presented in Tables 1, 2, and 3, respectively. To meet the vector attraction reduction



TABLE 1: DIGESTER TEMPERATURES AND DETENTION TIMES FOR CENTRIFUGE CAKE BIOSOLIDS GENERATED AT THE JOHN E. EGAN WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2010

Month	Average Temperature ----- °F -----	Average Detention Time ----- days -----	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32b3 <sup>1</sup> ----- days -----
January	97	28.1	yes	15.0
February	97	25.7	yes	15.0
March	97	27.4	yes	15.0
April	97	23.4	yes	15.0
May	97	24.2	yes	15.0
June	97	24.3	yes	15.0
July	98	27.2	yes	15.0
August	97	32.9	yes	15.0
September	98	32.8	yes	15.0
October	98	33.0	yes	15.0
November	97	28.4	yes	15.0
December	97	30.4	yes	15.0

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

TABLE 2: DIGESTER TEMPERATURES AND DETENTION TIMES FOR SEMI-DRIED BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2010

Month	Average Temperature	Average Detention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32b3 <sup>1</sup>
	---- °F ----	--- days ---		--- days ---
January	96	55.0	yes	15.0
February	96	63.5	yes	15.0
March	96	59.1	yes	15.0
April	97	49.2	yes	15.0
May	97	55.2	yes	15.0
June	97	55.0	yes	15.0
July	97	36.2	yes	15.0
August	97	61.3	yes	15.0
September	97	35.5	yes	15.0
October	96	37.5	yes	15.0
November	96	38.8	yes	15.0
December	97	70.6	yes	15.0

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

TABLE 3: DIGESTER TEMPERATURES AND DETENTION TIMES  
FOR CENTRIFUGE CAKE AND SEMI-DRIED BIOSOLIDS GENERATED  
AT THE STICKNEY WATER RECLAMATION PLANT  
AND APPLIED TO FARMLAND IN 2010

Month	Average Temperature	Average Detention Time	Meets Part 503 Class B Requirements	Minimum Detention Time Required by 503.32b3 <sup>1</sup>
	---- °F ----	--- days ---		--- days ---
January	98	28.0	yes	15.0
February	98	29.9	yes	15.0
March	98	23.4	yes	15.0
April	98	23.0	yes	15.0
May	98	27.6	yes	15.0
June	98	23.5	yes	15.0
July	98	34.8	yes	15.0
August	98	28.3	yes	15.0
September	98	39.9	yes	15.0
October	98	29.7	yes	15.0
November	98	35.0	yes	15.0
December	99	27.5	yes	15.0

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

requirements under Section 503.33b10, Class B biosolids are incorporated into the soil within six hours after they are spread on fields.

**Trace Metal Concentrations in Biosolids.** A summary of the trace metal concentrations in biosolids generated at the District's Egan, Calumet and Stickney WRPs in 2010 are shown in Tables 4, 5, and 6, respectively. The Part 503 rule requires monitoring of nine trace metals (As, Cd, Cu, Hg, Mo, Ni, Pb, Se, and Zn). The Part 503 concentration limits that are shown in Tables 4, 5, and 6, are based on a comprehensive risk assessment that considered 14 terrestrial pathways, including those relevant to farm families raising their own food, livestock grazing, farm workers and the surrounding rural communities. The IEPA permit requires monitoring of six of these trace metals. Data for other constituents which are not required to be monitored are also included in Tables 4, 5, and 6.

The concentrations of trace metals in all of the District's biosolids that are applied to land are always much lower than the Part 503 limits. The very low concentrations of trace metals in the District's biosolids are due to the operation of the District's Industrial Pretreatment Program implemented in 1986. The program is administered under the District's Sewage and Waste Control Ordinance in compliance with the USEPA Clean Water Act. Under the program, industries or commercial operations that have the potential to adversely impact the District's WRPs, sanitary sewerage system or biosolids management programs are subject to pretreatment standards. This program also resulted in the reduction in concentrations of other potential contaminants in biosolids.

To further ensure that all biosolids generated by the District are suitable for land application the District implemented a voluntary program of monitoring trace metal concentrations during the biosolids treatment process. In this program, the concentration of the nine trace metals regulated in the Part 503 rule are monitored in the biosolids leaving the anaerobic digesters on a weekly basis. The results of this monitoring are compared against self-imposed threshold concentrations, which are lower than the Part 503 limits, immediately as the results are generated. If the threshold values are exceeded in any instance, a corrective procedure is activated initiating action to identify the source of the contaminants producing the elevated concentration so that the source can be brought into compliance with the industrial waste control limits. Biosolids with elevated concentrations of contaminants are diverted from the process train before their concentrations reach the regulatory limits to protect the clean biosolids from contamination, ensuring that the final product always meets the regulatory limits and is safe for land application.

**Nutrient Content in Biosolids.** In addition to the trace metal concentration, the IEPA permit requires monitoring for pH, total solids, volatile solids, total Kjeldahl N (TKN), ammonia-N, P, and K. The analysis of the Egan, Calumet, and Stickney WRPs biosolids applied in 2010 are shown in Tables 4, 5, and 6. The TKN, ammonium, and nitrate forms of nitrogen are provided to the land application contractor to calculate the biosolids land application rates as required under the Part 503 rule and the IEPA permit. The application rates of biosolids to farmland are based on providing an amount of nitrogen equal to that which will be removed from

TABLE 4: ANALYSIS<sup>1</sup> OF BIOSOLIDS GENERATED AT THE CALUMET WATER RECLAMATION PLANT AND APPLIED TO FARMLAND DURING 2010

Constituent	Unit	Mean	Minimum	Maximum	503 Limit <sup>2</sup>
pH		7.7	7.4	8.1	
Total Solids	%	27.5	16.8	43.7	
Total Volatile Solids	"	43.5	37.6	48.4	
Total Kjeldahl-N	mg/kg	28,399	19,171	47,030	
NH <sub>3</sub> -N	"	5,380	3,193	7,906	
NO <sub>2</sub> +NO <sub>3</sub> -N	"	84	33	141	
Total P	"	21,216	14,953	36,024	
Volatile Acids	"	181	39	336	
Ag	"	11	8	15	
Al	"	11,806	9,509	15,642	
As	"	9	7	11	41
Ba	"	439	374	506	
Be	"	0.0900	<0.0002	0.2211	
Ca	"	51,731	45,579	56,962	
Cd	"	3	2	4	39
Co	"	7	6	8	
Cr	"	75	60	97	
Cu	"	429	368	491	1,500
Fe	"	23,897	20,651	28,115	
Hg	"	1.1	0.61	2.0	17
K	"	3,663	2,002	4,999	
Mg	"	17,669	15,519	21,469	
Mn	"	947	832	1,092	
Mo	"	15	13	18	75
Na	"	1,727	522	3,101	
Ni	"	38	32	46	420
Pb	"	93	70	115	300
Sb	"	5	4	6	
Se	"	4	1	8	100
Tl	"	<0.007	<0.007	<0.007	
V	"	26	21	33	
Zn	"	1,121	969	1,210	2,800

<sup>1</sup>Mean of 25 samples.

<sup>2</sup>Part 503 exceptional quality limit, where applicable.

TABLE 5: ANALYSIS<sup>1</sup> OF BIOSOLIDS GENERATED AT THE JOHN E. EGAN WATER RECLAMATION PLANT AND APPLIED TO FARMLAND IN 2010

Constituent	Unit	Mean	Minimum	Maximum	503 Limit <sup>2</sup>
pH		8.1	7.2	8.7	
Total Solids	%	23.5	20.8	27.7	
Total Volatile Solids	"	61.9	52.3	67.7	
Total Kjeldahl-N	mg/kg	30,511	11,278	50,314	
NH <sub>3</sub> -N	"	5,590	2,357	9,169	
NO <sub>2</sub> +NO <sub>3</sub> -N	"	11	1.4	29	
Total P	"	14,901	3,571	26,680	
Volatile Acids	"	1,774	348	6,247	
Ag	"	17	4	41	
Al	"	9,453	6,549	13,047	
As	"	12	7	17	41
Ba	"	379	288	441	
Be	"	<0.15	<0.15	<0.15	
Ca	"	32,521	26,469	42,141	
Cd	"	3	2	5	39
Cr	"	110	75	205	
Cu	"	737	582	879	1,500
Fe	"	42,864	30,630	62,876	
Hg	"	1.2	0.87	1.5	17
K	"	2,145	1,365	5,576	
Mg	"	7,970	5,691	10,982	
Mn	"	759	581	994	
Mo	"	13	10	21	75
Na	"	759	302	4,389	
Ni	"	70	50	101	420
Pb	"	44	31	59	300
Sb	"	<10	<10	12	
Se	"	<5	<5	<5	100
Tl	"	<10	<10	<10	
Zn	"	854	724	997	2,800

<sup>1</sup>Mean of 47 samples.

<sup>2</sup>Part 503 exceptional quality limit, where applicable.

TABLE 6: ANALYSIS<sup>1</sup> OF BIOSOLIDS GENERATED AT THE STICKNEY WATER RECLAMATION PLANT AND APPLIED TO FARMLAND DURING 2010

Constituent	Unit	Minimum	Mean <sup>1</sup>	Maximum	503 Limit <sup>2</sup>
pH		6.4	7.8	8.6	
Total Solids	%	16.8	31.6	70.6	
Total Volatile Solids	"	32.2	45.7	63.2	
Total Kjeldahl-N	mg/kg	19,769	40,783	60,642	
NH <sub>3</sub> -N	"	1,379	8,836	19,565	
NO <sub>2</sub> +NO <sub>3</sub> -N	"	16	129	617	
Total P	"	15,703	21,645	30,523	
Volatile Acids	"	958	1,793	2,628	
Al	"	6,944	16,828	23,032	
As	"	<10	10	12	41
B	"	16	44	60	
Ba	"	238	292	402	
Be	"	<0.31	0.31	0.31	
Ca	"	30,565	37,485	52,616	
Cd	"	3	3	4	39
Co	"	<10	<10	<20	
Cr	"	86	138	169	
Cu	"	336	422	649	1,500
Fe	"	11,913	15,908	29,844	
Hg	"	0.59	1.1	1.8	17
K	"	1,588	2,544	3,830	
Mg	"	6,491	17,005	28,007	
Mn	"	451	566	739	
Mo	"	5	12	17	75
Na	"	321	1,017	2,045	
Ni	"	33	39	63	420
Pb	"	43	109	144	300
Se	"	<10	<4	6	100
Tl	"	<20	<20	<20	
V	"	19	21	25	
Zn	"	694	889	1,044	2,800

<sup>1</sup>Means of 60 samples.

<sup>2</sup>Part 503 exceptional quality limit, where applicable.

the fields with the harvested crops. This rate is typically around 10 dry tons of biosolids per acre.

**Radioactivity in Biosolids.** The District conducts quarterly monitoring of gross beta and gross alpha radioactivity in raw wastewater entering its WRPs (influent), treated water leaving the WRPs (effluent), sludges, and final biosolids products. Specific gamma-emitting radionuclides were also monitored. This monitoring was done on a voluntary basis to determine the levels of radioactivity. This helps the District ensure that biosolids are low in radioactivity and are suitable for application on land as a fertilizer.

The Illinois Emergency Management Agency (IEMA) has proposed a rulemaking that will limit the incremental increase in total radium radioactivity (radium-226 plus radium-228) in soil through biosolids application to 1.0 pCi/g (pico curie per dry gram). This will apply to biosolids containing less than or equal to 100 pCi/g total radium radioactivity. The annual average of radium-226 radioactivity in digested biosolids generated at the Egan, Calumet, and Stickney WRPs during 1997 through 2009 are shown in [Table 7](#). The data show that the maximum annual level of radium-226 radioactivity was 6.0 pCi/g dry biosolids. The actinium-228, which is a progeny of radium-228, radioactivity level found in the air-dried biosolids were generally less than 1.0 pCi/g. For agricultural land receiving biosolids at the nitrogen based agronomic application rate, the blending ratio of biosolids:soil is about 1:100 after biosolids are incorporated into the surface soil. Therefore, a typical application of District biosolids containing radium-226 plus radium-228 radioactivity at 7.0 pCi/g will result in an increase of 0.07 pCi/g, which is much lower than the limit of 1.0 pCi/g proposed by IEMA.

**Organic Pollutants in Biosolids.** The District monitors 111 priority pollutants in influent, effluent, and raw sludge as required in its IEPA National Pollutant Discharge Elimination System permits and ten priority pollutants as required by the Part 503 rule on a semiannual basis. A majority of these contaminants are always below the detection limits and a few contaminants are above the detection limits and always below the regulatory limits.

The District utilizes a considerable portion of its air-dried biosolids as fertilizer and soil amendment for establishing and maintaining turf in public parks, school districts, golf courses, and park districts in the Chicago metropolitan area. To further evaluate the safety of using biosolids in the City of Chicago, the Chicago Department of Environment (DOE) requested that the District compare its biosolids to “clean fill” as defined by Tiered Approach to Corrective Action Objectives (TACO) standards administered by the IEPA’s Site Remediation Program. These objectives include risk-based soil concentrations for 135 compounds (including the nine trace elements regulated in the Part 503 biosolids rule) based on exposure through inhalation, ingestion, and groundwater contamination in residential and commercial/industrial exposure scenarios.



TABLE 7: ANNUAL AVERAGE<sup>1</sup> RADIUM-226 RADIOACTIVITY IN CALUMET, EGAN AND STICKNEY WATER RECLAMATION PLANT DIGESTED BIOSOLIDS FROM 1997 THROUGH 2009

Year	Calumet	Egan	Stickney
	----- pCi/g Dry Weight -----		
1997	4.5	3.8	3.4
1998	4.5	4.5	3.4
1999	4.2	3.8	2.1
2000	4.6	4.3	4.0
2001	4.8	4.6	3.5
2002	4.0	4.2	3.4
2003	4.2	4.0	3.3
2004	5.5	3.8	4.0
2005	4.4	3.9	3.5
2006	4.5	3.9	3.4
2007	4.3	3.9	3.4
2008	6.0	5.6	4.4
2009	3.2	2.8	1.9

<sup>1</sup>Data from the quarterly sampling of digested biosolids.

Since 1999, the District has been conducting TACO analysis on air-dried biosolids generated at its Calumet and Stickney WRPs annually. Evaluation of the data showed that the concentrations of most of the contaminants are lower than the Tier I remediation objectives (ROs) for residential property. Only six polycyclic aromatic hydrocarbons (PAHs), which are combustion by-products prevalent in soils in metropolitan areas, and arsenic (As) were found at concentrations above the ROs.

The Chicago Department of Environment conducted a risk assessment (Tier III) specific to biosolids use at Chicago Park District recreational facilities to generate ROs based on specific receptor/exposure scenario combinations for six PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene) and As. The facilities evaluated in the risk assessment were athletic fields, playgrounds, picnic areas, community gardens, multiuse trails, parking lot landscaping, and park building landscaping according to their use by adult workers and recreational visitors. The exposure pathways evaluated were dermal contact, soil ingestion, and dust inhalation. Based on the results of the risk assessment the DOE concluded that the District biosolids are safe for use as a topdressing fertilizer. Since the application rate of biosolids on farmland is about half the rate used for fertilizing turf in the Chicago metropolitan area, this analysis indicates that biosolids application to farmland is safe with respect to exposure to priority pollutants.

### **Farmland Application Field Approval Process**

The land application contractor is responsible for enrolling farm fields in the land application program. All farm fields the contractor identifies for land application of biosolids are reviewed by the District before they can be approved for biosolids application. This ensures that the fields are suitable for land application. For each field the contractor wishes to enlist in the program, the contractor submits the following information to the District for review:

1. Maps (includes soil survey showing soil types in field, aerial photograph, and plat survey).
2. IEPA sludge user information sheet.
3. Corn yield certification form – Certifies the yield potential of the field, which is used in determination of agronomic biosolids application rate.
4. Signed agreement with current land owner – Shows land owners consent for use of biosolids on the farm field.
5. Soil analysis report (less than one year old) – Shows at minimum, pH and available phosphorus analysis.
6. Lime recommendation and certification (if soil pH <6.5) – Form indicating determination of lime recommendation rates.

7. Cumulative metal loading data – Shows the cumulative amounts of metals applied to the field through biosolids both from the District and other sources.
8. Biosolids Land Application Field Information (BLAFI) Form – Shows details on location of field, list of public officials informed, field buffer zones to be observed (such as for wells and surface water), and history of biosolids application on field. An example the BLAFI form is shown in Appendix II.
9. Report of public relations activities in proximity to fields – List of addresses and feedback of field neighbors notified.

Based on the nature of some fields, the District staff conducts periodic on-site inspection of fields before approval or during the application of biosolids on fields.

### **Education and Public Relations Program**

Before land application of biosolids on any fields, the land application contractor is required to implement an Odor Control Plan and Public Relations (PR) Program, which has been approved by the District. An example Odor Control Plan is shown in Appendix III. The goal of the PR Program is to educate the community about the benefits of biosolids and to minimize nuisance. No hauling of biosolids is allowed until the PR requirements are completed. The PR Program includes:

- A full-time public relations coordinator on staff who dedicates adequate time to perform public relations, education, and community outreach functions, including scheduled meetings with officials of towns, townships and counties, officials and agricultural leaders, and agriculture students to promote the District's beneficial use program, and to ensure public awareness and acceptance of this program.
- Educational presentations at public meetings and organization of field days to educate the public about biosolids. The contractor is expected to conduct a minimum of one field day per growing season. District staff is expected to be invited to attend and sometimes contribute technical information to these functions.
- Printed materials (such as pamphlets and letters) are distributed to public officials, neighbors of the farms and the general public.
- Neighbors of the farms receiving the biosolids are contacted by home visits to explain the program and its anticipated activities, and address their concerns. The feedback of the neighbors in response to the information provided are documented and reported to the District.

- Notification to the District regarding any reports of odor complaints or negative PR issues related to their land application operations.

In addition to the PR Program, the land application contractor is required to submit a monthly PR Report to the District for each calendar month that work is performed under the contract. Some of the information included in the typical PR Report is:

- Number and location of fields utilized, and amount of biosolids applied to each field along with the field and weather conditions at the time of application.
- Number of farmers or local residents contacted about the utilization program or to answer questions along with a list of the contact name, the date of contact, and the nature of the contact
- Community outreach activities including the time, place, and the nature of the activities.
- Actions taken to minimize odors.
- Report of odor or other complaints received and their resolutions.
- Report of all public reaction both positive and negative to the contractor's land application activities.
- Report of any special requirements from any regulatory agency or local official.
- Report of all tours given, to include attendance list, time and location.

The PR requirements of the contractors are complemented by the District activities, which include:

- Participation in the PR outreach activities.
- Enforcement of the PR requirements in the contract.
- Field visitations and review.
- Investigation of issues and concerns raised by the community.
- Provision of information on biosolids as may be requested by the community.

The effectiveness of activities in the PR Program is continuously evaluated and the program is modified accordingly.

***APPENDIX I***

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
WATER POLLUTION CONTROL PERMIT

LOG NUMBERS: 0200-10

PERMIT NO.: 2010-SC-0200

FINAL PLANS, SPECIFICATIONS, APPLICATION  
AND SUPPORTING DOCUMENTS

PREPARED BY: Metropolitan Water Reclamation District of Greater  
Chicago

DATE ISSUED: May 28, 2010

SUBJECT: METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO-Controlled Solids  
Distribution Program

PERMITTEE TO OPERATE

Metropolitan Water Reclamation District of Greater  
Chicago  
100 East Erie Street  
Chicago, Illinois 60611

Permit is hereby granted to the above designated permittee(s) to operate water pollution control facilities described as follows:

Application of approximately 190,000 dry tons per year of anaerobically digested, dewatered and air-dried sewage sludge to sites for soil amendment from the MWRDGC Stickney, Calumet and John Egan water reclamation plants. Sludge amended sites shall not grow crops for food chain use.

This operating permit expires on April 30, 2015.

This permit renews and replaces Permit Number 2005-SC-3793 which was previously issued for the herein permitted facilities.

This Permit is issued subject to the following Special Condition(s). If such Special Condition(s) require(s) additional or revised facilities, satisfactory engineering plan documents must be submitted to this Agency for review and approval for issuance of a Supplemental Permit.

**SPECIAL CONDITION 1:** The application of digested sludge to farmland shall be governed by an effective state operating permit issued to the MWRDGC for such application.

**SPECIAL CONDITION 2:** For the duration of this permit, the permittee shall determine the quantity of sludge produced by the treatment facility in dry tons or gallons with a percent total solids analysis. The permittee shall maintain adequate records of the quantities of sludge produced and have said records available for Agency inspection. The permittee shall submit to the Agency a semi-annual summary report of the quantities of sludge generated and disposed (in units of dry tons) by different disposal methods including but not limited to application on farmland, application on reclamation land, landfilling, public distribution, dedicated land disposal, sod farms, storage lagoons or any other specified disposal method. Said reports shall be submitted to the Agency by January 31 and July 31 of each year reporting the preceding July through December and January through June sludge disposal operations respectively. The permittee shall submit the semi-annual sludge management report to the following address:

Page 1 of 4

THE STANDARD CONDITIONS OF ISSUANCE INDICATED ON THE REVERSE SIDE MUST BE COMPLIED WITH IN FULL. READ ALL CONDITIONS CAREFULLY.

SAK:JCH:j:\docs\permits\statecon\hutton\0200-10.docx DIVISION OF WATER POLLUTION CONTROL

cc: EPA-Des Plaines FOS  
Records - Municipal  
Binds

  
Alan Keller, P.E.  
Manager, Permit Section

AI-1

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
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Distribution Program

Illinois Environmental Protection Agency  
Bureau of Water  
Compliance Assurance Section  
Mail Code #19  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

**SPECIAL CONDITION 3:** For the duration of this permit, the permittee shall sample all different sludges being applied to land or publicly distributed on a monthly basis and chemically analyze said samples in accordance with the recommended procedures contained in the approved edition of Standard Methods for the Examination of Water and Wastewater for the following parameters:

Nutrients	Metals	Other
Total Kjeldahl Nitrogen	Cadmium	pH
Ammonia Nitrogen	Copper	% TS
Phosphorus	Lead	% VS
Potassium	Manganese	
	Nickel	
	Zinc	

In addition to the above parameters, anaerobically digested sludge shall also be tested for volatile acids. The results of these analyses shall be submitted to this Agency on a monthly basis. The permittee shall update the sludge application rate utilizing all sludge analyses obtained after the previous sludge application period.

**SPECIAL CONDITION 4:** The permittee shall submit monthly reports to the Agency which shall contain the following information, as a minimum:

- a. Solids analysis from different sources.
- b. Information on sludge users that includes the following:
  - i. User name and address
  - ii. Type of solids and source
  - iii. Quantity received (dry tons)
  - iv. Date received
  - v. Use of solids at site
  - vi. Size of application area (acres)
  - vii. Application rate (dry tons/acre)
- c. A sludge flow schematic diagram depicting the sludge processing operations. The permittee shall revise the sludge flow schematic diagrams as necessary to reflect modifications to actual operations.

**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
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- d. Specific site monitoring as required. The reports shall be submitted to the Field Operations Section in Des Plaines and to the Permit Section of the Division of Water Pollution Control.

**SPECIAL CONDITION 5:** The permittee shall contact the Field Operations Section in Des Plaines and the Permit Section of the Division of Water Pollution Control 2 (two) weeks prior to transporting digested sludge to a site if:

- a. The site is 20 acres or greater;
- b. When 50 or more 20 cubic yard truckloads are proposed to be used at a particular site;
- c. The proposed application rate exceeds 50 dry tons per acre; or
- d. The site has received MWRDGC sludge in the past.

This advance notice will allow the Agency time for site inspection for the determination of site suitability, when necessary. Should the Agency not provide a site inspector or contact the permittee within this time, the permittee may transport digested sludge to the proposed site.

Digested sludge may be applied at rates up to 200 dry tons per acre, without notification, provided the entire area receiving digested sludge drains to a combined sewer system which is tributary to the MWRDGC system

**SPECIAL CONDITION 6:** Digested sludge delivered to a site shall be incorporated within 24 hours of delivery unless otherwise approved by the Agency and seeded or stabilized within 90 days of delivery unless temporary runoff control measures such as containment dikes, straw bales, temporary seeding etc. is undertaken at the application site. Digested sludge meeting the Class A pathogen requirements of 40 CFR Part 503 shall not require incorporation provided the sludge is used as a fertilizer topdressing on established vegetation or the Dried Solids User Information Sheet specifies that the entire area receiving digested sludge drains to a combined sewer system which is tributary to the MWRDGC system.

**SPECIAL CONDITION 7:**

A. Digested sludge shall be applied to sites within the following guidelines:

- 1. Digested sludge shall not be applied to sites during precipitation.
- 2. Digested sludge shall not be applied to sites which are saturated or with ponded water.
- 3. Digested sludge shall not be applied to ice or snow covered sites.
- 4. Frozen land, which is not ice or snow covered and has a slope of 5% or less, may be used for land application of digested sludge provided a 200 foot grassy area exists between the sludge applied land and any surface water or potable water supply well.



**ILLINOIS ENVIRONMENTAL PROTECTION AGENCY  
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Distribution Program**

**B. It is not recommended that digested sludge be applied to sites:**

- 1. When precipitation is imminent.**
- 2. Which have received greater than ¼ inch rainfall within the 24-hour period preceding the intended application time of the digested sludge.**

**C. Digested sludge shall not be applied to land which lies within 200 feet from a community water supply well, potable water supply well, surface waters or intermittent streams.**

**SPECIAL CONDITION 8: Digested sludge shall only be applied to land if the sludge/soil pH is 6.5 or greater, unless lime or other suitable materials are applied to the site to raise the sludge/soil pH to a minimum of 6.5. The permittee shall perform background soil pH testing for all sites proposed to receive digested sludge.**

**SPECIAL CONDITION 9: User information sheets shall be provided by the permittee to all digested sludge users and shall be signed by the digested sludge users. Where sludge is used as fertilizer topdressing on established vegetation, the signed user sheets are required only for the first use of sludge during each five-year cycle of the permit. A revised and re-signed user information sheet shall be submitted to the Agency for such sites, at such time as there is a change in management, ownership or usage of said site. Records regarding digested sludge users shall be retained by the permittee.**

**READ ALL CONDITIONS CAREFULLY:  
STANDARD CONDITIONS**

The Illinois Environmental Protection Act (Illinois Revised Statutes Chapter 111-12, Section 1039) grants the Environmental Protection Agency authority to impose conditions on permits which it issues.

1. Unless the construction for which this permit is issued has been completed, this permit will expire (1) two years after the date of issuance for permits to construct sewers or wastewater sources or (2) three years after the date of issuance for permits to construct treatment works or pretreatment works.
2. The construction or development of facilities covered by this permit shall be done in compliance with applicable provisions of Federal laws and regulations, the Illinois Environmental Protection Act, and Rules and Regulations adopted by the Illinois Pollution Control Board.
3. There shall be no deviations from the approved plans and specifications unless a written request for modification of the project, along with plans and specifications as required, shall have been submitted to the Agency and a supplemental written permit issued.
4. The permittee shall allow any agent duly authorized by the Agency upon the presentations of credentials:
  - a. to enter at reasonable times, the permittee's premises where actual or potential effluent, emission or noise sources are located or where any activity is to be conducted pursuant to this permit;
  - b. to have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit;
  - c. to inspect at reasonable times, including during any hours of operation of equipment constructed or operated under this permit, such equipment or monitoring methodology or equipment required to be kept, used, operated, calibrated and maintained under this permit;
  - d. to obtain and remove at reasonable times samples of any discharge or emission of pollutants;
  - e. to enter at reasonable times and utilize any photographic, recording, testing, monitoring or other equipment for the purpose of preserving, testing, monitoring, or recording any activity, discharge, or emission authorized by this permit.
5. The issuance of this permit:
  - a. shall not be considered as in any manner affecting the title of the premises upon which the permitted facilities are to be located;
  - b. does not release the permittee from any liability for damage to person or property caused by or resulting from the construction, maintenance, or operation of the proposed facilities;
  - c. does not release the permittee from compliance with other applicable statutes and regulations of the United States, of the State of Illinois, or with applicable local laws, ordinances and regulations;
  - d. does not take into consideration or attest to the structural stability of any units or parts of the project;
  - e. in no manner implies or suggests that the Agency (or its officers, agents or employees) assumes any liability, directly or indirectly, for any loss due to damage, installation, maintenance, or operation of the proposed equipment or facility.
6. Unless a joint construction/operation permit has been issued, a permit for operating shall be obtained from the agency before the facility or equipment covered by this permit is placed into operation.
7. These standard conditions shall prevail unless modified by special conditions.
8. The Agency may file a complaint with the Board for suspension or revocation of a permit:
  - a. upon discovery that the permit application contained misrepresentations, misinformation or false statement or that all relevant facts were not disclosed; or
  - b. upon finding that any standard or special conditions have been violated; or
  - c. upon any violation of the Environmental Protection Act or any Rules or Regulation effective thereunder as a result of the construction or development authorized by this permit.

***APPENDIX II***

**Metropolitan Water Reclamation District of Greater Chicago  
Biosolids Land Application Field Information  
Contract 07-690-11 : Stewart Spreading**

Field designation:	Loftus 2	Application season:	<u>Spring, 2010</u>
Land Owner:	Bob Loftus	County:	<u>LaSalle</u>
Farmer: (Biosolids User)	John Stewart	Township:	<u>Fall River</u>

Has an agreement been signed by the Land Owner allowing the application of biosolids to their land?  YES / NO If yes, submit a copy

Were Local Officials notified of the planned land application activities at this site?  YES / NO List contacted entities below.

The following Officials are recommended to be contacted, as applicable: Roadway Commission, Dept.-/soil Conservation, Dept. of Environment/Ecology, Health Department, and County and Township Boards.

Julia Kerested

Rich Smith

Rob Fulwider

Health Dept.

Highway Commissioner

Supervisor

Are there Local Ordinances regulating biosolids land application on this field?  NO / YES

If yes, list the ordinances here and a copy must be submitted.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Acreage:	<u>75</u>	Ground water depth:	<u>                    </u> feet
Soil pH range:	<u>7.1</u> to <u>7.4</u>	Date of analysis:	<u>11/17/2009</u>

A copy of the analysis report, from within the past 12 months, is to be attached for the first application of the year. If any parcel of the field has a soil pH less than 6.5, complete and attach a Lime Certification Worksheet.

Crop type: Corn / Soybean / Wheat / Other   Corn   Expected yield:   195   bu / acre  
If corn yield is greater than 150 bu/acre, a corn yield certification is required to be on file with the IEPA.

Planned biosolids application rate:   35   wet tons / acre

List field specific buffer zones:  
(i.e. dwellings, wells, surface water bodies, roadways, potable water supplies)  
\_\_\_\_\_

Have biosolids, of either District or non-District origin, ever previously been applied to this field by your company or any other party?  YES / NO

Has more than 100 dry tons / acre of biosolids been applied to the field cumulatively, and/or have biosolids been applied to the field for five or more years? YES /  NO

If yes, soil testing is required per 35 IL Admin. Code Sub C Part 391.430  
Date of most recent Part 391.430 analysis report:

Have a plat map and a soil map of the field been submitted to IEPA?  YES / NO

Contractor representative:   Greg Firrantello  

Date submitted:   1/27/2010

***APPENDIX III***

## **Section 5.0**

### **Odor Control Program**

This Odor Control Program will be implemented for all land application activities associated with the District's biosolids. This plan addresses these specific areas: Prevention; Complaint Response and Corrective Actions; and Mitigation Measures. These areas are explained in greater detail below.

#### ***Prevention***

##### **➤ Spreading Operations**

###### **1. *Product Quality***

Only Class B biosolids will be land applied. The Authority will certify that the biosolids meet Class B requirements.

###### **2. *Site Assessment***

When permitting sites, an assessment of the area is conducted by the Technical Specialist. As part of this inspection, the Technical Specialist identifies the location of potential off-site sensitive receptors such as homes, schools and offices. If necessary, buffers distances are increased, or certain fields (or even the entire sites) may be excluded from permit application submittals.

###### **3. *Operational Management***

When an application site is being flagged and otherwise prepared for the initiation of spreading operations, and each day of operations, the Technical Specialist and/or the Field Manager will assess expected weather conditions on-site (e.g. temperature inversions, high heat and humidity) and wind directions to determine if an unusual situation may be anticipated which would increase the potential for nuisance conditions at sensitive off-site receptors. If such conditions exist, the following management practices may be implemented: spreading operations may be shifted on-site to different fields or the more remote portions of fields to increase the buffer distance; where feasible, incorporation activities may be accelerated; field loading areas may be shifted; spreading operations may be more tightly timed in order to

minimize the length of time biosolids sit in stockpiles; or, the number of stockpiles of unloaded material awaiting spreading will be reduced.

**4. Odor Surveillance**

The Project Manager will train field personnel to increase sensitivity to odor concerns and insure proper implementation of the procedures specified in this odor control plan. Inspections of the site and surrounding areas for odor will be increased and conducted regularly when biosolids land application operations are underway. This monitoring system, combined with Synagro's improved community communications strategy will minimize the potential for unacceptable off-site nuisance conditions.

➤ **Field Storage**

Synagro intends to land apply all biosolids hauled to a site on the same day they are delivered. However, provisions for on-site stockpiling are necessary as a contingency option when inclement weather conditions, equipment breakdowns, or other factors interrupt the land application operations. If biosolids are stored in the field, the following practices will be implemented. A concerted effort will be made to manage biosolids in a manner which prevents the development of odors. Prompt remedial action will be taken in the event that unacceptable odor levels develop.

**1. Minimize Storage Time**

The biosolids will be removed as promptly and as early as possible to avoid warm weather conditions which may be more conducive to the development of nuisance conditions. Storage will be checked after significant precipitation events. Storage will be limited to 30 days or less, whenever possible. Unloading and spreading operations will be conducted as quickly and efficiently as possible to minimize the time that biosolids are disturbed.

**2. Perform Timely Preventative Measures**

In terms of reliability and effectiveness, lime has been demonstrated to be the most effective means of odor suppression by inhibiting microbial growth (pH >9). Testing has verified that a pH >11 is maintained over extensive periods of time. If conditions warrant, field stockpiles also may be topdressed with an application of lime as an added odor control measure. When biosolids are removed, the

working face of the pile will be treated with lime at the end of each day if necessary.

**3. Prevent Accumulation of Water**

Accumulation of precipitation or runoff in contact with biosolids is the major cause of odor development associated with storage of biosolids. Accumulated water has a lower pH and picks up nutrients and organic matter from the biosolids that promotes microbial growth and anaerobic conditions conducive to the development of odors. Any biosolids stored at a site will be stacked in a manner to prevent accumulation of water. Berms will be constructed with hay bales, or earth, when necessary to prevent runoff contact with the biosolids and to prevent creeping of the pile. Surveillance of the site will also occur after significant rainfall events to inspect the storage pile and restack if necessary.

**4. Enhanced Surveillance**

The Project Manager will train field personnel to increase sensitivity to odor concerns and insure proper implementation of the procedures specified in this odor control plan. Inspections of the storage and surrounding areas for odor will be conducted when biosolids are stored on-site. This monitoring system, combined with Synagro's improved community communications strategy will minimize the potential for unacceptable off-site nuisance conditions.

**Complaint Response and Corrective Actions**

Synagro will make efforts to ensure that citizen questions, concerns or odor complaints to local officials or regulatory agencies will be promptly referred to Synagro. The personnel to be notified in the event of odor complaints are listed below in descending order of priority. During normal working hours they can be contacted through Synagro's office in Sugar Grove, Illinois at (630) 466-7892 or by fax number at (630) 466-8612.

Jim Churney, Operations Manager	(630) 466-7892
Erik Goldman, Technical Services Manager	(630) 466-7892
Jim McCabe, Sr. Operations Director	(630) 466-7892

Messages can also be left at the office phone number during non-business hours.



Synagro has developed a formal protocol to respond to and address odor complaints:

1. Staff member receiving citizen questions or complaints will collect the individuals name and phone number and pass this information on to the Technical Services Section and the Project Manager promptly so that an on-site investigation can be initiated.
2. Synagro will investigate the situation and keep a log of the investigation.
3. If unacceptable odor levels are present, Synagro will undertake steps to mitigate. Synagro will inform complaints of any mitigation and corrective actions to be taken and the schedule for implementation if requested.

#### District Notification

Upon receiving an odor complaint, Synagro will immediately notify the Plant that generated the material. When the odor complaint is investigated, the Plant shall also be given a verbal response as to what action was taken to remedy the situation.

#### Mitigation Measures

If upon investigation, it is determined that sustained, unacceptable, off-site odors are being generated, Synagro will undertake one or more of the following corrective actions depending on the source and/or activity generating unacceptable odor levels:

- Check housekeeping and sanitation of equipment, site and access roads and clean as necessary;
- Apply lime on stored biosolids and/or working face if removal operations are underway;
- Inspect any storage area for accumulated water and ensure measures are employed to prevent it. If any standing water is present it will be treated with lime;
- If nuisance conditions arise, spreading operations may be moved to a more remote areas on the site; and
- Cease spreading operations and wait until weather conditions are more suitable for odor dispersion.