

CHAPTER 3

EFFLUENT LIMITATIONS

Effluent limitations are based on the water use objectives and water quality standards that are developed to achieve the desired results. In Wisconsin, these objectives and standards are established by federal, State, and regional agencies and are administered through the Wisconsin Pollutant Discharge Elimination System (WPDES). Under this system, the DNR issues WPDES permits to each discharger in the State, setting forth the effluent limitations that must be met. Land application of biosolids is covered by WPDES due to the potential contamination of nearby bodies of water.

This chapter briefly reviews federal and State water use objectives and water quality standards as they relate to solids treatment at the NSWWTP, and the current and proposed WPDES permits and related effluent limitations.

BIOSOLID USE OBJECTIVES AND QUALITY STANDARDS

Recognizing the need for a nationwide approach to water quality, the U.S. Congress, through the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500), declared its objective to restore and maintain the chemical, physical and biological integrity of the nation's waters. Congress also required the establishment of water quality standards for all waters consistent with the applicable requirements of the Act.

The Wisconsin Legislature, through Chapter 283 of the Wisconsin Statutes, requires that any disposal of sludge from a wastewater treatment plant be done under a valid WPDES permit. Chapter NR 204 of the Wisconsin Administrative Code defines the monitoring and disposal requirements of sewage sludge. MMSD currently land applies biosolids from the NSWWTP under the regulations outlined in NR 204.07.

NR 204 defines exceptional quality sludge as sludge that meets the Class A pathogen requirements, high quality pollutant limitations, and has undergone at least one pre-application process to reduce the likelihood of pathogen transmittal. Because exceptional quality sludge is not considered to be a health or environmental hazard, it is exempt from many disposal requirements.

DISCHARGE PERMIT REQUIREMENTS

Public Law 92-500 requires a National Pollutant Discharge Elimination System (NPDES) permit for any point source discharge of pollutants into the nation's navigable waters. Chapter 283 of the Wisconsin Statutes authorizes the DNR to “establish, administer and maintain a state pollutant discharge elimination system.” This permit system, known as WPDES, conforms to the objectives and requirements of Public Law 92-500. The State of Wisconsin has expanded the permit system beyond the navigable waters concept by applying it to all of the State’s receiving waters. Due to the possibility of the State’s waters being contaminated by land applied sludge, biosolids disposal is also covered under WPDES.

On April 1, 2004, the Madison Metropolitan Sewerage District was granted WPDES Permit No. WI-0024597-07-0 with provisions to land-apply biosolids that meet Class B requirements. This permit expired on March 31, 2009. The DNR issued a proposed permit in 2009 that is subject to review prior to reissuance. A copy of this proposed permit is contained in the Appendix.

Table 3-1 shows the biosolids pollutant limits for Exceptional Quality sludge and Class B sludge listed in the proposed discharge permit. Table 3-2 shows the pathogen control requirements for Class A and Class B sludge and Table 3-3 provides a listing of vector attraction reduction options for anaerobic processes, both tables derived from lists in the proposed discharge permit.

**Table 3-1
Biosolids Pollutant Limitations
Nine Springs WWTP ⁽¹⁾**

Biosolids Parameter	Limit
Arsenic, Dry Weight High Quality Ceiling	41 mg/kg 75 mg/kg
Cadmium, Dry Weight High Quality Ceiling	39 mg/kg 85 mg/kg
Copper, Dry Weight High Quality Ceiling	1,500 mg/kg 4,300 mg/kg
Lead, Dry Weight High Quality Ceiling	300 mg/kg 840 mg/kg
Mercury, Dry Weight High Quality Ceiling	17 mg/kg 57 mg/kg
Molybdenum, Dry Weight Ceiling	75 mg/kg
Nickel, Dry Weight High Quality Ceiling	420 mg/kg 420 mg/kg
Selenium, Dry Weight High Quality Ceiling	100 mg/kg 100 mg/kg
Zinc, Dry Weight High Quality Ceiling	2,800 mg/kg 7,500 mg/kg
(1) See discharge permit for sample type and frequency	

**Table 3-2
Biosolids Pathogen Control Options
Nine Springs WWTP**

Sludge Type	Biosolids Parameter	Limit
Class A	Fecal Coliform	1,000 MPN ¹ /g TS
	or	
	Salmonella	3 MPN/4 g TS
	and (1) of the following processes:	
	Temp/Time based on % Solids Composting Alkaline Treatment Heat Treatment Beta Ray Irradiation Pasteurization Prior and Post Tests for Enteric Virus/Viable Helminth Ova Heat Drying Thermophilic Aerobic Digestion Gamma Ray Irradiation PFRP ² Equivalent Process	
Class B	Fecal Coliform	2,000,000 MPN/g TS
	Or (1) of the following processes	
	Aerobic Digestion Anaerobic Digestion Alkaline Stabilization Air Drying Composting PSRP ³ Equivalent Process	

¹ Most Probable Number

² Process to Further Reduce Pathogens

³ Processes to Significantly Reduce Pathogens

**Table 3-3
Vector Attraction Reduction Options
Nine Springs WWTP – Anaerobic Processes**

Option	Limit	Limit Application
Volatile solids reduction	≥ 38%	Across process
Anaerobic bench-scale test	< 17% VS reduction	On anaerobic digested sludge
pH adjustment	> 12 S.U. for 2 hours and > 11.5 for addnl. 22 hours	During the process
Drying with primary solids	> 90% TS	When applied or bagged
Injection	-	When applied
Incorporation	-	Within 6 hours of application
Equivalent Process	Approved by WDNR	Varies with process