CHAPTER 7040
MINNESOTA POLLUTION CONTROL AGENCY
WATER QUALITY DIVISION
SEWAGE SLUDGE MANAGEMENT

7040.0100 DEFINITIONS.

Subpart 1. **Scope.** For the purpose of this chapter, the following terms have the meanings given them.

Subp. 2. **Agency.** "Agency" means the Minnesota Pollution Control Agency.

Subp. 3. **Animal feed.** "Animal feed" means any crop grown for consumption by animals, such as pasture crops, forage, and grain.

Subp. 4. **Aquifer.** "Aquifer" means a water-bearing soil horizon or bedrock formation that transmits water in sufficient quantities to supply a well.

Subp. 5. **Available nitrogen.** "Available nitrogen" means nitrogen which is present in inorganic forms that are usable by plants, and which may be determined by procedures set out in part 7040.4600.

Subp. 6. **Available water-holding capacity.** "Available water-holding capacity" means the capacity of soil to hold water against the force of gravity and available for use by most plants. It is usually expressed in inches of water per inch of soil. It may be found in Soil Conservation Service soil surveys or Soil Conservation Service soil interpretation sheets, or it may be obtained in the laboratory using the method provided in part 7040.4300, subpart 3.

Subp. 7. **Bedrock outcrop.** "Bedrock outcrop" means any bedrock that appears at the surface of the land.

Subp. 8. **Cation exchange capacity.** "Cation exchange capacity" means a measure of the potential quantity of readily exchangeable positive ions that the soil can attract and retain, expressed in milliequivalents per 100 grams of soil. Part 7040.4300, subpart 2 provides acceptable methods of determining cation exchange capacity.

Subp. 9. **Cave.** "Cave" means any naturally formed, subterranean open area or chamber, or series of chambers.

Subp. 9a. **Commissioner.** "Commissioner" means the commissioner or other designated representative of the Minnesota Pollution Control Agency.

Subp. 10. **Crops for direct human consumption.** "Crops for direct human consumption" means crops that are consumed by humans without processing to minimize pathogens prior to distribution to the consumer.

Subp. 11. **Dewatered sewage sludge.** "Dewatered sewage sludge" means any sewage sludge with a total solids content of 20 percent or greater or which can be transported and handled as a solid material.

Subp. 12. [Repealed by Amendment, L 1987 c 186 s 15]

Subp. 13. **Fallow land.** "Fallow land" means land that is uncropped and kept cultivated throughout a growing season. Vegetative cover is less than 25 percent. Any land that is uncropped and cultivated during the months of September through May where a crop will be grown the following growing season is not considered fallow land.

Subp. 14 **Food-chain crops.** "Food-chain crops" means tobacco, crops grown for human consumption, and feed for animals whose products are consumed by humans.

Subp. 15. **Hundred-year floodplain.** "Hundred-year floodplain," as defined in part 7020.0300 for floodplain, means any area adjoining a watercourse which has been or hereafter may be covered by a large flood known to have occurred generally in Minnesota and reasonably characteristic of what can be expected to occur on an average frequency in the magnitude of the 100-year recurrence interval.

Subp. 16. **Immediate incorporation.** "Immediate incorporation" means the mixing of sewage sludge with topsoil, concurrent with application or within 48 hours thereafter, by means such as injection, discing, mold-board plowing, chisel plowing, or rototilling to a minimum depth of six inches.

Subp. 17. **Intermittent stream.** "Intermittent stream" means any stream which flows at certain times during the year, such as after a rainstorm or during wet weather. Intermittent streams receive water from surface runoff, springs, or melting snow and have definable banks. Any intermittent stream mapped on Soil Conservation Service soil surveys or United States Geological Survey quadrangle maps may be included within this definition. All Class 7 limited resource value waters listed in parts 7050.0380 and 7055.0310 are included within this definition.

Subp. 18. **Lakes and ponds.** "Lakes and ponds" means any water basins defined as water basins and public waters in Minnesota Statutes, section 105.37, subdivisions 9 and 14 respectively.

Subp. 19. **Landspreading.** "Landspreading" means placement of sewage sludge on or incorporated into the soil surface.

Subp. 20. **Landspreading facility.** "Landspreading facility" means any land that is used for sewage sludge landspreading and is owned, leased, or rented by the political subdivision generating the sewage sludge.

Subp. 21. **Landspreading site.** "Landspreading site" means any land used for sewage sludge landspreading that is not owned, leased, or rented by the political subdivision generating the sewage sludge.

Subp. 22. **Long-term storage.** "Long-term storage" means the storage of dewatered sewage sludge for a period of greater than one month but not exceeding seven months at a landspreading site not located at the place of sewage sludge generation.

Subp. 23. **Mine.** "Mine" means any excavation for minerals.

Subp. 24. **Organic priority pollutant.** "Organic priority pollutant" means the

organic compounds that appear in Code of Federal Regulations, title 40, section 401.15 (1981).

Subp. 25. **Pasture crops.** "Pasture crops" means crops such as legumes, grasses, grain stubble, and stover which are consumed by animals while grazing.

Subp. 26. **Pathogens.** "Pathogens" means organisms that are capable of producing an infection or disease in a susceptible host.

Subp. 27. **Person.** "Person," as defined in Minnesota Statutes, section 116.06, subdivision 8, means any human being, any municipality or other governmental or political subdivision or other public agency, any public or private corporation, any partnership, firm, association, or other organization, any receiver, trustee, assignee, agent, or other legal representative of any of the foregoing, or any other legal entity, but does not include the Minnesota Pollution Control Agency.

Subp. 28. **Place of habitation.** "Place of habitation" means any house, apartment, manufactured home, dwelling, residence, or other structure, occupied or intended to be occupied on a day to day basis by an individual, group of individuals, family unit, or group of family units.

Subp. 29. **Political subdivision.** "Political subdivision" as defined in Minnesota Statutes, section 115A.03, subdivision 24, means any municipal corporation, governmental subdivision of the state, local government unit, special district, or local or regional board, commission, or authority authorized by law to plan or provide for waste management.

Subp. 30. **Process to further reduce pathogens.** "Process to further reduce pathogens" means high temperature composting, heat drying, heat treatment, thermophilic aerobic digestion, or other methods which will achieve similar levels of pathogen reduction. These methods are described in part 7040.4700.

Subp. 31. **Process to significantly reduce pathogens.** "Process to significantly reduce pathogens" means aerobic digestion, air drying, anaerobic digestion, low temperature composting, lime stabilization, or other methods which achieve similar levels of pathogen reduction. These methods are described in part 7040.4700.

Subp. 32. **Putrescible sewage sludge.** "Putrescible sewage sludge" means any sewage sludge that has a volatile solids content of 70 percent or more of the total solids content.

Subp. 33. **Quarry.** "Quarry" means any surficial mine used for the purpose of obtaining building stone, limestone, gravel, or sand.

Subp. 34. **Recreational area.** "Recreational area" means any public park, trail, campground, playground, athletic field, picnic ground, botanical or zoological garden, swimming beach or pool, fairground, or wayside and any commercial campground, resort, tourist court, amusement park, riding stable, or golf course.

Subp. 35. **Residential development.** "Residential development" means ten or more places of habitation concentrated within ten acres of land. The term also includes schools, churches, hospitals, nursing homes, businesses, offices, and apartment buildings or complexes having ten or more living units.

Subp. 36. **Rivers and streams.** "Rivers and streams" means any watercourses defined as natural watercourses or altered natural watercourses and public waters in Minnesota Statutes, section 105.37, subdivisions 10, 11, and 14 respectively.

Subp. 37. **Road right-of-way.** "Road right-of-way" means any interstate, United States, state, county, municipal, or township highway or road including any shoulder and drainage ditch alongside the road.

Subp. 38. **Root crops.** "Root crops" means plants whose edible parts are grown below the soil surface.

Subp. 39. **Seasonal high water table.** "Seasonal high water table" means the highest level the water table reaches during a given year. Methods of determining the seasonal high water table are given in part 7040.4300, subpart 5.

Subp. 40. **Sewage sludge.** "Sewage sludge," as defined in Minnesota Statutes,

section 115A.03, subdivision 29, means the solids and associated liquids in municipal wastewater which are encountered and concentrated by a municipal wastewater treatment plant. Sewage sludge does not include incinerator residues and grit, scum, or screenings removed from other solids during treatment.

Subp. 41. **Sewage sludge solids.** "Sewage sludge solids" means the total solids remaining in sewage sludge after oven drying at 105 degrees Centigrade.

Subp. 42. **Short-term storage.** "Short-term storage" means the storage of dewatered sewage sludge for a period of less than one month at a landspreading site not located at the place of sewage sludge generation.

Subp. 43. **Sinkhole.** "Sinkhole" means a closed depression in an area of Karst topography that is formed either by solution of surficial limestone or by collapse of underlying caves.

Subp. 44. **Soil Conservation Service.** "Soil Conservation Service" means the Soil Conservation Service of the United States Department of Agriculture.

Subp. 45. **Soil horizon.** "Soil horizon" means a layer of soil that is approximately parallel to the soil surface and has some set of properties that have been produced by soil-forming processes, and has some properties that are not like those of the layers above and beneath it. These properties include color, structure, texture, consistence, and bulk density.

Subp. 46. **Soil pH.** "Soil pH" means the soil's hydrogen-ion activity or the negative logarithm of the hydrogen-ion concentration. It is a measure of the acidity of soil. A soil pH value of 7.0 is neutral. The value is obtained by methods provided in part 7040.4300, subpart 1.

Subp. 47. **Soil texture.** "Soil texture" means the relative portion of the soil separates sand, silt, and clay. It can be measured using methods addressed in part 7040.4300, subpart 1. Coarse texture is United States Department of Agriculture textural classifications sand and loamy sand. Medium texture is United States Department of Agriculture classifications sandy loam, loam, silt, silt loam, and sandy clay loam. Fine texture is United States Department of Agriculture classifications clay loam, silty clay loam, sandy clay, silty clay, and clay.

Subp. 48. **Soil type.** "Soil type" means a soil body having the same profile characteristics and morphology. It is the lowest unit in the natural system of soil classification.

Subp. 49. **Spray application.** "Spray application" means liquid sewage sludge application by sprinkling devices such as center pivots and stationary or movable spray irrigation mechanisms.

Subp. 50. **Spring.** "Spring" means any natural surface discharge of ground water large enough to flow in a small rivulet.

Subp. 51. **Surface application.** "Surface application" means sewage sludge spread on the surface of the land and not incorporated into the soil within 48 hours of application.

Subp. 52. **Surface water.** "Surface water" means any lake or pond, and any river or stream as defined in subparts 18 and 36, respectively.

Subp. 53. **Ten-year floodplain.** "Ten-year floodplain" means the lowland and relatively flat areas adjoining surface waters which are inundated by a flood which can be expected to occur, on an average, of once in ten years; or the land area to which flood waters have a ten percent chance of inundating in any given year.

Subp. 54. **Water table.** "Water table" means the surface of the ground water at which the pressure is atmospheric. Generally this is the top of the saturated zone.

Subp. 55. **Wetland.** "Wetland" means a natural marsh where water stands near, at, or above the soil surface during a significant portion of most years, which is eligible for classification as inland fresh water wetland type 3, 4, or 5 under United States Department of Interior classification, defined in United States Fish

and Wildlife Circular No. 39 (1971 edition), not included within the definition of public waters as defined in Minnesota Statutes, section 105.37, subdivision 14, and which is ten or more acres in size in unincorporated areas or two and one-half acres or more in incorporated areas.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.0200 PURPOSE AND SCOPE.

The purpose of this chapter is to provide for the protection of the public health and the environment in the utilization or disposal of sewage sludge. In accordance with the authority granted in Minnesota Statutes, section 116.07, subdivision 4, this chapter establishes standards for the design, location, and operation of sewage sludge landspreading sites and facilities.

Statutory Authority: *MS s 116.07 subd 4*

7040.0300 VARIANCE.

Any person may apply for a variance from any requirement of this chapter. Variances shall be applied for and acted upon by the agency in accordance with Minnesota Statutes, section 116.07, subdivision 5 and other applicable statutes and rules.

Statutory Authority: *MS s 116.07 subd 4*

7040.0400 PERMIT AND LETTER OF APPROVAL REQUIREMENTS.

Subpart 1. **Landspreading.** Landspreading:

A. The following persons shall comply with the requirements of this chapter:

(1) political subdivisions that landspread sewage sludge;

(2) persons who own, lease, or rent landspreading facilities; and

(3) persons who are under contract to subitem (1) or (2) to landspread sewage sludge or to operate a landspreading facility.

B. The persons identified in item A shall apply for, and be copermittees of, a state disposal system permit for landspreading facilities.

C. Political subdivisions shall apply for a letter of approval for landspreading sites.

D. Each existing and proposed landspreading site shall have a letter of approval at the time given in subpart 2, unless it possesses a current letter of approval. Each existing landspreading facility shall have a state disposal system permit at the time given in subpart 2, unless it possesses a current permit. Each proposed landspreading facility shall have a state disposal system permit prior to development and use.

Subp. 2. **Schedule for obtaining letter of approval or permit.**

Wastewater Treatment System Design Flow in Million Gallons/Day		Months After Rule Effective Date
More than 20	Sites	0
	Facilities	3
1 - 20	Sites	6
	Facilities	12
Fewer than 1	Sites	12
	Facilities	12

Subp. 3. **Incineration.** Incineration of sewage sludge is governed by parts 7005.2350 to 7005.2400 the Minnesota Pollution Control Agency.

Subp. 4. **Other facilities.** Any facility for the processing, storage, or disposal of sewage sludge into or on any land by means other than regulated by this chapter is prohibited without an agency permit.

Statutory Authority: *MS s 116.07 subd 4*

7040.0500 APPLICATION REQUIREMENTS FOR LANDSPREADING SITES.

Subpart 1. **In general.** Applications for letters of approval for sewage sludge landspreading sites shall include the specific information given in subparts 2 to 6. Submittal of this information shall be made using a form obtained from the commissioner.

Subp. 2. **Sewage sludge characterization.** Applications shall contain sewage sludge characterization. This shall include a description of the process to significantly reduce pathogens or process to further reduce pathogens used to treat the sewage sludge, including temperatures, retention times, volatile solids reduction, and chemical doses, if applicable.

Sewage sludge chemical characteristics shall be determined from either a single composite sample taken within six months of application submittal or the average of analyses from any number of samples taken within one year of application submittal. Sewage sludge shall be analyzed for parameters listed in part 7040.1600, subpart 2. The dates of sampling and analysis shall be included with the analysis.

Subp. 3. **Site characterization.** Applications shall contain site characterization:

A. This shall include a copy of Soil Conservation Service soil survey maps or comparable soil maps prepared by a soil scientist with mapping experience, delineating the boundaries of the specific sewage sludge landspreading and short-term or long-term storage areas. Information included with the soil survey maps or obtained from actual on-site investigations shall include the following items for each soil type present at the landspreading site:

(1) texture and thickness of each soil horizon to 60 inches of depth;

(2) permeability of each soil horizon to 60 inches of depth;

(3) available water-holding capacity of each soil horizon to 60 inches in depth;

(4) soil depth required to obtain six inches of available water-holding capacity;

(5) depth to seasonal high water table;

(6) depth to bedrock; and

(7) slope of land surface.

B. It shall include a copy of a United States Geological Service quadrangle map or aerial photo which shows the location of and distance to each of the following features, if within one-quarter mile of the landspreading site:

(1) lakes and ponds;

(2) rivers and streams;

(3) wetlands;

(4) intermittent streams;

(5) ten-year flood plains;

(6) sinkholes, caves, bedrock outcrops, mines, or quarries;

(7) potable water supply wells;

(8) places of habitation;

(9) recreational areas;

(10) residential developments;

(11) road rights-of-way; and

(12) airports.

C. It shall include a legal description of the landspreading site, including township, range, section, quarter section, township or city name, and county.

D. It shall include the approximate quantity of sewage sludge solids previously applied to the landspreading site.

E. Required sampling and analytical procedures of soil characteristics listed in subitems (1) to (7) are provided in parts 7040.4200 and 7040.4300. Applications shall contain the following soil characteristics which shall be determined from samples obtained within six months of application submittal:

(1) United States Department of Agriculture textural classification;

(2) percentage of organic matter;

(3) extractable phosphorus in pounds per acre;

(4) exchangeable potassium in pounds per acre;

(5) pH;

(6) soluble salts expressed in millimhos per centimeter; and

(7) cation exchange capacity expressed in milliequivalents per 100 grams.

F. Site characterization shall include the acreage of the landspreading site.

G. It shall include the name and address of landowner.

H. It shall also include the name and address of any renter, lessee, or occupier of the landspreading site.

Subp. 4. **Site management.** Applications shall include site management. This includes the following:

A. a description of the proposed method or methods of sewage sludge application;

B. the name and address of the person who will apply sewage sludge to the proposed landspreading site;

C. the maximum annual application rate, in tons of sewage sludge solids per acre per year, based on nitrogen or cadmium additions, whichever is limiting;

D. the estimated maximum sewage sludge loading rate over the life of the site, in tons of sewage sludge solids per acre, based on cumulative heavy metal limits, current sewage sludge analysis, and past heavy metal applications;

E. a description of the crop to be grown or dominant vegetation at the site and intended use of the crop;

F. a description of how public access to the site is proposed to be controlled; and

G. months and approximate dates when sewage sludge will be landspread.

Subp. 5. **Provisions for long-term sewage sludge storage at the site.** Applications shall include the following provisions for long-term sewage sludge storage at the site:

A. A description of the necessity for storage at the landspreading site.

B. The location of the storage area delineated on maps submitted pursuant to subpart 3, items A and B.

C. A description of how sewage sludge is to be stored.

D. The acreage of the sewage sludge storage area.

E. The quantity of sewage sludge to be stored.

F. Boring logs from at least two soil borings to a depth of ten feet taken at the perimeter of the proposed storage area. The boring logs shall include:

(1) texture and thickness of each soil horizon encountered;

(2) color and presence or absence of mottling for each soil horizon encountered;

(3) depth to water table, if encountered; and

(4) depth to bedrock, if encountered.

G. The soil depth required to obtain eight inches of available water-holding capacity.

H. The expected duration and dates of storage before landspreading.

I. The description of precaution or practices to minimize or prevent leachate, runoff, or nuisance conditions from the storage area. If the long-term storage site is to be at the same location for each year the landspreading site is used, an evaluation of the necessity for an impervious pad shall be included.

Subp. 6. **Public notification.** Applications shall include evidence that the applicable county and local officials have been notified that application is being made to the agency for approval of the proposed landspreading site and operation.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.0600 APPLICATION REQUIREMENTS FOR LANDSPREADING FACILITIES.

Subpart 1. **In general.** Applications for state disposal system permits for sewage sludge landspreading facilities shall include the information required by subparts 2 to 5.

Subp. 2. **Information required for letters of approval.** The application shall contain all information required in part 7040.0500, subparts 2 to 4 for letters of approval for landspreading sites.

Subp. 3. **Ground water quality.** Applications shall contain present ground water quality for the following parameters:

A. pH;

B. electrical conductivity expressed in millimhos per centimeter;

C. total hardness expressed in milligrams per liter as $CaCO_3$;

D. alkalinity expressed in milligrams per liter as $CaCO_3$;

E. chlorides expressed in milligrams per liter;

F. sulfates expressed in milligrams per liter;

G. total organic carbon expressed in milligrams per liter;

H. nitrate-nitrogen expressed in milligrams per liter;

I. total phosphorus expressed in milligrams per liter;

J. methylene blue active substances expressed in milligrams per liter;

K. total dissolved solids expressed in milligrams per liter; and

L. total coliform bacteria expressed in organisms per 100 milliliters.

The ground water to be sampled and analyzed shall be from the first aquifer below the proposed landspreading facility that is being used or may be used for drinking water purposes. Analytical methods for these parameters may be found in part 7040.4500.

Subp. 4. **Ground water monitoring wells and soil water sampling devices.** Applications shall contain a description of all ground water monitoring wells and soil water sampling devices installed at the facility, including:

A. location on required soil map;

B. elevation of ground water surface, depth of boring and well, well seals, and screened interval; and

C. description of well construction materials such as casing, well seal, grouting and packing.

Subp. 5. **Sewage sludge storage facility and operation.** Applications shall contain a description of the sewage sludge storage facility and operation, including:

A. facility type and capacity;

B. frequency of sewage sludge addition to and removal from the storage facility; and

C. description and permeability of storage pond liner or storage pad base, whichever is applicable.

Subp. 6. **Additional information.** The information in items A, B, and C shall be submitted in addition to that required in subparts 2 to 5 if the applicant or permittee proposes to apply available nitrogen in excess of that stipulated in part 7040.2600, subpart 2, item E, cadmium in excess of two pounds per acre per year, or metals in excess of levels stipulated in part 7040.2900, subparts 3 and 4. The information in items D to G, whichever is applicable, shall be submitted in addition to that required in subparts 2 to 5 if the applicant or permittee proposes not to comply with one or more of the minimum design requirements in parts 7040.2500 to 7040.2900.

A. An application shall contain a characterization of hydrogeological conditions at and within one mile from the landspreading facility, including:

(1) type of and depth to bedrock;

(2) bedrock condition, such as fractures, faults, and channels;

(3) texture of unconsolidated material above bedrock;

(4) depth to hydrostatic ground water table;

(5) direction of ground water flow and rate of movement;

(6) ground water recharge and discharge areas;

(7) available well boring logs for any public or private, potable or nonpotable water supply wells;

(8) present ground water quality and use; and

(9) suitability of ground water for future use.

This information may be obtained from available well boring data, United States Geological Survey hydrogeologic atlases, other hydrogeological studies in the area, or by actual on-site investigations.

B. The application shall contain a description of soil characteristics to a minimum depth of 25 feet. The minimum number of borings required can be determined using the following formula:

Number of borings = (landspreading acreage x 0.1) + 3

The information given for each boring shall include:

(1) location and depth of boring;

(2) soil classification using the Unified system for each soil horizon encountered;

(3) color and presence or absence of mottling for each soil horizon encountered; and

(4) water level measurement.

C. Utilizing the information in items A and B, the application shall contain an evaluation of the potential for impacting aquifer quality based on proposed facility management practices.

D. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with part 7040.2600, subpart 1 if one or more of the minimum design requirements in part 7040.2600, subpart 2 cannot be accomplished.

E. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with part 7040.2700,

subpart 1 if one or more of the minimum design requirements in part 7040.2700, subpart 2 cannot be accomplished.

F. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with part 7040.2800, subpart 1 if one or more of the minimum design requirements in part 7040.2800, subpart 2 cannot be accomplished.

G. It shall also contain a description and evaluation of the provisions, practices and site features that will be utilized to comply with part 7040.2900, subpart 1 if one or more of the minimum design requirements in part 7040.2900, subpart 2 cannot be accomplished.

Statutory Authority: *MS s 116.07 subd 4*

7040.0700 ADMINISTRATION OF LETTERS OF APPROVAL.

Subpart 1. **Review.** All applications shall be reviewed for completeness by the commissioner. If the application is incomplete, the commissioner shall promptly advise the applicant of the incompleteness. Further processing of the application may be suspended until the applicant has supplied the necessary information.

Subp. 2. **Preparation of preliminary determinations.** The commissioner shall make a preliminary determination regarding a completed application. This preliminary determination shall include a proposed determination to issue or to deny the approval sought in the application.

If the preliminary determination is to deny an approval, the commissioner shall notify the applicant in writing and include the specific reasons for denial. The applicant may request an appearance before the agency to appeal the denial pursuant to agency rules of procedure, part 7000.0300 of the Minnesota Pollution Control Agency.

If the preliminary determination is to issue an approval, the procedures set out in subparts 3 and 4 shall apply.

Subp. 3. **Public participation.** The commissioner shall provide notice of the application and a copy of the draft letter of approval to the following persons: the applicant; the owner and occupier of land proposed to be used for sewage sludge landspreading; the city or township and county officials of the area where a sewage sludge landspreading site is located; and other persons known by the commissioner to have an interest in the proposed approval.

Any interested person, including the applicant, may, within 14 days following the date of issuance of the notice, submit written comments on the application and the proposed approval to the commissioner.

All written comments submitted during the comment period shall be retained and considered in the formulation of final determinations concerning the application.

Subp. 4. **Final determination.** The commissioner shall attempt to resolve all comments prior to a final determination concerning the application. If such comments have been resolved, the commissioner shall issue or deny the approval.

If all comments cannot be resolved, the application shall be presented to the agency, which shall issue or deny the approval. A public hearing may be requested in accordance with part 7070.1700 of the Minnesota Pollution Control Agency.

All persons submitting comments on the application and the proposed approval shall be notified of the final determination concerning the application.

Subp. 5. **Denial of approval.** Approval shall be denied if the proposed site does not comply with this rule and other applicable state or federal laws or rules; or approval is likely to cause pollution, impairment or destruction of the air, water, land or other natural resources of the state and there is a feasible and prudent alternative.

Notice of denial and reasons for the denial shall be issued to the persons listed in subpart 3.

Subp. 6. **Modification, suspension, and revocation of letters of approval.** A letter of approval may be modified, suspended, or revoked in accordance with the requirements of part 7070.2500 of the Minnesota Pollution Control Agency.

Subp. 7. **Duration of approvals.** The letter of approval shall have a duration of one to five years. The term of approval shall be based upon the request of the applicant and a determination of the suitability of the landspreading site and operation for compliance with this chapter for the duration of the requested approval period.

Subp. 8. **Enforcement.** A letter of approval issued to a political subdivision pursuant to this rule shall become part of the political subdivision's national pollutant discharge elimination system or state disposal system permit and shall be enforceable to the same extent as the permit.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.0800 ADMINISTRATION OF STATE DISPOSAL SYSTEM PERMITS.

The administration of state disposal system permits for landspreading facilities shall be governed by chapter 7070 of the Minnesota Pollution Control Agency.

Statutory Authority: *MS s 116.07 subd 4*

LANDSPREADING SITES

7040.1500 MANAGEMENT REQUIREMENTS AND LIMITATIONS.

The requirements and limitations in parts 7040.1600 to 7040.2000 apply to the management of landspreading sites.

Statutory Authority: *MS s 116.07 subd 4*

7040.1600 SEWAGE SLUDGE SAMPLING AND ANALYSIS.

Subpart 1. **Sampling.** Sewage sludge samples shall be representative of the sewage sludge to be landspread.

In the case of digesters and liquid storage tanks, a representative sample shall be composed of at least four grab samples composited over a 24-hour period prior to landspreading.

In the case of lagoons, stockpiles, drying beds, and compost piles, a representative sample shall be composed of at least ten grab samples composited from the sewage sludge prior to landspreading.

Other recommended sampling and handling procedures are provided in parts 7040.4000 and 7040.4100.

Subp. 2. **Analysis.** Sewage sludge shall be analyzed according to methods set forth in parts 7040.4000 and 7040.4100 for the following parameters:

A. percentage of total solids;

B. volatile solids as percentage of total solids;

C. pH;

D. nitrogen, including the percentages of kjeldahl, ammonia and, in the case of aerobically digested and composted sewage sludges only, nitrate;

E. total weight of heavy metals, including milligrams per kilogram of zinc, copper, lead, nickel, cadmium, chromium and mercury; and

F. polychlorinated biphenyls expressed as milligrams per kilogram.

All analytical values, except pH and total solids, shall be recorded on a dry weight basis.

Subp. 3. **Minimum frequency of sewage sludge sampling and analysis.** The minimum frequency of sewage sludge sampling and analysis is given below:

Wastewater Treatment System Design Flow in Million Gallons/Day	Minimum Frequency
Less than 1.0	annually
1.0 - 20	semiannually
More than 20	quarterly

Subp. 4. **Parameter exceeding concentrations in subpart 5.** Each parameter exceeding concentrations listed in subpart 5 shall be analyzed for at two or three times the minimum frequency given in subpart 3.

Subp. 5. **Greater frequency of sewage sludge sampling and analysis.**

Parameter	Concentration Expressed in Milligrams/Kilogram of Dry Weight 2x Frequency	3x Frequency
Zinc	1800	3600
Copper	900	1800
Lead	500	1000
Nickel	100	200
Cadmium	20	40
Chromium	1000	2000
Mercury	5	10
Polychlorinated biphenyls	5	10

Subp. 6. **Reduction of frequency.** Frequency of sewage sludge sampling and analysis may be reduced by the commissioner depending on the annual frequency of landspreading and the variability of sewage sludge quality.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.1700 PATHOGEN CONTROL.

Subpart 1. **Treatment of sewage sludge.** Sewage sludge, at a minimum, shall be treated by a process to significantly reduce pathogens prior to landspreading.

Sewage sludge shall be treated by a process to further reduce pathogens if crops for direct human consumption are to be grown within 18 months of sewage sludge application, unless there is no contact between the sewage sludge and the edible portion of the crop.

Subp. 2. **Application of sludge to crops or pasture.** Sewage sludge shall only be applied to pasture or forage crops when foliage is minimal unless the sewage sludge is injected. Surface application during the growing season shall only be permitted within seven days following a cutting.

If sewage sludge is to be applied to land used for pasturing livestock or for growing forage crops, the pasturing or harvesting of the crop shall not be permitted for at least one month following the last sewage sludge application unless the sewage sludge was treated by a process to further reduce pathogens.

Subp. 3. **Public safety.** Public access to a landspreading site shall be controlled during and for a period of 12 months following sewage sludge application unless the sewage sludge was treated by a process to further reduce pathogens. Fencing or posting of appropriate signs is required if the site is likely to be frequented by the general public. If the site is remote, or used for agricultural purposes, fencing or posting is not required unless inadvertent public contact is likely.

Statutory Authority: *MS s 116.07 subd 4*

7040.1800 SOIL PH AND CADMIUM APPLICATION.

Subpart 1. **Soil pH.** For landspreading sites where food-chain crops will be

grown, the pH of the soil and sewage sludge mixture shall be 6.5 or greater during the growing season following sewage sludge application.

Subp. 2. **Annual cadmium addition.** Annual cadmium application shall not be more than one-half pound per acre on the land used for the production of tobacco, leafy vegetables, or root crops grown for human consumption. For other food-chain crops, the annual cadmium application shall not exceed two pounds per acre.

Subp. 3. **Maximum cumulative cadmium application.** Cumulative cadmium application to any landspreading site shall not exceed the levels provided below:

Soil Cation Exchange Capacity (milliequivalents/100 grams)	Maximum Cumulative Cadmium Application (pounds/acre)
Less than 5	5
5 - 15	10
More than 15	20

Statutory Authority: *MS s 116.07 subd 4*

7040.1801 MAXIMUM CUMULATIVE HEAVY METAL ADDITION.

Sewage sludge application shall be terminated when the sum addition any one heavy metal equals the level in the following table for that particular heavy metal and soil:

Soil Cation Exchange Capacity (milliequivalents/100 grams)	Maximum Cumulative Heavy Metal Addition (pounds/acre)			
	Lead	Zinc	Copper	Nickel
Less than 5	500	250	125	50
5 - 15	1000	500	250	100
More than 15	2000	1000	500	200

Statutory Authority: *MS s 116.07 subd 4*

7040.1802 SEWAGE SLUDGE APPLICATION RATES.

Sewage sludge application rates, combined with other known nitrogen sources, shall supply no more nitrogen than the amount required by the vegetation to be grown at the site. The rate of sewage sludge application shall be determined using the method outlined in part 7040.4600.

Sewage sludge application to a site shall be suspended whenever the soil extractable phosphorus content exceeds 400 pounds per acre.

Sewage sludge application to a site shall be suspended whenever the electrical conductivity of the saturation extract of soil exceeds four millimhos per centimeter as determined by the soluble salt test.

Sewage sludge shall not be applied to fallow land unless the following provisions are met: the soil surface has a medium or fine texture; the average annual precipitation is no greater than 24 inches; the addition of available nitrogen does not exceed 50 pounds per acre on medium-textured soil and 75 pounds per acre on fine-textured soil; and a crop is grown the year following sewage sludge application. The amount of available nitrogen applied to that crop is reduced by the amount of available nitrogen applied the previous year.

Statutory Authority: *MS s 116.07 subd 4*

7040.1803 ORGANIC PRIORITY POLLUTANT LIMITATIONS.

Sewage sludge containing concentrations of PCB's equal to or greater than ten milligrams per kilogram of sewage sludge solids shall be incorporated into the soil when applied to land used for producing food-chain crops.

Sewage sludge containing concentrations of PCB's equal to or greater than 50 milligrams per kilogram of sewage sludge solids shall not be landspread.

If there is a known source in the sewer system service area which discharges a significant quantity of an organic priority pollutant, the sewage sludge shall be analyzed for that chemical. Concentrations will be considered on a case-by-case basis and recommendations will be made regarding the utilization of that sewage sludge on land.

Statutory Authority: *MS s 116.07 subd 4*

7040.1804 SUITABLE SOIL CONDITIONS.

Subpart 1. **Depth of soil profile.** A soil profile shall be of sufficient depth to provide an available water-holding capacity of at least six inches above bedrock or the seasonal high water table. In no case shall this depth be less than three feet. Where sewage sludge is injected into the soil, the six inches of water-holding capacity or the three foot separation distance, whichever is applicable, shall exist between the bottom of the injection zone and the seasonal high water table or bedrock.

Subp. 2. **Perched water condition.** For the purpose of subpart 1, a perched water condition, in which a zone of saturated soil exists between zones of unsaturated soil in the upper five feet of the soil profile, shall not be considered a seasonal high water table.

Subp. 3. **Depth to subsurface drainage tiles.** For the purpose of subpart 1, the depth to subsurface drainage tiles shall be considered the depth to the seasonal high water table for tile drainage systems that are designed according to or equivalent to Soil Conservation Service engineering standards and criteria.

Subp. 4. **Boring.** If, according to available information such as Soil Conservation Service soil surveys and soil interpretation sheets, the required six inches of available water-holding capacity is not provided in the upper five feet of soil for any given soil type, a boring shall be made to the depth in which six inches of available water-holding capacity would be provided. If indication of a seasonal high water table or bedrock is found before this depth is accomplished, that soil type shall not be used for landspreading.

Subp. 5. **Soil texture.** The soil texture, United States Department of Agriculture classification, at the zone of sewage sludge application shall be one of the following: fine sand; loamy sand; sandy loam; loam; silt loam; silt; sandy clay loam; sandy clay; clay loam; silty clay loam; silty clay; or clay.

Subp. 6. **Liquid sewage sludge.** Liquid sewage sludge shall not be spread on soils with surface permeabilities of less than 0.2 inch per hour unless the sewage sludge is immediately incorporated.

Subp. 7. **Sewage sludge.** Sewage sludge shall not be spread on soils that have permeabilities of greater than six inches per hour throughout the top five feet.

Subp. 8. **Bedrock.** Sewage sludge shall not be spread in areas where bedrock containing solution cavities or fractures or cracks exists within six feet of the soil surface.

Subp. 9. **Ponds.** Sewage sludge shall not be spread on areas ponded with water or sewage sludge.

Subp. 10. **Slope.** Surface application of sewage sludge shall not be allowed on land with a slope greater than six percent. Subsurface application or an immediately incorporated application of sewage sludge shall not be allowed on land with a slope greater than 12 percent.

Subp. 11. **Soil sample parameters.** Soil samples shall be collected and analyzed prior to each cropping season that a landspreading site is used. The following parameters shall be determined using collection and analysis procedures provided in parts 7040.4200 and 7040.4300:

A. United States Department of Agriculture textural classification;

B. percentage of organic matter content;

C. extractable phosphorus in pounds per acre;

D. exchangeable potassium in pounds per acre;

E. pH; and

F. soluble salts expressed in millimhos per centimeter.

Statutory Authority: *MS s 116.07 subd 4*

7040.1805 SEPARATION DISTANCES.

Subpart 1. **Residences.** A distance of at least 200 feet from any place of habitation and a distance of at least 600 feet from any residential development or recreational area shall be maintained, unless written permission is obtained from all persons responsible for residential developments and places of recreation and all persons inhabiting within the otherwise protected distance.

Subp. 2. **Water supply well.** A distance of at least 200 feet from any private water supply well and a distance of at least 1,000 feet from any public water supply well shall be maintained. Monitoring and test wells are exempt from this limitation.

Subp. 3. **Sewage sludge.** Separation distances prescribed in subpart 1 may be reduced by one-half if sewage sludge is injected into the soil.

Subp. 4. **Adjoining property.** Land application of sewage sludge shall be conducted so that sewage sludge is not applied to adjoining property or to road rights-of-way.

Subp. 5. **Soil texture.** A distance of at least 200 feet for coarse-textured soils and at least 300 feet for medium and fine-textured soils shall be maintained from any downgradient surface water where sewage sludge is surface applied during the months of May through October. These separation distances shall be doubled where sewage sludge is surface applied during the months of November through April.

Subp. 6. **Downgradient surface water.** The minimum distances from any downgradient surface water shall be maintained where sewage sludge is immediately incorporated into the soil as follows:

Land Slope	Separation (feet)
Less than 2 percent	25
2 - 6 percent	50
6 - 12 percent	100

Subp. 7. **Streams.** A 100-foot separation distance from intermittent streams shall be maintained when applying sewage sludge unless one or more of the following conditions exist, in which case the separation distance shall be at least 25 feet:

A. the sewage sludge is immediately incorporated;

B. the sewage sludge is surface applied and the intermittent stream does not discharge to any surface water; or

C. the sewage sludge is surface applied and the intermittent stream discharges to a surface water that is more than one mile downstream.

Statutory Authority: *MS s 116.07 subd 4*

7040.1806 SHORT-TERM DEWATERED SEWAGE SLUDGE STORAGE.

Subpart 1. **Spreading.** Sewage sludge in short-term storage shall be spread as soon as conditions permit. In no case shall the short-term storage of sewage sludge be in excess of 30 days. It is advisable that the short-term storage site be relocated each year the landspreading site is used.

Subp. 2. **Separation distances.** Separation distances for short-term sewage sludge storage areas shall be those provided in part 7040.1805 for landspreading

sites except that short-term storage of sewage sludge shall not be within 100 feet of any adjoining property without the written permission of the owner or within 100 feet of any road right-of-way.

Subp. 3. **Sloped land.** Short-term storage of sewage sludge shall not take place on land with a slope greater than two percent unless measures are taken to control water runoff or the sewage sludge is being spread concurrent with the unloading of sewage sludge delivery trucks.

Subp. 4. **Soil conditions.** The suitable soil conditions for short-term storage of sewage sludge shall be the same as those for landspreading sites in part 7040.1804.

Statutory Authority: *MS s 116.07 subd 4*

7040.1807 LONG-TERM DEWATERED SEWAGE SLUDGE STORAGE.

Subpart 1. **Sites.** Long-term storage of sewage sludge shall only be allowed at landspreading sites where the stored sewage sludge is to be applied. Long-term storage at one landspreading site of sewage sludge that is intended for application at several landspreading sites is allowed provided that all sites are owned by the same person and all sites are within a one-half mile radius.

Subp. 2. **Distance from residences.** Long-term storage of sewage sludge for landspreading areas of 40 acres or less shall not take place within 400 feet from any place of habitation. This separation distance shall increase 100 feet for every additional ten acres of landspreading area, or portion thereof, up to a maximum of 1,000 feet. Separation distances may be reduced if written permission is obtained from all persons inhabiting within the otherwise protected distance.

Subp. 3. **Distance from residential development or recreational area.** Long-term storage of sewage sludge shall not take place within 1,000 feet of any residential development or recreational area.

Subp. 4. **Distance from downgradient surface waters or floodplain.** Long-term storage of sewage sludge shall not take place within 1,000 feet of any downgradient surface waters or ten-year floodplain, unless measures are taken to control runoff in which case the separation distance may be reduced to 200 feet.

Subp. 5. **Slopes.** Long-term storage of sewage sludge shall not be allowed on land with greater than two percent slope unless measures are taken to control runoff, in which case the maximum land slope may be increased to six percent.

Subp. 6. **Water-holding capacity.** Long-term sewage sludge storage areas shall not be located in areas where the soil profile has less than eight inches of available water-holding capacity between the soil surface and the seasonal high water table and bedrock.

Subp. 7. **Soil permeability.** Long-term sewage sludge storage shall not take place in areas where the soil permeability is greater than six inches per hour throughout the top five feet of soil.

Subp. 8. **Duration of storage.** Long-term sewage sludge storage shall not take place in the same area for two or more consecutive years.

Subp. 9. **Exemption.** Conditions set forth in subparts 6, 7, and 8 are not required if measures are taken to control leachate generation from the area of long-term sewage sludge storage.

Statutory Authority: *MS s 116.07 subd 4*

7040.1808 PROHIBITED SITES AND OTHER LIMITATIONS.

Subpart 1. **Specifically prohibited sites.** Sewage sludge shall not be disposed of on or into any cave, sinkhole, or wetland. Except as part of a reclamation project, sewage sludge shall not be disposed of in or on any mine or quarry.

Subp. 2. **Owner's consent.** Sewage sludge shall not be applied on any land without the permission of the owner.

Subp. 3. **Organic soil or peat.** Organic soils or peat shall not be utilized for sewage sludge application unless subsurface drainage is provided by a system designed according to or equivalent to Soil Conservation Service engineering criteria.

Subp. 4. **Daily surface application limits.** Daily surface applications of liquid sewage sludge shall not exceed the following: for coarse-textured soil, 25,000 gallons per acre; for medium-textured soil, 15,000 gallons per acre; or for fine-textured soil, 10,000 gallons per acre.

Subp. 5. **Uniform spreading.** Sewage sludge shall be applied to land in such a manner as to provide uniform spreading or application over the entire site.

Subp. 6. **Boundaries.** The boundary of a landspreading site shall be identified prior to and during application with the use of conspicuous flags placed every 100 feet along the border unless apparent boundaries, such as fence rows, roads, tree lines, or steep slopes, exist.

Subp. 7. **Putrescible sewage sludge.** Putrescible sewage sludge, regardless of pathogen reduction process, shall be immediately incorporated into the soil.

Statutory Authority: *MS s 116.07 subd 4*

7040.1900 RECORD KEEPING.

A record keeping system shall be initiated and maintained by the political subdivision generating the sewage sludge that is applied at landspreading sites to verify compliance with parts 7040.1500 to 7040.1808. The information recorded in the system shall include the following:

A. required sewage sludge composition data pursuant to part 7040.1600, subpart 2;

B. soil test data for landspreading sites used during the year, pursuant to part 7040.1804, subpart 11;

C. the location of the landspreading and stockpile sites on a United States Geological Survey quadrangle or soil survey map and the number of acres to which sewage sludge was applied, if different from the submitted application;

D. the amount of sewage sludge applied that year and cumulatively expressed in terms of tons of sewage sludge solids per acre;

E. the known amount of available nitrogen applied that year expressed in terms of pounds per acre;

F. the amount of cadmium, zinc, lead, nickel, and copper applied that year and cumulatively expressed in terms of pounds per acre; and

G. vegetation grown on the site during the year.

Statutory Authority: *MS s 116.07 subd 4*

7040.2000 ANNUAL REPORTS.

The information in parts 7040.1800 to 7040.1808 shall be recorded on an agency form by the political subdivision and submitted annually to the agency no later than the March 1 next following the end of the reporting year. The form for annual reporting may be obtained from the commissioner.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

LANDSPREADING FACILITIES

7040.2500 MANAGEMENT REQUIREMENTS AND LIMITATIONS.

The following requirements and limitations in parts 7040.2600 to 7040.3100 apply to the management of landspreading facilities.

Statutory Authority: *MS s 116.07 subd 4*

7040.2600 GROUND WATER PROTECTION.

Subpart 1. **Performance standard.** A sewage sludge landspreading facility shall be designed, constructed, monitored, and maintained so that it will comply with the standards of chapter 7060 of the Minnesota Pollution Control Agency at the facility boundary.

Subp. 2. **Minimum design requirements.** The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with subpart 1 will be accomplished:

A. A minimum of six ground water monitoring wells shall be installed at the facility. Four wells shall be placed within the facility boundaries, two upgradient and two downgradient of ground water flow. The remaining two wells shall be placed within the area of landspreading. All wells shall be placed in the uppermost portion of the first aquifer below the landspreading facility that is currently being used or may be used in the future for drinking water purposes. All wells shall sample the same portion of the aquifer. At a minimum, the frequency of sampling shall be semiannually. The parameters to be tested for and a sampling frequency exceeding the minimum shall be determined by the commissioner and will be based upon soil permeabilities, depth to water table, direction of ground water flow in relation to the location of potable water supply wells, distance to potable water supply wells, sewage sludge application rates, sewage sludge quality, and suitability of the ground water as a source of potable drinking water.

B. A landspreading facility shall not be located on soils that have permeabilities of greater than six inches per hour throughout the profile above the water table.

C. Landspreading facilities shall not be located in areas where the soil profile has less than six inches of available water-holding capacity between the soil surface and the water table or bedrock.

D. Landspreading facilities shall be located at least 1,000 feet from potable water supply wells that are finished to a depth of less than 50 feet and are downgradient with respect to ground water flow direction.

E. Sewage sludge application rates shall supply no more nitrogen than the amount required by the vegetation to be grown at the facility. The rate of sewage sludge application shall be determined using the method outlined in part 7040.4600.

F. Any basin, tank, pit, or lagoon used to store liquid sewage sludge shall not seep at a rate greater than 500 gallons per acre per day. Any area at a landspreading facility used to store dewatered sewage sludge for a period in excess of one month per year shall be paved with asphalt or concrete to a depth sufficient to bear the weight of unloading and loading trucks and equipment without cracking. The pad shall be sloped and curbed to collect all runoff water. Runoff water shall be routed to a wastewater treatment facility or land applied in a manner approved by the commissioner.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.2700 SURFACE WATERS PROTECTION.

Subpart 1. **Performance standard.** A sewage sludge landspreading facility shall be designed, constructed, operated, and maintained so that it will not impact the use or the quality of surface waters.

Subp. 2. **Minimum design requirements.** The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with subpart 1 will be accomplished.

A. A sewage sludge landspreading facility shall not be located within 1,000 feet of the normal high water level of any lake or pond.

B. A sewage sludge landspreading facility shall not be located within 300 feet of any river or stream.

C. A sewage sludge landspreading facility shall not be located within a wetland.

D. A sewage sludge landspreading facility shall not be located within a hundred-year floodplain.

E. Surface sewage sludge application at a landspreading facility shall not take place within 100 feet of an intermittent stream unless it is immediately incorporated, in which case the separation distance may be reduced to 25 feet.

F. The commissioner may determine that discharge from a landspreading facility of subsurface water via underground drainage systems or of channelized runoff to surface waters should be monitored. Any required monitoring, parameters to be monitored for, and sampling frequency shall be determined by the commissioner based upon the following: discharge quantity; time of year discharge is expected; classification of receiving water; sewage sludge quality; sewage sludge application rate; source of channelized runoff; depth of tile drainage system; and purpose of tile drainage system.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.2800 PUBLIC HEALTH AND SAFETY.

Subpart 1. **Performance standard.** A sewage sludge landspreading facility shall be designed, constructed, operated, and maintained so that it will not adversely impact the health and safety of the public living near or passing by the facility. The facility shall comply with applicable provisions of parts 7005.0900 to 7005.0960 of the Minnesota Pollution Control Agency at the facility boundary.

Subp. 2. **Minimum design requirements.** The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with subpart 1 will be accomplished.

A. At a minimum, sewage sludge applied to a landspreading facility shall be treated by a process to significantly reduce pathogens.

B. Daily surface applications of liquid sewage sludge shall be limited to quantities that will infiltrate into the soil within 24 hours.

C. Unauthorized public access to a landspreading facility shall be controlled by fencing or posting of appropriate signs.

D. Any landspreading facility located within 10,000 feet of any airport runway used by turbojet aircraft or within 5,000 feet of any airport runway used by only piston-type aircraft shall have the approval of the Federal Aviation Administration.

Statutory Authority: *MS s 116.07 subd 4*

7040.2900 FOOD-CHAIN PROTECTION.

Subpart 1. **Performance standard.** A sewage sludge landspreading facility shall be designed, constructed, operated, and maintained so that the quality of food-chain crops grown at the facility complies with applicable regulations of the Food and Drug Administration, United States Department of Agriculture, and rules of the Minnesota Department of Agriculture.

Subp. 2. **Minimum design requirements.** The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with subpart 1 will be accomplished.

A. If crops for direct human consumption are to be grown at a landspreading facility within 18 months of sewage sludge application, the sewage sludge shall be treated by a process to further reduce pathogens.

B. If sewage sludge is to be applied to land used for pasturing livestock

or for growing forage crops, the pasturing or harvesting of the crop shall not take place for at least one month following the last sewage sludge application.

C. Sewage sludge containing concentrations of PCBs greater than ten milligrams per kilogram of sewage sludge solids shall be incorporated into the soil when applied to land used for producing food-chain crops.

D. Sewage sludge containing concentrations of PCBs equal to or greater than 50 milligrams per kilogram of sewage sludge solids shall not be landspread.

E. If the facility is used for growing a food-chain crop, vegetative tissue shall be sampled at the stage of development designated in part 7040.4400 and analyzed for cadmium if the pH of the soil and sewage sludge mixture is less than 6.5 immediately before the time food-chain crops are grown; or the annual application of cadmium exceeds one-half pound per acre on land used for the production of tobacco, leafy vegetables, or root crops grown for human consumption; or the annual cadmium application rate exceeds two pounds per acre on land used for the production of other food-chain crops.

F. The cumulative addition of cadmium to any land shall not exceed the levels in subpart 3, unless the only food-chain crop produced is animal feed; the pH of the soil and sewage sludge mixture is 6.5 or greater immediately before the time the crop is planted and this pH level is maintained whenever food-chain crops are grown; vegetative tissue is sampled at the stage of development designated in part 7040.4400 and analyzed for cadmium; there is a facility operating plan which demonstrates how the animal feed will be distributed to preclude ingestion by humans and which describes the measures to be taken to safeguard against possible health hazards from cadmium entering the food-chain, which may result from alternative land uses; and future property owners are notified by a stipulation in the land record or property deed of the amount of cadmium the property has received and that food-chain crops should not be grown due to a possible health hazard.

G. The cumulative addition of lead, zinc, copper, and nickel shall not exceed the levels in subpart 4 unless future property owners are notified by a stipulation in the land record or property deed of the amount of lead, zinc, copper, or nickel applied, whichever are in excess. The stipulation shall state that these levels may result in reduced crop yield.

Subp. 3. **Maximum cumulative addition of cadmium.**

Soil Cation Exchange Capacity (milliequivalents/100 grams)	Maximum Cumulative Cadmium Addition (pounds/acre)
Less than 5	5
5 - 15	10
More than 15	20

Subp. 4. **Maximum cumulative heavy metal addition.**

Soil Cation Exchange Capacity (milliequivalents/100 grams)	Maximum Cumulative Heavy Metal Addition (pounds/acre)			
	Lead	Zinc	Copper	Nickel
Less than 5	500	250	125	50
5 - 15	1000	500	250	100
More than 15	2000	1000	500	200

Statutory Authority: *MS s 116.07 subd 4*

7040.3000 RECORD KEEPING.

A record keeping system shall be initiated and maintained by the permittee of the landspreading facility to verify compliance with requirements and limita-

tions in parts 7040.2500 to 7040.2900. The information recorded in such a system shall include the following:

A. sewage sludge composition data for parameters outlined in part 7040.1600, subpart 2;

B. the quantity and rate of sewage sludge solids applied to the facility expressed in tons per acre;

C. the amount of available nitrogen applied to the facility expressed in pounds per acre;

D. the amount of cadmium, zinc, lead, nickel, and copper applied that year and cumulatively expressed in pounds per acre;

E. vegetation grown and use of vegetation grown at the facility;

F. results of required monitoring of ground water, soils, or vegetative tissue;

G. information required in the facility operating permit;

H. a description of any adverse environmental, health, or social effects, complaints, management problems, or other difficulties encountered during the year due to sewage sludge disposal; and

I. a report of any action not in compliance with the permit or parts 7040.2500 to 7040.2900.

At a minimum, the frequency of sewage sludge sampling and analysis shall be once a year. A frequency exceeding the minimum may be required by the commissioner at the time of permit issuance based on the following: sewage sludge characteristics; quantity of sewage sludge applied at the facility; frequency of sewage sludge application; and design wastewater treatment system daily flow.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*

7040.3100 ANNUAL REPORT.

The information and records prescribed in part 7040.3000 shall be organized into a report to be submitted annually to the agency no later than the March 1 next following the end of the reporting year.

Statutory Authority: *MS s 116.07 subd 4*

APPENDIXES

7040.4000 COLLECTION OF SEWAGE SLUDGE SAMPLES.

Subpart 1. **Liquid sewage sludge.** The following sampling and handling methods for liquid sewage sludge are recommended to obtain a sample that accurately represents the sewage sludge being sampled:

A. Daily grab samples of approximately one cup of sewage sludge are transferred to a two-gallon watertight container left in a refrigerator at four degrees Centigrade. After one month, the large composite sample is thoroughly mixed and a quart subsample removed for analysis. The quart subsample is delivered or shipped to the analytical laboratory as rapidly as possible in a very well-insulated shipping container. During very warm weather, the subsample is packed with dry ice to prevent microbial activity which would affect analytical values. If more than one day will elapse between sample collection and cold storage, enough sulfuric acid (H_2SO_4) is added to decrease the sewage sludge pH to about pH 1.0, which is approximately ten to 20 milliliters per quart, prior to shipping.

B. Random grab samples of equal volume are taken from different depths and locations in the storage lagoon, tank, or digester. Care is exercised to obtain samples from many varied sampling points. The grab samples are composited into a single container, thoroughly mixed, and a quart subsample removed for analysis. Subsample handling then proceeds as discussed in item A.

Subp. 2. **Dewatered sewage sludge.** The following sampling and handling method is recommended for dewatered sewage sludges that are stored in stockpiles, compost piles, or drying beds. The storage area is divided up into sections of equal size using an imaginary grid. Grab samples or cores are taken from the center of each section at several depths. The samples are then composited, thoroughly mixed, and a pint subsample removed for analysis. The subsample is delivered or shipped to the analytical laboratory as rapidly as possible in a well-insulated container.

Statutory Authority: *MS s 116.07 subd 4*

7040.4100 ANALYSIS OF SEWAGE SLUDGE.

Analytical procedures for determining constituents in sewage sludge samples shall be obtained from one of the following publications:

A. Methods for Chemical Analysis of Water and Wastes, issued by the United States Environmental Protection Agency as EPA-625/6-74-003 (1974);

B. Standard Methods for the Examination of Water and Wastes, 14th edition, issued by the American Public Health Association;

C. Analytical Procedures for Determining Organic Priority Pollutants in Municipal Sludges, issued by the United States Environmental Protection Agency as EPA 600/2-80-030 (1980); or

D. Method Development for Determination of Polychlorinated Hydrocarbons in Municipal Sludge, issued by the United States Environmental Protection Agency as EPA 600/2-80-029 (1980).

Statutory Authority: *MS s 116.07 subd 4*

7040.4200 COLLECTION OF SOIL SAMPLES.

At a minimum, one soil sample shall represent an area of no more than 40 acres. Additional soil samples may be required if there are areas differing greatly in previous fertilization, liming, cropping history, land management, or soil texture. The soil shall be sampled to a depth of six to nine inches from at least 15 to 20 random locations in the sampling area. The samples shall be composited, thoroughly mixed, and subsampled for analysis. Approximately one pint of soil is necessary for analysis.

Statutory Authority: *MS s 116.07 subd 4*

7040.4300 ANALYSIS OF SOILS.

Subpart 1. **Analytical methods.** Acceptable analytical methods for United States Department of Agriculture textural classification, organic matter, extractable phosphorus, exchangeable potassium, pH, and soluble salts are found in one or more of the following publications:

A. Guide to Computer Programmed Soil Test Recommendations in Minnesota, issued by the University of Minnesota, Agricultural Extension Service as Special Report No. 1 (Saint Paul, Minnesota, 1978);

B. Recommended Chemical Soil Test Procedures for the North Central Region, issued by the North Dakota State University as North Central Region Publication No. 221 (1975);

C. Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965);

D. Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples, issued by the Soil Conservation Service as Soil Survey Investigations Report 1 (revised) (Washington, D.C., United States Government Printing Office, 1972).

Subp. 2. **Cation exchange capacity.** Soil cation exchange capacity may be estimated on the basis of soil texture and organic matter content using the

following table or by direct analysis, either by the summation method for distinctly acid soils or the sodium acetate method for neutral, calcareous, or saline soils (Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965):

Cation Exchange Capacity

(milliequivalents/100 grams)

Soil Organic Matter Level

Texture	Low (less than 2%)	Medium (2-4%)	High (greater than 4%)
Coarse	less than 5	5 - 15	5 - 15
Medium	5 - 15	5 - 15	more than 15
Fine	more than 15	more than 15	more than 15

Subp. 3. **Water-holding capacity.** Available water-holding capacity measurements for different soil types and soil horizons may be found in Soil Conservation Service soil surveys or Soil Conservation Service soil interpretation sheets. Another acceptable alternative is the determination by direct analysis of soil samples. In general, the available water-holding capacity is the difference in water retained at 1/3 bar (1/10 bar for coarse-textured soil) and 15 bar matric suction. Acceptable procedures are discussed in the following publications:

A. Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples, issued by the Soil Conservation Service as Soil Survey Investigations Report 1 (revised) (Washington, D.C., United States Government Printing Office, 1972).

B. Chapter 8-2, "Water Retentivity of Soil at Specified Values of Matric Suction," in Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965).

Subp. 4. **Soil permeability.** Soil permeability measurements for different soil types and soil horizons can be found in Soil Conservation Service soil surveys and Soil Conservation Service soil interpretation sheets. Other acceptable alternatives include:

A. determination by direct measurements in the field as outlined in chapter 15, Field Measurement of Hydraulic Conductivity Above a Water Table, in Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965); or

B. determination in the laboratory using undisturbed soil samples as outlined in chapter 13, Laboratory Measurement of Hydraulic Conductivity of Saturated Soil, in Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965).

Subp. 5. **Water table.** The depth to the seasonal high water table for different soil types can be found in Soil Conservation Service soil surveys and Soil Conservation Service soil interpretation sheets. Other acceptable alternatives include:

A. determination of the depth of soil having mottles with a chroma of two or less as discussed on pages 48 and 49 of Soil Taxonomy, issued by the Soil Conservation Service as Agriculture Handbook No. 436 (Washington, D.C., United States Government Printing Office, 1975); or

B. measurement of water levels at monthly intervals over the course of one year in piezometers. The highest water level measurement obtained is

acceptable as the seasonal high water table. The piezometers must be installed and water levels must be measured as outlined in chapter 11, Hydraulic Head, in Methods of Soil Analysis, edited by C.A. Black, issued by the American Society of Agronomy as Agronomy Monograph No. 9 (Madison, Wisconsin, 1965).

Statutory Authority: *MS s 116.07 subd 4*

7040.4400 COLLECTION AND ANALYSIS OF VEGETATIVE TISSUE SAMPLES.

Subpart 1. **Sample collection.** Samples collected shall adequately represent the average condition of the vegetation grown at the landspreading facility. This is best accomplished by compositing many grab samples followed by subsampling to a quantity sufficient for chemical analysis. Areas that are managed differently, for example different soil type, crop, sewage sludge application rate, application method, shall be sampled separately. A sample shall represent an area no larger than ten acres.

Samples shall be taken from the following plant parts at the designated stages of development:

A. corn, leaf at, or opposite and below, ear level, at silking stage;

B. soybeans, the youngest mature leaves and petioles on the plant after first pod formation;

C. legumes, upper stem cuttings in early flower stage;

D. cereals, the whole plant at the boot stage; and

E. grasses, whole plants at early hay cutting stage.

Subp. 2. **Sample handling and preservation.** All samples should be washed with deionized or distilled water to remove any surface contamination. Samples are then dried at 55 degrees Centigrade as quickly as possible, ground, and stored for analysis. If samples cannot be dried immediately, they shall be placed in plastic bags and stored in a refrigerator.

Subp. 3. **Sample analysis.** Dried and ground tissue samples may be prepared for analysis by wet digestion in a suitable combination of nitric, sulfuric, or perchloric acid or by dry ashing at a temperature not to exceed 500 degrees Centigrade. Cadmium shall then be analyzed by using atomic absorption or flame emission spectroscopy.

Statutory Authority: *MS s 116.07 subd 4*

7040.4500 COLLECTION AND ANALYSIS OF GROUND WATER SAMPLES.

Subpart 1. **Sample collection.** Construction and sampling of ground water monitoring wells at sewage sludge landspreading facilities shall be consistent with methods discussed in either of the following publications:

A. Water Quality Monitoring at Solid Waste Disposal Sites in Minnesota, issued by the Minnesota Pollution Control Agency (May 1979); or

B. Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities, issued by the United States Environmental Protection Agency as EPA/530/SW-611 (August 1977).

Subp. 2. **Sample analysis.** Analytical procedures for determining constituents in ground water collected in monitoring wells at sewage sludge landspreading facilities shall be obtained from one of the following publications:

A. Methods for Chemical Analysis of Water and Wastes, issued by the United States Environmental Protection Agency as EPA-625/6-74-003 (1974); or

B. Standard Methods for the Examination of Water and Wastes, 14th edition, issued by the American Public Health Association.

Statutory Authority: *MS s 116.07 subd 4*

7040.4600 DETERMINATION OF SEWAGE SLUDGE APPLICATION RATE BASED ON CROP NITROGEN REQUIREMENTS.

Subpart 1. **In general.** Sewage sludge application rates shall be based upon soil texture, crop nitrogen requirements and yield goals, sewage sludge nitrogen availability, carryover nitrogen supplied by past sewage sludge applications, and available nitrogen added by manures or fertilizers. The procedures in subparts 2 to 9 shall be used.

Subp. 2. **Maximum allowable available nitrogen level.** Based on cropping practices and soil texture, determine the maximum allowable available nitrogen level in pounds per acre from the tables in subparts 3 and 4. Maximum allowable nitrogen levels for crops not listed in these exhibits shall be based on agricultural extension, Soil Conservation Service, or University of Minnesota recommendations.

Subp. 3. **Maximum allowable available nitrogen levels for various crops, yields, and soil textures.**

		Maximum Allowable Available Nitrogen Level (pounds/acre)		
		Soil Texture		
Crop	Yield/Acre	Coarse	Medium	Fine
Alfalfa	4 ton	180	210	230
	6 ton	280	340	370
Barley	80 bushel	100	110	120
Bluegrass	3 ton	180	210	230
Corn	75 bushel	100	120	130
	100 bushel	130	150	160
	125 bushel	150	180	190
	150 bushel	180	210	230
	175 bushel	210	250	270
Oats	75 bushel	80	90	100
	100 bushel	130	150	160
Soybeans	30 bushel	120	140	150
	40 bushel	180	210	230
	50 bushel	230	270	300
	60 bushel	280	340	370
Wheat	50 bushel	100	120	130
	75 bushel	160	180	190

Subp. 4. **Maximum allowable available nitrogen levels for non-cropped, non-harvested areas.**

	Maximum Allowable Available Nitrogen Level (pounds/acre)		
Degree of	Soil Texture		
Vegetative Cover	Coarse	Medium	Fine
High density (more than 50 percent cover)	75	100	125
Low density (25-50 percent cover)	50	75	100
Fallow (less than 25 percent cover)	0	50	75

Subp. 5. **Carryover nitrogen.** Determine carryover nitrogen from the previous year's sewage sludge application using the following formula:

Carryover N (pounds per acre) = (percentage organic sewage sludge N) x (tons sewage sludge solids applied per acre).

If sewage sludge was not applied the previous year, carryover nitrogen is zero.

Subp. 6. **Net allowable available nitrogen level.** To determine the net allowable available nitrogen level in pounds per acre subtract carryover nitrogen, nitrogen added from other sources such as fertilizer or animal manure, if known, and available nitrogen applied the previous year to fallow land, from the maximum allowable available nitrogen level.

Subp. 7. **Sewage sludge available nitrogen.** Determine the available nitrogen in sewage sludge in pounds per ton using the appropriate formula in subpart 8.

Subp. 8. **Formulas for determination of available nitrogen in sewage sludge.** Pounds of available nitrogen per ton of sewage sludge solids.

Type of Stabilization	Application Method	Formula
Digested	Surface	(% organic-N x 4)+(%NH_3-N x 10)
	Incorporated or Injected	(% organic-N x 4)+(%NH_3-N x 15)
Chemically or Physically Stabilized or Unstabilized	Surface	(% organic-N x 6)+(%NH_3-N x 10)
	Incorporated or Injected	(% organic-N x 6)+(%NH_3-N x 15)

Subp. 9. **Sewage sludge application rate.** Divide the net allowable available nitrogen level in pounds per acre from subpart 6 by the available nitrogen in sewage sludge in pounds per ton from subparts 7 and 8 to obtain the sewage sludge application rate in tons of solids per acre per year.

Statutory Authority: *MS s 116.07 subd 4*

7040.4700 PATHOGEN REDUCTION PROCESSES.

Subpart 1. **Processes to significantly reduce pathogens.** Items A to E contain processes to significantly reduce pathogens:

A. Aerobic digestion is a process conducted by agitating sewage sludge with air or oxygen to maintain aerobic conditions at residence times ranging from 60 days at 15 degrees Centigrade to 40 days at 20 degrees Centigrade. The level of volatile solids in the sewage influent must be reduced by at least 38 percent after processing.

B. Air drying is a process by which liquid sewage sludge not exceeding nine inches in depth is allowed to drain and/or dry on underdrained sand beds or paved basins. A minimum of three months is needed, two months of which temperatures average on a daily basis above zero degrees Centigrade.

C. Anaerobic digestion is a process conducted in the absence of air at residence times ranging from 60 days at 20 degrees Centigrade to 15 days at 35 degrees Centigrade to 55 degrees Centigrade. The level of volatile solids in the sewage influent must be reduced by at least 38 percent after processing.

D. In composting by means of the within vessel, static aerated pile, or windrow composting methods, the sewage sludge is maintained at minimum operating conditions of 40 degrees Centigrade for five days. For four hours during this period the temperature exceeds 55 degrees Centigrade.

E. Lime stabilization is a process by which sufficient lime is added to produce a pH of 12 after two hours of contact.

F. The commissioner may determine that other methods or operating conditions are acceptable if pathogens, vector attraction, and volatile solids of the waste are reduced to an extent equivalent to the reduction achieved by any

of the methods listed in items A to E, or to an extent necessary for the proposed landspreading operation. The commissioner's decision shall be based upon:

(1) sewage sludge residence time;

(2) temperatures achieved during treatment;

(3) duration of sewage sludge storage;

(4) method of sewage sludge application;

(5) crop or crops to which sewage sludge is applied;

(6) potential impact of runoff on surface waters;

(7) location of landspreading area with respect to places of habitation, residential developments, and recreational areas; and

(8) degree of public access control.

Subp. 2. **Processes to further reduce pathogens.** Items A to D contain processes to further reduce pathogens:

A. Composting consists of the aerobic thermophilic decomposition of organic constituents to a relatively stable, humus like material. High temperature composting methods which will further reduce pathogens are:

(1) Windrow, consisting of an unconfined composting process involving periodic aeration or mixing of uninsulated compost piles. At least five turnings must occur during a period of 15 days when the temperature of the mixture is at least 55 degrees Centigrade.

(2) Static aerated pile, consisting of an unconfined composting process involving mechanical aeration of insulated compost piles. The sewage sludge in the insulated pile is maintained at operating conditions of 55 degrees Centigrade or greater for three days.

(3) Within vessel, consisting of a confined composting process involving mechanical mixing of compost under controlled environmental conditions so that the sewage sludge is maintained at operating conditions of 55 degrees Centigrade or greater for three days.

B. Heat drying consists of a process by which dewatered sewage sludge cake is dried by direct or indirect contact with hot gases and moisture content is reduced to ten percent or lower. Sewage sludge particles must reach temperatures in excess of 80 degrees Centigrade, or the wet bulb temperature of the gas stream in contact with the sewage sludge at the point where it leaves the dryer must be in excess of 80 degrees Centigrade.

C. Heat treatment consists of a process by which liquid sewage sludge is heated to temperatures of 180 degrees Centigrade for 30 minutes.

D. Thermophilic aerobic digestion consists of a process by which liquid sewage sludge is agitated with air or oxygen to maintain aerobic conditions at residence times of ten days at 55 to 60 degrees Centigrade. The level of volatile solids in the sewage influent must be reduced by at least 38 percent after processing.

E. The commissioner may determine that other methods or operating conditions are acceptable if pathogens, vector attraction, and volatile solids of the sewage sludge are reduced to an extent equivalent to the reduction achieved by the methods in items A to D.

Statutory Authority: *MS s 116.07 subd 4*

History: *L 1987 c 186 s 15*