

Minnesota Attorney General: Administrative Rules Proceedings

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Version 3
August 20, 2018

Our File No. 801

4/16 H. Bateson requested to send/incorp. by Ref approved 4/16 rec'd

RULE REVIEW CHECKLIST

DATE RULE RECEIVED 4-5-82
DATE FOR REVIEW 4-14-82
DATE DUE 4-19-82

Adopted w/a hearing _____
Adopted w/o hearing ✓
Temporary rule _____

Approved 4-19-82 Disapproved _____ Returned to Agency 4-20-82

Resubmitted _____ Due _____
Approved _____ Disapproved _____ Returned to Agency _____

Date filed w/Secretary of State 4-20-82 Revisor approved 4/16/82 disapproved 4/9/82

✓ Rule as Adopted

✓ Rule as Proposed see SR.

✓ Order Adopting 3.9.82. Date

✓ Notice of Intent to Solicit Outside Opinion SR. 3.9.81 + Comments

✓ Order for rulemaking
N/A date of Hearing

✓ Certificate of Board's Authorizing Resolution

✓ Notice of rulemaking
✓ Sufficiency

✓ Affidavit of Mailing Notice or rulemaking
12.21.81 At least 30 days prior to hearing/adoption

✓ Mailing list Certificate

✓ Publication in State Register
12.28.81 At least 30/~~20~~ days prior to ~~hearing~~/adoption

N/A Hearing Examiner's Report

Chief Hearing Examiner's Report(s)
_____ Approving H.E.'s Report
_____ Approving agency action

✓ Agency's Findings of Fact

N/A LCRAR Report or agency Affidavit

✓ Certificate of Board's Resolution "Adopting" Rules - labelled "Authorizing"

✓ Order Approving Incorporation by Reference

✓ Statement of Need and Reasonableness

N/A Petition for Adoption of a Rule

✓ Record (includes transcript or tape, exhibits, comments received by agency, requests for a hearing, and other ~~relevant~~ materials)

✓ Certificate of Compliance w/Rulemaking Procedures

✓ Affidavit of Mailing Notice of Submission to Attorney General

✓ Notice of Submission to the Attorney General

STATE OF MINNESOTA

DEPARTMENT ATTORNEY GENERAL

Office Memorandum

TO : LOUIS J. BREIMHURST
Executive Director

DATE: 4/19/82

ATTN : MARLENE E. SENECHAL, Spec. Ass't. Atty. Gen.

FROM : LARRY D. STARNS
Special Assistant
Attorney General

PHONE: 297-3493

SUBJECT: In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

Enclosed herewith are the rules you have submitted for approval. These rules have been approved by this office and filed with the Secretary of State. Please note that they have not been filed with the State Register. This must be done promptly by your agency.

Upon receipt and before transmittal to your agency, however, it is important that you recheck these rules as to:

1. Affixation of stamps of the Attorney General and Secretary of State;

2. Coverage by these stamps of all rules submitted; and

3. Inclusion of all pages to the rules in the approved set.

If you have any questions in this regard, please contact me.

LDS:drw
Encs.

cc: Ms. Kathy Burek
Mr. Duane Harves

STATE OF MINNESOTA
OFFICE OF THE ATTORNEY GENERAL
ST. PAUL 55155

WARREN SPANNAUS
ATTORNEY GENERAL

April 2, 1982

ADDRESS REPLY TO:
ATTORNEY GENERAL'S OFFICE
POLLUTION CONTROL DIVISION
1935 WEST COUNTY ROAD B-2
ROSEVILLE, MN 55113
TELEPHONE: (612) 296-7342

Mr. Jerry Anderson
Special Assistant Attorney General
Office of the Attorney General
G-25 State Administration Building
50 Sherburne Avenue
St. Paul, Minnesota 55155

Re: In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

Dear Mr. Anderson:

In accordance with Minn. Stat. § 15.0412, subd. 4h (1981 Supp.) the above-captioned rule is hereby submitted to you for your review.

The following documents are enclosed:

1. Rule as adopted. (Original and three copies. Because the clean copy of the rule will ultimately be printed by the Office of the Revisor and accordingly stamped, we have not submitted a clean copy to you for your review. Note that the Order adopting does indicate the necessary changes to the proposed rule.)

2. Order Adopting (two copies).

3. Certificate of Board's Resolution Adopting a Rule.

4. Notice of Intent to Solicit Outside Opinion.

5. Affidavit of Steven Stark with attached comments.

6. Order for Notice of Intent to Adopt a Rule Without Public Hearing.

7. Certificate of Board's Authorizing Resolution (Ordering Notice).

8. Notice of Intent to Adopt a Rule Without a Public Hearing.

9. Affidavit of Mailing Notice of Intent to Adopt a Rule Without Public Hearing, Notice, and Mailing List.

10. Mailing List Certificate.

11. Rule as Proposed.

12. Findings of Fact and Conclusions.

13. Statement of Need and Reasonableness.

14. Affidavit of Rodney Massey regarding comments submitted to the Agency.

15. Affidavit of mailing notice of submission to the Attorney General, Notice and Mailing List.

16. Certificate of Compliance with Rulemaking Procedures.

Unless it is otherwise indicated, I have enclosed only one copy of the above-listed documents.

If you have any questions, please call me at 296-7346.

Sincerely,

MARLENE E. SENECHAL
Special Assistant
Attorney General

MES:cg
Enclosures
cc: Ann Bateson

Minnesota Pollution Control Agency

Adopted Rules Governing Sewage Sludge Management (6 MCAR S 4.6101, 6 MCAR S 4.6102, 6 MCAR S 4.6103, 6 MCAR S 4.6104, 6 MCAR S 4.6105, 6 MCAR S 4.6106, 6 MCAR S 4.6107, 6 MCAR S 4.6108, 6 MCAR S 4.6111, 6 MCAR S 4.6112, 6 MCAR S 4.6121, 6 MCAR S 4.6122, 6 MCAR S 4.6131, 6 MCAR S 4.6132, 6 MCAR S 4.6133, 6 MCAR S 4.6134, 6 MCAR S 4.6135, 6 MCAR S 4.6136)

Rules as Adopted

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Chapter Five: General Provisions

6 MCAR S 4.6101 Purpose and scope. The purpose of 6 MCAR SS 4.6101-4.6136 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 Minn. Stat. S 116.07, subd. 4, these rules establish standards for the design, location, and operation of sewage sludge landspreading sites and facilities.

6 MCAR S 4.6102 Permit and letter of approval requirements.

A. Landspreading.

1. The following persons shall comply with the requirements of 6 MCAR SS 4.6101-4.6136:

a. political subdivisions that landspread sewage sludge;

b. persons who own, lease, or rent landspreading facilities; and

c. persons who are under contract to a. or b. to landspread sewage sludge or to operate a landspreading facility.

2. The persons identified in 1. shall apply for, and be copermittees of, a state disposal system permit for landspreading facilities.

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

4. Each existing and proposed landspreading site shall have a letter of approval at the time given in Exhibit 6 MCAR S 4.6102 A.4.-1, unless it possesses a current letter of approval. Each existing landspreading facility shall have a state disposal system permit at the time given in Exhibit 6 MCAR S 4.6102 A.4.-1, unless it possesses a current permit. Each proposed landspreading facility shall have a state disposal system permit prior to development and use.

Exhibit 6 MCAR S 4.6102 A.4.-1

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

B. Incineration. Incineration of sewage sludge is governed by rule APC 28 of the Minnesota Pollution Control Agency.

C. Other facilities. Any facility for the processing, storage, or disposal of sewage sludge into or on any land by means other than regulated by 6 MCAR SS 4.6101-4.6136 is prohibited without an agency permit.

6 MCAR S 4.6103 Definitions. For the purpose of 6 MCAR SS 4.6101-4.6136, the following terms have the meanings given them.

A. Agency. "Agency" means the Minnesota Pollution Control Agency.

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

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

D. Available nitrogen. "Available nitrogen" means nitrogen which is present in inorganic forms that are useable by plants, and which may be determined by procedures set out in 6 MCAR S 4.6135.

E. 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 6 MCAR S 4.6132 B.3.

F. Bedrock outcrop. "Bedrock outcrop" means any bedrock that appears at the surface of the land.

G. 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. Rule 6 MCAR S 4.6132 B.2. provides acceptable methods of determining cation exchange capacity.

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

I. 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.

J. 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.

K. Director. "Director" means the executive director or other designated representative of the Minnesota Pollution Control Agency.

L. 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.

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

N. Hundred-year floodplain. "Hundred-year floodplain," as

defined in 6 MCAR S 4.8051 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.

O. 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.

P. 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 Supplement 1 of 6 MCAR SS 4.8024 and 4.8025 are included within this definition.

Q. Lakes and ponds. "Lakes and ponds" means any water basins defined as water basins and public waters in Minn. Stat. S 105.37, subds. 9 and 14 respectively.

R. Landspreading. "Landspreading" means placement of sewage sludge on or incorporated into the soil surface.

S. 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.

T. 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.

U. 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.

V. Mine. "Mine" means any excavation for minerals.

W. Organic priority pollutant. "Organic priority pollutant" means the organic compounds that appear in 40 Code of Federal Regulations, Section 401.15 (1981).

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

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

Z. Person. "Person," as defined in Minn. Stat. S 116.06, subd. 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.

AA. Place of habitation. "Place of habitation" means any house, apartment, mobile 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.

BB. Political subdivision. "Political subdivision" as defined in Minn. Stat. S 115A.03, subd. 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.

CC. 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 6 MCAR S 4.6136.

DD. 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 6 MCAR S 4.6136.

EE. 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.

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

GG. 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.

HH. 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.

II. Rivers and streams. "Rivers and streams" means any watercourses defined as natural watercourses or altered natural watercourses and public waters in Minn. Stat. S 105.37, subds. 10, 11, and 14 respectively.

JJ. 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.

KK. Root crops. "Root crops" means plants whose edible parts are grown below the soil surface.

LL. 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 6 MCAR S 4.6132 B.5.

MM. Sewage sludge. "Sewage sludge," as defined in Minn. Stat. S 115A.03, subd. 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.

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

OO. 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.

PP. 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.

QQ. Soil Conservation Service. "Soil Conservation Service" means the Soil Conservation Service of the United States Department of Agriculture.

RR. 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.

SS. 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 6 MCAR S 4.6132 B.1.

TT. Soil texture. "Soil texture" means the relative portion of the soil separates sand, silt, and clay. It can be measured using methods addressed in 6 MCAR S 4.6132 B.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.

UU. 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.

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

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

XX. 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.

YY. Surface water. "Surface water" means any lake or pond, and any river or stream as defined in Q. and II., respectively.

ZZ. 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.

AAA. 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.

BBB. 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 Minn. Stat. S 105.37, subd. 14, and which is ten or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

6 MCAR S 4.6104 Variance. Any person may apply for a variance from any requirement of 6 MCAR SS 4.6101-4.6136. Variances shall be applied for and acted upon by the agency in accordance with Minn. Stat. S 116.07, subd. 5 and other applicable statutes and rules.

6 MCAR S 4.6105 Application requirements for landspreading sites. Applications for letters of approval for sewage sludge landspreading sites shall include the specific information given in A.-E. Submittal of this information shall be made using a form obtained from the director.

A. Sewage sludge characterization. Applications shall contain sewage sludge characterization.

1. 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.

2. 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 6 MCAR S 4.6111 A.5. The dates of sampling and analysis shall be included with the analysis.

B. Site characterization. Applications shall contain site characterization.

1. 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:

a. texture and thickness of each soil horizon to 60 inches of depth;

b. permeability of each soil horizon to 60 inches of depth;

c. available water-holding capacity of each soil horizon to 60 inches in depth;

d. soil depth required to obtain six inches of

available water-holding capacity;

e. depth to seasonal high water table;

f. depth to bedrock; and

g. slope of land surface.

2. 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:

a. lakes and ponds;

b. rivers and streams;

c. wetlands;

d. intermittent streams;

e. ten-year flood plains;

f. sinkholes, caves, bedrock outcrops, mines, or quarries;

g. potable water supply wells;

h. places of habitation;

i. recreational areas;

j. residential developments;

k. road right-of-ways; and

l. airports.

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

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

5. Required sampling and analytical procedures of soil characteristics listed in a. to g. are provided in 6 MCAR S 4.6132. Applications shall contain the following soil characteristics which shall be determined from samples obtained within six months of application submittal:

a. United States Department of Agriculture textural classification;

b. percentage of organic matter;

c. extractable phosphorus in pounds per acre;

d. exchangeable potassium in pounds per acre;

e. pH;

f. soluble salts expressed in millimhos per centimeter; and

g. cation exchange capacity expressed in milliequivalents per 100 grams.

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

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

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

C. Site management. Applications shall include site management. This includes the following:

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

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

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

4. 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;

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

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

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

D. 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:

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

2. The location of the storage area delineated on maps submitted pursuant to B.1. and B.2.

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

4. The acreage of the sewage sludge storage area.

5. The quantity of sewage sludge to be stored.

6. 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:

a. texture and thickness of each soil horizon encountered;

b. color and presence or absence of mottling for each soil horizon encountered;

c. depth to water table, if encountered; and

d. depth to bedrock, if encountered.

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

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

9. 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.

E. 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.

6 MCAR S 4.6106 Application requirements for landspreading facilities. Applications for state disposal system permits for sewage sludge landspreading facilities shall include the information required by A.-D.

A. Information required for letters of approval. The application shall contain all information required in 6 MCAR S 4.6105 A., B., and C. for letters of approval for landspreading sites.

B. Ground water quality. Applications shall contain present ground water quality for the following parameters:

1. pH;

2. electrical conductivity expressed in millimhos per centimeter;

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

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

5. chlorides expressed in milligrams per liter;

6. sulfates expressed in milligrams per liter;

7. total organic carbon expressed in milligrams per liter;

8. nitrate-nitrogen expressed in milligrams per liter;

9. total phosphorus expressed in milligrams per liter;

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

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

12. 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 6 MCAR S 4.6134.

C. 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:

1. location on required soil map;

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

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

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

1. facility type and capacity;

2. frequency of sewage sludge addition to and removal

from the storage facility; and

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

E. Additional information. The information in 1.-3. shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes to apply available nitrogen in excess of that stipulated in 6 MCAR S 4.6121 A.2.e., cadmium in excess of two pounds per acre per year, or metals in excess of levels stipulated in Exhibits 6 MCAR S 4.6121 D.2.f.-1 or D.2.g.-2. The information in 4., 5., 6., or 7., whichever is applicable, shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes not to comply with one or more of the minimum design requirements in 6 MCAR S 4.6121.

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

a. type of and depth to bedrock;

b. bedrock condition, such as fractures, faults, and channels;

c. texture of unconsolidated material above bedrock;

d. depth to hydrostatic ground water table;

e. direction of ground water flow and rate of movement;

f. ground water recharge and discharge areas;

g. available well boring logs for any public or private, potable or non-potable water supply wells;

h. present ground water quality and use; and

i. 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.

2. 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:

a. location and depth of boring;

b. soil classification using the Unified system for each soil horizon encountered;

c. color and presence or absence of mottling for each soil horizon encountered; and

d. water level measurement.

3. Utilizing the information in 1. and 2., the application shall contain an evaluation of the potential for impacting aquifer quality based on proposed facility management practices.

4. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 A.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 A.2. cannot be accomplished.

5. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 B.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 B.2. cannot be accomplished.

6. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 C.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 C.2. cannot be accomplished.

7. It shall also contain a description and evaluation of the provisions, practices and site features that will be utilized to comply with 6 MCAR S 4.6121 D.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 D.2. cannot be accomplished.

6 MCAR S 4.6107 Administration of letters of approval.

A. Review. All applications shall be reviewed for completeness by the director. If the application is incomplete, the director shall promptly advise the applicant of the

incompleteness. Further processing of the application may be suspended until the applicant has supplied the necessary information.

B. Preparation of preliminary determinations. The director 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.

1. If the preliminary determination is to deny an approval, the director 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, rule MPCA 3 of the Minnesota Pollution Control Agency.

2. If the preliminary determination is to issue an approval, the procedures set out in C. and D. shall apply.

C. Public participation.

1. The director 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 director to have an interest in the proposed approval.

2. 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 director.

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

D. Final determination.

1. The director shall attempt to resolve all comments prior to a final determination concerning the application. If such comments have been resolved, the director shall issue or deny the approval.

2. 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 rule WPC 36(k) of the Minnesota Pollution Control Agency.

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

E. Denial of approval.

1. 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.

2. Notice of denial and reasons for the denial shall be issued to the persons listed in C.1.

F. Modification, suspension, and revocation of letters of approval. A letter of approval may be modified, suspended, or revoked in accordance with the requirements of rule WPC 36(s) of the Minnesota Pollution Control Agency.

G. 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 6 MCAR SS 4.6101-4.6136 for the duration of the requested approval period.

H. 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.

6 MCAR S 4.6108 Administration of state disposal system permits. The administration of state disposal system permits for landspreading facilities shall be governed by rule WPC 36 of the Minnesota Pollution Control Agency.

6 MCAR S 4.6111 Requirements and limitations. The following requirements and limitations apply to the management of landspreading sites.

A. Sewage sludge sampling and analysis.

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

2. 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.

3. 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.

4. Other recommended sampling and handling procedures are provided in 6 MCAR S 4.6131.

5. Sewage sludge shall be analyzed according to methods set forth in 6 MCAR S 4.6131 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.

6. The minimum frequency of sewage sludge sampling and analysis is given in Exhibit 6 MCAR S 4.6111 A.6.-1.

Exhibit 6 MCAR S 4.6111 A.6.-1

Minimum Frequency of Sewage Sludge Sampling and Analysis

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

7. Each parameter exceeding concentrations listed in Exhibit 6 MCAR S 4.6111 A.7.-2 shall be analyzed for at two or three times the minimum frequency given in Exhibit 6 MCAR S 4.6111 A.6.-1.

Exhibit 6 MCAR S 4.6111 A.7.-2

Greater Frequency of Sewage Sludge Sampling and Analysis

	Concentration Expressed in Milligrams/ Kilogram of Dry Weight	
Parameter	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

8. Frequency of sewage sludge sampling and analysis may be reduced by the director depending on the annual frequency of landspreading and the variability of sewage sludge quality.

B. Pathogen control.

1. Sewage sludge, at a minimum, shall be treated by a process to significantly reduce pathogens prior to landspreading.

2. 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.

3. 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.

4. 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.

5. 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 ~~and~~ or posting ~~are~~ is not required ~~if~~ unless inadvertant public contact is ~~deemed unlikely~~ likely.

C. Soil pH and cadmium application.

1. 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.

2. 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.

3. Cumulative cadmium application to any landspreading site shall not exceed the levels provided in Exhibit 6 MCAR S 4.6111 C.3.-3.

Exhibit 6 MCAR S 4.6111 C.3.-3

Maximum Cumulative Cadmium Application

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

D. Cumulative heavy metal additions. Sewage sludge application shall be terminated when the sum addition of any one heavy metal equals the level in Exhibit 6 MCAR S 4.6111 D.-4 for that particular heavy metal and soil.

Exhibit 6 MCAR S 4.6111 D.-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

E. Sewage sludge application rates.

1. 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 6 MCAR S 4.6135.

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

3. 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.

4. 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.

F. Organic priority pollutant limitations.

1. Sewage sludge containing concentrations of PCBs equal to or greater than 10 milligrams per kilogram of sewage sludge solids shall be incorporated into the soil when applied to land used for producing food-chain crops.

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

3. 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.

G. Suitable soil conditions.

1. 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.

2. For the purpose of 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.

3. For the purpose of 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.

4. 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.

5. 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.

6. 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.

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

8. 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.

9. Sewage sludge shall not be spread on areas ponded with

water or sewage sludge.

10. 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.

11. 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 6 MCAR S 4.6132:

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.

H. Separation distances.

1. 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 ~~the appropriate party~~ all persons responsible for residential developments and places of recreation and all persons inhabiting within the otherwise protected distance.

2. 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.

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

4. Land application of sewage sludge shall be conducted so that sewage sludge is not applied to adjoining property or to road right-of-ways.

5. 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.

6. The minimum distances in Exhibit 6 MCAR S 4.6111 H.6.-5 from any downgradient surface water shall be maintained where sewage sludge is immediately incorporated into the soil.

Exhibit 6 MCAR S 4.6111 H.6.-5

Minimum Distances From Downgradient Surface Water.

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

7. 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.

I. Short-term dewatered sewage sludge storage.

1. 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.

2. Separation distances for short-term sewage sludge storage areas shall be those provided in H. 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.

3. 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.

4. The suitable soil conditions for short-term storage of sewage sludge shall be the same as those for landspreading sites in G.

J. Long-term dewatered sewage sludge storage.

1. 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.

2. 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 ~~the appropriate party~~ all persons inhabiting within the otherwise protected distance.

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

4. 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.

5. 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.

6. 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.

7. 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.

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

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

K. Prohibited sites and other limitations.

1. 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.

2. Sewage sludge shall not be applied on any land without the permission of the owner.

3. 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.

4. 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.

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

6. 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.

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

6 MCAR S 4.6112 Record keeping and annual reporting.

A. 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 6 MCAR S 4.6111. The information recorded in the system shall include the following:

1. required sewage sludge composition data pursuant to 6 MCAR S 4.6111 A.5.;

2. soil test data for landspreading sites used during the year, pursuant to 6 MCAR S 4.6111 G.11.;

3. 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;

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

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

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

7. vegetation grown on the site during the year.

B. Reports. The information in A. 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 director.

Chapter Seven: Landspreading Facilities

6 MCAR S 4.6121 Requirements and limitations. The following requirements and limitations apply to the management of landspreading facilities.

A. Ground water protection.

1. A sewage sludge landspreading facility shall be designed, constructed, monitored, and maintained so that it will comply with the standards of rule WPC 22 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 ~~well~~ water purposes. All wells shall sample the same portion of the aquifer. At a minimum, the frequency of sampling shall be semi-annually. The parameters to be tested for and a sampling frequency exceeding the minimum shall be determined by the director 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 6 MCAR S 4.6135.

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 director.

B. Surface waters protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 director 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 director 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.

C. Public health and safety.

1. 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 rule APC 9 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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.

D. Food-chain protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 6 MCAR S 4.6133 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 Exhibit 6 MCAR S 4.6121 D.2.f.-1, 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 6 MCAR S 4.6133 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.

Exhibit 6 MCAR S 4.6121 D.2.f.-1

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

g. The cumulative addition of lead, zinc, copper, and nickel shall not exceed the levels in Exhibit 6 MCAR S 4.6121 D.2.g.-2 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.

Exhibit 6 MCAR S 4.6121 D.2.g.-2

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

6 MCAR S 4.6122 Record keeping and annual reporting.

A. Record keeping. A record keeping system shall be initiated and maintained by the permittee of the landspreading facility to verify compliance with requirements and limitations in 6 MCAR S 4.6121. The information recorded in such a system shall include the following:

1. sewage sludge composition data for parameters outlined in 6 MCAR S 4.6111 A.5.;

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

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

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

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

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

7. information required in the facility operating permit;

8. 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

9. a report of any action not in compliance with the permit or 6 MCAR S 4.6121.

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 director 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.

B. Reports. The information and records prescribed in A. 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.

Chapter Eight: Appendices

6 MCAR S 4.6131 Collection and analysis of sewage sludge samples.

A. Collection of sewage sludge samples.

1. 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 4 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 10 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 a.

2. 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.

B. Analysis of sewage sludge. Analytical procedures for determining constituents in sewage sludge samples shall be

obtained from one of the following publications:

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

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

3. '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).

4. '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).

6 MCAR S 4.6132 Collection and analysis of soil samples.

A. 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.

B. Analysis of soils.

1. 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 (St. 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).

2. Soil cation exchange capacity may be estimated on the basis of soil texture and organic matter content using Exhibit 6 MCAR S 4.6132 B.2.-1 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).)

Exhibit 6 MCAR S 4.6132 B.2.-1

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

3. 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).

4. 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).

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).

5. 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).

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).

6 MCAR S 4.6133 Collection and analysis of vegetative tissue samples.

A. 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:

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

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

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

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

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

B. 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.

C. 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.

6 MCAR S 4.6134 Collection and analysis of ground water samples.

A. 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:

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

2. '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).

B. 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:

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

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

6 MCAR S 4.6135 Determination of sewage sludge application rate based on crop nitrogen requirements. Sewage sludge application rates shall be based upon soil texture, crop nitrogen requirements and yield goals, sewage sludge nitrogen availability, carry-over nitrogen supplied by past sewage sludge applications, and available nitrogen added by manures or fertilizers. The procedures in A.-E. shall be used:

A. Maximum allowable available nitrogen level. Based on

cropping practices and soil texture, determine the maximum allowable available nitrogen level in pounds per acre from Exhibit 6 MCAR S 4.6135 A.-1 or Exhibit 6 MCAR S 4.6135 A.-2.

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.

Exhibit 6 MCAR S 4.6135 A.-1

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

Exhibit 6 MCAR S 4.6135 A.-2

Maximum Allowable Available Nitrogen

Levels for Non-Cropped, Non-Harvested Areas

Degree of Vegetative Cover	Maximum Allowable Available Nitrogen Level (pounds/acre) Soil Texture 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

B. Carry-over nitrogen. Determine carry-over nitrogen from the previous year's sewage sludge application using the following formula:

Carry-over 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, carry-over nitrogen is zero.

C. Net allowable available nitrogen level. To determine the net allowable available nitrogen level in pounds per acre subtract carry-over 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.

D. Sewage sludge available nitrogen. Determine the available nitrogen in sewage sludge in pounds per ton using the appropriate formula in Exhibit 6 MCAR S 4.6135 D.-3.

Exhibit 6 MCAR S 4.6135 D.-3

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)

E. Sewage sludge application rate. Divide the net allowable available nitrogen level in pounds per acre from C. by the available nitrogen in sewage sludge in pounds per ton from D. to obtain the sewage sludge application rate in tons of solids per acre per ~~ten~~ year.

6 MCAR S 4.6136 Pathogen reduction processes.

A. Process to significantly reduce pathogens. Paragraphs 1.-5. contain processes to significantly reduce pathogens.

1. 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.

2. 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 0 degrees Centigrade.

3. 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.

4. 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.

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

6. The director 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 1.-5., or to an extent necessary for the proposed landspreading operation. The director's decision shall be based upon:

a. sewage sludge residence time;

b. temperatures achieved during treatment;

c. duration of sewage sludge storage;

d. method of sewage sludge application;

e. crop or crops to which sewage sludge is applied;

f. potential impact of runoff on surface waters;

g. location of landspreading area with respect to places of habitation, residential developments, and recreational areas; and

h. degree of public access control.

B. Processes to further reduce pathogens. Paragraphs 1.-4. contain processes to further reduce pathogens.

1. 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:

a. 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.

b. 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.

c. 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.

2. 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.

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

4. 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.

5. The director 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 1.-4.

6 MCAR S 4.6131 B.3.	Analytical Procedures for Determining Organic Priority Pollutants in Municipal Sludges
6 MCAR S 4.6132 B.1.a.	Guide to Computer Programmed Soil Test Recommendations in Minnesota
6 MCAR S 4.6131 B.1. 6 MCAR S 4.6134 B.1.	Methods for Chemical Analyses of Water and Wastes
6 MCAR S 4.6131 B.4.	Method Development for Determination of Polychlorinated Hydrocarbons in Municipal Sludge
6 MCAR S 4.6132 B.1.c. 6 MCAR S 4.6132 B.2. 6 MCAR S 4.6132 B.3.b. 6 MCAR S 4.6132 B.4.a. 6 MCAR S 4.6132 B.4.b. 6 MCAR S 4.6132 B.5.b.	Methods of Soil Analysis
6 MCAR S 4.6134 A.2.	Procedures Manual for Ground Water Monitoring at Solid Waste Disposal Facilities
6 MCAR S 4.6132 B.1.b.	Recommended Chemical Soil Test Procedures for the North Central Region
6 MCAR S 4.6103 E. 6 MCAR S 4.6103 P. 6 MCAR S 4.6132 B.3.	Soil Conservation Service Soil Surveys and Interpretation Sheets
6 MCAR S 4.6132 B.1.d. 6 MCAR S 4.6132 B.3.a.	Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples
6 MCAR S 4.6132 B.5.a.	Soil Taxonomy
6 MCAR S 4.6131 B.2. 6 MCAR S 4.6134 B.2.	Standard Methods for the Examination of Water and Wastewater
6 MCAR S 4.6103 BBB.	U.S. Fish and Wildlife Circular No. 39, 1971 edition
6 MCAR S 4.6103 P.	U.S. Geologic Survey Quadrangle Maps
6 MCAR S 4.6134 A.1.	Water Quality Monitoring at Solid Waste Disposal Sites in Minnesota

4/16/82
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OFFICE OF THE REVISOR OF STATUTES

Certificate of Approval of Adopted Rules

Agency: Minnesota Pollution Control Agency

Rule Numbers: 6 MCAR SS 4.6101-4.6108; 6 MCAR S 4.6111; 6 MCAR S 4.6112; 6 MCAR S 4.6121; 6 MCAR S 4.6122; 6 MCAR SS 4.6131-4.6136

Rule Title: Adopted Rules Governing Sewage Sludge Management

Type of Rules: Permanent X

Temporary _____

Documents Incorporated by Reference: See attached sheet.

STATE OF MINNESOTA
DEPARTMENT OF STATE
FILED
3:10 P.M.
APR 20 1982
Secretary of State

The attached Rules are approved as to form.

Steven C. Cross
Revisor of Statutes

APPROVED AS TO LEGALITY
April 19, 1982
WARREN SPANNAUS, ATTORNEY GENERAL
BY
SPECIAL ASSISTANT ATTORNEY GENERAL

Name: Ann L. Bateson
Ann L. Bateson

Title: Deputy Revisor

Phone: 296-1536

FIG copy - disapproved form.

Minnesota Pollution Control Agency

Adopted Rules Governing Sewage Sludge Management (6 MCAR S 4.6101, 6 MCAR S 4.6102, 6 MCAR S 4.6103, 6 MCAR S 4.6104, 6 MCAR S 4.6105, 6 MCAR S 4.6106, 6 MCAR S 4.6107, 6 MCAR S 4.6108, 6 MCAR S 4.6111, 6 MCAR S 4.6112, 6 MCAR S 4.6121, 6 MCAR S 4.6122, 6 MCAR S 4.6131, 6 MCAR S 4.6132, 6 MCAR S 4.6133, 6 MCAR S 4.6134, 6 MCAR S 4.6135, 6 MCAR S 4.6136)

Rules as Adopted

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.6101 .6102

Chapter Five: General Provisions

6 MCAR S 4.6101 Purpose and scope. The purpose of 6 MCAR SS 4.6101-4.6136 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 Minn. Stat. S 116.07, subd. 4, these rules establish standards for the design, location, and operation of sewage sludge landspreading sites and facilities.

6 MCAR S 4.6102 Permit and letter of approval requirements.

A. Landspreading.

1. The following persons shall comply with the requirements of 6 MCAR SS 4.6101-4.6136:

a. political subdivisions that landspread sewage sludge;

b. persons who own, lease, or rent landspreading facilities; and

c. persons who are under contract to a. or b. to landspread sewage sludge or to operate a landspreading facility.

2. The persons identified in 1. shall apply for, and be copermittees of, a state disposal system permit for landspreading facilities.

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

4. Each existing and proposed landspreading site shall have a letter of approval at the time given in Exhibit 6 MCAR S 4.6102 A.4.-1, unless it possesses a current letter of approval. Each existing landspreading facility shall have a state disposal system permit at the time given in Exhibit 6 MCAR S 4.6102 A.4.-1, unless it possesses a current permit. Each proposed landspreading facility shall have a state disposal system permit prior to development and use.

Exhibit 6 MCAR S 4.6102 A.4.-1

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

B. Incineration. Incineration of sewage sludge is governed by rule APC 28 of the Minnesota Pollution Control Agency.

C. Other facilities. Any facility for the processing, storage, or disposal of sewage sludge into or on any land by means other than regulated by 6 MCAR SS 4.6101-4.6136 is prohibited without an agency permit.

6 MCAR S 4.6103 Definitions. For the purpose of 6 MCAR SS 4.6101-4.6136, the following terms have the meanings given them.

A. Agency. "Agency" means the Minnesota Pollution Control Agency.

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

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

D. Available nitrogen. "Available nitrogen" means nitrogen which is present in inorganic forms that are useable by plants, and which may be determined by procedures set out in 6 MCAR S 4.6135.

E. 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 6 MCAR S 4.6132 B.3.

F. Bedrock outcrop. "Bedrock outcrop" means any bedrock that appears at the surface of the land.

G. 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. Rule 6 MCAR S 4.6132 B.2. provides acceptable methods of determining cation exchange capacity.

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

I. 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.

J. 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.

K. Director. "Director" means the executive director or other designated representative of the Minnesota Pollution Control Agency.

L. 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.

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

N. Hundred-year floodplain. "Hundred-year floodplain," as

defined in 6 MCAR S 4.8051 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.

O. 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.

P. 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 Supplement 1 of 6 MCAR SS 4.8024 and 4.8025 are included within this definition.

Q. Lakes and ponds. "Lakes and ponds" means any water basins defined as water basins and public waters in Minn. Stat. S 105.37, subds. 9 and 14 respectively.

R. Landspreading. "Landspreading" means placement of sewage sludge on or incorporated into the soil surface.

S. 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.

T. 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.

U. 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.

V. Mine. "Mine" means any excavation for minerals.

W. Organic priority pollutant. "Organic priority pollutant" means the organic compounds that appear in 40 Code of Federal Regulations, Section 401.15 (1981).

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

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

Z. Person. "Person," as defined in Minn. Stat. S 116.06, subd. 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.

AA. Place of habitation. "Place of habitation" means any house, apartment, mobile 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.

BB. Political subdivision. "Political subdivision" as defined in Minn. Stat. S 115A.03, subd. 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.

CC. 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 6 MCAR S 4.6136.

DD. 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 6 MCAR S 4.6136.

EE. 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.

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

GG. 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.

HH. 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.

II. Rivers and streams. "Rivers and streams" means any watercourses defined as natural watercourses or altered natural watercourses and public waters in Minn. Stat. S 105.37, subds. 10, 11, and 14 respectively.

JJ. 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. FofF 7a

KK. Root crops. "Root crops" means plants whose edible parts are grown below the soil surface.

LL. 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 6 MCAR S 4.6132 B.5.

MM. Sewage sludge. "Sewage sludge," as defined in Minn. Stat. S 115A.03, subd. 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.

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

OO. 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.

PP. 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.

QQ. Soil Conservation Service. "Soil Conservation Service" means the Soil Conservation Service of the United States Department of Agriculture.

RR. 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.

SS. 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 6 MCAR S 4.6132 B.1.

TT. Soil texture. "Soil texture" means the relative portion of the soil separates sand, silt, and clay. It can be measured using methods addressed in 6 MCAR S 4.6132 B.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.

UU. 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.

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

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

XX. 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.

YY. Surface water. "Surface water" means any lake or pond, and any river or stream as defined in Q. and II., respectively.

ZZ. 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. delete ?

AAA. 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.

BBB. 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 Minn. Stat. S 105.37, subd. 14, and which is ten or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

6 MCAR S 4.6104 Variance. Any person may apply for a variance from any requirement of 6 MCAR SS 4.6101-4.6136. Variances shall be applied for and acted upon by the agency in accordance with Minn. Stat. S 116.07, subd. 5 and other applicable statutes and rules.

6 MCAR S 4.6105 Application requirements for landspreading sites. Applications for letters of approval for sewage sludge landspreading sites shall include the specific information given in A.-E. Submittal of this information shall be made using a form obtained from the director.

A. Sewage sludge characterization. Applications shall contain sewage sludge characterization.

1. 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.

2. 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 6 MCAR S 4.6111 A.5. The dates of sampling and analysis shall be included with the analysis.

B. Site characterization. Applications shall contain site characterization.

1. 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:

a. texture and thickness of each soil horizon to 60 inches of depth;

b. permeability of each soil horizon to 60 inches of depth;

c. available water-holding capacity of each soil horizon to 60 inches in depth;

d. soil depth required to obtain six inches of

available water-holding capacity;

e. depth to seasonal high water table;

f. depth to bedrock; and

g. slope of land surface.

2. 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:

a. lakes and ponds;

b. rivers and streams;

c. wetlands;

d. intermittent streams;

e. ten-year flood plains;

f. sinkholes, caves, bedrock outcrops, mines, or quarries;

g. potable water supply wells;

h. places of habitation;

i. recreational areas;

j. residential developments;

k. road right-of-ways; and

l. airports.

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

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

5. Required sampling and analytical procedures of soil characteristics listed in a. to g. are provided in 6 MCAR S 4.6132. Applications shall contain the following soil characteristics which shall be determined from samples obtained within six months of application submittal:

a. United States Department of Agriculture textural classification;

b. percentage of organic matter;

c. extractable phosphorus in pounds per acre;

d. exchangeable potassium in pounds per acre;

e. pH;

f. soluble salts expressed in millimhos per centimeter; and

g. cation exchange capacity expressed in milliequivalents per 100 grams.

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

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

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

C. Site management. Applications shall include site management. This includes the following:

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

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

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

4. 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;

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

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

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

D. 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:

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

2. The location of the storage area delineated on maps submitted pursuant to B.1. and B.2.

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

4. The acreage of the sewage sludge storage area.

5. The quantity of sewage sludge to be stored.

6. 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:

a. texture and thickness of each soil horizon encountered;

b. color and presence or absence of mottling for each soil horizon encountered;

c. depth to water table, if encountered; and

d. depth to bedrock, if encountered.

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

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

9. 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.

E. 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.

6 MCAR S 4.6106 Application requirements for landspreading facilities. Applications for state disposal system permits for sewage sludge landspreading facilities shall include the information required by A.-D.

A. Information required for letters of approval. The application shall contain all information required in 6 MCAR S 4.6105 A., B., and C. for letters of approval for landspreading sites.

B. Ground water quality. Applications shall contain present ground water quality for the following parameters:

1. pH;

2. electrical conductivity expressed in millimhos per centimeter;

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

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

5. chlorides expressed in milligrams per liter;

6. sulfates expressed in milligrams per liter;

7. total organic carbon expressed in milligrams per liter;

8. nitrate-nitrogen expressed in milligrams per liter;

9. total phosphorus expressed in milligrams per liter;

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

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

12. 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 6 MCAR S 4.6134.

C. 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:

1. location on required soil map;

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

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

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

1. facility type and capacity;

2. frequency of sewage sludge addition to and removal

from the storage facility; and

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

E. Additional information. The information in 1.-3. shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes to apply available nitrogen in excess of that stipulated in 6 MCAR S 4.6121 A.2.e., cadmium in excess of two pounds per acre per year, or metals in excess of levels stipulated in Exhibits 6 MCAR S 4.6121 D.2.f.-1 or D.2.g.-2. The information in 4., 5., 6., or 7., whichever is applicable, shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes not to comply with one or more of the minimum design requirements in 6 MCAR S 4.6121.

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

a. type of and depth to bedrock;

b. bedrock condition, such as fractures, faults, and channels;

c. texture of unconsolidated material above bedrock;

d. depth to hydrostatic ground water table;

e. direction of ground water flow and rate of movement;

f. ground water recharge and discharge areas;

g. available well boring logs for any public or private, potable or non-potable water supply wells;

h. present ground water quality and use; and

i. 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.

2. 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:

a. location and depth of boring;

b. soil classification using the Unified system for each soil horizon encountered;

c. color and presence or absence of mottling for each soil horizon encountered; and

d. water level measurement.

3. Utilizing the information in 1. and 2., the application shall contain an evaluation of the potential for impacting aquifer quality based on proposed facility management practices.

4. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 A.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 A.2. cannot be accomplished.

5. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 B.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 B.2. cannot be accomplished.

6. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR S 4.6121 C.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 C.2. cannot be accomplished.

7. It shall also contain a description and evaluation of the provisions, practices and site features that will be utilized to comply with 6 MCAR S 4.6121 D.1. if one or more of the minimum design requirements in 6 MCAR S 4.6121 D.2. cannot be accomplished.

6 MCAR S 4.6107 Administration of letters of approval.

A. Review. All applications shall be reviewed for completeness by the director. If the application is incomplete, the director shall promptly advise the applicant of the

incompleteness. Further processing of the application may be suspended until the applicant has supplied the necessary information.

B. Preparation of preliminary determinations. The director 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.

1. If the preliminary determination is to deny an approval, the director 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, rule MPCA 3 of the Minnesota Pollution Control Agency.

2. If the preliminary determination is to issue an approval, the procedures set out in C. and D. shall apply.

C. Public participation.

1. The director 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 director to have an interest in the proposed approval.

2. 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 director.

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

D. Final determination.

1. The director shall attempt to resolve all comments prior to a final determination concerning the application. If such comments have been resolved, the director shall issue or deny the approval.

2. 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 rule WPC 36(k) of the Minnesota Pollution Control Agency.

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

E. Denial of approval.

1. 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.

2. Notice of denial and reasons for the denial shall be issued to the persons listed in C.1.

F. Modification, suspension, and revocation of letters of approval. A letter of approval may be modified, suspended, or revoked in accordance with the requirements of rule WPC 36(s) of the Minnesota Pollution Control Agency.

G. 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 6 MCAR SS 4.6101-4.6136 for the duration of the requested approval period.

H. 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.

6 MCAR S 4.6108 Administration of state disposal system permits. The administration of state disposal system permits for landspreading facilities shall be governed by rule WPC 36 of the Minnesota Pollution Control Agency.

.6111

Chapter Six: Landspreading Sites

6 MCAR S 4.6111 Requirements and limitations. The following requirements and limitations apply to the management of landspreading sites.

A. Sewage sludge sampling and analysis.

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

2. 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.

3. 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.

4. Other recommended sampling and handling procedures are provided in 6 MCAR S 4.6131.

5. Sewage sludge shall be analyzed according to methods set forth in 6 MCAR S 4.6131 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.

6. The minimum frequency of sewage sludge sampling and analysis is given in Exhibit 6 MCAR S 4.6111 A.6.-1.

Exhibit 6 MCAR S 4.6111 A.6.-1

Minimum Frequency of Sewage Sludge Sampling and Analysis

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

7. Each parameter exceeding concentrations listed in Exhibit 6 MCAR S 4.6111 A.7.-2 shall be analyzed for at two or three times the minimum frequency given in Exhibit 6 MCAR S 4.6111 A.6.-1.

Exhibit 6 MCAR S 4.6111 A.7.-2

Greater Frequency of Sewage Sludge Sampling and Analysis

	Concentration Expressed in Milligrams/ Kilogram of Dry Weight	
Parameter	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

8. Frequency of sewage sludge sampling and analysis may be reduced by the director depending on the annual frequency of landspreading and the variability of sewage sludge quality.

B. Pathogen control.

1. Sewage sludge, at a minimum, shall be treated by a process to significantly reduce pathogens prior to landspreading.

2. 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.

3. 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.

4. 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.

5. 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 ~~and~~ or posting are not required ~~if~~ unless inadvertant public contact is ~~deemed unlikely~~ likely. FoF 76.

C. Soil pH and cadmium application.

1. 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.

2. 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.

3. Cumulative cadmium application to any landspreading site shall not exceed the levels provided in Exhibit 6 MCAR S 4.6111 C.3.-3.

Exhibit 6 MCAR S 4.6111 C.3.-3

Maximum Cumulative Cadmium Application

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

D. Cumulative heavy metal additions. Sewage sludge application shall be terminated when the sum addition of any one heavy metal equals the level in Exhibit 6 MCAR S 4.6111 D.-4 for that particular heavy metal and soil.

Exhibit 6 MCAR S 4.6111 D.-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

E. Sewage sludge application rates.

1. 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 6 MCAR S 4.6135.

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

3. 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.

4. 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.

F. Organic priority pollutant limitations.

this abbreviation is not specifically defined - means "polychlorinated biphenyls"

1. Sewage sludge containing concentrations of PCBs equal to or greater than 10 milligrams per kilogram of sewage sludge solids shall be incorporated into the soil when applied to land used for producing food-chain crops.

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

3. 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.

G. Suitable soil conditions.

1. 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.

2. For the purpose of 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.

3. For the purpose of 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.

4. 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.

5. 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.

6. 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.

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

8. 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.

9. Sewage sludge shall not be spread on areas ponded with

water or sewage sludge.

10. 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.

11. 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 6 MCAR S 4.6132:

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.

H. Separation distances.

1. 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 ~~the appropriate party~~ all persons responsible for residential developments and places of recreation and all persons inhabiting within the otherwise protected distance.

does this mean public officials only? or also private developers too

FoF 76(2)

2. 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.

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

4. Land application of sewage sludge shall be conducted so that sewage sludge is not applied to adjoining property or to road right-of-ways.

5. 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.

6. The minimum distances in Exhibit 6 MCAR S 4.6111 H.6.-5 from any downgradient surface water shall be maintained where sewage sludge is immediately incorporated into the soil.

Exhibit 6 MCAR S 4.6111 H.6.-5

Minimum Distances From Downgradient Surface Water

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

7. 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.

I. Short-term dewatered sewage sludge storage.

1. 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.

2. Separation distances for short-term sewage sludge storage areas shall be those provided in H. 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.

3. 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.

4. The suitable soil conditions for short-term storage of sewage sludge shall be the same as those for landspreading sites in G.

J. Long-term dewatered sewage sludge storage.

1. 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.

2. 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 ~~the appropriate party~~ all persons inhabiting within the otherwise protected distance. FAF 7b(2)

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

4. 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.

5. 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.

6. 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.

7. 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.

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

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

K. Prohibited sites and other limitations.

1. 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.

2. Sewage sludge shall not be applied on any land without the permission of the owner.

3. 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.

4. 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.

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

6. 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.

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

6 MCAR S 4.6112 Record keeping and annual reporting.

A. 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 6 MCAR S 4.6111. The information recorded in the system shall include the following:

1. required sewage sludge composition data pursuant to 6 MCAR S 4.6111 A.5.;

2. soil test data for landspreading sites used during the year, pursuant to 6 MCAR S 4.6111 G.11.;

3. 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;

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

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

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

7. vegetation grown on the site during the year.

B. Reports. The information in A. 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 director.

Chapter Seven: Landspreading Facilities

6 MCAR S 4.6121 Requirements and limitations. The following requirements and limitations apply to the management of landspreading facilities.

A. Ground water protection.

1. A sewage sludge landspreading facility shall be designed, constructed, monitored, and maintained so that it will comply with the standards of rule WPC 22 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 semi-annually. The parameters to be tested for and a sampling frequency exceeding the minimum shall be determined by the director 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 that 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 6 MCAR S 4.6135.

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 director.

B. Surface waters protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 director 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 director 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.

C. Public health and safety.

1. 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 rule APC 9 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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.

D. Food-chain protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 6 MCAR S 4.6133 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 Exhibit 6 MCAR S 4.6121 D.2.f.-1, 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 6 MCAR S 4.6133 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.

Exhibit 6 MCAR S 4.6121 D.2.f.-1

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

g. The cumulative addition of lead, zinc, copper, and nickel shall not exceed the levels in Exhibit 6 MCAR S 4.6121 D.2.g.-2 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.

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Exhibit 6 MCAR S 4.6121 D.2.g.-2

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

6 MCAR S 4.6122 Record keeping and annual reporting.

A. Record keeping. A record keeping system shall be initiated and maintained by the permittee of the landspreading facility to verify compliance with requirements and limitations in 6 MCAR S 4.6121. The information recorded in such a system shall include the following:

1. sewage sludge composition data for parameters outlined in 6 MCAR S 4.6111 A.5.;

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

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

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

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

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

7. information required in the facility operating permit;

8. 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

9. a report of any action not in compliance with the permit or 6 MCAR S 4.6121.

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 director 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.

B. Reports. The information and records prescribed in A. 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.

Chapter Eight: Appendices

6 MCAR S 4.6131 Collection and analysis of sewage sludge samples.

A. Collection of sewage sludge samples.

1. 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 4 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 10 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 a.

2. 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.

B. Analysis of sewage sludge. Analytical procedures for determining constituents in sewage sludge samples shall be

obtained from one of the following publications:

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

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

3. '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).

4. '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).

6 MCAR S 4.6132 Collection and analysis of soil samples.

A. 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.

B. Analysis of soils.

1. 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 (St. 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).

2. Soil cation exchange capacity may be estimated on the basis of soil texture and organic matter content using Exhibit 6 MCAR S 4.6132 B.2.-1 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).)

Exhibit 6 MCAR S 4.6132 B.2.-1

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

3. 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).

4. 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).

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).

5. 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).

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).

6 MCAR S 4.6133 Collection and analysis of vegetative tissue samples.

A. 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:

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

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

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

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

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

B. 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.

C. 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.

6 MCAR S 4.6134 Collection and analysis of ground water samples.

A. 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:

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

2. '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).

B. 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:

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

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

6 MCAR S 4.6135 Determination of sewage sludge application rate based on crop nitrogen requirements. Sewage sludge application rates shall be based upon soil texture, crop nitrogen requirements and yield goals, sewage sludge nitrogen availability, carry-over nitrogen supplied by past sewage sludge applications, and available nitrogen added by manures or fertilizers. The procedures in A.-E. shall be used:

A. Maximum allowable available nitrogen level. Based on

cropping practices and soil texture, determine the maximum allowable available nitrogen level in pounds per acre from Exhibit 6 MCAR S 4.6135 A.-1 or Exhibit 6 MCAR S 4.6135 A.-2.

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.

Exhibit 6 MCAR S 4.6135 A.-1

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

Exhibit 6 MCAR S 4.6135 A.-2

Maximum Allowable Available Nitrogen

Levels for Non-Cropped, Non-Harvested Areas

Degree of Vegetative Cover	Maximum Allowable Available Nitrogen Level (pounds/acre) Soil Texture 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

B. Carry-over nitrogen. Determine carry-over nitrogen from the previous year's sewage sludge application using the following formula:

Carry-over 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, carry-over nitrogen is zero.

C. Net allowable available nitrogen level. To determine the net allowable available nitrogen level in pounds per acre subtract carry-over 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.

D. Sewage sludge available nitrogen. Determine the available nitrogen in sewage sludge in pounds per ton using the appropriate formula in Exhibit 6 MCAR S 4.6135 D.-3.

Exhibit 6 MCAR S 4.6135 D.-3

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)

E. Sewage sludge application rate. Divide the net allowable available nitrogen level in pounds per acre from C. by the available nitrogen in sewage sludge in pounds per ton from D. to obtain the sewage sludge application rate in tons of solids per acre per year.

6 MCAR S 4.6136 Pathogen reduction processes.

A. Process to significantly reduce pathogens. Paragraphs 1.-5. contain processes to significantly reduce pathogens.

1. 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.

2. 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 0 degrees Centigrade.

3. 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.

4. 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.

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

6. The director 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 1.-5., or to an extent necessary for the proposed landspreading operation. The director's decision shall be based upon:

a. sewage sludge residence time;

b. temperatures achieved during treatment;

c. duration of sewage sludge storage;

d. method of sewage sludge application;

e. crop or crops to which sewage sludge is applied;

f. potential impact of runoff on surface waters;

g. location of landspreading area with respect to places of habitation, residential developments, and recreational areas; and

h. degree of public access control.

B. Processes to further reduce pathogens. Paragraphs 1.-4. contain processes to further reduce pathogens.

1. 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:

a. 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.

b. 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.

c. 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.

2. 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.

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

4. 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.

5. The director 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 1.-4.

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed
Adoption of Rules of the
Minnesota Pollution Control
Agency Governing Sewage Sludge
Management, 6 MCAR §§ 4.6101
Through 4.6136

ORDER ADOPTING RULES

Notice of the Minnesota Pollution Control Agency's intent to adopt the above-entitled rules without a public hearing was published in the State Register on December 28, 1981, and was sent by United States mail to all persons on the list maintained by the Minnesota Pollution Control Agency pursuant to Minnesota Statutes § 15.0412, subdivision 4. on December 21, 1981. After affording interested and affected persons an opportunity to submit written data and views for thirty (30) days after Notice, having received fewer than seven written requests for a public hearing, which were not withdrawn within the 30-day comment period, reviewing and considering the data and views, and determining that the above-captioned rules are needed and reasonable,

NOW, THEREFORE, IT IS ORDERED that these rules identified as 6 MCAR §§ 4.6101 through 4.6136 are adopted this 9th day of March, 1982, pursuant to authority vested in the Minnesota Pollution Control Agency by Minnesota Statutes, section 116.07, subdivision 4. (1981 Supp.).

MINNESOTA POLLUTION CONTROL AGENCY

Dated: 3/16/82

LOUIS J. BREIMHURST
Executive Director

Dated: 3-25-82

VIRGIL C. HERRICK
Chairman
CYNTHIA C. JEPSEN
Vice-Chairperson

All interested or affected persons or groups who desire to participate on this committee are requested to respond by March 31, 1981. Please send comments and statements of application to:

Clarence Manke or Art Dunn
Operations/Training Unit
Minnesota Pollution Control Agency
1935 West County Road B-2
Roseville, Minnesota 55113
(612) 297-3717 or 297-3716

Pollution Control Agency

Notice of Intent to Solicit Outside Opinion Concerning A Proposed Rule to Regulate Sewage Sludge Disposal

Notice is hereby given that the Minnesota Pollution Control Agency (MPCA) is developing a rule to govern the land disposal of sewage sludge. This rule is being developed pursuant to the Waste Management Act (Minnesota Laws of 1980, Chapter 564, Article XI, Section 6, Subdivision 4) which requires that the MPCA develop rules and standards regarding sewage sludge disposal.

The agency must consider the following factors in the development of the rule:

The intrinsic suitability of land.

The volume and rate of application of sewage sludge of various degrees of intrinsic hazard.

Design of disposal facilities.

Operation of disposal facilities and disposal sites.

The agency may write rules and standards relating to collection, transportation, processing, disposal, equipment, location, procedures, methods, systems or techniques, or any other matter relevant to the prevention, abatement or control of water, air and land pollution.

Interested persons should review the proposed temporary rule governing sewage sludge disposal published at *State Register*, Volume 5, Number 23, December 8, 1980 (5 S.R. 935), which provides an example of the requirements being considered by the agency. This proposed temporary rule is being modified prior to final publication in April 1981, and should only be referred to for general information. An additional source of information which may be useful is the report *An Evaluation of Sewage Sludge Disposal on Land*, prepared by the MPCA for the Legislative Committee on Waste Management.

The agency invites all interested persons or groups to submit information or comments on this subject to:

Steve A. Stark
Water Quality Division
Minnesota Pollution Control Agency
1935 West County Road B-2
Roseville, Minnesota 55113

Oral statements will be accepted during regular business hours over the telephone at (612) 296-7769. All statements and comments must be received by April 13, 1981.

Any written or oral information and comments will be reviewed by agency staff and considered in development of this rule. Any written material received by the agency will become part of the hearing record on this rule.

Louis J. Breimhurst, Executive Director
Pollution Control Agency

Office of the Secretary of State

Notice of Vacancies in Multi-member State Agencies

Notice is hereby given to the public that vacancies have occurred in multi-member state agencies, pursuant to Minn. Stat. § 15.0597, subd. 4. Application forms may be obtained at the Office of the Secretary of State, 180 State Office Building, St. Paul 55155; (612) 296-7876.

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the
Proposed Adoption of
6 MCAR § 4.6101, 6 MCAR § 4.6102,
6 MCAR § 4.6103, 6 MCAR § 4.6104,
6 MCAR § 4.6105, 6 MCAR § 4.6106,
6 MCAR § 4.6107, 6 MCAR § 4.6108,
6 MCAR § 4.6111, 6 MCAR § 4.6112,
6 MCAR § 4.6121, 6 MCAR § 4.6122,
6 MCAR § 4.6131, 6 MCAR § 4.6132,
6 MCAR § 4.6133, 6 MCAR § 4.6134,
6 MCAR § 4.6135, 6 MCAR § 4.6136,
Proposed Rules Governing Sewage Sludge
Management

ORDER FOR NOTICE OF
INTENT TO ADOPT RULES
WITHOUT PUBLIC HEARING

IT IS ORDERED this 14th day of December, 1981, that Notice of Intent to Adopt Rules Without Public Hearing in the above-entitled matter be given to all persons who have registered their names with the Minnesota Pollution Control Agency for that purpose and be published in the State Register.

MINNESOTA POLLUTION CONTROL AGENCY

Louis Breimhurst

LOUIS J. BREIMHURST
EXECUTIVE DIRECTOR

CERTIFICATE OF BOARD'S
AUTHORIZING RESOLUTION

I, Virgil C. Herrick, do hereby certify that I am a member and the Chairman of the Board of Minnesota Pollution Control Agency, a board duly authorized under the laws of the State of Minnesota, and that the following is a true, complete, and correct copy of a resolution adopted at a meeting of the Board of the Minnesota Pollution Control Agency duly and properly called and held on the 27th day of October. 1981, that a quorum was present at said meeting, that a quorum voted for the resolution and that said resolution is set forth in the minutes of said meeting and has not been rescinded or modified.

BE IT RESOLVED, that the Minnesota Pollution Control Agency approves the proposed rules 6 MCAR §§ 4.6101 to 4.6136 and authorizes the initiation of rulemaking proceedings on the attached proposed rules.

BE IT FURTHER RESOLVED, that the Minnesota Pollution Control Agency finds that the attached proposed rules are noncontroversial in nature and hereby authorizes rule-making proceedings in accordance with statutory provisions regarding noncontroversial rules;

BE IT FURTHER RESOLVED, that the Executive Director of the Minnesota Pollution Control Agency, be and hereby is granted the authority and directed: 1) to sign an Order of the Agency directing that Notice be given of the Agency's intent to adopt, without a public hearing, the attached proposed rules, 2) to sign the Notice thereof, and 3) to perform any and all acts incidental to the promulgation of said rules, including any form changes in the proposed rules, that the Revisor of Statutes requires the Agency to make in order to obtain the Revisor's certification as required by Minn. Stat. § 15.0412, subd. 2a 4) include in the Notice on [sic] estimated total cost to local public bodies to implement the rules. In the event a public hearing becomes necessary, the Executive Director is also hereby granted the authority and directed to call a hearing for the purpose of promulgating said rules as well as perform any and all acts incidental thereto, including but without being limited to, signing an Order for Hearing and Notice of Hearing as well as acting as the Agency's representative at all hearings.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 16th day of December, 19 81.

Virgil B. Hansen
(Officer of the Board)

Cynthia C Jepsen
Attest by one other Board member

Minnesota Pollution Control Agency
In the Matter of the Proposed Adoption of
6 MCAR § 4.6101, 6 MCAR § 4.6102,
6 MCAR § 4.6103, 6 MCAR § 4.6104,
6 MCAR § 4.6105, 6 MCAR § 4.6106,
6 MCAR § 4.6107, 6 MCAR § 4.6108,
6 MCAR § 4.6111, 6 MCAR § 4.6112,
6 MCAR § 4.6121, 6 MCAR § 4.6122,
6 MCAR § 4.6131, 6 MCAR § 4.6132,
6 MCAR § 4.6133, 6 MCAR § 4.6134,
6 MCAR § 4.6135, 6 MCAR § 4.6136,
Proposed Rules Governing Sewage Sludge Management

Notice of Intent to Adopt Rules Without a Public Hearing

Notice is hereby given that the Minnesota Pollution Control Agency proposes to adopt the above entitled rules without a public hearing. The Agency has determined that the proposed adoption of these rules will be noncontroversial in nature and has elected to follow the procedures set forth in Minnesota Statutes § 15.0412, subd. 4h.

Persons interested in these rules shall have 30 days to submit comments on the proposed rules. The proposed rules may be modified if the modifications are supported by the data and views submitted to the Agency and do not result in a substantial change in the proposed language.

Unless seven or more persons submit written requests for a public hearing on the proposed rules within the 30-day comment period, a public hearing will not be held. In the event a public hearing is required, the Agency will proceed according to the provisions of Minnesota Statutes § 15.0412, subd. 4-4f. The Agency asks that requests for a public hearing identify the particular objection and suggest appropriate modifications to the proposed rules and the reasons or data relied on to support the suggested modification.

Persons who wish to submit comments or a written request for a public hearing should submit such comments or requests to:

Rodney E. Massey, P.E.
Chief, Program Development and Facility Review Section
Minnesota Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
(612) 297-2713

Authority for the adoption of these rules is contained in Minnesota Statutes § 116.07, subd. 4. Additionally, a Statement of Need and Reasonableness that describes the need for and reasonableness of each provision of the proposed rules, and that identifies the data and information relied upon to support the proposed rules, has been prepared and is available upon request. It is also available for review in the Minnesota Pollution Control Agency office in Roseville and in each of the Minnesota Pollution Control Agency regional offices:

Duluth Regional Office
314 West Superior Street
1015 Torrey Building
(218) 723-4660

Brainerd Regional Office
304 East River Road
Suite 3
(218) 828-2492

Detroit Lakes Regional Office
116 East Front Street
(218) 847-2164

Marshall Regional Office
Box 286
1104 East College Drive
(507) 537-7146

Rochester Regional Office
1200 South Broadway
Suite 140
(507) 285-7343

The Agency has estimated the total cost to local public bodies to implement the proposed rules in either of the first two years following their adoption would be approximately $186,000. This estimate includes $117,500 in annual costs and $68,500 in initial costs.

Upon adoption of the final rules without a public hearing, the proposed rules, this Notice, the Statement of Need and Reasonableness, all written comments received, and the final rules as adopted will be delivered to the Attorney General for review as to form and legality, including the issue of substantial change. Persons who wish to be advised of the submission of this material to the Attorney General or who wish to receive a copy of the final rules should submit a written statement of such request to Mr. Massey.

The purpose of the proposed rules is to provide for the protection of the public health and the environment in the utilization or disposal of sewage sludge. The proposed rules establish standards for the design, location and operation of sewage sludge landspreading sites and facilities. The proposed rules also establish permit and letter of approval requirements for landspreading sites and facilities. In addition, the proposed rules provide methods for collection and analysis of sewage sludge samples, soil samples, vegetative tissue samples, and ground water samples; establish methods for sewage sludge application rates based on crop nitrogen requirements and, establish pathogen reduction processes. The persons regulated by the proposed rule include political subdivisions that landspread sewage sludge, persons who own, lease or rent landspreading facilities, and persons who are under contract to landspread sewage sludge or to operate a landspreading facility.

Copies of this notice and the proposed rules are available for review in the Minnesota Pollution Control Agency office in Roseville and at each of the Minnesota Pollution Control Agency regional offices and may be obtained by contacting Mr. Massey.

Minnesota Pollution Control Agency

Louis J. Breimhurst
Executive Director

DEC 14 1981

Dated: _____

In the Matter of the Proposed Adoption of Rules of the
State of Minnesota
Governing Sewage Sludge Management

AFFIDAVIT OF
MAILING

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Dale E. Newton, being first duly sworn, deposes and says:

That on the twenty first day of December, 1981, at the City of Roseville, County of Ramsey, State of Minnesota, he served the attached Notice of Intent to Adopt Rules Without Public Hearing by depositing in the State of Minnesota Central Mail System for first class mailing (or) in the United States mail at said City of Roseville, a copy thereof, properly enveloped, with postage prepaid, on all persons and associations who have requested that their names be placed on file with the State of Minnesota for the purpose of receiving notice of the proposed adoption of rules by the Minnesota Pollution Control Agency.

Dale E. Newton

Subscribed and sworn to before this twenty first day of December, 1981.

Maryanne Gibbons

MARYANNE GIBBONS
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Commission Expires Sept 26, 1985

MPCA HEARING NOTIFICATION
MAILING LIST
PAGE 1

LAKE SUPERIOR
INDUSTRIAL BUREAU
828 FIRST NATIONAL BANK
DULUTH MN 55802 1

N S P LAW DEPT
ATTN JOSEPH D BIZZANO JR
414 NICOLLET MALL
MPLS MN 55401 1

NORTHERN STATES POWER CO
ATTN G V WELK MANAGER
REG COMPLIANCE AND SERV
414 NICOLLET MALL
MPLS MN 55101 1

MN MULTI HOUSING ASSOC
ATTN JOHN G HORNER
3100 W LAKE ST
MPLS MN 55416 1

HOLMES & GRAVEN
ATTN LARRY M WERTHEIM
4610 IDS CENTER
MPLS MN 55402 1

POTLATCH CORPORATION
ATTN MR ARCHIE D CHELSETH
BOX 510
CLOQUET MN 55720 1

ANOKA.CO COMM HEALTH &
SOCIAL SERV DEPT
ATTN GERTRUDE M JAMES
COURTHOUSE 4TH FL
ANOKA MN 55303 1

FEDERAL STATE REPORTS INC
ATTN STATE REG DIV
5203 LEESBURG PIKE
SUITE 1201
FALLS CHURCH VA 22041 1

LAKE MINNETONKA CONS DIST
402 E LAKE ST
WAYZATA MN 55391 1

U OF M PHYSICAL PLANT DEPT
ATTN ROBERT SILVAGNI
200 SHOPS BLDG
319 15TH AVE SE
MPLS MN 55455 1

GENERAL MILLS INC
ATTN J W HAUN
P O BOX 1113
MPLS MN 55440 1

HESSIAN MCKASY & SODERBERG
ATTN MR JOHN A KNAPP
1500 MIDWEST PLAZA BLDG
MPLS MN 55402 1

MN ASSOC HEALTH CARE FAC
ATTN RICK CARTER
2850 METRO DRIVE SUITE 429
MPLS MN 55420 1

PETERSON POPOVICH KNUTSON
& FLYNN LAW OFFICE
ATTN PETER S POPOVICH
314 MN BULD
ST PAUL MN 55101 1

JONES HAUGH & SMITH INC
515 SOUTH WASHINGTON
ALBERT LEA MN 56007 1

WILLIAM MITCHELL COLLEGE
OF LAW
ATTN PROF MARCIA GELPE
875 SUMMIT AVE
ST PAUL MN 55102 1

COLOR-AD PACKAGING INC
ATTN MICHAEL S KECKEISEN
3600 ALABAMA AVE
MPLS MN 55416 1

THE SHERWIN-WILLIAMS CO
ATTN D A COHAGAN
101 PROSPECT AVE NW
CLEVELAND OH 44115 1

MN RETAIL MERCHANTS ASSO
ATTN WENDY M BORSHEIM
180 METRO SQUARE BLDG
ST PAUL MN 55101 1

IOWA DEPT ENVIRON QUALIT
ATTN STEVEN N WILLIAMS
HENRY A WALLACE BLDG
DES MOINES IA 50319 1

MPIRG
ATTN KENNETH PETERSON
2412 UNIVERSITY AVE SE
MPLS MN 55414 1

MPIRG
ATTN JAMES MILLER
2412 UNIVERSITY AVE SE
MPLS MN 55414 1

GEO A HORMEL & CO
ATTN KEVIN C JONES
BOX 800
AUSTIN MN 55912 1

ASHLAND PETROLEUM COMPAN
ATTN RICHARD HETLAND
P O BOX 9
ST PAUL PARK MN 55071 1

BLANDIN PAPER COMPANY
ATTN W J LICKE
115 FIRST STREET SW
GRAND RAPIDS MN 55744 1

ROBERT S BURK
4344 IDS CENTER
MINNEAPOLIS MN 55402 1

BARBARA L HUGHES
METRO CLEAN AIR COMMITTE
1829 PORTLAND AVENUE
MINNEAPOLIS MN 55404 1

MN MOTOR TRANSPORT ASSOC
ATTN JAMES N DENN
1821 UNIVERSITY RM 134N
ST PAUL MN 55104 2

MAC ARTHUR CO
2400 WYCLIFF STREET
ST PAUL MN 55114 2

UNITED POWER ASSOC
ATTN REYNOLD S RAHKO
PROJECTS COORD DIVISION
ELK RIVER MN 55330 2

THE PILLSBURY COMPANY
ATTN CARL A SMITH
608 2ND AVE SOUTH
MPLS MN 55402 2

INDUST HEALTH ENG ASSOC
ATTN KNOWLTON J CAPLAN
P O BOX 9342
MPLS MN 55440 2

COMM HEALTH SERV BRD
ATTN BRUCE T ROWE
325 LAKE AVENUE S SUITE 604
DULUTH MN 55802 2

CITY OF WINONA
ATTN ROBERT J BOLLANT
4TH & LAFAYETTE ST
WINONA MN 55987 2

MOSS FLAHERTY CLARKSON &
FLETCHER LAW OFFICES
2340 IDS CENTER
80 SOUTH EIGHTH STREET
MPLS MN 55402 2

L L P O D LAW OFFICES
ATTN JOHN E DRAWZ
1100 FIRST NAT BANK BLDG
MPLS MN 55402 2

ASSOC OF MN COUNTIES
ATTN JAMES C SHIPMAN
2305 FORD PARKWAY
ST PAUL MN 55116 2

DAKOTA COUNTY ATTORNEY
ROBERT F CAROLAN
1560 HIGHWAY 55
HASTINGS MN 55033 2

SHELDAHL
ATTN DAVID MILLER
N HWY 3
NORTHFIELD MN 55057 2

OLSON GUNN & SERAN LTD
ATTN WAYNE H OLSON ESQ
315 PEAVEY BLDG
730 SECOND AVE SOUTH
MPLS MN 55402 2

AM CRYSTAL SUGAR CO
ATTN MR I V FORDYCE
101 NO THIRD ST
MOORHEAD MN 56560 2

MN RAILROADS ASSOC
ATTN GORDON FORBES
303 HANOVER BLDG
480 CEDAR ST
ST PAUL MN 55101 2

PAUL J HUBER LTD
1821 UNIVERSITY AVE
ST PAUL MN 55104 2

METROPOLITAN COUNCIL
ATTN JOHN T HOEFT
300 METRO SQ BLDG
7TH ST & ROBERT ST
ST PAUL MN 55101 2

CARL MAHLKE
MN COUN TROUT UNLIMITED
909 REDWOOD W 2
LA CRESCENT MN 55947 2

IBM CORPORATION
ATTN J P HARMON
DEPT 713/BLDG 658-D
ROCHESTER MN 55901 2

EPA REGION V
ATTN ART BADEN
230 SOUTH DEARBORN
CHICAGO IL 60604 2

MN PETROLEUM COUNCIL
ATTN WILLIAM HADDELAND
300 NORTHERN FEDERAL BLDG
ST PAUL MN 55102 2

FEDERAL-STATE REPORTS INC
ATTN BONNIE M SPENCER
5203 LEESBURG PIKE #1201
BAILEYS CROSSROADS
FALLS CHURCH VA 22041 2

MINNEAPOLIS TRIBUNE
ATTN BOB FRANKLIN
425 PORTLAND AVE
MPLS MN 55488 2

BOLTON & MENK INC
ATTN THOMAS A ROUSHAR
515 N FRONT ST
MANKATO MN 56001 2

MS SHAILLA REGEHR
R R 1 BOX 419
STEWARTVILLE MN 55976 2

PICKANDS MATHER & CO
ATTN T J MANTHEY
1100 SUPERIOR AVE NE
CLEVELAND OH 44114 2

PICKANDS MATHER & CO
ATTN CHUCK HOFFMAN
200 WEST SUPERIOR ST
SUITE 811
DULUTH MN 55802 3

NORTH STAR STEEL CO
ATTN MR R A GARVEY
1678 RED TOCK TD
P O BOX 43189 3
ST PAUL MN 55164

MINNKOTA POWER COOP INC
ATTN LOREN L JOHNSON
BOX 1318
GRAND FORKS MN 58201 3

DULUTH MISSABE & IRON
RANGE RAILWAY CO
210 MISSABE BLDG
DULUTH MN 55802 3

MR HENRY CHISHOLM
OGLEBAY NORTON CO
P O BOX 6508
CLEVELAND OHIO 44101 3

ROBERT E ISAKSON
CONSULTING ENGINEERS
DIVERSIFIED INC
P O BOX J 3
OSSEO MN 55369

GEORGE MASTOR
LEGAL DIVISION
MINNESOTA GAS CO
300 PEAVEY BLDG 3
MINNEAPOLIS MN 55402

DAMES & MOORE
ATTN GEORGE NICHOLAS
1550 NORTHWEST HIGHWAY
PARK RIDGE ILL 60068 3

DOUGLAS HILDRE
NORTHERN ORDINANCE DIV.
FMC CORP.
4800 E RIVER ROAD
MINNEAPOLIS MN 55421 3

COOPERATIVE POWER ASSOC
ATTN WILLIAM KAUL
8020 MITCHELL ROAD
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MINNEAPOLIS MN 55414

CONWED CORPORATION
ATTN M L MAU
332 MINNESOTA STREET
P O BOX 43237 3
ST PAUL MN 55164

MANAGER
ENVIR. PLANNING
ROOM 807
TRANSPORTATION BLDG
ST PAUL MN 55155 3

RAMSEY CO ENVIR HEALTH
ATTN DOUGLAS WOOD
1910 W CO RD B
ROSEVILLE MN 55113 3

KRIS ANNE MONTEITH
SF&A REPORTING SERVICES
1101 15TH ST NW
WASHINGTON DC 20005 3

UNITED POWER ASSOC
ATTN MICHAEL V OBRIEN
ENVIRONMENTAL & LAND DIV
ELK RIVER MN 55330 3

MN CHAPTER OF ABC
ATTN DONALD E MONTGOMERY
6300 WALKER ST SUITE 109
MPLS MN 55416

ROBT J PUGLEASA CO INC
ATTN GENE A BROWN
61 BEDFORD ST SE
MPLS MN 55414

PERRY GRUBB ASSOC INC
ATTN CHARLES R SINGER
771 HARDING ST NE
MPLS MN 55413

LAW OFFICES
ATTN DONALD B CRASSWELLE
1000 ALWORTH BUILDING
DULUTH MN 55802

THOMAS M POLT
ATTORNEY AT LAW
MCCARTHY BLDG
EYOTA MN 55934

BURLINGTON NORTHERN INC
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176 EAST FIFTH ST RM 1280
ST PAUL MN 55101
3

RICE COUNTY PLANNING OFF
610 NW 20TH STREET
PO BOX 40
FARIBAULT MN 55021

CALC
ATTN PAM BARBOUR
122 W FRANKLIN AVE RM 30
MINNEAPOLIS MN 55404 3

~~HEALTH & SOCIAL SERVICES~~
ATTN ~~ROBERT HUTCHISON~~
~~COURTHOUSE-4TH FLOOR~~
ANOKA MN 55303 3

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1000 MAIN ST
DUBUQUE IA 52001 4

PHILLIPS LEGIS. SERVICES
459 RICE ST
ST PAUL MN 55103 4

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ENVIR. HEALTH ENGIN.
DAKOTA CNTY GOV. CENTER
1560 HWY 55
HASTINGS MN 55033 4

D H G & G ATTORNEYS AT LAW
ATTN JOHN HERMAN
TEN SOUTH FIFTH ST
SUITE 930
MPLS MN 55401 4

MIDLAND GLASS COMPANY INC
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SHAKOPEE MN 55379 4

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LAW DEPARTMENT
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ST PAUL MN 55101 4

WOLVERTON ENGINEERING CO
847 40TH AVENUE NE
COLUMBIA HTS MN 55421 4

DAIRYLAND POWER COOP
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2615 EAST AVENUE S
LA CROSSE WI 54601 4

ROCHESTER PUBLIC UTILITIES
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506 FIRST AVENUE NE
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ROCHESTER MN 55901 4

SARGENT & LUNDY ENGINEERS
55 EAST MONROE STREET
CHICAGO IL 60603 4

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POWER AND ENERGY DIV.
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300 PARKDALE 1 BLDG
5401 GAMBLE DRIVE
MPLS MN 55416 4

LAND O LAKES
ATTN JAMES A BOSCH
4001 LEXINGTON AVE N
ARDEN HILLS MN 55112 4

INTERNATIONAL ECO SOCIETY
ATTN R J F KRAMER
1471 BARCLAY STREET
ST PAUL MN 55106 4

HARSTAD & RAINBOW
ATTN ERIC W INGVALDSON
1036 MIDLAND BANK BLDG
MPLS MN 55401 4

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1994 BUFORD AVE
ST PAUL MN 55108 4

KSTP AM RADIO
ATTN J B ECKERT
3415 UNIVERSITY AVE
ST PAUL MN 55114 4

KOPPERS COMPANY INC
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1201 KOPPERS BUILDING
PITTSBURGH PA 15219 4

THE ISAAK WALTON LEAGUE
OF AMERICA INCORPORATED
3255 HENNEPIN AVE S # 10
MINNEAPOLIS MN 55408 4

BROEKER HARTFELDT HEDGES
GRANT ATTORNEY AT LAW
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BETTY SIMS
2149 GOODRICH AVE
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ENVIRONMENTAL TASK FORCE
1346 CONNECTICUT AVE NW
SUITE 730
WASHINGTON DC 20036 4

WM MITCHELL COLLEGE OF LA
ATTN RENEE BELOY
875 SUMMIT AVE
ST PAUL MN 55105 4

REGION NINE DEVELP COMM
ATTN LYNNETTE RENNEKE WIE
410 S 5TH ST P O BOX 3367
MANKATO MN 56001 4

MN NEWSPAPER ASSOC
845 6TH ST SUITE 400
MPLS MN 55402 4

LIBBIE HENDERSON
305 LAFOND AVE
ST PAUL MN 55103 4

NCASI
ATTN REID MINER
CENTRAL LAKE ST REG CE
WESTERN MICHIGAN UNIVERSITY
KALAMAZOO MI 49008 5

KFIL RADIO
ATTN ERNIE HAIN
P O BOX 377
PRESTON MN 55965

BLACK & VEATCH/MICHIGAN
ATTN ENVIRONMENTAL SPECIAL
200 RENAISSANCE CE # 1220
DETROIT MI 48243
5

TENNECO INC
ATTN B J WHITLEY CEP
1100 MILAM BLDG
HOUSTON TX 77001

STEARNS COUNTY PLAN DEPT
ATTN KENNETH HOPKE
BOX 604
ST CLOUD MN 56301 5

FINANCE AND COMMERCE
THE DAILY BUSINESS NEWS
615 SOUTH 7TH STREET
MPLS MN 55415 5

MOTORCYCLE IND COUNCIL
ATTN KATHY R VAN KLEECK
1001 CONNECTICUT AVE NW
WASHINGTON DC 20036

N AGRI-GROWTH COUNCIL
TTN PATRICIA KLOCKE
850 METRO DRIVE SUITE 725
INNEAPOLIS MN 55420
5

HAMLINE U LAW SCHOOL
PUBLIC INTEREST CLINIC
ATTN BARBARA JOHNSON
ST PAUL MN 55104
5

TECH SALES CO
ATTN DON REGER
311 WEST 44TH STREET
MPLS MN 55409 5

ELLSWORTH HARPOLE
1906 THIRD AVE S APT 35
MINNEAPOLIS MN 55404
5

ENVIR ENG & POLLUTION
CONTROL/3M: 21-2W-06
DAVID M BENFORADO PE
P O BOX 33331
ST PAUL MN 55133 5

BLANDIN WOOD PRODUCTS CO
ATTN CURT R FIRMAN
WAFERBOARD PLANT SITE BOX N
GRAND RAPIDS MN 55744
5

CIVIC CENTER
ENV ED COORDINATOR
ATTN BOB OVERBY
APPLETON MN 56208 5

COOPERATIVE POWER ASSOC
ATTN SCOTT SCHULER
8020 MITCHELL ROAD
EDEN PRAIRIE MN 55344
5

~~BRUCE E BENSON~~
~~ZONING OFFICER~~
~~COURTHOUSE~~
~~CARLSON MN 55718~~ 5

KEVIN HOFSTAD
1323 E 22ND ST #101
MPLS MN 55404
5

BARBARA JOHNSON
1636 TAYLOR AVE
ST PAUL MN 55104
5

NEWS EDITOR
REGISTER-MIRROR
1414 SOO LINE BLDG
MPLS MN 55402
5

PILLSBURY CO
ATTN MAHLOW SCHNEIDER
608 2ND AVE S
MPLS MN 55402 5

ANN REHTMAN
805 HAGUE AVE
ST PAUL MN 55104

MN PETROLEUM COUNCIL
300 NORTHERN FED BLDG
ST PAUL MN 55102
5

LITTON INDUSTRIES
ATTN NATALIE GAULL
P O BOX 9461
MPLS MN 55420
5

ANN MONGOVEN
211 1/2 MINNESOTA
BEMIDJI MN 56601
5

KEN KADLER
762 HOLLY AVE
ST PAUL MN 55104
6

BADGER SAFE ENERGY ALLI
BOX 68
DURAND WI 54736
6

D E GRAMMER
4410 E 4TH AVE
HIBBING MN 55746
6

AL KURKI
2904 W 3RD ST
DULUTH MN 55806
6

AMY GOLDSMITH
2600 PLEASANT AVE S
MPLS MN 55408
6

HAMLINE U SCHOOL OF LAW
PUBLIC INTEREST AD
ADVOCACY CLINIC
ST PAUL MN 55104
6

KRISTIN LARSON
2215 W 21ST ST
MPLS MN 55405
6

NELSON FRENCH
3715 E 26TH ST
MPLS MN 55406
6

KATE FLOM
1288 HUBBARD AVE
ST PAUL MN 55106
6

REGINZ LARSON
717 FRY ST
ST PAUL MN 55104
6

BETSY GLASSMAN
304 1/2 CARLTON AVE
CLOQUET MN 55720
6

THE MINNESOTA PROJECT
ATTN LONI KEMP
618 E 22ND ST
MPLS MN 55404
6

JOHN M BROEKER
2850 METRO DRIVE SUITE 800
MPLS MN 55420
6

CITY OF BROOKLYN CENTER
ATTN PATTY PAGE
6301 SHINGLE CREEK PKWY
BROOKLYN CE MN 55430
6

POPHAM HAIK LAW FIRM
ATTN G ROBERT JOHNSON
4344 IDS CENTER
MPLS MN 55402
6

HARDIA RIEKE
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MPLS MN 55406
6

A B SCHAEFER JR
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STILLWATER MN 55082
6

ROBERT LOCKYEAR
14900 61ST ST N
STILLWATER MN 55082
6

M NEAL ERDAHL
14900 61ST ST N
STILLWATER MN 55082
6

PAUL BRANDT
14900 61ST ST N
STILLWATER MN 55082
6

BROWN & ROOT INC
ATTN BILL SNELLING
P O BOX 3
HOUSTON TX 77001
6

JACQUELYNE FARM
385 W CO RD B2
ROSEVILLE MN 55113
6

ENVIRONMENTAL ENGINEERIN
& POLLUTION CONTROL/3M
ATTN THOMAS ZOSEL
P O BOX 33331
ST PAUL MN 55133
6

MOBIL OIL
ATTN PETE GATES
P O BOX 66568
AMF O'HARE IL 60666
6

DORSEY LAW FIRM
ATTN PHIL CHEN
2300 1ST NATL BANK BLDG
MPLS MN 55402
6

INDUSTRIAL FABRICATORS C
P O BOX 1561
JACKSON TN 38301
6

EDWIN E STERLING
3920 39TH AVE S
MPLS MN 55406
6

FRUNDT FRUNDT & JOHNSON
117 WEST 5TH STREET
BLUE EARTH MN 56013
6

RELIANCE UNIVERSAL INC
ATTN PAUL H WALKER
ROBTSON RESEARCH & DVLP
4730 CRITTENDEN DRIVE
LOUISVILLE KY 40233

PULP & PAPER
ATTN PAULA IRONS
500 HOWARD ST
SAN FRANCISCO CA 94105
7

C.W. BERGSTROM
DIV. CHIEF ENGINEER
AMOCO PIPELINE CO.
2200 S. MAIN ST.
LOMBARD IL 60148
7

API INC
ATTN TERRY WOLD
2366 ROSE PLACE
ST PAUL MN 55113
7

THE HEALTH CENTRAL SYSTEM
ATTN DONALD G ROBIDA
501 BROOKDALE TOWERS
2810 FIFTY SEVENTH AVE N
MPLS MN 55430
7

CENEX
ATTN RALPH SCHLETTY
BOX 43089
ST PAUL MN 55164
7

BOISE CASCADE CORPORATION
ATTN MR RUSS SUMMER
ENVIRONMENTAL ENGINEER
INTERNATIONAL FALLS MN
56649
7

EPA REGION V
ATTN DAVE ULLRICH
230 S DEARBORN ST
CHICAGO IL 60604
7

DAMES & MOORE
ATTN LARRY ANNEN
1550 NW HWY
PARK RIDGE IL 60068
7

GOULD INC
PORTABLE BATTERY DIVISION
ATTN DOUGLAS ROBAHM
931 VANDALIA ST
ST PAUL MN 55114
7

PICKANDS MATHER & CO
ATTN THOMAS W HAYES
SUITE 811-200 W SUPERIOR ST
DULUTH MN 55802
7

BENDIX
ENVIR & PROCESS INST DIV
P O DRAWER 831
LEWISBURG W VA 24901
7

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REGULATORY LIAISON
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MPLS MN 55401 AQ

DAIRYLAND POWER COOP
ATTN ERIC HENNEN
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LA CROSSE WI 54601 AQ

CHAIRMAN OF FAIRMONT AREA
CHAMBER OF COMMERCE
99 DOWNTOWN PLAZA
FAIRMONT MN 56031 SW

STEVEN BUCHANAN
MPLS AUDUBON
4552 ALDRICH AVE S
MPLS MN 55409 WQ

METROPOLITAN AIRPORTS COMM
ATTN DIR OF OPERATIONS
6040 28TH AVE S
MPLS MN 55450 AQ&WQ

ECRDC
119 SOUTH LAKE STREET
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KIRCOR ENGINEERING CO
ATTN BERNARD TRENDA
3424 WOODDALE AVE
MPLS MN 55416 AQ

WINONA DAILY NEWS
ATTN DON STUART
401 N FRANKLIN OLMSTED
WINONA MN 55987 WINONA
COUNTIES

GREGORY WERSAL
7841 WAYZATA BLVD
MPLS MN 55426 HAZ W

MIDWESTERN GAS TRANS CO
ATTN MICHAEL CATT
P O BOX 2511
HOUSTON TX 77001 HAZ W

CHEMFIX INC
ATTN H HUDSON BUZBEE
1675 AIRLINE HWY
P O BOX 1572
KENNER LA 70063 WQ & SW

A B SCHAEFER JR
CHAIRMAN WASHINGTON CO
BOARD OF COMMISSIONERS
14900 61ST ST NO
STILLWATER MN 55082 HAZ W

ROBERT LOCKYEAR
PLANNING COORDINATOR
14900 61ST ST NO
STILLWATER MN 55082 HAZ W

M NEAL ERDAHL
COUNTY ADMINISTRATOR
14900 61ST ST N
STILLWATER MN 55082 HAZ W

PAUL BRANDT
ENVIRONMENTAL SERV TECH
14900 61ST ST N
STILLWATER MN 55082 HAZ W

INFORMATION NEWS SERVICE
854 NATIONAL PRESS BLDG
WASHINGTON DC 20045 WQ

MARY AYEDE
1201 N BIRCHLAKE BLVD
WHITE BEAR LK MN 55110 HAZ W SW

ENVIR HYDROLOGY CORP
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3036 UNIVERSITY AVE SE
MPLS MN 55414 HAZ W

KVB ENGINEERING
ATTN THOMAS STERN
6176 OLSON MEM HWY
GOLDEN VALLEY MN 55422 AQ

PORTAGE SANITARY LANDFILL
AUTHORITY
CRANE LAKE MN 55725 SW

ROBB KUNZIG
HAZARDOUS MATERIALS
P O BOX 535
CAMBRIDGE MA 02238 SHW

WRIGHT CHEMICAL CO
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COON RAPIDS MN 55433 HW

UNIVERSITY OF MN
ATTN LASZLO FULOP
DIR OF PHYSICAL PLANNING
503 MORRILL HALL
MPLS MN 55455 WQ/SHW

PORTAGE SANITARY LANDFILL AUTH
CRANE LAKE MN 55725 SHW

ERIKA SITZ
IZAAK WALTON LEAGUE
6521 154TH LANE NW
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NW PULP & PAPER
ATTN HEIDI SCHULTZ
555 116TH AVE NE SUITE 266
BELLEVUE WA 98004 AQ

MPCA HEARING NOTIFICATION
MAILING LIST
INTER OFFICE

DEPT OF EDUCATION
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RM 911 CAPITOL SQ BLDG
ST PAUL MN 55101

DEPT OF ECONOMIC DVLPMT
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480 CEDAR ST
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DEPT OF ECONOMIC DVLPMT
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717 DELAWARE ST SE
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555 WABASHA RM 206
ST. PAUL MN 55102

LEGISLATIVE COMM TO
REVIEW ADMIN RULES
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RM 430
STATE OFFICE BLDG

MN DEPT ECONOMIC SECURITY
ATTN F JAMES RYBAK PHD
690 AM CE 150 E KELLOGG
ST PAUL MN 55101

JEAN DAWSON, EDITOR
MINNESOTA GOVT. REPORT
B-12, PRESS RM
STATE CAPITOL BLDG

OFF OF LEGISLATIVE AUDITOR
ATTN ALLAN BAUMGARTEN
PROGRAM EVALUATION SPEC
122 VETERANS SERV BLDG
ST PAUL MN 55155

LEGISLATIVE COMM ON
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B-46
STATE CAPITOL

ATTORNEY GENERAL'S OFFICE
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2ND FLOOR FORD BLDG
117 UNIVERSITY AVE

DEPT OF AGRICULTURE
AGRONOMY SERVICES
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150 E. KELLOGG BLVD.

SEWAGE SLUDGE RULES ADVISORY COMMITTEE

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6/15/81 [redacted]

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Tim Kennedy
Sanitation & Zoning Administrator
Cook County Courthouse
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Merritt C. Petersen
Cottonwood County
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Windom, MN 56101
507-831-2458
(after 1:15, 831-2554, home)
(emergency, 831-1389,
mobile unit 99)

Otto Schalow
Crow Wing County Zoning
Administrator
Courthouse
Brainerd, MN 56401
218-829-1726

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Dakota County Highway Department
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Hastings, MN 55033
612-437-0398

Cecil Samuelson
Dodge County Zoning Administra-
tor
Courthouse
Mantorville, MN 55955
507-635-3221

Dennis Nagle
Douglas County Zoning
Administrator
Courthouse

Alexandria, MN 56308
612-763-6068

Hershel L. Koenig, P.E.
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507-765-3325

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218-685-4494

*Luther Nelson
Hennepin County Department of Public
Works
Environmental Services Division
320 Washington South
Hopkins, MN 55343
612-935-3381

*NOTE: Luther Nelson is the official county solid waste officer. All correspondence to Luther should be cc'd to Ed Monteleone who should continue to receive inspection reports, etc.

Richard Frank
Houston County Solid Waste Officer
Courthouse
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507-724-5211

Vern Massie
Hubbard County Zoning Administrator
Courthouse
Park Rapids, MN 56470
218-732-3890

Carolyn Drude
Isanti County Solid Waste Officer
Cambridge, MN 55008
612-689-1644

Schuyler Mitchell
Itasca County Planning and Zoning
Office
Courthouse
Grand Rapids, MN 55744
218-328-5801

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and Environmental Health Officer
P.O. Box 64
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Alden E. Smith
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Courthouse
Mora, MN 55051
612-679-1030 (courthouse)
612-679-1327 (home)

Melvin A. Fladeboe/Steve Peterson
Kandiyohi County Engineer
Courthouse
Willmar, MN 56201
612-235-3266/612-235-3917

Floyd Sanner
Kittson County
Courthouse
Hallock, MN 56728
218-762-5811

Tom Barthell
Koochiching County Solid Waste Officer
County Zoning Office
Courthouse
International Falls, MN 56649
218-283-2581 Ext. 272

Marlyn D. Hanson
Lac Qui Parle County Engineer
Courthouse
Madison, MN 56256
612-598-3878

John Bjorum
Assistant Highway Engineer
Lake County Courthouse
Box J
Two Harbors, MN 55616
218-834-4392

Gary Lockner
Lake of the Woods County Courthouse
Route 1, Box 272B
Baudette, MN 56623
218-634-1945

Myron Wolf
Le Sueur County Highway Department
Le Center, MN 56057
612-357-2251

Peter Boomgarden
Lincoln County Engineer
Courthouse
Ivanhoe, MN 56142
507-694-1464

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Lyon County Environmental Admin.
607 W. Main
Marshall, MN 56258
507-532-6311

Edwin Homan
McLeod County Zoning Administrator
Courthouse
Glencoe, MN 55336
612-864-5551, ext. 253

Mark Diekman
Mahnomen County Solid Waste Officer
Courthouse
Mahnomen, MN 56557
218-935-5639

Charles Cheeney, County Auditor
Marshall County Courthouse
Warren, MN 56762
218-748-6380

Wayne Flohrs
Martin County Zoning and Solid Waste Officer
Room 124
Security Building
114 1/2 S.W. 2nd St.
Fairmont, MN 56031
507-238-4757, ext. 260

H.A. Knieff
Meeker County Engineer
Courthouse
Litchfield, MN 55355 (612-693-8244)

Mahlon Dahl
Mille Lacs County Zoning Admin.
Courthouse
Milaca, MN 56353
612-983-2561

Kathy Kendall
Morrison County Landfill Board Zoning Officer
Courthouse
Little Falls, MN 56345
612-632-2941, ext. 170

William Buckley
Mower County Sanitarian
Courthouse
Austin, MN 55912
507-433-1846

Claire Jerome
Murray County Engineer
Courthouse
Slayton, MN 56172
507-836-6327

Phil R. Lutzi, Sr.
Zoning Administrator
Nicollet County Courthouse
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Gil C. Bomgaars
Nobles County Zoning Officer
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Worthington, MN 56187
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Kenneth Benesh
Norman County Auditor
Courthouse
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218-784-2101

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Olmsted County Health Department
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507-285-8342

Malcolm K. Lee
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Fergus Falls, MN 56537
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218-681-1221

Wayne R. Golly
Pine County Solid Waste Officer
Pine County Zoning Officer
Courthouse
Pine City, MN 55063
612-629-6781

Wayne W. Lange
Pipestone County Courthouse
Pipestone, MN 56164
507-825-4246, 7

Bernard Lieder, P.E.
Polk County Highway Engineer
Courthouse
Crookston, MN 56716
218-281-3952

Michael D. Howe
Pope County Environmental
Planning Office
Courthouse
Glenwood, MN 56334
612-634-4813

Douglas Wood/Colleen Halpine
Ramsey County Community Health Servi
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934 Woodhill Drive, Room 118
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612-483-5845, 298-5972, 483-5983

Orin Linder
Red Lake County Courthouse
Red Lake Falls, MN 56750
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Gary Zick
Solid Waste Management Officer
Redwood County Courthouse
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Courthouse
Olivia, MN 56277
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Mert Hoover, Director
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Faribault, MN 55021
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Jack Wimmer/Ken Hopke
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Stevens County Engineer
Courthouse
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Frances Perrizo
Swift County Auditor
Courthouse
Benson, MN 56215
612-842-6271

Albert Steuck
Todd County Zoning Administrator
Courthouse Annex
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612-732-6181

Lester M. Deyo
Traverse County Solid Waste Officer
Courthouse
Wheaton, MN 56296
612-563-4411

Charles McDonald
Wabasha County Auditor
Courthouse
Wabasha, MN 55981
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Greg J. Kempf
Wadena County Zoning Administrator
Courthouse
Wadena, MN 56482
218-631-4455

Bob McPartlin
Waseca County Engineer
Courthouse
Waseca, MN 56093
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Chuck Swanson/Paul Brandt
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11660 Myeron Road North
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Marvin Wellnitz, Zoning Admin.
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612-682-3900, ext. 106

Robert R. Olson
Yellow Medicine County Planner
Box 675
Clarkfield, MN 56223
612-669-7524

STATE OF MINNESOTA
COUNTY OF RAMSEY

CERTIFICATE

In the Matter of the Proposed Adoption of Rules of the
State of Minnesota
Governing Sewage Sludge Management

I hereby certify that the list of persons, associations, and other interested groups who have requested, pursuant to Minn. Stat. § 15.0412, subd. 4., that their names be placed on file with and maintained by the State of Minnesota for the purpose of receiving notice of the proposed adoption of rules by the Minnesota Pollution Control Agency is accurate and complete as of 2:00 p.m., this twenty first day of December, 1981.

Marjorie Bouchard

judicial candidates, assessment and waiver of late filing fees, allocation of the cost of radio and television reports to constituents, allocation of the costs of preparation and distribution of sample ballots, application of contribution limits and tax credit receipt provisions to special elections, termination of political committees and political funds, return of public financing money, expenditures by state political parties in support of more than one candidate, application of registration-reporting requirements, contributions-expenditures limitations and expenditure allocation provisions to ballot questions. The board proposes to amend existing economic interest disclosure rules (9 MCAR §§ 1.0100-1.0111) pertaining to the assessment and waiver of late filing fees, and filing deadlines. The board proposes to amend existing lobbyist rules (9 MCAR §§ 1.0200-1.0209) pertaining to filing requirements and the assessment and waiver of late filing fees. The board proposes to amend existing conflict of interest rules (EC 300-307) pertaining to filing requirements and deadlines, identification of the immediate superior of public officials, and to remove the definition of public official. The board proposes to amend existing representation disclosure rules (EC 500-507) pertaining to filing requirements, the assessment and waiver of late filing fees, and to remove the definition of public official. The board proposes to amend existing hearings rules (EC 601-623) by updating and incorporating references to contested case procedures, identifying those matters which are contested cases, establishing procedures and requirements for submission, consideration, and disposition of complaints under the Ethics in Government Act, Minn. Stat. ch. 10A, and establishment of procedures for meetings related to investigations and audits. The board proposes to repeal rules 9 MCAR § 1.0013 and EC 603. The proposed amendments are intended to reflect legislative changes in Minn. Stat. ch. 10A, to remove obsolete provisions and language, and to incorporate applicable advisory opinions which have been rendered by the board.

Text and references to rules as proposed were originally published as rules to be adopted after a hearing in the *State Register* on Monday, December 7, 1981, pages 1075-1084 (6 S.R. 1975-1084).

Minnesota Pollution Control Agency

Proposed Rules Governing Sewage Sludge Management (6 MCAR § 4.6101, 6 MCAR § 4.6102, 6 MCAR § 4.6103, 6 MCAR § 4.6104, 6 MCAR § 4.6105, 6 MCAR § 4.6106, 6 MCAR § 4.6107, 6 MCAR § 4.6108, 6 MCAR § 4.6111, 6 MCAR § 4.6112, 6 MCAR § 4.6121, 6 MCAR § 4.6122, 6 MCAR § 4.6131, 6 MCAR § 4.6132, 6 MCAR § 4.6133, 6 MCAR § 4.6134, 6 MCAR § 4.6135, 6 MCAR § 4.6136)

Notice of Intent to Adopt Rules without a Public Hearing

Notice is hereby given that the Minnesota Pollution Control Agency proposes to adopt the above entitled rules without a public hearing. The agency has determined that the proposed adoption of these rules will be noncontroversial in nature and has elected to follow the procedures set forth in Minnesota Statutes § 15.0412, subd. 4h.

Persons interested in these rules shall have 30 days to submit comments on the proposed rules. The proposed rules may be modified if the modifications are supported by the data and views submitted to the agency and do not result in a substantial change in the proposed language.

Unless seven or more persons submit written requests for a public hearing on the proposed rules within the 30-day comment period, a public hearing will not be held. In the event a public hearing is required, the agency will proceed according to the provisions of Minnesota Statutes § 15.0412, subd. 4-4f. The agency asks that requests for a public hearing identify the particular objection and suggest appropriate modifications to the proposed rules and the reasons or data relied on to support the suggested modification.

Persons who wish to submit comments or a written request for a public hearing should submit such comments or requests to:

Rodney E. Massey, P.E.
Chief, Program Development and Facility Review Section
Minnesota Pollution Control Agency
1935 West County Road B2
Roseville, Minnesota 55113
(612) 297-2713

KEY: PROPOSED RULES SECTION — Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

Authority for the adoption of these rules is contained in Minnesota Statutes § 116.07, subd. 4. Additionally, a statement of need and reasonableness that describes the need for and reasonableness of each provision of the proposed rules, and that identifies the data and information relied upon to support the proposed rules, has been prepared and is available upon request. It is also available for review in the Minnesota Pollution Control Agency office in Roseville and in each of the Minnesota Pollution Control Agency regional offices:

Duluth Regional Office
314 West Superior Street
1015 Torrey Building
(218) 723-4660

Brainerd Regional Office
304 East River Road
Suite 3
(218) 828-2492

Detroit Lakes Regional Office
116 East Front Street
(218) 847-2164

Marshall Regional Office
Box 286
1104 East College Drive
(507) 537-7146

Rochester Regional Office
1200 South Broadway
Suite 140
(507) 285-7343

The agency has estimated the total cost to local public bodies to implement the proposed rules in either of the first two years following their adoption would be approximately $186,000. This estimate includes $117,500 in annual costs and $68,500 in initial costs.

Upon adoption of the final rules without a public hearing, the proposed rules, this notice, the statement of need and reasonableness, all written comments received, and the final rules as adopted will be delivered to the Attorney General for review as to form and legality, including the issue of substantial change. Persons who wish to be advised of the submission of this material to the Attorney General or who wish to receive a copy of the final rules should submit a written statement of such request to Mr. Massey.

The purpose of the proposed rules is to provide for the protection of the public health and the environment in the utilization or disposal of sewage sludge. The proposed rules establish standards for the design, location and operation of sewage sludge landspreading sites and facilities. The proposed rules also establish permit and letter of approval requirements for landspreading sites and facilities. In addition, the proposed rules provide methods for collection and analysis of sewage sludge samples, soil samples, vegetative tissue samples, and ground water samples; establish methods for sewage sludge application rates based on crop nitrogen requirements and, establish pathogen reduction processes. The persons regulated by the proposed rule include political subdivisions that landspread sewage sludge, persons who own, lease or rent landspreading facilities, and persons who are under contract to landspread sewage sludge or to operate a landspreading facility.

Copies of this notice and the proposed rules are available for review in the Minnesota Pollution Control Agency office in Roseville and at each of the Minnesota Pollution Control Agency regional offices and may be obtained by cntacting Mr. Massey.

December 14, 1981

Louis J. Breimhurst, Executive Director
Minnesota Pollution Control Agency

Rules as Proposed (all new material)

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Chapter Five: General Provisions

6 MCAR § 4.6101 Purpose and scope. The purpose of 6 MCAR §§ 4.6101-4.6136 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 Minn. Stat. § 116.07, subd. 4, these rules establish standards for the design, location, and operation of sewage sludge landspreading sites and facilities.

6 MCAR § 4.6102 Permit and letter of approval requirements.

A. Landspreading.

1. The following persons shall comply with the requirements of 6 MCAR §§ 4.6101-4.6136:

a. political subdivisions that landspread sewage sludge;

b. persons who own, lease, or rent landspreading facilities; and

c. persons who are under contract to a. or b. to landspread sewage sludge or to operate a landspreading facility.

2. The persons identified in 1. shall apply for, and be copermittees of, a state disposal system permit for landspreading facilities.

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

4. Each existing and proposed landspreading site shall have a letter of approval at the time given in Exhibit 6 MCAR § 4.6102 A.4.-1, unless it possesses a current letter of approval. Each existing landspreading facility shall have a state disposal system permit at the time given in Exhibit 6 MCAR § 4.6102 A.4.-1, unless it possesses a current permit. Each proposed landspreading facility shall have a state disposal system permit prior to development and use.

Exhibit 6 MCAR § 4.6102 A.4.-1

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

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B. Incineration. Incineration of sewage sludge is governed by rule APC 28 of the Minnesota Pollution Control Agency.

C. Other facilities. Any facility for the processing, storage, or disposal of sewage sludge into or on any land by means other than regulated by 6 MCAR §§ 4.6101-4.6136 is prohibited without an agency permit.

6 MCAR § 4.6103 Definitions. For the purpose of 6 MCAR §§ 4.6101-4.6136, the following terms have the meanings given them.

A. Agency. "Agency" means the Minnesota Pollution Control Agency.

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

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

D. Available nitrogen. "Available nitrogen" means nitrogen which is present in inorganic forms that are useable by plants, and which may be determined by procedures set out in 6 MCAR § 6.6135.

E. 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 6 MCAR § 4.6132 B.3.

F. Bedrock outcrop. "Bedrock outcrop" means any bedrock that appears at the surface of the land.

G. 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 milliquivalents per 100 grams of soil. Rule 6 MCAR § 4.6132 B.2. provides acceptable methods of determining cation exchange capacity.

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

I. 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.

J. 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.

K. Director. "Director" means the executive director or other designated representative of the Minnesota Pollution Control Agency.

L. 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.

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

N. Hundred-year floodplain. "Hundred-year floodplain," as defined in 6 MCAR § 4.8051 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.

O. 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.

P. 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 Supplement 1 of 6 MCAR §§ 4.8024 and 4.8025 are included within this definition.

Q. Lakes and ponds. "Lakes and ponds" means any water basins defined as water basins and public waters in Minn. Stat. § 105.37, subds. 9 and 14 respectively.

R. Landspreading. "Landspreading" means placement of sewage sludge on or incorporated into the soil surface.

S. 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.

T. 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.

U. 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.

V. Mine. "Mine" means any excavation for minerals.

W. Organic priority pollutant. "Organic priority pollutant" means the organic compounds that appear in 40 Code of Federal Regulations, Section 401.15 (1981).

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

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

Z. Person. "Person," as defined in Minn. Stat. § 116.06, subd. 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.

AA. Place of habitation. "Place of habitation" means any house, apartment, mobile 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.

BB. Political subdivision. "Political subdivision" as defined in Minn. Stat. § 115A.03, subd. 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.

CC. 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 6 MCAR § 4.6136.

DD. 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 6 MCAR § 4.6136.

EE. 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.

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

GG. 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.

HH. 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.

II. Rivers and streams. "Rivers and streams" means any watercourses defined as natural watercourses or altered natural watercourses and public waters in Minn. Stat. § 105.37, subds. 10, 11, and 14 respectively.

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

KK. Root crops. "Root crops" means plants whose edible parts are grown below the soil surface.

LL. 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 6 MCAR § 4.6132 B.5.

MM. Sewage sludge. "Sewage sludge," as defined in Minn. Stat. § 115A.03, subd. 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.

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

OO. 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.

PP. 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.

QQ. Soil Conservation Service. "Soil Conservation Service" means the Soil Conservation Service of the United States Department of Agriculture.

RR. 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.

SS. 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 6 MCAR § 4.6132 B.1.

TT. Soil texture. "Soil texture" means the relative portion of the soil separates sand, silt, and clay. It can be measured using methods addressed in 6 MCAR § 4.6132 B.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.

UU. 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.

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

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

XX. 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.

YY. Surface water. "Surface water" means any lake or pond, and any river or stream as defined in Q. and II., respectively.

ZZ. 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.

AAA. 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.

BBB. 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 Minn. Stat. § 105.37, subd. 14, and which is ten or more acres in size in unincorporated areas or 2.5 acres or more in incorporated areas.

6 MCAR § 4.6104 Variance. Any person may apply for a variance from any requirement of 6 MCAR §§ 4.6101-4.6136. Variances shall be applied for and acted upon by the agency in accordance with Minn. Stat. § 116.07, subd. 5 and other applicable statutes and rules.

6 MCAR § 4.6105 Application requirements for landspreading sites. Applications for letters of approval for sewage sludge landspreading sites shall include the specific information given in A.-E. Submittal of this information shall be made using a form obtained from the director.

A. Sewage sludge characterization. Applications shall contain sewage sludge characterization.

1. 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.

2. 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 6 MCAR § 4.6111 A.5. The dates of sampling and analysis shall be included with the analysis.

B. Site characterization. Applications shall contain site characterization.

1. 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:

a. texture and thickness of each soil horizon to 60 inches of depth;

b. permeability of each soil horizon to 60 inches of depth;

c. available water-holding capacity of each soil horizon to 60 inches in depth;

d. soil depth required to obtain six inches of available water-holding capacity;

e. depth to seasonal high water table;

f. depth to bedrock; and

g. slope of land surface.

2. 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:

a. lakes and ponds;

b. rivers and streams;

c. wetlands;

d. intermittent streams;

e. ten-year flood plains;

f. sinkholes, caves, bedrock outcrops, mines, or quarries;

g. potable water supply wells;

h. places of habitation;

i. recreational areas;

j. residential developments;

k. road right-of-ways; and

l. airports.

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

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

5. Required sampling and analytical procedures of soil characteristics listed in a. to g. are provided in 6 MCAR § 4.6132. Applications shall contain the following soil characteristics which shall be determined from samples obtained within six months of application submittal:

a. United States Department of Agricultural textural classification;

b. percentage of organic matter;

c. extractable phosphorus in pounds per acre;

d. exchangeable potassium in pounds per acre;

e. pH;

f. soluble salts expressed in millimhos per centimeter; and

g. cation exchange capacity expressed in milliequivalents per 100 grams.

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

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

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

C. Site management. Applications shall include site management. This includes the following:

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

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

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

4. 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;

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

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

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

D. 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:

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

2. The location of the storage area delineated on maps submitted pursuant to B.1. and B.2.

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

4. The acreage of the sewage sludge storage area.

5. The quantity of sewage sludge to be stored.

6. 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:

a. texture and thickness of each soil horizon encountered;

b. color and presence or absence of mottling for each soil horizon encountered;

c. depth to water table, if encountered; and

d. depth to bedrock, if encountered.

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

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

9. 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.

E. 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.

6 MCAR § 4.6106 Application requirements for landspreading facilities. Applications for state disposal system permits for sewage sludge landspreading facilities shall include the information required by A.-D.

A. Information required for letters of approval. The application shall contain all information required in 6 MCAR § 4.6105 A., B., and C. for letters of approval for landspreading sites.

B. Ground water quality. Applications shall contain present ground water quality for the following parameters:

1. pH;

2. electrical conductivity expressed in millimhos per centimeter;

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

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

5. chlorides expressed in milligrams per liter;

6. sulfates expressed in milligrams per liter;

7. total organic carbon expressed in milligrams per liter;

8. nitrate-nitrogen expressed in milligrams per liter;

9. total phosphorus expressed in milligrams per liter;

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

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

12. 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 6 MCAR § 4.6134.

C. 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:

1. location on required soil map;

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

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

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

1. facility type and capacity;

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

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

E. Additional information. The information in 1.-3. shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes to apply available nitrogen in excess of that stipulated in 6 MCAR § 4.6121 A.2.e., cadmium in excess of two pounds per acre per year, or metals in excess of levels stipulated in Exhibits 6 MCAR § 4.6121 D.2.f.-1. or D.2.g.-2. The information in 4., 5., 6., or 7., whichever is applicable, shall be submitted in addition to that required in A.-D. if the applicant or permittee proposes not to comply with one or more of the minimum design requirements in 6 MCAR § 4.6121.

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

a. type of and depth to bedrock;

b. bedrock condition, such as fractures, faults, and channels;

c. texture of unconsolidated material above bedrock;

d. depth to hydrostatic ground water table;

e. direction of ground water flow and rate of movement;

f. ground water recharge and discharge areas;

g. available well boring logs for any public or private, potable or non-potable water supply wells;

h. present ground water quality and use; and

i. 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.

2. 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 × 0.1) + 3.

The information given for each boring shall include:

a. location and depth of boring;

b. soil classification using the Unified system for each soil horizon encountered;

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c. color and presence or absence of mottling for each soil horizon encountered; and

d. water level measurement.

3. Utilizing the information in 1. and 2., the application shall contain an evaluation of the potential for impacting aquifer quality based on proposed facility management practices.

4. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR § 4.6121 A.1. if one or more of the minimum design requirements in 6 MCAR § 4.6121 A.2. cannot be accomplished.

5. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR § 4.6121 B.1. if one or more of the minimum design requirements in 6 MCAR § 4.6121 B.2. cannot be accomplished.

6. It shall contain a description and evaluation of the provisions, practices, and site features that will be utilized to comply with 6 MCAR § 4.6121 C.1. if one or more of the minimum design requirements in 6 MCAR § 4.6121 C.2. cannot be accomplished.

7. It shall also contain a description and evaluation of the provisions, practices and site features that will be utilized to comply with 6 MCAR § 4.6121 D.1. if one or more of the minimum design requirements in 6 MCAR § 4.6121 D.2. cannot be accomplished.

6 MCAR § 4.6107 Administration of letters of approval.

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

B. Preparation of preliminary determinations. The director 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.

1. If the preliminary determination is to deny an approval, the director 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, rule MPCA 3 of the Minnesota Pollution Control Agency.

2. If the preliminary determination is to issue an approval, the procedures set out in C. and D. shall apply.

C. Public participation.

1. The director 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 director to have an interest in the proposed approval.

2. 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 director.

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

D. Final determination.

1. The director shall attempt to resolve all comments prior to a final determination concerning the application. If such comments have been resolved, the director shall issue or deny the approval.

2. 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 rule WPC 36(k) of the Minnesota Pollution Control Agency.

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

E. Denial of approval.

1. 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.

2. Notice of denial and reasons for the denial shall be issued to the persons listed in C.1.

F. Modification, suspension, and revocation of letters of approval. A letter of approval may be modified, suspended, or revoked in accordance with the requirements of rule WPC 36(s) of the Minnesota Pollution Control Agency.

G. 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 6 MCAR §§ 4.6101-4.6136 for the duration of the requested approval period.

H. 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.

6 MCAR § 4.6108 Administration of state disposal system permits. The administration of state disposal system permits for landspreading facilities shall be governed by rule WPC 36 of the Minnesota Pollution Control Agency.

Chapter Six: Landspreading Sites

6 MCAR § 4.6111 Requirements and limitations. The following requirements and limitations apply to the management of landspreading sites.

A. Sewage sludge sampling and analysis.

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

2. 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.

3. 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.

4. Other recommended sampling and handling procedures are provided in 6 MCAR § 4.6131.

5. Sewage sludge shall be analyzed according to methods set forth in 6 MCAR § 4.6131 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.

6. The minimum frequency of sewage sludge sampling and analysis is given in Exhibit 6 MCAR § 4.6111 A.6.-1.

Exhibit 6 MCAR § 4.6111 A.6.-1

Minimum Frequency of Sewage Sludge Sampling and Analysis

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

7. Each parameter exceeding concentrations listed in Exhibit 6 MCAR § 4.6111 A.7.-2 shall be analyzed for at two or three times the minimum frequency given in Exhibit 6 MCAR § 4.6111 A.6.-1.

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Exhibit 6 MCAR § 4.6111 A.7.-2

Greater Frequency of Sewage Sludge Sampling and Analysis

Concentration Expressed in Milligrams/ Kilogram of Dry Weight

Parameter	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

8. Frequency of sewage sludge sampling and analysis may be reduced by the director depending on the annual frequency of landspreading and the variability of sewage sludge quality.

B. Pathogen control.

1. Sewage sludge, at a minimum, shall be treated by a process to significantly reduce pathogens prior to landspreading.

2. 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.

3. 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.

4. 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 mouth following the last sewage sludge application unless the sewage sludge was treated by a process to further reduce pathogens.

5. 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 and posting are not required if inadvertant public contact is deemed unlikely.

C. Soil pH and cadmium application.

1. 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.

2. 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.

3. Cumulative cadmium application to any landspreading site shall not exceed the levels provided in Exhibit 6 MCAR § 4.6111 C.3.-3.

Exhibit 6 MCAR § 4.6111 C.3.-3.

Maximum Cumulative Cadmium Application

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

D. Cumulative heavy metal additions. Sewage sludge application shall be terminated when the sum addition of any one heavy metal equals the level in Exhibit 6 MCAR § 4.6111 D.-4 for that particular heavy metal and soil.

Exhibit 6 MCAR § 4.6111 D.-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

E. Sewage sludge application rates.

1. 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 6 MCAR § 4.6135.

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

3. 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.

4. 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.

F. Organic priority pollutant limitations.

1. Sewage sludge containing concentrations of PCBs equal to or greater than 10 milligrams per kilogram of sewage sludge solids shall be incorporated into the soil when applied to land used for producing food-chain crops.

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

3. 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.

G. Suitable soil conditions.

1. 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.

2. For the purpose of 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.

3. For the purpose of 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.

4. 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.

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5. 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.

6. 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.

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

8. 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.

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

10. 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.

11. 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 6 MCAR § 4.6132:

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.

H. Separation distances.

1. 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 the appropriate party.

2. 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.

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

4. Land application of sewage sludge shall be conducted so that sewage sludge is not applied to adjoining property or to road right-of-ways.

5. 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.

6. The minimum distances in Exhibit 6 MCAR § 4.6111 H.6.-5. from any downgradient surface water shall be maintained where sewage sludge is immediately incorporated into the soil.

Exhibit 6 MCAR § 4.6111 H.6.-5.

Minimum Distances From Downgradient Surface Water

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

7. 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.

I. Short-term dewatered sewage sludge storage.

1. 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.

2. Separation distances for short-term sewage sludge storage areas shall be those provided in H. 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.

3. 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.

4. The suitable soil conditions for short-term storage of sewage sludge shall be the same as those for landspreading sites in G.

J. Long-term dewatered sewage sludge storage.

1. 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.

2. 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 the appropriate party.

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

4. 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.

5. 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.

6. 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.

7. 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.

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

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

K. Prohibited sites and other limitations.

1. 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.

2. Sewage sludge shall not be applied on any land without the permission of the owner.

3. 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.

4. 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.

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

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6. 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.

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

6 MCAR § 4.6112 Record keeping and annual reporting.

A. 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 6 MCAR § 4.6111. The information recorded in the system shall include the following:

1. required sewage sludge composition data pursuant to 6 MCAR § 4.6111 A.5.;

2. soil test data for landspreading sites used during the year, pursuant to 6 MCAR § 4.6111 G.11.;

3. 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;

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

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

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

7. vegetation grown on the site during the year.

B. Reports. The information in A. 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 director.

Chapter Seven: Landspreading Facilities

6 MCAR § 4.6121 Requirements and limitations. The following requirements and limitations apply to the management of landspreading facilities.

A. Ground water protection.

1. A sewage sludge landspreading facility shall be designed, constructed, monitored, and maintained so that it will comply with the standards of rule WPC 22 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 well purposes. All wells shall sample the same portion of the aquifer. At a minimum, the frequency of sampling shall be semi-annually. The parameters to be tested for and a sampling frequency exceeding the minimum shall be determined by the director 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 6 MCAR § 4.6135.

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 director.

B. Surface waters protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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 director 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 director 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.

C. Public health and safety.

1. 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 rule APC 9 of the Minnesota Pollution Control Agency at the facility boundary.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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.

D. Food-chain protection.

1. 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.

2. The facility shall comply with the following minimum design requirements unless the permittee can demonstrate that compliance with 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.

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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 6 MCAR § 4.6133 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 Exhibit 6 MCAR § 4.6121 D.2.f.-1, 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 6 MCAR § 4.6133 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.

Exhibit 6 MCAR § 4.6121 D.2.f.-1

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

g. The cumulative addition of lead, zinc, copper, and nickel shall not exceed the levels in Exhibit 6 MCAR § 4.6121 D.2.g.-2 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.

Exhibit 6 MCAR § 4.6121 D.2.g.-2

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

6 MCAR § 4.6122 Record keeping and annual reporting.

A. Record keeping. A record keeping system shall be initiated and maintained by the permittee of the landspreading facility to verify compliance with requirements and limitations in 6 MCAR § 4.6121. The information recorded in such a system shall include the following:

1. sewage sludge composition data for parameters outlined in 6 MCAR § 4.6111 A.5.;
2. the quantity and rate of sewage sludge solids applied to the facility expressed in tons per acre;
3. the amount of available nitrogen applied to the facility expressed in pounds per acre;
4. the amount of cadmium, zinc, lead, nickel, and copper applied that year and cumulatively expressed in pounds per acre;
5. vegetation grown and use of vegetation grown at the facility;
6. results of required monitoring of ground water, soils, or vegetative tissue;
7. information required in the facility operating permit;

8. 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

9. a report of any action not in compliance with the permit or 6 MCAR § 4.6121.

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 director 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.

B. Reports. The information and records prescribed in A. 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.

Chapter Eight: Appendices

6 MCAR § 4.6131 Collection and analysis of sewage sludge samples.

A. Collection of sewage sludge samples.

1. 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 4 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 10 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 a.

2. 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.

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

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

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

3. '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).

4. '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).

6 MCAR § 4.6132 Collection and analysis of soil samples.

A. 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.

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B. Analysis of soils.

1. 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 (St. 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).

2. Soil cation exchange capacity may be estimated on the basis of soil texture and organic matter content using Exhibit 6 MCAR § 4.6132 B.2.-1 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).)

Exhibit 6 MCAR § 4.6132 B.2.-1
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

3. 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 Investigation 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).

4. 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).

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).

5. 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 the 'Soil Taxonomy,' issued by the Soil Conservation Service as Agriculture Handbook No. 436 (Washington, D.C.: United States Government Printing Office, 1975).

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).

6 MCAR § 4.6133 Collection and analysis of vegetative tissue samples.

A. 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:

1. corn, leaf at, or opposite and below, ear level, at silking stage;
2. soybeans, the youngest mature leaves and petioles on the plant after first pod formation;
3. legumes, upper stem cuttings in early flower stage;
4. cereals, the whole plant at the boot stage; and
5. grasses, whole plants at early hay cutting stage.

B. 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.

C. 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.

6 MCAR § 4.6134 Collection and analysis of ground water samples.

A. 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:

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

2. '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).

B. 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:

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

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

6 MCAR § 4.6135 Determination of sewage sludge application rate based on crop nitrogen requirements. Sewage sludge application rates shall be based upon soil texture, crop nitrogen requirements and yield goals, sewage sludge nitrogen availability, carry-over nitrogen supplied by past sewage sludge applications, and available nitrogen added by manures or fertilizers. The procedures in A.-E. shall be used:

A. Maximum allowable available nitrogen level. Based on cropping practices and soil texture, determine the maximum allowable available nitrogen level in pounds per acre from Exhibit 6 MCAR § 4.6135 A.-1 or Exhibit 6 MCAR § 4.6135 A.-2.

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.

KEY: PROPOSED RULES SECTION — Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

Exhibit 6 MCAR § 4.6135 A.-1
Maximum Allowable Available Nitrogen Levels for Various Crops, Yields, and Soil Textures

Crop	Yield/Acre	Maximum Allowable Available Nitrogen Level (pounds/acre) Soil Texture 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

Exhibit 6 MCAR § 4.6135 A.-2
Maximum Allowable Available Nitrogen Levels for Non-Cropped, Non-Harvested Areas

Degree of Vegetative Cover	Maximum Allowable Available Nitrogen Level (pounds/acre) Soil Texture 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

B. Carry-over nitrogen. Determine carry-over nitrogen from the previous year's sewage sludge application using the following formula:

Carry-over N (pounds per acre) = (percentage organic sewage sludge N) × (tons sewage sludge solids applied per acre).

If sewage sludge was not applied the previous year, carry-over nitrogen is zero.

C. Net allowable nitrogen level. To determine the net allowable available nitrogen level in pounds per acre subtract carry-over 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.

D. Sewage sludge available nitrogen. Determine the available nitrogen in sewage sludge in pounds per ton using the appropriate formula in Exhibit 6 MCAR § 4.6135 D.-3.

Exhibit 6 MCAR § 4.6135 D.-3
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 × 4) + (% NH_3-N × 10)
	Incorporated or Injected	(% organic-N × 4) + (% NH_3-N × 15)

Chemically or Physically Stabilized or Unstabilized	Surface	(% organic-N × 6) + (% NH_3-N × 10)
	Incorporated or Injected	(% organic-N × 6) + (% NH_3-N × 15)

E. Sewage sludge application rate. Divide the net allowable available nitrogen level in pounds per acre from C. by the available nitrogen in sewage sludge in pounds per ton from D. to obtain the sewage sludge application rate in tons of solids per acre per ton.

6 MCAR § 4.6136 Pathogen reduction processes.

A. Process to significantly reduce pathogens. Paragraphs 1.-5. contain processes to significantly reduce pathogens.

1. 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.

2. 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 0 degrees Centigrade.

3. 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.

4. In composting by means of the within vessel, static aerated pile, or window 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.

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

6. The director 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 1.-5., or to an extent necessary for the proposed landspreading operation. The director's decision shall be based upon:

a. sewage sludge residence time;

b. temperatures achieved during treatment;

c. duration of sewage sludge storage;

d. method of sewage sludge application;

e. crop or crops to which sewage sludge is applied;

f. potential impact of runoff on surface waters;

g. location of landspreading area with respect to places of habitation, residential developments, and recreational areas; and

h. degree of public access control.

B. Processes to further reduce pathogens. Paragraphs 1.-4. contain processes to further reduce pathogens.

1. 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:

a. 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.

b. 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.

c. 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.

KEY: PROPOSED RULES SECTION — Underlining indicates additions to existing rule language. ~~Strike outs~~ indicate deletions from existing rule language. If a proposed rule is totally new, it is designated "all new material." ADOPTED RULES SECTION — Underlining indicates additions to proposed rule language. ~~Strike outs~~ indicate deletions from proposed rule language.

2. 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.

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

4. 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.

5. The director 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 1.-4.

ADOPTED RULES

The adoption of a rule becomes effective after the requirements of Minn. Stat. § 15.0412, subd. 4, have been met and five working days after the rule is published in the *State Register*, unless a later date is required by statutes or specified in the rule.

If an adopted rule is identical to its proposed form as previously published, a notice of adoption and a citation to its previous *State Register* publication will be printed.

If an adopted rule differs from its proposed form, language which has been deleted will be printed with strike outs and new language will be underlined, and the rule's previous *State Register* publication will be cited.

A temporary rule becomes effective upon the approval of the Attorney General as specified in Minn. Stat. § 15.0412, subd. 5. Notice of his decision will be published as soon as practicable, and the adopted temporary rule will be published in the manner provided for adopted rules under subd. 4.

Capitol Area Architectural and Planning Board
Adopted Capitol Area Zoning and Design Rules

The rules proposed and published at *State Register*, Volume 5, Number 43, pages 1655-1683, April 27, 1981 (5. S.R. 1655) are now adopted with the following modifications:

Rules as Adopted

[CAAPC 208 Renumber as CAAPB 207.]

CAAPB 259 Sign.

J. Identification and name ~~place~~ plate: A business sign stating the name of a person, firm, institution, or name or description of a certain permitted use.

M. Political sign: A temporary sign which displays information pertaining to an ~~uncoming~~ upcoming governmental district, city, county, state or national election.

[CAAPC 254 q.-r. Reletter and renumber as 259 T.-U.]

[Change all internal references in Chapter Four from CAAPC to CAAPB.]

CAAPB 405 Governmental district (G-2); conditional uses. Underground structures containing uses, as regulated in G-1 zone, shall be permitted provided that the following criteria are met:

C. ~~Proof~~ Reasonable documentation satisfactory to the board that soil conditions will not cause damage to adjacent property shall be provided.

CAAPB 410 Office-service district (OS-1); principal uses.

F. All principal uses permitted in the governmental district (G-1), as governed by CAAPB ~~403~~ 402.

CAAPB 609 Minimum number of required off-street parking spaces. The minimum number of off-street parking spaces by type of

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed
Adoption of Rules of the
Minnesota Pollution Control
Agency Governing Sewage Sludge
Management, 6 MCAR §§ 4.6101
Through 4.6136

FINDINGS OF FACT
AND CONCLUSIONS

The above entitled matters came on for decision before the Minnesota Pollution Control Agency on the 9th day of March, 1982. After affording all interested persons an opportunity to submit written and oral data and views on the proposed rules, in accordance with the requirements regarding the adoption of noncontroversial rules, having considered the Statement of Need and Reasonableness and the written comments submitted to the Minnesota Pollution Control Agency within the comment period, and having considered all of the evidence adduced upon the records, files, and proceedings herein, the Minnesota Pollution Control Agency makes the following:

FINDINGS OF FACT

1. On October 14, 1981, the Order for Notice of Intent to Adopt Rules Without a Public Hearing was issued.

2. On December 28, 1981, a Notice of Intent to Adopt Rules Without a Public Hearing and the proposed rules were published at 6 State Register 1187, et seq.

3. On December 28, 1981, the Statement of Need and Reasonableness of the proposed rules was made available.

4. On December 21, 1981, the Notice of Intent to Adopt Rules Without a Public Hearing was mailed to all persons who registered their names with the Minnesota Pollution Control Agency for the purpose of being informed of rule-making proceedings. In addition, notice was sent to other interested persons.

5. The comment period, as set out in the Notice of Intent, expired January 27, 1982.

6. Within the comment period, the Minnesota Pollution Control Agency received six (6) written comments: Michael F. Davy, Davy Engineering Company (dated January 6, 1982); Marvin T. Skodje, P.E., City of Rochester (dated January 8, 1982); Michael A. Zagar, P.E., RCM (dated January 20, 1982); Virginia R. Harris, County of Carver (dated January 21, 1982); Del Senst, City of New Ulm (dated January 22, 1982); George W. Lusher, Metropolitan Waste Control Commission (dated January 26, 1982). In addition, 22 written requests for a public hearing were received during the comment period. Twenty of these requests were rescinded. The following two requests for public hearings remain: Joanne Anderson, Wrenshall (dated January 25, 1982); Donald Wallin, Wrenshall (dated January 25, 1982).

7. The Minnesota Pollution Control Agency finds that certain modifications of the proposed rules are supported by the data and views submitted to the Minnesota Pollution Control Agency within the comment period. In specific, the Minnesota Pollution Control Agency makes the following findings with respect to each of the comments received within the comment period:

a. Comments regarding rule 6 MCAR § 4.6103.

The comment was made that the word "municipal" should be added to the definition of road right-of-way. It was the intent of the Minnesota Pollution Control Agency to address every type of road right-of-way in the definition. Through an oversight, municipal road right-of-ways were not specifically included. Therefore, the definition has been expanded to include municipal road

added p. 8

right-of-ways.

b. Comments regarding rule 6 MCAR § 4.6111.

(1) The comment was made that the wording for the public access control requirement, B.5., should be changed to be consistent with the Environmental Protection Agency's explanation of the requirement. The suggested changes remove the ambiguity without changing the application or intent of the requirement, therefore, the requirement has been rephrased as requested.

(2) The comment was made that the reference to "the appropriate party" in J.2. was ambiguous and should be modified. The Minnesota Pollution Control Agency agrees. The phrase used in J.2. is also used in H.1., however, the suggested revision is not applicable in both cases. The suggested revision used in J.2. has been slightly modified to be appropriate to use in H.1.

8. The Minnesota Pollution Control Agency adopts the Statement of Need and Reasonableness, in its entirety as the factual basis for the rules. The Minnesota Pollution Control Agency hereby incorporates the Statement of Need and Reasonableness into these Findings.

CONCLUSIONS

A. The Minnesota Pollution Control Agency duly acquired and has jurisdiction in this matter.

B. The Minnesota Pollution Control Agency has statutory authority to promulgate and adopt the proposed rules.

C. All relevant substantive and procedural requirements of statutes and rules have been properly complied with.

D. All the modifications to the proposed rules are supported by the data and views submitted to the Minnesota Pollution Control Agency within the comment

period and do not result in substantial change in the sense, meaning, or effect of the proposed rules.

MINNESOTA POLLUTION CONTROL AGENCY

Dated: 3/16/82

LOUIS J. BREIMHURST
Executive Director

Dated: 3-25-82

VIRGIL C. HERRICK
Chairman
CYNTHIA C. JEPSEN
Vice-Chairperson

CERTIFICATE OF BOARD'S

AUTHORIZING RESOLUTION

I, Virgil C. Herrick, do hereby certify that I am a member and the Chairman of the Board of Minnesota Pollution Control Agency, a board duly authorized under the laws of the State of Minnesota, and that the following is a true, complete, and correct copy of a resolution adopted at a meeting of the Board of the Minnesota Pollution Control Agency duly and properly called and held on the 9th day of March, 1982, that a quorum was present at said meeting, that a quorum voted for the resolution and that said resolution is set forth in the minutes of said meeting and has not been rescinded or modified.

BE IT RESOLVED, that the Minnesota Pollution Control Agency adopts the Minnesota Polution Control Agency staff's proposed Findings of Fact and Conclusions, and Order Adopting Rules atached hereto with respect to the Rules Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 through 4.6136.

BE IT FURTHER RESOLVED, that the Chairman and Executive Director of the Minnesota Pollution Control Agency are hereby authorized to sign the above-described documents.

BE IT FURTHER RESOLVED, that the Executive Director of the Minnesota Pollution Control Agency, be and hereby is granted the authority and directed to perform any and all acts incidental to the promulgation of said rules, including any form changes in the rules that the Revisor of Statutes requires the Minnesota Pollution Control Agency to make in order to obtain the Revisor's certification as required by Minn. Stat. § 15.0412, subd. 2.a.

IN WITNESS WHEREOF, I have hereunto subscribed my name this 30th day of March, 1982.

Virgil C. Herrick

Cynthia C Jaasen

Attest by one other Board member

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

AFFIDAVIT OF STEVEN A. STARK

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STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Steven A. Stark, being first duly sworn, states as follows:

1. He is an employee of the Minnesota Pollution Control Agency.

2. He was named in the Notice of Intent to Solicit Outside Opinion Concerning A Proposed Rule to Regulate Sewage Sludge Disposal, 5 S.R. 1420 (March 9, 1981), as the person to be contacted as to comments on the above-referenced rule.

3. True and correct copies of all comments received are attached hereto as Exhibits 1 and 2.

Steven A. Stark
STEVEN A. STARK

Subscribed and sworn to before me this 2nd day of April, 1982.

Carol T. Groppoli

CAROL T. GROPPOLI
NOTARY PUBLIC-MINNESOTA
RAMSEY COUNTY
My Comm. Expires Jun.23, 1987

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

AFFIDAVIT OF RODNEY E. MASSEY

- - - - - - - - - - - - - - - - -

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Rodney E. Massey, being first duly sworn, states as follows:

1. He is an employee of the Minnesota Pollution Control Agency.

2. He was named in the Notice of Intent to Adopt Rules Without a Public Hearing, 6 S.R. 1187 (December 28, 1981) as the person to be contacted as to comments on the above-referenced rule.

3. True and correct copies of all comments received and hearing requests are attached hereto as Exhibits 1-28.

4. True and correct copies of all hearing request withdrawals are attached hereto as Exhibits 29-48.

Rodney E Massey
RODNEY E. MASSEY

Subscribed and sworn to before me this 2nd day of April, 1982.

Carol T. Groppoli

CAROL T. GROPPOLI
NOTARY PUBLIC-MINNESOTA
RAMSEY COUNTY
My Comm. Expires Jun.23, 1987

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed Rules,
6 MCAR § 4.6101, 6 MCAR § 4.6102,
6 MCAR § 4.6103, 6 MCAR § 4.6104,
6 MCAR § 4.6105, 6 MCAR § 4.6106,
6 MCAR § 4.6107, 6 MCAR § 4.6108,
6 MCAR § 4.6111, 6 MCAR § 4.6112,
6 MCAR § 4.6121, 6 MCAR § 4.6122,
6 MCAR § 4.6131, 6 MCAR § 4.6132,
6 MCAR § 4.6133, 6 MCAR § 4.6134,
6 MCAR § 4.6135, and 6 MCAR § 4.6136.

STATEMENT OF NEED
AND REASONABLENESS

I. INTRODUCTION

The subject of this rulemaking is the proposed adoption by the Minnesota Pollution Control Agency (MPCA) of rules governing sewage sludge management. These rules are proposed for adoption pursuant the Minn. Stat. § 116.07, subd. 4 (1981 Supp.) which authorizes the MPCA to adopt standards for sewage sludge.

Rulemaking on the proposed rules was authorized by the Agency on October 27, 1981. At the same time it authorized the initiation of rulemaking, the Agency found that the proposed adoption of the rules is noncontroversial in nature and directed that the rulemaking proceedings be conducted in accordance with the statutory provisions governing the adoption of noncontroversial rules, Minn. Stat. § 15.0412, subd. 4h (1981 Supp.). Accordingly, the rulemaking proceedings on the proposed rules are governed by that statute and no hearing will be conducted on the adoption of the rules unless, on or before January 27, 1981, seven or more persons submit to the Agency a written request for such a hearing.

In accordance with the requirements of Minn. Stat. § 15.0412, subd. 4h (1981 Supp.), this document, the Statement of Need and Reasonableness, was prepared and completed prior to the dates that the proposed adoption of the rules was noticed in the State Register.

The discussion provided in this Statement is divided into the following parts:

Part II. General Overview;
Part III. Need for the Proposed Rules;
Part IV. Reasonableness of the Proposed Rules;
Part V. Estimated Total Cost to Local Public Bodies to Implement the Proposed Rules.
Part VI. Exhibit List.

II. GENERAL OVERVIEW

A. Overview of Sewage Sludge Landspreading.

In order to understand the need for and reasonableness of specific portions of the proposed rules, it will be useful to have a general understanding of the principles of sewage sludge landspreading and the current status of sewage sludge disposal in Minnesota.

Sewage sludge is defined by Minn. Stat. § 115A.03, subd. 29 as "the solids and associated liquids in municipal wastewater which are encountered and concentrated by a municipal wastewater treatment plant." These solids do not include grit or screenings, which are removed prior to primary treatment and usually deposited at a landfill.

Raw sewage arriving at the treatment plant is processed by various methods to achieve a high quality effluent and to condition the sewage sludge. The quality and characteristics of the sewage sludge will vary, depending on the treatment process and the composition of the raw sewage. Sewage sludge can be derived from both primary and secondary treatment processes. Primary sludge is the result of the physical separation of the sewage solids from the liquids. Secondary sludge is sewage which has been altered by biological processes so that the organic matter in the sewage is broken down by microorganisms. Both primary and secondary sludges are considered unstabilized and highly putrescible, and have a large viable pathogen population. Before landspreading,

sewage sludge must be further treated to increase handling efficiency and decrease public health concerns (pathogens) and nuisance conditions (odors).

Most sewage sludges are thickened to increase the solids content and therefore reduce the handling costs. Sewage sludge is usually thickened to at least 3% solids and sometimes is dewatered to make a solid material that is 20% solids or more.

The population of pathogenic microorganisms and the level of volatile organic substances can be reduced in a number of ways but the most frequently used method is digestion. Digestion processes vary, but generally the process involves the conversion of the sewage sludge organic matter into microbial cells. The effectiveness of the process depends on the temperature, the retention time in the digester, and the composition of the raw sewage. Other commonly used methods to reduce pathogens and putrescence are lime treatment, heat treatment and composting.

Sewage sludge contains relatively high levels of the major plant nutrients, nitrogen and phosphorus. These nutrients, and the high organic matter content, make sewage sludge a desirable soil amendment. The concern associated with the use of sewage sludge as a soil amendment arises from the fact that sludge contains other components which can cause adverse health and environmental effects. These components of concern are the heavy metals such as cadmium, nickel, lead, zinc and copper, synthetic organic compounds such as PCBs, and pathogenic microorganisms. The landspreading of sewage sludge creates the potential that these components of concern may contaminate surface and ground waters, impair food crop quality, decrease crops yields, and induce disease in man and animals.

Landspreading is the controlled application of sewage sludge to land at rates which will not overload the assimilative capacity of the soil. The soil system, which includes the microorganisms, chemical processes and physical environment, is the mechanism by which the sewage sludge components of concern are degraded, immobilized, or removed to diminish or eliminate their effect on the environment and on public health. Extensive research has been conducted to develop an understanding of the capacity of the soil for waste treatment and the best methods to ensure the safe utilization of sewage sludge. The research has shown that sewage sludge can be landspread without producing adverse effects if it is applied under controlled conditions.

When sewage sludge is landspread, it is applied at rates which will meet the nitrogen requirements of the crop to be grown, although in some cases the cadmium applied with the sewage sludge may be the limiting factor. The sewage sludge may be applied either on the soil surface or incorporated or injected into the soil. The actual amount applied will vary, but generally a quarter of an inch of dewatered sewage sludge or one inch of liquid sewage sludge applied over the soil surface, will provide sufficient nitrogen for a crop of corn. Sewage sludge can be applied to any crop but is not usually recommended for application to crops which may be eaten raw because of the potential for disease transmission.

In Minnesota, more than 80% of the municipalities that generate sewage sludge, dispose of it by landspreading. In some communities, sewage sludge is incinerated or deposited in sanitary landfills or lagoons. It is the policy of the MPCA to encourage the landspreading of sewage sludge over other disposal alternatives when it is economically feasible and managed in a manner to protect the public health and quality of the environment. Most sewage sludge is

landspread on privately-owned farmland at the request of the landowner. In some cases, especially when the treatment plant has a limited storage capacity and the sewage sludge must be frequently landspread, the sewage sludge is applied to public property such as a municipal airport.

B. Format of the Proposed Rules.

The proposed rules have been divided into four general chapters. Rules 6 MCAR §§ 4.6101-4.6108 in Chapter Five address the general provisions of the rules. These provisions include the purpose, scope and applicability of the rules, the definitions applicable to the proposed rules, and procedural matters related to variances, applications and administration.

Chapter Six, 6 MCAR § 4.6111 and 4.6112, establishes the specific requirements applicable to landspreading sites, and Chapter Seven, 6 MCAR § 4.6121 and 4.6122, establishes the specific requirements applicable to landspreading facilities.

It is important to understand the distinction between landspreading sites and facilities. By definition, landspreading sites are property that is not owned, leased or rented by the political subdivision generating the sewage sludge being landspread. This is generally privately owned farmland but may include industrial/commercial property or public property not owned by the political subdivision. The proposed requirements and limitations for landspreading sites are very specific and may only be modified by obtaining a variance to the rules.

Landspreading facilities are property that is owned, rented or leased by the political subdivision generating the sewage sludge being landspread. The proposed requirements and limitations for landspreading facilities contain two alternatives for compliance. The rule contains general performance standards

and minimum design requirements; compliance with either limitation is acceptable. This format allows for greater flexibility in designing facilities for specific landspreading situations. Landspreading facilities can be divided into two classes depending on the operation of the facility. If the facility will be operated in accordance with all the minimum design requirements, it will be operated similarly to a landspreading site and therefore, be required to submit a similar level of information to the MPCA to obtain a permit. However, if the facility will be used more intensively than would be approved for a landspreading site, or which does not meet the minimum design requirements, additional information and/or monitoring must be provided prior to obtaining or revising a permit. Regardless of the method of operation, landspreading facilities must have a program to monitor ground water to determine the effect of the operation on ground water quality.

Chapter Eight, 6 MCAR §§ 4.6131 - 4.6136 establishes procedures and methodology for conducting certain analyses and other determinations required to be made pursuant to the proposed rules.

III. NEED FOR THE PROPOSED RULES

The need for the proposed rules (6 MCAR §§ 4.6101-4.6136) arises from four sources: A) The requirements of Minn. Stat. § 116.07, subd. 4; B) The potential for adverse environmental and health effects if sewage sludge is improperly managed; C) The widespread use of landspreading as a sewage sludge disposal alternative; and D) The need for standards which serve as a guide for correct landspreading procedures.

A. The Requirements of Minn. Stat. § 116.07, Subd. 4.

The Minnesota Legislature has mandated that the MPCA develop standards addressing the management of sewage sludge. The statute is quite specific as to the extent of the standards. The standards must address the degree of hazard of the sewage sludge, the suitability of the landspreading area, the design and operation of landspreading sites and facilities, and the volume and rate of sewage sludge application. It was necessary to develop very specific rules in order to fulfill each provision of the statute.

B. The Potential for Adverse Environmental and Health Effects if Sewage Sludge is Improperly Managed.

Extensive research has shown that the landspreading of sewage sludge is a safe method of disposal if it is properly managed. However, definite adverse effects have been identified in association with the mismanagement of sewage sludge or sewage sludge components. The components of concern in sewage sludge are the pathogens, heavy metals, synthetic organic compounds, and macronutrients such as nitrogen, phosphorus and salts. These components may impair the quality of surface and ground waters, affect the production of food chain crops and create other public health and welfare impacts if sewage sludge is improperly applied. It is necessary that the rules provide standards for the correct management of each of these components of concern. In addition, improper management of sewage sludge can cause odor, aesthetic and other nuisance conditions and may cause bird hazards at airports.

1. Pathogens.

Sewage sludge contains pathogenic organisms which reflect the occurrence of disease in the sewer service area. The number and type of pathogens vary widely

depending on the health of the sewered population and the method of sewage treatment. Bacteria, viruses, protozoa and parasitic ova are all present to some degree in the sludge as it is applied to land. Pathogens in sewage sludge may cause disease in humans if a route of infection exists. Disease causing organisms may be transmitted through direct contact with the sewage sludge, by contaminated food products, or by contamination of surface and ground water. Restrictions are needed to minimize the number of viable pathogens applied to the land and to reduce the routes for infection.

While it is possible for sewage sludge to contain pathogenic organisms, the level of pathogens associated with municipal sewage is greatly diminished during treatment plant processes and in the soil environment. Soil temperatures and moisture regimes, competition and predation by soil microorganisms, and sunlight are all effective in eliminating pathogens after sewage sludge is landspread. At this time, there is no evidence to indicate that landspreading of treated sewage sludge is a route of disease transmission. But, because some viruses and the ova of some intestinal parasites may survive long enough to present a potential for human infection, precautions must be taken to reduce animal or human contact with viable pathogens.

2. Metals.

Sewage sludge may contain heavy metals. The term "heavy metals" refers to the metals cadmium, nickel, lead, zinc and copper. From a human health standpoint, cadmium is the metal of greatest concern. The concern over cadmium arises from the fact that cadmium can be taken up by plants when high levels are present in acid soils. Cadmium tends to accumulate in the leafy tissue of plants and, if ingested, may cause adverse health effects. Cadmium accumulates

in the liver and kidneys of animals. High levels of cadmium in the human diet may, over time, cause a chronic kidney condition. Cadmium is generally not accumulated in food grains and animal muscle tissue. The soil pH, cation exchange capacity (CEC), type of crop, and the amount of cadmium applied annually and cumulatively all affect the amount of cadmium taken up by the crop.

The other heavy metals, copper, zinc and nickel, must be regulated because of their potential to impair crop growth when high levels are present in the soil. Different soils and crops react differently to the effects of metal additions. Lead must be regulated because of the potential for adverse animal health effects from ingestion with soil. Unlike cadmium, there is very little concern that the annual application rates of these metals will produce adverse effects, although repeated applications will eventually produce high soil concentrations.

Heavy metals are relatively insoluble in the soil. Because of this, the chief method of transport is with eroded solids. Metals remain concentrated in the surface soil layers and are, therefore, susceptible to erosion. The impact of metals reaching surface waters varies. If the water is a source of drinking water, cadmium may be a human health concern. Very high metal concentrations may be toxic to some aquatic organisms. In addition, some aquatic organisms tend to accumulate metals, especially mercury and cadmium, in their body tissues. When this accumulation occurs in organisms harvested for food-chain purposes, it could present another route for high metal levels to enter the human food-chain.

Metal contamination of ground water has not been shown to be a major concern. However, the potential for such movement does exist, and especially in the case of cadmium, contamination could result in human health effects.

3. Synthetic Organic Compounds.

Synthetic organic compounds in sewage sludge include a broad range of substances. Research on many of these compounds has found the the level present in sludge, or the behavior of these materials, does not present a threat to human health. However, polychlorinated biphenyls (PCBs) due to their widespread occurrence in sewage sludges and potential for impacting human health, must be regulated. The soil has a capacity to degrade and adsorb many compounds, and many are volatilized to the atmosphere. However, because of the large number of synthetic organic compounds and the relatively recent development of them, extensive research on their behavior in the soil and on the long term effects of these compounds is limited. At present the potential risk from most of the compounds normally found in sewage sludge appears to be minimal due to their low concentrations and the mitigating effects of the soil environment. Of the many compounds found in sewage sludge, only a few are sufficiently toxic and persistent to be considered health risks and none have been shown to have contaminated ground waters as a result of sewage sludge application. However, if contamination occurred, the effects would vary according to the nature of the contaminant.

4. Macronutrients.

The macronutrients of concern in sewage sludge are nitrogen, phosphorus and certain salts. These components may cause ground and surface water contamination and reduce crop yields.

The effects of ground water contamination by macronutrients in sewage sludge are primarily risks from nitrate poisoning. Nitrates in drinking water can be converted to nitrites by microorganisms in the digestive tract of livestock and in the intestines of infants less than three months old. The resulting condition, called methemoglobanemia, disrupts the oxygen carrying capacity of blood.

The effect of surface water contamination by macronutrients is primarily the decline of water quality as a result of nitrogen and phosphorus enrichment. Nitrogen and phosphorus can be transported from a landspreading site in solution or with eroded particles. These nutrients can promote excessive algal growth which will subsequently deplete the oxygen supply of the water.

Salts of potassium, calcium, sodium and magnesium are often present in significant quantities in sewage sludge. In general there are two basic problems associated with high salt concentrations in soils. A disproportionate amount of sodium affects the soil structure and an excess of salt ions in the soil upsets the osmotic balance in the plant root zone, inhibiting water uptake by plants.

5. Nuisance Conditions and Bird Hazards.

The major nuisance condition associated with sludge landspreading is odor. Until the volatile solids in the sewage sludge have been stabilized, sewage sludge generates odors which may be objectionable to persons living near or traveling past the landspreading operation. Landspreading of sewage sludge may also create other nuisance conditions such as noise and dust generation, and may create a bird hazard at nearby airports. It is possible that large numbers of birds may be attracted to landspreading areas in the vicinity of airports. Airplanes which hit birds during take-off or landing may be damaged seriously enough to cause a safety hazard.

C. The Widespread Use of Landspreading as a Sewage Sludge Disposal Alternative.

In Minnesota approximately 80% of the municipalities generating sewage sludge landspread the sludge. Landspreading programs may require a few acres or several hundred acres to dispose of the sludge generated, and sludge may be

landspread once a year or several times a week. It is the policy of the MPCA to encourage the landspreading of sewage sludge as a beneficial utilization of resource, even when alternative disposal methods are available. The frequency and magnitude of this practice prevents the close surveillance and supervision of each operation by the MPCA. Although the impact of mismanagment in any individual situation may be insignificant, widespread and repeated mismanagement could create serious problems.

In the St. Paul-Minneapolis and Duluth areas, sewage sludge landspreading programs are monitored by the MPCA. In the first half of 1981 the MPCA reviewed 249 proposals to landspread sludge on sites in the St. Paul-Minneapolis area. Approximately 6% of the sites were rejected as unsuitable. On a statewide scale this would represent a considerable amount of MPCA and treatment plant staff time that would be wasted because of the lack of established criteria for evaluating potential landspreading sites. The proposed rules are needed in order to provide a basis to evaluate the pollution potential for each landspreading site based on definite, quantitive standards.

D. The Need for Standards Which Serve as a Guide for Local Ordinances and Conditions and for Correct Landspreading Procedures.

The rules must provide basic guidance for the operation of landspreading sites and facilities. Small treatment facilities which infrequently landspread sludge do not have the resources to hire a consultant to develop a landspreading program. The rules are needed to provide guidance as to the legally and environmentally acceptable methods of sewage sludge landspreading in an accessable format.

Local units of government are becoming increasingly active in reviewing MPCA

letters of approval and permits and in developing local conditions and ordinances to regulate sewage sludge management. According to Minn. Stat. § 473.516, subd. 3, county and local units of governments within the Twin Cities metropolitan area may regulate sewage sludge management only to the extent that the conditions established are consistent with MPCA rules. The proposed rules will provide a basis for evaluating such conditions. The proposed rules will be useful to political subdivisions throughout the state as they develop local ordinances and restrictions regarding sewage sludge management.

IV. REASONABLENESS OF THE PROPOSED RULES

A. Reasonableness of the General Provisions.

The general provisions of the rule are necessary in order to provide the working structure for the adminstration of the sewage sludge landspreading program in Minnesota by establishing 1) who must comply with the rules, 2) how information must be submitted to the Agency, 3) how the Agency must respond, and 4) the terms which are used throughout the rule.

6 MCAR § 4.6101

The proposed variance rule is consistent with the standard language used in other Agency rules. It is reasonable to provide direction for parties seeking a variance.

6 MCAR § 4.6102

The proposed applicability rule is necessary to establish the legal responsibility for sewage sludge management and to identify the type of authorization which is required for different types of landspreading operations. It is also necessary to provide direction to municipalities that incinerate or process, store, or dispose of sewage sludge by some other method.

The rule assigns the responsiblity for compliance with the requirements of the rule to the parties which have the authority to manage the sewage sludge and the application area. The political subdivison which generates the sewage sludge maintains the most control over the quality of the sewage sludge and the selection of application areas and landspreading management, and therefore is primarily responsible for the proper disposal of the sewage sludge. However, other parties may also be responsible for sewage sludge management through contract with the political subdivision. The owner of land rented or leased to a political subdivision is responsible for the effects of any activities which were allowed on his property and is responsible for the future use of his land after the facility is closed, and must be included in a permit for a facility. The operator of a landspreading facility also shares the responsibility that the facility will not produce adverse effects and must also be legally included in the permit and the responsibilities attached thereto.

However, it is not reasonable to require the same degree of responsibility for the owners and operators of landspreading sites. In this case, the political subdivision will have the sole control of the landspreading activities at the site. The farmer receiving the sewage sludge cannot be held responsible for ensuring that the sewage sludge is of acceptable quality, that the correct application rates are applied, or that landspreading is conducted in accordance with the requirements of the rules.

6 MCAR § 4.6103

The majority of people using the rule will be wastewater treatment plant operators and local government officials. Typically these individuals are not familiar with agricultural, animal husbandry, soil science, or geologic terms that are used in the proposed rule. For this reason, it is reasonable

to define the following terms in 6 MCAR § 4.6103:

animal feed	pasture crops
aquifer	pathogen
available nitrogen	quarry
available water holding capacity	root crops
bedrock outcrop	seasonal high water table
cation exchange capacity	sinkhole
cave	soil horizon
crops for direct human consumption	soil pH
fallow land	soil texture
food-chain crops	soil type
hundred year floodplain	spring
intermittent stream	ten year floodplain
mine	water table

The definition for fallow land is the only agriculture term which has a more limited scope than the common usage of the term. The definition was narrowed to include land that is relatively void of vegetation during the summer, sometimes referred to as black fallow. Under certain conditions, application of sewage sludge to fallow land may result in ground water contamination.

Several terms defined in the proposed rule are consistent with the definitions of Minn. Stat. § 105.37. These terms are lakes and ponds, rivers and streams, and surface water. These definitions are used because these water bodies are considered public (protected) waters and therefore considered important resources by the state. For the sake of consistency, it is reasonable to interpret the terms used in the proposed rule, which are based on the definition of public waters, in the same manner as the DNR has interpreted the terms in Minn. Stat. § 105.37.

The proposed rule also limits the size and type of wetlands. The definition follows the size limitation provided in Minn. Stat. § 105.37, subd. 15. Wetlands are protected in Minn. Stat. § 105.392. It is reasonable to protect wetlands that are protected under statutory provisions.

Three methods of sewage sludge application are defined in the proposed rule.

Surface application, immediate incorporation, and spray application are defined because different limitations apply to each method. The definition for immediate incorporation limits the applicability of the term to sewage sludge that is mixed with the soil within 48 hours of application. This time span is reasonable since it allows the farmer sufficient time to conduct tillage operations and a longer period may increase the potential for runoff, erosion, vector attraction and other impacts that incorporation alleviates. The definition for spray application includes only methods by which sewage sludge is applied under pressure, which may create conditions for aerosol formation. If the definition was not limited in this way, it could be misinterpreted to include application by various types of tank trucks and tank wagons.

Some of the definitions relate to sewage sludge. The definition for sewage sludge is taken from the Waste Management Act which required that these rules be developed. Sewage sludge solids are defined to assure that all sludge chemical parameters and application rates are expressed on a dry solids basis. The term putrescible sewage sludge is limited to sewage sludges with volatile solids contents of 70% or more. This is a reasonable level which treatment plants should be able to achieve. Volatile solids contents above 70% result in an odorous sludge that may attract vectors. It is reasonable to regulate certain aspects of sewage sludge management differently depending on the solids content of the sludge. Sewage sludges that can be handled as a solid can be managed differently than liquid sludges. For this reason, dewatered sewage sludge was defined to include this type of sludge.

Two definitions were taken directly from Minnesota Statutes. These include person and political subdivision.

In order to assist individuals using the rule, it is necessary to provide the

location of the federal list of organic priority pollutants within the definition of organic priority pollutant.

The definitions for long term storage and short term storage simply restate what is already established in the rule in order to more clearly identify the differences between them.

The terms place of habitation, residential development, and recreational area were expanded from their common usage to include every conceivable situation that may be impacted by landspreading. It is necessary to specify in each definition the exact situations that should be considered so that there would be no questions regarding interpretation. Landspreading was defined so it could not be misinterpreted to include landfilling.

Landspreading areas were defined as landspreading sites or landspreading facilities based on land ownership. Landspreading sites and landspreading facilities are addressed differently throughout the proposed rules. Because of this difference, it is essential that the distinction between them be clearly established by definition.

6 MCAR § 4.6105-4.6106

The information required for an application for approval of a landspreading site or facility relates to the various requirements and limitations which will apply to the landspreading operation so that Agency staff can determine if the operation will be able to provide adequate protection for the environment and the health and safety of the public. To assist political subdivisions in submitting the required information for an approval, the Agency will provide standard application forms. The use of a form will make applications for approval easier and less burdensome for the treatment plant operator.

It is necessary to have basic information regarding the treatment and composition of the sewage sludge in order to verify the accuracy of the proposal. For example, it is not sufficient to know that sewage sludge is aerobically digested, the retention time and temperature must also be known in order to determine the degree of pathogen reduction. Also, the chemical characteristics of the sewage sludge must be determined within a reasonable time prior to sludge application. Sewage sludge characteristics can change rapidly due to changes in the influent quality, and samples should reflect the conditions which will be most similar to conditions which will exist at the time of sewage sludge landspreading. However, representative sampling, analyses and application development and processing take considerable time, so analyses more current than six months prior to application submittal would not be reasonable.

The information that is required to characterize the landspreading property and management relates to specific requirements and limitations regarding land suitability and operation procedures and also to the information necessary to identify all parties that may be involved with the proposal. In some cases the rule specifies acceptable sources to obtain the information to ensure that the decision to approve or deny the proposal is based on reliable data and also to provide the applicant with guidance in developing an application for a proposed site or facility.

Proposals for landspreading facilities must include all of the information required for landspreading sites and also some additional information. All landspreading facilities will be required to have a ground water monitoring program. The proposal must include information on the location and construction of the necessary monitoring wells. Although the actual sampling frequency and parameters will not be determined until the application is reviewed, basic

information on the system is required in order to determine the suitability and reliability of the proposal.

The quality of the ground water must be determined before landspreading operations begin, in order to establish a standard for comparison with future water samples. The parameters required are those that are frequently associated with wastewater or sewage sludge analyses and are routinely performed by most analytical laboratories.

If the facility will be receiving applications of nitrogen or metals beyond the limits established for landspreading sites, the application must also contain evaluations of how the surface and ground water quality, public health and safety, and the food chain will be protected. Because landspreading facilities may differ a great deal, the required submittal information must be general in order to accommodate the great variety of landspreading options that my be developed and proposed. Part of the evaluation for ground water protection involves the identification of specific hydrogeologic and subsoil features. In order to make an evaluation of the potential for ground water contamination from sewage sludge application beyond the specified limits, it is necessary to know the subsurface characteristics to a greater depth than is required for sewage sludge application within the limits.

The source of the required hydrogeologic data will vary depending on the location of the facility, and the acceptable level of information must be determined on a site specific basis and therefore, cannot be specified in the rule. The specific information required will be used to determine the vulnerability of the aquifer to contamination and the potential for such contamination to impact wells in the area. The information obtained from the soil characterization will also be used to determine the effect of the facility on the aquifer quality by

providing information on the attenuation potential of the soil. It is reasonable to require more detailed information for facilities which present a greater pollution potential.

6 MCAR § 4.6107-4.6108

Based on past experience, the Agency has found it necessary to have a program to approve and permit landspreading operations. The agency has issued guidelines and a temporary rule regarding sewage sludge landspreading. Neither document required that approvals be obtained for landspreading operations, except those of the Metropolitan Waste Control Commission (MWCC). The program for approving MWCC proposals has worked successfully with relatively few problems. However, where landspreading was conducted without MPCA approval, problems have developed that could have been avoided by prior MPCA plan review and approval. For these reasons, a permitting/approval program is needed which will apply to every site and facility in the state. This is the only way that the MPCA can know in advance that sewage sludge will be properly managed.

The proposed rules regarding the administration of Letters of Approval and Permits have been developed through several years of Agency experience with sewage sludge landspreading programs. It is essential that the Agency's administrative program provide a reasonably convenient method for political subdivisions to obtain landspreading approval, and provide a fair and effective mechanism for public notification and the resolution of conflicts. The administrative procedures specified in the rule are essentially the same as those in effect with the temporary rule and are based on the program to administer permits issued through the National Pollutant Discharge Elimination System (NPDES) as prescribed in WPC 36. These procedures have, in the past, provided a reasonable compromise between the need of the political subdivision for rapid response to

landspreading proposals, and the need to notify concerned parties and provide enough time to allow them to respond to the proposal.

B. Reasonableness of the Requirements and Limitations.

The landspreading of sewage sludge creates a potential for adverse effects on four major areas, ground water quality, surface water quality, food-chain quality and public health. The components of concern in sewage sludge are the macronutrients, metals, pathogens and synthetic organic compounds. Each of these components has the potential to affect one or more of the major areas of concern, depending on a number of factors. For example, under some circumstances nitrate may leach to ground water and reduce the quality of that water. If a shallow well intercepts that poor quality water supply, a public health problem could develop. If some of the sewage sludge applied to the land surface is washed into a nearby lake, nitrogen in the sewage sludge may create a surface water problem. Because of the interrelatedness of sludge landspreading effects and the interlocking nature of those effects, certain provisions of the rules may address several aspects of several problems. An example are the metal application limits which are set to protect 1) the yield potential of the land, 2) the quality of the food crop produced and 3) the ground water beneath the area. This part of the statement will address how each provision will prevent adverse impacts from each component of concern.

Performance Standards

6 MCAR § 4.6121 A.1, B.1, C.1, and D.1

The purpose of these rules is to provide for the protection of the public health and environment in the utilization or disposal of sewage sludge. It is necessary and reasonable to establish the goals or performance standards that

should be accomplished when designing and operating a landspreading facility. Since WPC-22 is the agency rule regarding ground water protection, the proposed rules use this as the standard with which all facilities should comply during operation. The state's surface waters are important resources used for recreation and consumption, and therefore, their uses and quality should be protected. The protection of the public health and safety is a major concern of the agency, consequently, it is reasonable to protect the public who live near or pass by a landspreading facility. Food-chain crops produced at a landspreading facility and consumed by the public may have an impact upon their health. It is essential, therefore, that the food-chain crops produced comply with quality standards established by state and federal agencies.

Analysis

6 MCAR § 4.6111 A.1-A.8

6 MCAR § 4.6122 A.1

The composition of sewage sludge varies a great deal, depending on the composition of the influent and the treatment process at the wastewater treatment plant. It is necessary for the Agency to know the composition of the sewage sludge in order to determine compliance with application rates and other restrictions specified in the proposed rules. Each parameter which the sewage sludge must be tested for relates directly to a requirement of the proposed rules, with the exception of chromium and mercury. Concern exists that chromium and mercury may be potential risks when sewage sludge is landspread. However, no adverse effects have ever been observed as a result of these metals in landspread sewage sludge and insufficient research exists to support specific application limits. The proposed rules require that sewage sludge be analyzed

for chromium and mercury in order to identify sewage sludges which may require special consideration under certain circumstances.

The proposed rules specify standard methods for obtaining samples and analyzing for the required parameters in order to maintain uniformity and reliability in the information used to determine application rates.

The required frequency of sewage sludge sampling and analysis is weighted to minimize the burden for small treatment plants. Small treatment plants are required to monitor sewage sludge quality less frequently than larger treatment plants. In general, small treatment plants serve small, stable communities and sewage sludge quality does not vary a great deal, due to limited industrial discharges. However, the proposed rules provide for increased monitoring frequency if any parameter is present at high concentrations, or decreased frequency if it can be shown that the required schedule is not warranted due to sewage sludge quality, variability or landspreading frequency. Where more frequent analyses are required, the frequency is based on the concentration of the metals which exceed median levels as established in a survey of sludge quality from more than 200 treatment plants in Minnesota, Wisconsin, Ohio, Michigan, Illinois, Indiana, New Jersey and New Hampshire. For example, half the sewage sludges in these states contain less than 20 parts per million of cadmium. If a sewage sludge contains 20 or 40 parts per million, then analyses for cadmium must be conducted at twice or three times the minimum frequency in order to provide a more accurate basis for determining application rates.

The minimum frequency for sewage sludge sampling and analysis for landspreading facilities is once per year, however, more frequent sampling and analysis may be required if it appears necessary. The factors which will be considered in the Director's decision on monitoring frequency are specified in

the proposed rules. Because of the flexibility that is allowed in the design and operation of landspreading facilities, it is not possible to establish a monitoring schedule in the proposed rules that will be relevant in all situations. Some agency discretion is necessary in order to avoid unreasonable burdens on facilities which present minimal risk and to provide additional protection if a facility poses a high risk.

Pathogen Reduction

6 MCAR § 4.6111 B.1

6 MCAR § 4.6121 C.2.a

Raw sewage sludge contains high populations of viable pathogens that could present a serious disease hazard if the sewage sludge was applied where human contact was possible. The Environmental Protection Agency (EPA) has recognized this potential problem and has included minimum pathogen reduction requirements in its criteria for sewage sludge disposal (40 CFR Part 257). The proposed rules have adopted all of the EPA criteria relating to pathogen reduction, although the requirements have been rephrased to be more easily understood. The acceptable processes to significantly reduce pathogens (PSRP) are those which will produce a ten-fold reduction in viable pathogen levels.

Other processes (PFRP) may be used to essentially eliminate viable pathogens and are prescribed in 6 MCAR § 4.6136. However, this level of protection is unnecessary unless certain activities will be conducted at the landspreading site or facility. The conditions which require that the sewage sludge be treated by a process to further reduce pathogens (PFRP) will be discussed in the section of this statement which addresses management requirements.

Organic Priority Pollutants

6 MCAR § 4.6111 F.1-F.3

6 MCAR § 4.6121 D.2.c-D.2.d

The proposed rules also include the provisions regarding PCBs in sewage sludge that are established in the EPA criteria (40 CFR Part 257). The proposed rules set limits on the maximum levels of PCBs that may be present in sewage sludge that is landspread. If the sewage sludge contains more than ten parts per million of PCB, it must be managed differently, e.g. incorporated. If the sewage sludge contains more than fifty parts per million of PCB it may not be landspread. These restrictions are based on the need to prevent high levels of PCBs from entering the food chain, either through ingestion with soil, adhesion to food chain crops, or in runoff to surface waters.

The proposed rules specify that sewage sludge which contains high concentrations of priority pollutants must be analyzed for that pollutant and managed appropriately. Because the list of priority pollutants contain sixty-five compounds, it is not possible to establish limitations in the proposed rules for sludge containing varying amounts of every priority pollutant. Some degree of discretion is necessary in order to provide the flexibility to regulate the situations where organic priority pollutants may present a hazard, without imposing an unreasonable burden on those treatment plants which do not generate a sewage sludge which contains an organic priority pollutant and which do not require special consideration.

Soil Characteristics

6 MCAR § 4.6111 G.1-G.8, I.4, J.6-J.7, J.9

6 MCAR § 4.6121 A.2.b-A.2.c.

A number of soil factors interact to determine the suitability of land for sewage sludge application. The soil will be a factor in determining the amount of attenuation, retention and removal of waste components that will occur to prevent their migration downward to ground water or overland to surface waters.

The available water holding capacity (AWC) of a soil is the ability of a soil to hold water against the force of gravity and available for use by most plants. As it relates to sewage sludge landspreading, it is an indication of the capacity of a soil to retain sewage sludge components in the upper soil horizon long enough for soil and environmental mechanisms to attenuate those components. The AWC of a soil is frequently used to characterize a soil's suitability for various waste treatment operations because the degree of attenuation and removal of waste constituents is a function of the residence time of those constituents in the soil. A soil with a high ability to retain water will hold nitrate, pathogens, soluble metals and synthetic compounds within the soil treatment zone where soil mechanisms and crop uptake can act to reduce the potential that those components will move to groundwater.

The AWC of a soil changes with depth and is determined by the soil texture, structure and organic matter content. The proposed rules require consideration of the soil profile to a depth that will provide 6 inches of AWC. It is not reasonable to require a certain separation distance to the water table or bedrock based solely on a soil's surface texture. In some cases a soil may have a very high AWC (a fine texture) in the surface horizon but may be very coarse below, or, a soil may be coarse on the surface but the entire profile may be relatively impermeable. In either of these cases, the texture of the surface soil does not accurately characterize the soil profile and its ability to restrict leachate migration.

Depending on the specific nature of a soil profile, the required 6 inches of AWC will be obtained in varying soil thicknesses. For example, a soil which is uniformly loamy sand with an AWC of 0.07 in./in. would require a water table at least 7 feet below the surface in order to provide the required 6 inches of AWC.

The minimum of 6 inches of total AWC is based on research and recommendations by various governmental agencies, agricultural organizations and universities. Much research has been conducted measuring the movement of various sewage sludge components through different soil profiles. The depth of migration varied as a result of several factors, such as application rate, soil properties and nature of the component. Based on this research, 6 inches was selected as the most reasonable limit that would still provide adequate waste treatment. The AWC of a soil may be determined by direct analysis or from Soil Conservation Service (SCS) Soil Surveys, soil interpretation sheets or local SCS office personnel.

At a minimum, landspreading sites may not have less than 3 feet of soil between the sewage sludge application zone and the bedrock or water table. This minimum separation distance is specified to ensure that the physical filtering capacity of the soil is uniformly adequate. Areas that are too small to be located on a soil map may exist at a site. These areas may contain coarse conducting layers, vertical conduits, elevated water tables or bedrock; or soil properties which may be less suitable for sewage sludge application than the surrounding mapped soils. Therefore, a minimum separation distance of three feet is required to compensate for any variability within the soil that receives sewage sludge.

The texture of the soil at the zone of sewage sludge addition controls the retention of sewage sludge components at the soil surface, and affects both the food chain and ground water quality. The requirement that very coarse textured soils may not receive sewage sludge ensures that soluble sewage sludge components will not migrate rapidly from the soil surface where most of the soil physical, chemical and biological activities which attenuate and immobilize waste components take place, thereby affecting movement to ground water or plant

uptake. The texture of the soil determines the amount of adsorptive surfaces and reactive compounds that are present in the soil. The surface soil also usually contains the highest population of microorganisms, and the physical effects of ultraviolet light, freezing and drying are more extreme in the surface layer.

The soil permeability is the property of a soil that enables it to transmit water. The proposed rules specify a maximum permeability for the soil within the top five feet in order to further characterize the soil for waste treatment. The soil permeability must be used on conjunction with the surface soil texture and AWC requirements. A soil with a low permeability will not transmit water and soluble waste components below the plant rooting zone so rapidly that soil mechanisms cannot act to treat the waste. The proposed rules only prohibit sewage sludge application on soils which are uniformly coarse textured throughout the upper five feet.

The limitation of six inches per hour maximum permeability is based on Soil Conservation Service recommendations for soils suitable for waste disposal. A greater permeability would place the soil in a class which the SCS considers to have only a moderate limitation for waste disposal. Six inches per hour or less constitutes a slight limitation for waste disposal.

The following examples of various soil conditions will show how surface texture, permeability, the minimum depth to the water table, and AWC can be used to determine the suitability of a soil for sewage sludge application.

Soil thickness	A	B	C	D
0 - 12"	Coarse sand and gravel	Loamy Sand	Loam	Loamy Sand
12 - 36"	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam
36 - 60"	Sandy Loam	Loamy Sand	Sand	Sandy Loam
Watertable at:	6 ft.	10 ft	5 ft	5 ft

Profile A has a very coarse surface but has, as a result of the sandy loam below the surface, an AWC of more than 6 inches above the water table and a permeability throughout the profile of less than 6 inches/hr. However, this soil is not suitable for sewage sludge application because the surface texture is too coarse.

Profile B is a uniform profile of loamy sand. The surface texture is acceptable according to the proposed rules and 6 inches of AWC are provided within the top 7 feet. However, this profile provides no barrier to rapid movement of water, every horizon has a permeability of 6 inches/hr. or greater. Therefore, this soil is not suitable for sewage sludge application.

Profile C shows a medium textured soil with a water table at five feet. The surface soil and permeability comply with the proposed rules. However, the soil is unsuitable because 6 inches of AWC is not present above the water table; the soil would be suitable if the water table was two feet deeper.

The soil in profile D may appear to be coarse and not suitable for waste treatment. However, although the profile provides only the minimum AWC and surface texture, it avoids being too permeable throughout the profile, and the combination of all these factors is sufficient to provide adequate waste attenuation. This soil would be acceptable for sewage sludge application according to the proposed rules.

It is necessary that the proposed rules distinguish between perched water conditions and seasonal high water table and not require protection for perched water conditions. Perched water is not used as drinking water supply nor is it, according to the definition in the proposed rules, connected to an aquifer. Perched water is a soil water condition and not considered a ground water table and, therefore, is not protected.

Sewage sludge may not be applied to soils which have karst or fractured bedrock within six feet of the soil suface. Karst and fractured bedrock are associated with ground water that is very vulnerable to contamination. Contaminants can move rapidly through this sort of bedrock with little or no attenuation or dilution. By requiring three feet more than the minimum separation distance of three feet, the rule provides additional protection for these sensitive aquifers. Bedrock maps exist which show where these conditions exist or this information may be obtained from the Minnesota Geologic Survey.

The storage of sewage sludge involves additional concerns regarding ground water protection. According to the proposed rules, sewage sludge may be stockpiled at a site for a few days or for as long as seven months. Although dewatered sewage sludge is largely impermeable and does not contain free moisture, the concern exists that the large amount of sewage sludge concentrated in one area will contribute to leachate generation and migration.

Where sewage sludge is stockpiled for short periods, the proposed rules only require that the same soil conditions for suitable landspreading sites apply to the stockpile site. Very little decomposition of the sewage sludge in the stockpile will occur in the one month that is allowed for short term storage. Therefore, the only concern for the ground water quality beneath the site arises from the sewage sludge that remains after the pile is removed. This is usually a small amount and can be considered comparable to the sewage sludge which is spread over the entire field, therefore the soil conditions that are suitable for landspreading also apply to short term stockpiles. Also, the soil located at the short-term stockpile site is usually plowed and cropped, consequently, nitrate leaching is controlled.

Long-term storage of sewage sludge, where sewage sludge may remain stockpiled for as long as seven months, may present a greater potential for ground

water contamination due to the increased decomposition of the sewage sludge, which releases soluble components, and greater total precipitation which will encourage leachate production from the stockpile surface. Because of the increased potential for leachate production, the proposed rules require that the soil beneath the stockpile site have at least eight inches of AWC, which is two inches more than is required for short term stockpiles. Two soil borings are required at the site of long-term storage. Borings are required because storage sites are usually relatively small and soil maps are not of a scale to adequately indicate differences on such a site specific basis. The boring logs are used as a check to verify the soil map.

Location Characteristics

6 MCAR § 4.6111 G.10, H.1-H.3, H.5-H.7, I.2-I.3, J.2-J.5

6 MCAR § 4.6121 A.2.d, B.2.a-B.2.b, B.2.e

The potential for adverse effects from sewage sludge landspreading can in many cases be greatly reduced by maintaining certain distances between the sewage sludge application area and the area that may be affected. The distance that must be maintained will vary depending on the seriousness of the hazard, the degree that distance can mitigate the effect, and the presence of other mitigating factors such as land slope and soil texture.

Surface waters near a landspreading area may receive runoff water from that area. Some provisions of the proposed rules prevent the accumulation of excessive levels of waste components in the soil surface where they will be subject to erosion and transport from the site. Those provisions will be discussed in the section of this statement which addresses management requirements. In addition to the management requirements to minimize the effect of landspreading on surface waters, the proposed rules also provide requirements regarding the suitability of the property for landspreading. Waste components that are

transported over the soil surface, either with eroded particles or in solution, can be attenuated by the surface soil and vegetation so that the runoff water is cleaned of those components over a certain distance. The distance that is necessary depends on several factors. The soil texture, land slope, time of year and type of surface water are all factors which will determine the effect of the landspreading operation on surface water quality.

Soil texture will determine how rapidly the runoff water will infiltrate into the ground. Coarse textured soils will have much less runoff after a rainstorm than a fine textured soil with low infiltration. Therefore, a greater distance is needed for a fine textured soil before waste components will be absorbed into the soil. The specific soil permeability and surface texture requirements were discussed previously in the section of this statement addressing suitable soil conditions. However, as they relate to the separation distances required in the proposed rules, it is sufficient to characterize soils into two general textural classes, 1) coarse textured, and 2) medium and fine textured.

The slope of the application site has a direct impact on the potential for contaminant migration with surface runoff. As the land slope increases, the velocity of the runoff water increases. This results in an increase in the ability of the runoff water to detach particles from the soil mass and transport them from the field. The proposed rules specify various separation distances for different land slopes and management practices. If sewage sludge is injected or incorporated into the soil there is less potential for erosion of sewage sludge particles and therefore the acceptable land slope may be increased and the separation to surface water decreased without increasing the potential for adverse effects.

The infiltrative capacity of the soil will vary according to the time of year that sewage sludge application occurs. If the ground is frozen, infiltration is reduced and the potential for waste components to be transported from the site is increased. For this reason, the proposed rules specify increased separation distances for application during the months that the ground is frozen.

The required separation distances to intermittent streams are less than the required separation distances to other surface waters. Intermittent streams are generally not high quality waters for drinking or recreational uses and are often no more than a drainageway through a field. If an intermittent stream does not discharge to a surface water, application of sewage sludge within twenty five feet of the stream will not impair the usefulness of that water. If an intermittent stream discharges to a surface water there is an increased potential for adverse effects as a result of runoff. However, the rule specifies that the intermittent stream must flow for at least one mile from the point of sewage sludge application to the discharge point if the reduced separation distance will be allowed. Biological, chemical and physical process in the water and stream bed will provide the same attenuation mechanisms as the soil system so that waste components will not present a threat to the protected surface water.

Sewage sludge which is stored for long periods of time has an increased potential for erosion loss because no soil processes are able to act on the sludge components until after it is transported from the stockpile. Therefore, the rule requires a greater separation distance between long term stockpiles and surface waters or ten year flood plain unless measures to control runoff are used. Ten year flood plains are included in this restriction because the length of time sewage sludge may be stored at a long term stockpile increases the potential that eroded waste components may be transported to flood waters

without any soil treatment.

The separation distances to surface waters that are required for landspreading facilities differ from those that are required for landspreading sites. The required separation distances from a facility to surface water are based on the purpose of the Shoreland Management Act, Minn. Stat. § 105.485. One purpose of the Act (subd. 1) is to preserve the economic and natural environmental value of shorelands. According to the Act, shoreland means land located within 1000 feet of the normal high water mark of a lake or pond and 300 feet of a river or stream. The proposed rules are following the purpose of the Act by requiring the same setback distances specified in the Act for the location of a landspreading facility in the vicinity of a lake, pond, river or stream.

In addition to providing protection for surface waters, separation distances also protect drinking water wells and reduce nuisance conditions which may result from landspreading.

Wells in the vicinity of the landspreading operation are protected by the requirements which minimize the movement of waste components to ground water, and additionally, by separation distances between the well and the landspreading operation. Four types of wells are identified in the rules in regard to separation distances. Monitoring and sampling wells are exempt from any separation distances because of the need to locate these wells where they will be most useful in detecting contaminants. Public water supply wells have the greatest separation distance requirement because generally, such wells have a large zone of influence in order to supply water for a municipality. By drawing from a large area, the well has an increased potential to draw in contaminants from sources outside of the immediate area.

The required separation distances to private water supply wells are based on the potential risk presented by the landspreading operation. Landspreading facilities, because they are monitored, and if intensively used must have a hydrogeologic assessment, do not need separation distance requirements except in cases where very vulnerable wells are located nearby. Wells which are not in compliance with the Minnesota Well Code, that is, wells which are finished at a depth of less than fifty feet, are more easily contaminated than deeper wells. Therefore, the proposed rules specify a separation distance to only these wells in the vicinity of a facility.

Landspreading sites, although not monitored, present a lower potential for adverse impacts on well quality than landspreading facilities because of the less intensive use of the site. Therefore, a minimum separation distance to any private well is specified, regardless of the depth of the well.

Concerns for sewage sludge landspreading also include odor generation and the potential for infection either through direct contact or aerosols. The distance a storage area or landspreading operation is located from residences or areas frequented by the public will affect the aesthetic acceptability of the operation. Sewage sludges vary in the amount of odor generated, in some cases a distance of several thousand feet is not sufficient to completely eliminate the odor, while in other cases, the odor is not detectable within a few hundred feet. The required separation distances, of 200 and 600 feet between the landspreading site and residences and recreation areas will provide some reduction in odor intensity but are mainly to reduce the potential for inadvertent contact and disease transmission.

Aerosols which can transport pathogens can be generated from liquid sewage sludge application processes. Such aerosols generally do not travel far, but a

minimum separation distance will provide additional protection and also minimize the potential for small children and house pets to come in direct contact with sewage sludge.

If sewage sludge is injected into the soil, the potential for direct contact, aerosol formation and odor generation is greatly reduced and the required separation distances are reduced accordingly.

Special Land Considerations

6 MCAR § 4.6111 K.1, K.3

6 MCAR § 4.6121 B.2.c-B.2.d

The rule prohibits landspreading on certain types of land unless certain measures are met. Sewage sludge may not be deposited in caves, sinkholes or wetlands because of the very high potential for ground water contamination from such practices. Such practices are not consistent with agricultural utilization, which is the basis for effective waste treatment. In some cases, mines or quarrys may be reclaimed by sewage sludge application although generally such areas are not suitable for effective crop uptake of nutrients in the sewage sludge which would prevent their becoming contaminants. However, if the sewage sludge will be used as an amendment and an aid in a reclamation project, then its agronomic use is allowed by the rules.

Wetlands are defined in the rule to include those areas which are not protected waters according to the DNR but which are classified as Type 3, 4 and 5 wetlands according to the U.S. Department of the Interior. Minnesota Stat. § 105.392, Water Bank Program, establishes the policy of the State in regard to wetlands. It states that "The legislature finds that it is in the public interest to preserve the wetlands of the state and thereby to conserve surface waters, to preserve wildlife habitat, to reduce runoff, to provide for

floodwater retention, to reduce stream sedimentation, to contribute to improved subsurface moisture, to enhance the natural beauty of the landscape and to promote comprehensive and total water management planning."

In addition, Minn. Stat. § 105.391, subd. 3 prohibits the drainage of wetlands. Undrained wetlands cannot meet the water table depth requirements of the rule and therefore cannot be used for sewage sludge application.

Organic soils, which are not classified in the proposed rules as coarse, medium or fine textured soils, should not be used for sewage sludge application due to the high water tables and flooded conditions frequently associated with them. However, if organic soils are adequately drained, and meet the other requirements for suitable soils, they may be used for sewage sludge application.

The prohibition of landspreading facilities in hundred year flood plains is based on the Federal criteria for the classification of solid waste disposal facilities and practices (40 CFR Part 257). Part 257.3-1 of the Federal criteria states that a facility may not result in washout of solid waste, so as to pose a hazard to human life, wildlife or land or water resources. This requirement has been interpreted to mean that the landspreading facility may not be located where a significant chance of flooding may occur. It is assumed that any flooding of the soil surface immediately after sewage sludge landspreading will result in washout, although the extent of the impact of such washout cannot be determined for all cases. Diking or berming of facilities would reduce or eliminate the potential for washout, however, practices that restrict the flow of the 100 year flood or reduce the temporary water storage capacity of the floodplain are also prohibited by the Federal criteria. 6 MCAR § 4.6121 C.2.d

The location of airports in relation to landspreading facilities is a factor

in determining the effect of the facility on the safety of the public. EPA criteria for the classification of solid waste disposal facilities (40 CFR Part 257) require that landspreading operations not present a bird hazard to aircraft. Activities at a landspreading facility may tend to attract birds which, if in the vicinity of low flying aircraft, may cause equipment damage and malfunction. The EPA criteria require that if the facility is located within specified distances of different types of airports, the facility must not present a bird hazard to aircraft. The MPCA has no staff to address bird hazards and consequently is not able to make such a determination; therefore, the rules require Federal Aviation Administration approval if the facility is located within the distance identified by the EPA as being a potential hazard area.

6 MCAR § 4.6111 E.4

In some cases it may be necessary to maintain a sewage sludge application site as fallow land. Fallow land may be used under certain limited conditions which will compensate for the lack of crop uptake. Management and site selection will affect the amount of nitrate formed and the extent it will move. The site selection considerations involve the soil texture and area of the state the site is located in.

The rule requires that the soil at a fallow land application site be fine or medium textured. Coarser textured soils have more air spaces which will encourage the formation and movement of nitrates due to the high oxygen level and permeability. Finer textured soils depress the formation and movement of nitrates and provides more optimum conditions for denitrification, which is the transformation of nitrate into gaseous forms that are volatilized to the atmosphere.

The annual precipitation at the landspreading site will be a factor in determining the extent of leachate migration. In areas of western Minnesota which receive less than 24 inches of annual precipitation, nitrate accumulates in the subsoil. In this area of the state, evapotranspiration generally exceeds precipitation, consequently conditions for leaching usually do not exist. Nitrate may move downward with percolating water but not so far that it cannot be reached by plant roots or move back up as soil water is drawn up by crop uptake and evaporation. Under these conditions, the potential for nitrate contamination of ground water is much reduced. An annual precipitation limit of 24 inches is specified in the rule because this limit corresponds to the area of the state where a nitrate soil test is used by the University of Minnesota to determine crop nitrogen requirements. This soil test is based on the fact that nitrate in the soil profile will not leach, but will be available the following growing season for crop uptake.

Application Rates.

6 MCAR § 4.6111 E.1-E.4, G.11

6 MCAR § 4.6121 A.2.e

Because the nitrogen content of sewage sludge is a major reason why sewage sludge is desirable as a soil amendment, crop nitrogen requirements are used as the basis for determining application rates, except when metal application rates are the limiting factor. The amount of sewage sludge that may be applied to a crop will depend on the amount of available nitrogen in the sludge, the nutrient requirements of the crop and the texture of the soil. Excessive applications of nitrogen will increase the potential for contamination of surface and ground waters and impair the quality of some crops. The nitrogen which is of concern is the nitrogen which is in the available form (readily mineralized and

inorganic). The total nitrogen in sewage sludge is not available for crop uptake or movement in solution, most is bound in organic forms. The amount of available nitrogen in sewage sludge has been determined by research studying mineralization of sewage sludge organic nitrogen and volatilization of ammonia from sewage sludges produced by various treatment processes. The amount of nitrogen that crops can utilize has been determined by agricultural research and is discussed in the part of this statement dealing with the appendices. The proposed rules correlate the amount of available nitrogen in the sewage sludge with the amount that a crop can utilize to determine the acceptable application rate. In addition, the soil texture is taken into account in the determination of crop nitrogen requirement because the soil texture and related conditions will be a major factor in denitrification. More nitrogen may be applied to crops on medium and fine textured soils because of the increased potential for gaseous loss of nitrogen via denitrification.

When sewage sludge is applied to fallow land, there is no crop utilization basis for determining acceptable application rates. The fallow land application rates specified in the rule represent estimates of the amount of nitrogen that will remain in the rooting zone under low precipitation and low soil permeability conditions.

The proposed rules also require that a crop be produced the year after sewage sludge is applied to fallow land. In addition to the nitrogen that was immediately available from the sewage sludge, more nitrogen becomes available as the organic matter in the sewage sludge mineralizes. This makes it especially important to produce a crop the year after sewage sludge is applied to fallow and to subtract the amount of nitrogen already in the soil from the total amount the crop will require.

Sewage sludge contains relatively high concentrations of phosphorus that will usually provide more than the crop requires when sewage sludge application rates are based on nitrogen requirements. After repeated applications, phosphorus may build up to very high levels in the surface soil. Most soils are able to retain a large amount of phorphorus within top few inches of soil which prevents phosphorus from moving down to ground water. In addition to being an efficient use of a resource, high levels of phosphorus in the surface soil may increase the potential for surface water contamination. If soil containing high levels of phosphorus is eroded and transported to surface water, it may contribute to excessive algal growth which will diminish the quality of that water. Four hundred pounds of extractable phosphorus per acre is a reasonable limit because it is within the amount that can be retained by the soil and is considerably above the level that is considered very high for crop production.

In order to prevent the accumulation of salts in the soil surface, the proposed rules require that the electrical conductivity, which is a measure of the concentration of soluble salts, be less than four millimhos per centimeter. Four millimhos per centimeter is the point where some plants begin to show adverse effects and reduced yields due to high soil salinity.

In order to ensure that sewage sludge is not causing adverse soil effects and to ensure that soil conditions are acceptable for successful crop production, the proposed rules require certain analyses to be conducted on a yearly basis. The parameters that must be monitored affect the management and productivity of the landspreading operation. The required analyses are routinely conducted by various soil testing laboratories for a reasonable fee.

6 MCAR § 4.6111 C.1-C.3, D.

6 MCAR § 4.6121 D.2.e-D.2.g

The proposed rules specify application limits for heavy metals in order to prevent their accumulation in the soil and subsequent contamination of surface and ground waters, but mainly to protect the productivity of the land and the quality of the crops produced.

The soil pH, cation exchange capacity (CEC), type of crop and the amount of cadmium applied annually and cumulatively all affect the amount of cadmium that is accumulated in the crop. Each of these aspects is addressed by the EPA criteria for classification of solid waste disposal facilities (40 CFR Part 257). The proposed rules are essentially the same as the EPA criteria with one exception. The EPA criteria allow two levels of cumulative cadmium application depending on the background soil pH. In Minnesota, no reliable means of determining background soil pH is available. After consulting with EPA staff and University researchers it was determined that the available methods to determine background pH are subjective and do not, in most cases, provide a relevant indication of what soil conditions will be in the future. Because the pH of the soil during the first few years after sewage sludge application is the most important factor in controlling plant uptake, the EPA criteria have been adapted to be more relevant to existing conditions in Minnesota and to reflect the results of current research on and understanding of cadmium/soil relationships.

The proposed rules specify that the maximum amounts of cadmium allowed by the EPA criteria may be applied, regardless of the soil's background pH. In some cases, this maximum level may exceed the level that would be allowed by the EPA criteria, if the background pH could be determined. However, since soil pH does not decrease rapidly with time and several years are available for the soil to bind cadmium, an eventual decrease in pH will not produce excessive cadmium availability. Therefore, it is reasonable to regulate soil pH only at the time

of sewage sludge application. It is not reasonable to base cadmium application rates on a factor that cannot be measured (background soil pH). Therefore, the Agency feels that the most reasonable course is to allow the application of cadmium to all land at the maximum safe levels that the EPA will allow and also to require that the pH be maintained at a level which will reduce crop uptake of cadmium for several years after sewage sludge is applied, which is the time that cadmium is most available for uptake.

Under certain conditions it is reasonable to allow cadmium applications in excess of the cumulative limits. The acceptable conditions for application of high levels of cadmium are based on the EPA criteria for application of excessive cadmium to land, and in addition, the proposed rules require that vegetative tissue be sampled to ensure that excessive cadmium has not accumulated in the crop. Monitoring of vegetative tissue is also required if the annual cadmium application limits are exceeded, if certain crops are grown, or if the soil pH at a facility is lower than the required minimum.

The other heavy metals, copper, zinc, lead and nickel, are regulated because of their potential to impair crop growth when high levels are present in the soil and because of the potential for adverse animal health effects from ingestion with soil. Unlike cadmium, there is very little concern that the annual application rates of these metals will produce adverse effects. However, repeated applications will produce high soil concentrations. For this reason, only cumulative application limits are specified in the proposed rules. The limits are based on the cation exchange capacity (CEC) of the soil. The use of soil CEC does not mean that metals added with sludge are retained as exchangeable cations. The CEC is used as an index because it is related to soil properties which will minimize the plant availability of metals and it is easily estimated.

The application limits are recommended by the EPA and were developed by joint efforts of researchers in various Agricultural Experiment Stations, the U.S. Department of Agriculture and the U.S. EPA, and are also used in guidelines and rules from other states.

Management

6 MCAR § 4.6111 J.8., K.5

The application rates specified in the rules are based on pounds per acre. It is important that the sewage sludge be landspread evenly over the entire application area. If large amounts of sewage sludge are applied to some areas and none to others, mitigating soil and crop mechanisms may not be able to adequately treat the waste components and the pollution potential may be increased. Therefore, the proposed rules specify that sewage sludge must be applied evenly and uniformly to the site.

Where sewage sludge is stockpiled for a long period, there is an increased potential for more sewage sludge to be left on the soil beneath the stockpile then is applied to the rest of the area. If sewage sludge is stockpiled several times on the same location, the soil may not be able to assimilate the additional waste components and pollution may occur. Therefore, the proposed rules require that long term stockpiles not be located at the same area for two or more consecutive years. This will ensure that the storage area is cropped at least every other year and thus utilize added sludge nitrogen and allow the soil at least a twelve month period to assimilate waste components.

6 MCAR § 4.6111 B.2-B.5

6 MCAR § 4.6121 C.2.c, D.2.a-D.2.b

The proposed rules require certain conditions which will minimize the potential for disease transmission as a result of the pathogenic organisms in

sewage sludge. The proposed rules require that the sewage sludge must either be further treated to reduce pathogens or the landspreading operation must be managed so that pathogens cannot contact a host.

Processes to further reduce pathogens (PFRP) are specified in 6 MCAR § 4.6136 and involve the treatment of sewage sludge so that it is essentially free of pathogenic organisms. A PFRP is required if access to the operation is not controlled, or if livestock will be grazing within one month of sewage sludge application, or crops for direct human consumption are grown on the sewage sludge application area. If the sewage sludge is not treated by a PFRP, the proposed rules specify various activities that the area may not be used for until certain time periods have passed. The requirements in the proposed rules regarding PFRP and land uses for pathogen control are adopted from the EPA criteria for the classification of solid waste disposal facilities (40 CFR Part 257).

Additional measures to reduce contact with pathogens have been included in the proposed rules. The proposed rules specify that sewage sludge may only be applied to forage crops when foliage is minimal. Sewage sludge will adhere to vegetation and increased levels of metals, synthetic organic compounds and pathogens may be added to the animal diet if sewage sludge is applied to foliage. By limiting the time period after cutting forage, the proposed rules ensure that the minimum leaf area will be exposed and new plant growth will not be affected by the application of sewage sludge.

6 MCAR § 4.6111 G.9, K.4

6 MCAR § 4.6121 C.2.b

Liquid sewage sludge applications are limited in the proposed rules so that sewage sludge does not remain on the soil surface for long periods of time

where it can produce nuisance conditions and also increase the potential for direct contact with pathogens or disease transmission through vectors such as flies and domestic animals. The maximum gallon rates that are specified for sites are based on the soil texture. Coarse soils are more permeable than fine textured soils, therefore, more liquid can be applied without ponding on the surface. The maximum application rates are specified for sites because it would be time consuming and burdensome for treatment plant operators to determine site specific application rates based on sewage sludge and soil characteristics at the time of sewage sludge application. Operators of facilities which may receive repeated applications of liquid sewage sludge must determine the appropriate application rates according to the specific characteristics of the soil and the sewage sludge, so that the sewage sludge applied will infiltrate into the soil in a day.

An additional provision of the proposed rules requires that sewage sludge not be applied to ponded areas because such areas do not provide the infiltrative capacity necessary to minimize the disease and nuisance condition potential of ponded sewage sludge.

6 MCAR § 4.6111 I.1, J.1

6 MCAR § 4.6121 A.2.f

The proposed rules establish three categories of sewage sludge storage -- short term, long term and storage at a facility, which may be continuous. The time spans which are allowed are based on the various storage needs for landspreading. Short term storage is storage for as long as one month at a landspreading site. Several days may be required to deliver enough sewage sludge to a landspreading site and in some cases, landspreading may not be conducted due to equipment failure, adverse weather conditions, or scheduling conflicts. Therefore, the proposed rules stipulate that sewage sludge must be

spread as soon as conditions permit, but recognize that conditions may prevent spreading for a considerable time. Thirty days is a reasonable time span to allow the operator to either landspread the sludge or find a storage area suitable for long term storage.

Long term storage is allowed so that sludge generated during the winter or during the growing season may be stored at the intended application area until the fields are accessible. Except under certain conditions, long term storage is only allowed at the site which is to receive the sludge. Those conditions will allow a property owner who proposes to have sludge applied to several parts of his property to store the sludge at one location if all the application sites are located within a half mile radius. The restriction is intended to prevent the establishment of central storage areas containing sludge intended for use on many landspreading sites in the area. The land suitability requirements regarding sewage sludge storage are based on the assumption that a reasonable amount of sewage sludge will be stockpiled at a site and allowed to crust over. A certain amount of nuisance is inevitable from the dust, noise and odors associated with sewage sludge hauling. However, after sewage sludge is delivered, nuisance conditions should diminish. Allowing sewage sludge to be stockpiled at a central landspreading site but landspread at other sites would be an unreasonable burden for the residents in an area to accept. Also, several townships in Minnesota prohibit stockpiling of sewage sludge. Without the restriction in the proposed rules, local prohibitions may lead to the stockpiling of large quantities of sewage sludge in other townships or counties that do not have ordinances against stockpiles.

Sewage sludge may be stored on a continuous basis at landspreading facilities although the method of storage will vary according to the design of the facility. The proposed rules establish acceptable standards for liquid and

dewatered sewage sludge storage. The seepage restriction for liquid sewage sludge storage is based on a study developed by the Agency with the aid of a consulting firm which addresses the acceptable rate of seepage from municipal waste treatment ponds. Storage pads for dewatered sludge must be constructed to prevent cracking and subsequent leachate infiltration.
6 MCAR § 4.6111 K.2

The proposed rules require that the permission of the landowner be obtained before sludge is applied to the land. This is required because some aspects of sewage sludge landspreading may affect the land use for some time after the initial sewage sludge application. For example, a landowner may rent land for one year and plan to grow vegetable crops the next year. If the renter applies sewage sludge, the landowner will not be able to produce certain crops the next growing season. This requirement also provides an additional safety factor to ensure that sewage sludge is properly applied and managed by requiring permission from the person most interested in the long term care of the property.
6 MCAR § 4.6111 H.4, K.6

The proposed rules also require that the boundaries of the sewage sludge application area be clearly marked in order to prevent the inadvertant application of sewage sludge to areas which should not receive sewage sludge. It is important that sewage sludge not be applied where soil or site characteristics are unsuitable and to avoid the application of sewage sludge to adjoining property or road right-of-ways. It is not reasonable to expect that the operator of the application equipment will be able to identify unsuitable soils or unmarked property lines at the time of sewage sludge application. Therefore, the proposed rules require that such boundaries be identified prior to sewage

sludge application and remain marked during the time sewage sludge is being applied.

6 MCAR § 4.6111 K.7

The putrescence of a sewage sludge is based on the level of volatile solids contained in it. Putrescence is an indication of the odors and vector attractants that will be generated at the application area. A sewage sludge which is highly putrescible will create nuisance conditions for the residents of the surrounding area. Incorporation of the sewage sludge into the soil will promote the microbial decomposition of the volatile solids and prevent odor release into the air. In most cases, increased levels of pathogen reduction will decrease the putrescence of the sewage sludge. However, this does not apply in all cases and the degree of pathogen reduction cannot be used as an index of odor potential.

6 MCAR § 4.6121 A.2.a, B.2.f

Landspreading facilities are required to have a ground water, and in some cases, a surface water monitoring program because of the potential for intensive use of the property. A program to monitor ground water is required for all facilities in order to 1) ensure that ground water quality beyond the facility boundary is not affected, 2) alleviate public concerns regarding the operation of the facility and 3) provide protection for the municipality which operates the facility in the event that an unidentified source is polluting the ground water in the area. Also, in some cases facilities will be allowed to apply sewage sludge in excess of agricultural rates, and monitoring wells will also serve to signal changes in ground water quality so that the landspreading operation can be modified or discontinued.

A reasonable minimum number and general location of the required monitoring wells is specified in the proposed rules to ensure that reliable, relevant data is obtained. Often, a single monitoring well is not able to provide consistent, accurate data. A second well at the same depth will provide a means of back-up sampling and verification of data. Upgradient and downgradient wells are required in order to establish background water quality and to determine if the facility is causing a change in water quality. Two wells located within the landspreading area will provide early warning of changes in ground water quality.

Although the frequency of sampling and the parameters which must be analyzed must be established before facility operation, it is not reasonable to establish the monitoring program requirements in the proposed rules. Facilities will vary a great deal in operation, soil characteristics and sewage sludge composition and the same monitoring program will not apply to all situations. However, the factors which will be considered by the Director in developing a monitoring plan have been included in the proposed rules. This degree of discretion is necessary in order to provide more stringent controls for facilities with a high potential without requiring the same level of monitoring for a facility which, due to its location and operation, presents very little potential for contamination. An applicant for a landspreading facility permit will be able to estimate the facility's monitoring needs based on the information provided in the proposed rules and the information obtained from the site investigation. For example, an applicant for a facility which is located over a widely used, shallow aquifer and which will be receiving high levels of nitrogen will know that frequent analyses for nitrate will be required. An applicant for a facility which will be operated according to all the requirements for a landspreading site will know that he will probably not be required to conduct more than a

very basic monitoring program.

Surface water monitoring may be required if there is a discharge of drainage or runoff water to surface water. As was discussed with ground water monitoring, the parameters and frequency of monitoring are not specified in the proposed rules. However, the factors which the Director will consider in establishing a monitoring program are listed in the proposed rules to enable the applicant to estimate monitoring needs.

C. Reasonableness of Record-keeping and Annual Reporting

6 MCAR § 4.6112

6 MCAR § 4.6122

In order for a political subdivision to determine if it is applying the appropriate quantity of sewage sludge to a site or facility, accurate records must be kept and regularly updated. If a record-keeping system is not maintained, excessive quantities of nitrogen, zinc, lead, nickel, copper, and/or cadmium may be applied.

Since a landspreading approval or permit may be in effect for a period of five years, a regular reporting of important information is needed to determine compliance with the proposed rules. The information in an annual report will be stored at the Agency to ensure that no parcel of land in Minnesota will receive quantities of metals in excess of limitations. This is especially important since sites may, over many years, be used by more than one treatment plant.

D. Reasonableness of Appendices

Appendices have been included in the proposed rules to provide more detailed information relating to certain aspects of the proposed rules in an accessible form. It is necessary to provide information regarding standard procedures for sampling and analyzing the various parameters required by the proposed rules in

order to ensure that the data obtained is reliable and to provide an information base other than Agency staff for treatment plant personnel to refer to. The appendices also provide an easily understood procedure for determining the amount of sewage sludge that can be applied to a crop, because this determination is basic for any sort of landspreading operation. A description of the treatment plant processes which reduce and further reduce pathogen levels are necessary to establish operating standards for the process in a relevant and understandable manner.

6 MCAR §§ 4.6131 - 4.6134

These appendices provide information on standard sample collection procedures and where to obtain information for detailed analytical methods. Collection and sample storage and preparation procedures which are commonly used and scientifically acceptable have been detailed in the proposed rules. The actual analytical techniques used to measure the various required parameters are much more complex and in most cases, several options are available. Economic or time constraints and laboratory availability may be factors in determining the type of analyses conducted. Therefore, the proposed rules provide for alternative analytical procedures which will still provide reliable, relevant data. The references provided in the appendices for analytical procedures are generally available and obtaining them will not present an unreasonable burden for analytical laboratories or treatment plant personnel.

6 MCAR § 4.6135

The crop nitrogen requirements are usually the basis for determining sewage sludge application rates. The laboratory determination of total nitrogen which is submitted with the landspreading proposal must be converted to show the amount of crop available nitrogen in the sludge. A formula for determining the

available nitrogen per ton of sewage sludge has been developed through research on nitrogen mineralization rates and ammonia volatilization. The formula in the proposed rules is recommended by the EPA and has been used successfully in landspreading programs in Minnesota conducted under the quidelines and the Temporary Sewage Sludge Disposal Standards (6 MCAR § 4.8050).

6 MCAR § 4.6136

Several requirements within the proposed rules refer to the degree of pathogen reduction in the sewage sludge. The actual process standards necessary to produce the acceptable levels of pathogen reduction are specified in this appendix. The operating procedures for most of the commonly used treatment processes are specified and are the same as the standards required for pathogen reduction in the EPA criteria for the classification of solid waste disposal facilities (40 CFR Part 257). These standards represent the methods which must be used to produce a ten-fold reduction in pathogen levels (PSRP) or to produce a sewage sludge which is essentially pathogen free (PFRP). However, many treatment plants in Minnesota use pathogen reduction processes which do not fit within the standards specified but which are effective to reduce pathogens. Processes which do not meet the standards provided in the proposed rules must be evaluated by the Director. It is reasonable to consider other factors in addition to the actual treatment process when making a determination of the potential for disease transmission from the land application of the sewage sludge. The factors which will be considered in the Director's decision are specified in the proposed rules and all relate to the degree of risk which a proposal may present.

V. ESTIMATED TOTAL COST TO LOCAL PUBLIC BODIES TO IMPLEMENT THE PROPOSED RULES.

A. Introduction

There are two major cost categories that must be addressed when determining the expense of the proposed sewage sludge management rules. The first major cost is that which would be expended to get a landspreading site approved by the MPCA. After discussion with individuals that are currently involved in getting site approval, Table 1 was formulated. Table 1 lists each task that must be undertaken to obtain and operate a landspreading site along with the average time necessary to perform each task. Additional costs for the borings required at long-term storage sites are also included in Table 1. Since the proposed rules do not require that landspreading facilities be established, these costs are not included in the assessment.

TABLE 1

Tasks and estimated costs for obtaining a landspreading site.

A. Man hours involved	
Finding willing landowner.	1 hour
Explaining sludge landspreading program.	1 hour
Collecting and evaluating site information.	4 hours
Boundaries — USGS Maps	
Legal Description — Soil Maps	
Separation Distances	
Taking soil sample and ship to lab.	2 hours
Filling out application form .	1 hour
Staking site boundaries.	1 hour
Updating and maintaining site records.	1 hour
B. Costs	
11 Man hours @ $10/hour	$110
1 Soil sample @ $10/sample	10
	$120
C. Additional costs for long-term storage site.	
Three man hours for soil boring @ $10/hour	$30

The second major cost is that for sampling and analyzing sewage sludge. All publicly owned treatment works (POTW's) will have to analyze their sewage sludge at a frequency determined by POTW design flow. A total sewage sludge analysis cost approximately $220.00 for the parameters listed in Table 2. In addition to the total sewage sludge analytical costs, certain municipalities will be required to analyze for specific metals at a frequency greater than the minimum. From past experience, it is doubtful that any municipality will have to analyze for PCBs at a frequency greater than the minimum since most sewage sludges contain levels less than 5mg/kg. Analytical costs for a single metal is typically $20.00.

Table 2

Parameters included in a total sewage sludge analysis.

pH	zinc
total solids	copper
volatile solids	lead
kjeldahl nitrogen	nickel
ammonia nitrogen	cadmium
polychlorinated biphenyls	chromium
	mercury

Tables 3 and 4 summarize the cost analysis which is discussed in the remainder of this section. The cost analysis does not take into consideration that certain costs and responsibilities are required under Federal regulations (40 CFR Part 257). These costs include sewage sludge analysis for cadmium and PCBs, protection of surface and ground waters, sewage sludge treatment for the reduction of pathogens, soil analysis for pH and cation exchange capacity, and public access control. Because of these cost and responsibilities required by Federal regulations, the costs added by the proposed sludge rules will be much less than that estimated in Tables 3 and 4. Also, the municipalities that will

be affected by the proposed rules are currently regulated by the temporary rules governing sewage sludge disposal (6 MCAR 4.8050). The costs imposed by the temporary rule are of similar magnitude as the ones estimated in Tables 3 and 4 for the proposed rules. Therefore, municipalities should not notice a substantial increase in sewage sludge management costs after the proposed rules are adopted.

TABLE 3

Estimated total cost to local public bodies to implement the proposed rules.

1.	Site Costs	
	830 Landspreading sites @ $120/site	$99,600.00
	70 Long term storage sites @ $30/site	2,100.00
2.	Sludge Analysis Costs	
	304 total analyses @ $220/sample	$66,880.00
	874 additional metal analyses @ $20/sample	17,480.00
3.	Estimated Total Cost	$186,060.00

TABLE 4

Breakdown of annual and initial costs to local public bodies to implement the proposed rules.

1.	Annual Costs	
	Total sludge analyses	$66,880
	Additional sludge analyses	17,480
	830 soil samples (2 hours x $10 + $10/sample)	24,900
	830 site record updating (1 hour x $10)	8,300
		$117,560
2.	Initial Costs	
	830 landspreading sites (minus soil sampling and record keeping)	$66,400
	70 long term storage sites	2,100
3.	Estimated Total Costs	$186,060

B. Costs to POTW's with Design Flow more than 20 mgd

Only two treatment facilities in Minnesota fall within this category--Metropolitan Waste Control Commission (MWCC) and Western Lake Superior Sanitary District (WLSSD)-- therefore, the economic analysis can more specifically relate to the two sludge programs.

1. Costs to MWCC

It is assumed that 50% of the yearly production of MWCC sewage sludge will be landspread. This is a dewatered sewage sludge and some storage at sites is anticipated. One-half of the annual sewage sludge production is approximately 90,000 dry tons. An average application rate is 20 tons per acre, therefore a minimum of 225 forty acre landspreading sites are required. In addition to the sewage sludge produced at the main plant, several satellite plants produce sewage sludge that is, or may be landspread. It is assumed that a total of 2600 acres (65 sites) will be required for these plants. It is also assumed that long-term storage will take place at 50 of the 225 landspreading sites.

The minimum sewage sludge analytical frequency for the main plant is four times a year. According to current analyses, it appears that nickel will have to be analyzed eight times per year, and cadmium twelve times per year.

Based on their design flow, the satellite plants that may landspread sewage sludge--Anoka, Cottage Grove, Hastings, Blue Lake, and Stillwater, Bayport and Rosemount-- would need a minimum of 13 sludge analyses per year. Assuming each plant had one metal that would have to be analyzed more frequently due to higher concentrations, 13 additional metal analyses would be required.

TABLE 5

Estimated Total Cost to MWCC

1. Site Costs	
290 landspreading sites @ $120/site	$34,800.00
50 long-term storage sites @ $30/site	1,500.00
2. Sludge Analysis Costs	
17 total analyses @ $220/sample	$3,740.00
25 additional metal analyses @ $20/sample	500.00
3. Estimated Total Cost to MWCC	$40,540.00

2. Costs to WLSSD

All of WLSSD's sewage sludge production is currently landspread. This amounts to approximately 15,000 dry tons per year. At an average application rate of 10 tons per acre, about 40 forty acre sites would be required to landspread this amount of sewage sludge. It is assumed that half of these sites will have long-term sewage sludge storage. The minimum sewage sludge analytical frequency is four times per year. Based on the current sewage sludge composition, no additional metal analyses would be required.

TABLE 6

Estimated Total Costs to WLSSD

1. Site Costs	
40 Landspreading sites @ $120/site	$4,800.00
20 long-term storage sites @ $30/site	600.00
2. Sludge Analysis Costs	
4 total analyses @ $220/sample	$880.00
3. Estimated Total Cost to WLSSD	$6,280.00

C. Costs to POTW's with Design Flow of 1 to 20 mgd

In Minnesota there are 33 wastewater treatment facilities within this category. Four of these have a design flow between 10 and 20 mgd, four have a design flow between 5 and 10 mgd, and 25 between 1 and 5 mgd. For every 1 mgd of flow it is assumed that one dry ton of sewage sludge is produced (365 dry tons per year). Utilizing these figures, approximately 50,000 dry tons of sewage sludge per year are produced by the 33 treatment facilities in this category. At an average application rate of five tons per acre, approximately 300 forty acre land-spreading sites are needed for sewage sludge disposal.

The minimum sewage sludge analytical frequency for this category is twice per year (66 analyses). Assuming each treatment facility must analyze for one metal at two times the mimimum frequency and for another metal at three times the minimum frequency, an additional 198 metal analyses will be required for these facilities.

TABLE 7

Estimated total costs for POTW's with design flows of 1 to 20 mgd.

1. Site Costs	
300 landspreading sites @ $120/site	$36,000.00
2. Sludge Analysis Costs	
66 total analyses @ $220/sample	$14,520.00
198 additional metal analyses @ $20/sample	3,960.00
3. Estimated Total Costs for This Category	$54,480.00

D. Costs to POTW's with Design Flow less than 1 mgd

In Minnesota there are 217 wastewater treatment facilities within this category. Assuming an average design flow 0.5 mgd for these facilities and one dry ton of sewage sludge produced per mgd, approximately 40,000 dry tons of sewage sludge would be generated by the 217 facilities in one year. At an application rate of five dry tons per acre, 200 forty acre landspreading sites are necessary.

The minimum sewage sludge analytical frequency for this category is once per year (217 analyses). Assuming each treatment facility must analyze for one metal at twice the minimum frequency and for another metal at three times the minimum frequency, an additional 651 metal analyses will be required.

TABLE 8

Estimated Total Costs for POTW's with design flows of less than 1 mgd.

1. Site Costs	
200 Landspreading sites @ $120/site	$24,000.00
2. Sludge Analysis Costs	
217 total analyses @ $220/sample	$47,740.00
651 additional metal analyses @ $20/sample	$13,020.00
3. Estimated Total Costs for This Category	$84,760.00

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a. Letter from Marvin Skodje, Manager, Rochester Wastewater Treatment Plant, Rochester Minnesota, dated 4-9-81
b. Letter from William Bulger, Minnesota Department of Agriculture, dated 4-13-81.
c. Letter from William Bulger, Minnesota Department of Agriculture, dated 4-6-81.

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1) Rules of Bureaus of Solid Waste Management.
2) Supplement to the Rules of the Solid Waste Administration.
3) Guidelines for the Preparation of Sludge Management Plans.

Minnesota Pollution Control Agency

12/24/81
Date

Louis J. Breimhurst
Executive Director

STATE OF MINNESOTA

COUNTY OF RAMSEY

MINNESOTA POLLUTION

CONTROL AGENCY

In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

CERTIFICATE OF COMPLIANCE WITH RULEMAKING PROCEDURES

- - - - - - - - - - - - - - - - - -

I, Special Assistant Attorney Marlene E. Senechal, do hereby declare that I have examined the proposed rule and all related documents and that, based on them and my personal familiarity with the applicable requirements, all rulemaking procedures required by statute and rule have been followed.

Marlene E. Senechal

MARLENE E. SENECHAL
Special Assistant
Attorney General

Dated: April 2, 1982

In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

AFFIDAVIT OF MAILING NOTICE OF SUBMISSION TO THE ATTORNEY GENERAL

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Carol C Groppoli being first duly sworn, deposes and says:

That on the 5th day of April, 1982, in the City of Roseville, County of Ramsey, State of Minnesota, s/he served the attached Notice of Submission to the Attorney General by depositing in the State of Minnesota Central Mail System for first class mailing (or) in the United States mail at said City of Roseville, a copy thereof, properly enveloped, with postage prepaid, to all persons and associations who requested notice that the rules in the above-entitled matter have been submitted to the Attorney General.

Carol C Groppoli

Subscribed and sworn to before me this 5 day of April, 1982.

Mary Ann Hammer
Notary Public

MARY ANN HAMMER
NOTARY PUBLIC - MINNESOTA
RAMSEY COUNTY
My Commission Expires Dec. 11, 1985

STATE OF MINNESOTA

POLLUTION CONTROL AGENCY

In the Matter of the Proposed Adoption of Rules of the Minnesota Pollution Control Agency Governing Sewage Sludge Management, 6 MCAR §§ 4.6101 Through 4.6136

NOTICE OF SUBMISSION TO THE ATTORNEY GENERAL

Pursuant to your request and in accordance with Minnesota Statutes, section 15.0412:

PLEASE TAKE NOTICE that the above-captioned rules have been submitted to the Office of the Attorney General on this date, April 5, 1982, for review as to form and legality. Pursuant to 1 MCAR § 1.206 B., the Attorney General will not approve the rules for at least 14 calendar days after receipt to allow any person or association time to comment on the legality of the rules, after which that Office will complete its review. If you desire to comment on the legality of the above-captioned rules, you should direct your comments to the Office of the Attorney General, G-25 State Administration Building, 50 Sherburne Avenue, Saint Paul, Minnesota 55155, telephone (612) 296-7030. Please note that the above-cited rule of the Attorney General also provides that a copy of any written comments submitted to the Attorney General must be submitted simultaneously to this agency.

If you are interested in determining what changes, if any, were made in the proposed rules after publication in the State Register and before submission to the Attorney General, you may contact Steve Stark, Minnesota Pollution Control Agency, Solid and Hazardous Waste Division, 1935 West County Road B-2, Roseville, Minnesota 55113, telephone (612) 297-2702.

MINNESOTA POLLUTION
CONTROL AGENCY

LOUIS J. BREIMHURST
Executive Director