



Land Application of Sewage Sludge in Pennsylvania

A Plain English Tour of the Regulations

At first reading, regulatory language often is difficult to understand because it is written to be technically accurate and legally precise. This fact sheet seeks to provide a “plain English” description of the current regulations for land application of sewage sludge in Pennsylvania. It introduces the approach and concepts used in developing the regulations and explains the regulations’ key points. The fact sheet is not, however, intended as a substitute for the regulations themselves; it does not include all of the technical details and specific requirements found in the regulations. In addition, the regulations are subject to amendment and revision. Changes could result from concerns or legal challenges brought forward by various institutions or organizations, and from internal agency review. Therefore, any person who requires or desires a complete understanding of the regulations should obtain an up-to-date version. The regulations are published as: Pennsylvania Code, Title 25, Chapter 271, Subchapter J, Beneficial Use of Sewage Sludge by Land Application.

INTRODUCTION

On January 25, 1997, changes made in Pennsylvania’s municipal waste regulations included the addition of a subchapter entitled *Beneficial Use of Sewage Sludge by Land Application*.¹ The rules it outlines went into effect on May 27, 1997. These regulations adopt the “risk assessment approach” of the United States Environmental Protection Agency (EPA) and regulate land application of sewage sludge on the basis of sewage sludge quality. In addition, the regulations provide for a general permit system whose focus is on sewage sludge quality rather than individual application sites. These changes represent a significant shift in approach from how land application of sewage sludge formerly was regulated in Pennsylvania.

A Brief History of Sewage Sludge Regulation in Pennsylvania

Land application of sewage sludge was first regulated in 1977 under Pennsylvania Code, Title 25, Chapter 75. Regulation was done on a site-specific basis, and the assessment of a site’s suitability and the sewage sludge application rate were based on research conducted at various northeastern U.S. universities, as well as on mine reclamation research conducted at Penn State.

In 1985 scientists from several of these northeastern universities published a bulletin entitled *Criteria and Recommendations for Land Application of Sludges in the Northeast*.² The bulletin recommended that sewage sludge application be limited by the amount of nitrogen and phosphorus in the sewage sludge, by the concentrations and cumulative loadings of seven trace elements and PCBs (polychlorinated biphenyls), and on the basis of pathogen reduction. These recommendations became the foundation for regulating sewage sludge applied to agricultural land in Pennsylvania.

In 1988 revised regulations for land application of sewage sludge were established under Title 25, Chapter 275. The revisions required that individual (site-specific) permits for land application be issued. They also called for a regular analysis of sewage sludge and soils for the pollutants and plant nutrients listed in *Criteria and Recommendations for Land Application of Sludges in the Northeast*. Although regulation continued to be on a site-specific basis, greater emphasis was placed on sewage sludge quality.

¹ These regulations can be found in the Pennsylvania Code, Title 25, Chapter 271.

² The Pennsylvania State University. NEC-28. Bulletin 851.

In 1993 the EPA established *The Standards for the Use or Disposal of Sewage Sludge*, commonly referred to as Part 503.³ The Part 503 regulations resulted from a comprehensive risk assessment exercise conducted by the EPA. Its purpose was to establish the maximum concentrations of several pollutants that could be present in land-applied sewage sludge and still be protective of a highly exposed person, animal, or plant. Part 503 established quality criteria for sewage sludge and allowed considerable regulatory relief for land application of high-quality sewage sludge. In 1994 Pennsylvania established interim guidelines that largely adopted the technical aspects of Part 503. The current Pennsylvania regulations continue to use Part 503 as the technical basis for regulating land-applied sewage sludge, but they include several requirements not found in Part 503.

Features of the Current Regulations

Sewage sludge quality is the basis for determining if, where, how much, and how frequently sewage sludge may be land applied, as well as the regulatory requirements for land application. General permits authorize land application of a particular sewage sludge product meeting certain quality criteria to sites meeting specified requirements.

GENERAL PERMITS

A major change in the new regulations is the switch from granting individual permits for specific sewage sludge application sites to a general permitting system. This shift is consistent with the concept that land application of sewage sludge should be based on sewage sludge quality. Under the individual permit system, each sewage sludge application site (farm field) was issued a separate permit. The permit system's focus, therefore, was on the application site.

Under the general permitting system, the focus is on sewage sludge quality. The general permit is issued to the treatment plant that generates the sewage sludge, or to residential septage haulers who land apply residential septage. The generator must supply data documenting the levels of plant nutrients, environmental pollutants, and human pathogens in the sewage sludge, as well as the steps taken to reduce the attraction of disease vectors to the sewage sludge. Once its quality has been established, the sewage sludge may be applied to multiple sites. The sites must meet specified

requirements, and all soil and crop management restrictions must be followed at each site. General permits are issued for a five-year period.

RISK ASSESSMENT

Sewage sludges contain plant nutrients (primarily nitrogen and phosphorus), several trace elements and organic chemicals (referred to as pollutants in the regulations), and human pathogens (certain bacteria, viruses, and parasites). When sewage sludge is land applied, each of these constituents can pose certain risks to human health and the environment. Using formal risk assessment procedures, the EPA studied the risks that could result from land application of sewage sludge.⁴ The risk assessment focused on individuals (human, animal, or plant) that could be highly exposed to sewage sludge either during or following land application.

Based on the outcome of its risk assessments, the EPA established limits for several pollutants in sewage sludge that would be protective of (minimize risk to) highly exposed individuals. Risk assessment procedures were not used to establish levels for pathogens in sewage sludge. Rather, the EPA established technology-based operational standards that would reduce pathogens to levels demonstrated to be protective of public health and the environment. These protective levels then became the basis for establishing sewage sludge quality parameters used in Part 503 and also in the Pennsylvania regulations.

SEWAGE SLUDGE QUALITY

For purposes of land application, sewage sludge quality is assessed by three general criteria:

1. The concentrations of pollutants in the sewage sludge (9 trace elements and PCBs),
2. The processes used to reduce human pathogens in the sewage sludge and the degree of pathogen reduction achieved, and
3. The processes used to reduce those characteristics of the sewage sludge which attract disease vectors (e.g., rodents, flies, mosquitoes).

³ Title 40, Code of Federal Regulations (CFR), Part 503.

⁴ Comprehensive and detailed information on the risk assessment procedures used by the EPA is provided in *A Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule*, EPA832-B-93-005.

The regulations establish two categories of sewage sludge:

1. *Exceptional quality sludge* (EQ sludge) is the highest quality material. To qualify as an EQ sludge, the material must meet pollutant concentration limits, pathogen reduction standards, and vector attraction reduction. EQ sludge is largely free of regulatory requirements for land application.
2. *Nonexceptional quality sludge* (non-EQ sludge) is lesser quality material. It must still meet pollutant limits, pathogen reduction standards, and vector attraction reduction, but the requirements are not as stringent as for EQ sludge. Non-EQ sludge is subject to considerable regulatory requirements for land application.

Sewage sludge that does not meet the quality criteria for either EQ or non-EQ sludge may not be land applied. Such material must be disposed of either by incineration or by landfill.

POLLUTANT CONCENTRATIONS

The maximum concentrations of each regulated pollutant that a sewage sludge may contain for each of the quality classifications is given in Table 1. To qualify as an EQ sludge, concentrations of all 10 pollutants must be less than the pollutant concentration shown in the lefthand column of Table 1. If a sewage sludge exceeds the pollutant concentration limit for any of the 10 pollutants, it cannot be classified as an EQ sludge. Likewise, to qualify as a non-EQ

Table 1. Pollutant and ceiling concentrations for land application of sewage sludge.

Exceptional quality sludge	Non-exceptional quality sludge	Sludge may not be land applied
41	ARSENIC	75
39	CADMIUM	85
1,500	COPPER	4,300
300	LEAD	840
17	MERCURY	57
75	MOLYBDENUM	75
420	NICKEL	420
100	SELENIUM	100
2,800	ZINC	7,500
4	PCBs	8.6

Pollutant concentration (mg/kg sludge dry wt) Ceiling concentration (mg/kg sludge dry wt)

sludge, concentrations of all 10 pollutants must be below the ceiling concentration given in the righthand column of Table 1. If a sewage sludge exceeds the ceiling concentration limit for any of the 10 pollutants, it cannot be a non-EQ sludge and therefore may not be land applied. Note that pollutant and ceiling concentrations are the same for molybdenum, nickel, and selenium.

CUMULATIVE POLLUTANT LOADING RATES

A limit also is placed on the total amount of a pollutant that may be added to an application site. This limit is known as the cumulative pollutant loading rate because each time sewage sludge is applied to a field, pollutants in that application must be added to the total from all previous applications. Cumulative pollutant loading rates apply only to land application of non-EQ sludge. Because of the low levels of pollutants in EQ sludge, land application of this material is not subject to cumulative pollutant loading rates. The cumulative loading rates for each of the pollutants are given in Table 2.

Table 2. Cumulative pollutant loading limits for land application of sewage sludge.

Pollutant	Cumulative pollutant loading rate (lb/A)
Arsenic	36
Cadmium	34
Copper	1320
Lead	264
Mercury	15
Nickel	370
Selenium	88
Zinc	2464

Before non-EQ sludge may be applied, soil at the proposed application site must be analyzed to determine total concentrations of the eight elements listed in Table 2. These values serve as the starting point for determining cumulative loadings. Each time sewage sludge is applied to the site, the total amount of each of the eight elements added to the soil must be determined and added to the cumulative total for that element. When the total for any element reaches its cumulative loading rate, no more sewage sludge may be applied to that site. Table 3 provides an example of how cumulative pollutant loading is calculated, in this case for copper.

For every element listed in Table 2, the calculations shown in Table 3 must be continued each time sewage sludge is applied to the site.

Table 3. Sample calculations for determining cumulative pollutant loading for copper.

	Column A Concentration of copper in sewage sludge or soil (ppm, mg/kg, or lb/1 million lb)	Column B Sewage sludge application rate (T/acre)	Column C Multiplication factor to convert to pounds per acre	Column D Amount of copper in soil or added in sewage sludge (lb/acre)	Column E Cumulative load of copper in soil (lb/acre)
Background in soil before any sewage sludge is applied	50	—	Col A x 2 ^a	100	100
First sewage sludge application	850	5	Col A x Col B x 0.002 ^b	8.5	108.5
Second sewage sludge application	1250	8	Col A x Col B x 0.002	20	128.5
Third sewage sludge application	2500	5	Col A x Col B x 0.002	25	153.5

^a Assumes there are 2 million pounds of soil per acre plow depth (depth of sewage sludge incorporation). The conversion factor of 2 comes from dividing 2 million by 1 million in the following equation: (lb/1,000,000 lb soil) x (2,000,000 lb soil/acre).

^b The conversion factor of 0.002 comes from dividing 2000 pounds by 1 million pounds in the following equation: (lb/1,000,000 lb) x (T/acre) x (2000 lb/T).

PATHOGEN REDUCTION

Two levels of pathogen reduction are defined in the regulations: Class A, a high level of pathogen reduction, and Class B, a considerable, but lesser, level of pathogen reduction.

Class A pathogen reduction is required for an EQ sludge, while Class A or Class B is required for a non-EQ sludge. The regulations allow for several alternatives to achieve each of these pathogen reduction levels. The alternative methods are specific for various treatment plant operating conditions and sewage sludge characteristics. One very important feature of the pathogen reduction requirements is that the sewage sludge must meet the requirements at the time it is land applied, sold, or given away, rather than immediately following treatment.

Class A Pathogen Reduction

The regulations specify six alternative methods by which Class A pathogen reduction can be attained for sewage sludge. These six methods are described in very general terms here. For specific details, refer to paragraph 271.932(a) of the regulations.

1. *Heat treatment*—The specific temperature and duration of heating are dependent on sludge characteristics, primarily the solids content.

2. *pH and temperature*—Combined treatment to increase sludge pH to 12 for at least 72 hours and temperature to at least 125 °F for 12 of the 72 hours, followed by drying to at least 50 percent solids content.

3. *Pathogen testing*—Demonstrate that treatment has reduced the density of enteric viruses to less than one plaque-forming unit per 4 grams of sludge (dry weight basis) and helminth ova to less than one viable ovum per 4 grams of sludge (dry weight basis).

4. *Pathogen testing*—Demonstrate that at the time the sewage sludge is used or prepared for distribution, the density of viruses and helminth ova is below the levels specified above.

5. *Process to further reduce pathogens (PFRP)*—Treatment by one of seven PFRPs developed by the EPA. These processes involve composting, heat drying, heat treatment, thermophilic aerobic digestion, beta ray irradiation, gamma ray irradiation, or pasteurization. Specific details for the seven PFRPs can be found in Appendix A of the regulations.

6. *PFRP equivalent*—Treatment of the sewage sludge by a process that the EPA has approved as equivalent to one of the PFRPs.

Each of the six Class A pathogen reduction alternatives requires that the sewage sludge be tested for the density of fecal coliform or salmonella bacteria. At the time the sewage sludge is land applied, fecal coliform bacteria density must be less than 1000 per gram of total solids (dry weight basis), and salmonella bacteria density must be less than 3 per 4 grams of dry solids.

Sewage treatment plants are required to document that they have met the operational and technical standards for whichever Class A pathogen reduction alternative they have selected.

Class B Pathogen Reduction

The regulations describe three alternatives to attain Class B pathogen reduction in sewage sludge. These three methods are described in very general terms below. For specific details, refer to paragraph 271.932(b) of the regulations.

1. *Pathogen testing*—Seven samples of the sewage sludge must be collected and tested for fecal coliform bacteria. At the time the sewage sludge is used, the geometric mean density of fecal coliform bacteria in the seven samples must be less than either 2 million most probable number or 2 million colony-forming units per gram of total solids (dry weight basis).
2. *Process to significantly reduce pathogens (PSRP)*—Treatment of the sewage sludge by one of five PSRPs developed by the EPA. These processes involve aerobic digestion, air drying, anaerobic digestion, composting, and lime stabilization. Specific details of the five PSRPs can be found in Appendix A of the regulations.
3. *PSRP equivalent*—Treatment of the sewage sludge by a process that the EPA has approved as equivalent to one of the PSRPs.

VECTOR ATTRACTION REDUCTION

Vector attraction refers to those characteristics of sewage sludge which attract disease vectors such as rodents, flies, and mosquitoes. The purpose of vector attraction reduction is to decrease the number of disease vectors that could come into contact with the sewage sludge and thereby to reduce the risk of disease transmission by these vectors from the source (sewage sludge) to the target organism (humans or animals). The regulations describe 10 standards for vector attraction reduction in sewage sludge. EQ sludge must meet one of the first eight standards, while non-EQ sludge must meet any one of the 10 standards. These standards are

briefly described below. Complete descriptions can be found in paragraph 271.933 of the regulations.

- 1–3. The first three standards involve reducing the mass (weight) of volatile solids in the sewage sludge by 38 percent during aerobic or anaerobic digestion, or demonstrating that the percentage of volatile solids in the sewage sludge will not be reduced by more than a specified amount during an additional digestion period.
4. The specific oxygen uptake rate (SOUR) for an aerobically treated sewage sludge must be less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 68°F.
5. Sewage sludge must be treated in an aerobic process for 14 days or longer, during which time the temperature of the sewage sludge must always be above 104°F and its average temperature must be greater than 113°F.
6. The pH of the sewage sludge must be raised to 12 or higher for 2 hours by adding alkali, followed by a pH of at least 11.5 for an additional 22 hours.
7. The solids content of sewage sludge that does not contain unstabilized solids must be at least 75 percent.
8. The solids content of sewage sludge that does contain unstabilized solids must be at least 90 percent.
9. Sewage sludge must be injected below the surface of the land. No significant amount of sewage sludge may be present on the land surface within one hour of injection. For Class A sewage sludge, injection must occur within eight hours of discharge from the pathogen treatment process.
10. Sewage sludge applied to the land surface must be incorporated within six hours of application. For Class A sewage sludge, incorporation must occur within eight hours of discharge from the pathogen treatment process.

MONITORING FREQUENCY

The frequency of monitoring sewage for pollutants and pathogens depends on the amount of sewage sludge a treatment plant land applies or distributes for land application, not on the amount of sewage sludge it generates. The required monitoring frequencies are given in Table 4. After a treatment plant has monitored its sewage sludge at the frequency required for two years, DEP may reduce the required frequency. However, monitoring may not be less than once per year.

Table 4. Monitoring frequency required for land-applied sewage sludge.

Tons (dry weight basis) of sewage sludge that is land applied per 365-day period	Monitoring frequency
0 to less than 319	Once per year
319 to less than 1650	Once per quarter (4 times per year)
1650 to less than 16,500	Once per 60 days (6 times per year)
Greater than 16,500	Once per month (12 times per year)

REGULATORY REQUIREMENTS FOR LAND APPLICATION OF EXCEPTIONAL QUALITY (EQ) SLUDGE

Quality Requirements

To be classified as an EQ sludge, the material must meet the following requirements:

- It continuously must be below the pollutant concentration levels for the constituents listed in Table 1,
- It must meet one of the Class A pathogen reduction standards,
- It must meet one of the first eight vector attraction reduction standards listed above,
- It must be nonliquid, and
- It must be unrecognizable as human waste.

Regulation

Exceptional quality sewage sludge essentially is considered a fertilizer material. The only restriction placed on land application of EQ sludge is that it may not be applied at greater than agronomic rates. Agronomic rates are to be determined based on the nitrogen requirements of the crop to be grown. When it is used for land reclamation, EQ sludge must be incorporated within 24 hours of application.

EQ sludge may be sold or given away in a bag or other container for use in lawns or gardens. It is not subject to the site management, crop restrictions, notification, and record keeping that are required for non-EQ sludge. On a case by case basis, however, DEP may apply to EQ sludge any of the general requirements or management practices required for non-EQ sludge. The regulatory requirements for EQ sludge pertain to labeling requirements for the bag or container in which the material is distributed.

EQ Sludge Labeling

A label must be affixed to the bag or container in which EQ sludge is distributed, or the person who receives the sewage sludge must be provided with an information sheet containing the following information:

- The name and address of the person who prepared the sewage sludge,
- A statement that applying the sewage sludge to the land is prohibited except in accordance with the instructions on the sheet, and
- A description of the sewage sludge's nutrient value and any restrictions or limitations on its use. (Generally, the only restriction will be that the sewage sludge must be used at or below agronomic rates.)

REGULATORY REQUIREMENTS FOR LAND APPLICATION OF NONEXCEPTIONAL QUALITY (NON-EQ) SLUDGE

Quality Requirements

To be classified as a non-EQ sludge, the material must meet the following requirements:

- It must be below the ceiling concentrations for all pollutants listed in Table 1,
- It must meet one of the Class B or Class A pathogen reduction standards, and
- It must meet one of the 10 vector attraction reduction standards listed above.

Regulation

Significant regulatory requirements are placed on non-EQ sludge that is land applied. These fall under the categories of general requirements, management practices, and site restrictions.

General Requirements

- Cumulative pollutant loading must be determined for each of the elements listed in Table 2. Any prior sewage sludge applications made to the site must be included in the determination. Once the cumulative loading limit is reached for any of the elements listed in Table 2, no further sewage sludge applications may be made to that site.
- Sewage sludge may only be applied at reclamation sites if the reclamation activity is approved or permitted by DEP.

- Written consent of the landowner must be obtained before sewage sludge is applied to the land.
- At least seven days before sewage sludge is applied, the occupant of the land must be provided with written instructions that describe the acceptable uses and limitations of the sewage sludge.
- At least 30 days prior to the first application of sewage sludge at a site, written notification that includes a brief description of the operation, site restrictions, and name and permit number of the sewage sludge applicator must be provided to: (1) adjacent landowners, (2) the County Conservation District, and (3) the Department of Environmental Protection regional office.
- Before any sewage sludge is applied to a site, a representative soil sample must be obtained. At a minimum, the sample must be analyzed for pH and for the constituents listed in Table 1.
- The generator of the sewage sludge must supply written notification of the sewage sludge's total nitrogen content (on a dry weight basis).

Management Practices

- Sewage sludge may not be applied to land if it is likely to adversely affect a threatened or endangered species or its designated habitat.
- Sewage sludge may not be applied to land that is frozen, snow covered, or flooded.
- Sewage sludge may not be applied to agricultural land that is:
 - within 100 feet of a perennial stream,
 - within 100 feet of the edge of a sinkhole,
 - within 300 feet of an occupied dwelling unless the current owner provides a written waiver,
 - without an implemented erosion and sedimentation control plan or a farm conservation plan,
 - within 300 feet of a water source unless the current owner provides a written waiver,
 - within 100 feet of an exceptional value wetland, and
 - within 11 inches of the seasonal high water table, nor within 3.3 feet of the regional groundwater table.
- Sewage sludge may not be applied to agricultural land with slopes greater than 25 percent or to reclamation land with slopes greater than 35 percent.
- Sewage sludge may not be applied to soil with a pH of less than 6, unless the sewage sludge material will increase the soil pH to 6 or greater within six months following application.
- Sewage sludge may not be applied at rates greater than the agronomic rate (based on the nitrogen requirement of the crop to be grown).
- Sewage sludge may not be applied at a farm where resident animals produce sufficient manure to meet the farm's nitrogen needs, unless a management plan that allows for off-farm uses of the manure is implemented.
- When land applying sewage sludge, the applicator must display the permit number on the side and rear of each vehicle used.
- Sewage sludge used for land reclamation must be incorporated within 24 hours of application.

Site Restrictions

These restrictions are intended to minimize the risk that pathogens will be transferred from sewage sludge to humans or animals. They apply specifically to sewage sludge that is Class B with respect to pathogen reduction, not to all non-EQ sludge.

- Food crops with harvested parts that touch the sewage sludge–soil mixture and that are totally above the land surface may not be harvested for 14 months after application of sewage sludge.
- Food crops with harvested parts below the land surface may not be harvested for 20 months if the sewage sludge was on the soil surface for at least four months prior to incorporation, or for 38 months if the sewage sludge was incorporated within four months of application.
- Food, feed, and fiber crops may not be harvested for 30 days after application of sewage sludge.
- Animals may not be allowed to graze on land for 30 days after sewage sludge is applied.
- Turf grown on land where sewage sludge has been applied may not be harvested for one year after application of the sewage sludge if the turf will be placed on land with a high potential for public exposure or on a lawn.
- Public access to land where sewage sludge has been applied must be restricted for one year if the site has a high potential for public exposure, and for 30 days if the site has a low potential for public exposure.

TRAINING

Persons who generate, prepare, or land apply sewage sludge must satisfactorily complete training courses sponsored by DEP.

ENFORCEMENT

Enforcement of the regulations relies on record keeping, reporting, and inspection.

Record Keeping

Record-keeping requirements are divided between the sewage sludge generator and the person who land applies the sewage sludge. Ultimately, however, it is the permit holder (normally the sewage treatment authority) who is responsible for complying with all record-keeping requirements.

Sewage Sludge Generator

Sewage treatment plants or sewage sludge processing facilities that prepare sewage sludge for land application must develop, and retain for five years, records containing the following information:

- The concentration in the sewage sludge of each pollutant listed in Table 1,
- A description of the process by which Class A or Class B pathogen reduction will be achieved and documentation to demonstrate that the process was carried out, and
- A description of the process by which vector attraction will be reduced, along with documentation that the process was carried out.

A legally binding certification statement attesting to the validity of the above documentation also is required of the treatment plant or processing facility that prepares sewage sludge for land application. These requirements apply to generators of both EQ sludge and non-EQ sludge.

Sewage Sludge Applicator

Any person who land applies sewage sludge must develop and retain the following information for an indefinite time:

- The location of each site where sewage sludge was applied,
- The size in acres or hectares of each sewage sludge application site,
- The amount of sewage sludge in tons or metric tons (dry weight basis) applied to each site,

- The cumulative loading of each pollutant listed in Table 2 for each sewage sludge application site, and a statement of how the information needed to make this determination will be obtained.

Any person who land applies sewage sludge must also prepare certified statements about how all pertinent management practices, site restrictions, and vector attraction reduction requirements will be met for each sewage sludge application site. These requirements apply only to land application of non-EQ sludge.

Reporting

Any of the information listed above under “Record Keeping” must be made available to DEP upon request. DEP must also be notified when a sewage sludge application site reaches 90 percent of the cumulative loading limit for any of the pollutants listed in Table 2. For purposes of inspection or investigation, DEP may also request that a sewage sludge applicator supply it with the date, time, and location at which land application of sewage sludge will occur.

Inspection

Representatives of the Commonwealth may, without advanced notice or delay, have access to a facility that generates sewage sludge or to a sewage sludge application site to ensure compliance with all applicable regulations and to collect samples of sewage sludge, soil, water, or air.

ASSISTANCE OF COUNTY CONSERVATION DISTRICTS

The regulations allow DEP to enter into agreements with County Conservation Districts. The agreements authorize the districts to:

- Evaluate sewage sludge application sites and review permits for land application of sewage sludge,
- Provide information and written materials to the general public, to the regulated community, and to the agricultural community concerning land application of sewage sludge,
- Conduct educational sessions with interested parties on the land application of sewage sludge, and
- Conduct inspections of sewage sludge application sites and collect samples from those sites.

REGULATORY REQUIREMENTS FOR LAND APPLICATION OF RESIDENTIAL SEPTAGE

Land application of residential septage also is covered under the general permit system, but the regulatory requirements are less stringent than those for sewage sludge. Residential septage must be treated to reduce pathogens and must be treated or handled to reduce vector attraction. However, no chemical analysis of the septage is required, and no pollutant concentration or loading limits are placed on residential septage. The key points of the regulations that pertain to land application of residential septage are the following:

- Persons who land apply residential septage must obtain a general permit from DEP.
- Persons who land apply residential septage must receive the same training as is required of those who apply sewage sludge.
- Application rates for land-applied residential septage are determined on the basis of assumed nitrogen in the septage and nitrogen needs of the crop or vegetation on the application site.
- Land-applied residential septage is subject to pathogen and vector attraction reduction requirements.
- Before any septage is applied to a site, a representative soil sample must be collected and analyzed for pH and for the pollutants listed in Table 1.
- Nonorganic objects must be removed from the septage prior to land application.
- Persons who land apply residential septage must provide prior notification to adjacent landowners, Conservation Districts, and DEP regional offices.
- Site restrictions listed for land-applied non-EQ sludge also pertain to land-applied residential septage (see the section entitled, "Site restrictions for land application of non-EQ sludge").
- Residential septage may not be applied to land with a high potential for public exposure.
- Persons who land apply residential septage must maintain records of all land application activities.

Application Rate

Application of residential septage is subject to an annual application rate (AAR) limit based on nitrogen needs of the

crop or vegetation on the application site. The rate can be determined by the following equation:

$$AAR = N/0.0026$$

Where:

AAR = annual application rate in gallons per acre per 365-day period, and

N = the amount of nitrogen in pounds per acre per 365-day period needed by the crop or vegetation grown on the land.

Pathogen Reduction Requirements

Before septage is land applied, it must be screened and either treated with alkali or treated by one of the pathogen reduction processes described previously (either PSRP or PSRP). To reduce pathogens by adding alkali, the pH of residential septage must be raised to 12 or higher and must remain above 12 for at least 30 minutes without the addition of more alkali.

Vector Attraction Requirements

There are three options for reducing vector attraction in residential septage.

1. Septage must be injected below the land surface. No significant amount of septage may be present on the land surface within one hour of injection.
2. Septage applied to the soil surface must be incorporated within six hours of application.
3. Prior to land application, the pH of residential septage must be raised to 12 or higher by adding alkali and must remain above 12 for at least 30 minutes without the addition of more alkali.

Notification

At least 30 days before the first application of residential septage at a location, the person who applies the septage must provide written notification to the adjacent landowner(s), the County Conservation District, and the appropriate regional DEP office. Notification must include a brief description of the operation, any site restrictions, the name of the person land applying the septage, and the applicable permit number. Notification of the Conservation District must include the location of the fields on a United States Geological Survey map and on a Natural Resources Conservation Service soils map.

Record Keeping

The person who land applies residential septage must keep the following records for five years after applying the septage:

- The location of each site where septage is applied,
- The area in acres or hectares of each site where septage is applied,
- The date and time residential septage is applied at each site,
- The nitrogen requirement for the crop or vegetation grown on each site during a 365-day period,
- The rate, in gallons per acre (or liters per hectare) per 365-day period, at which septage was applied to each site,
- Analytical results that demonstrate and document how pathogen reduction was achieved, and
- A description of how the vector attraction reduction standard was met.

A legally binding certification statement attesting to the validity of the above documentation is also required of the person who land applies residential septage. The above records must be submitted to DEP if requested. For purposes of inspection or investigation, DEP also may request notification of the date, time, and location at which residential septage will be land applied.

FOR FURTHER INFORMATION

For more information on land application of sewage sludge, contact the DEP Bureau of Water Quality Protection (717-787-8184), your regional DEP office, your County Conservation District Office, or your county extension office.

Regional DEP offices are listed below.

Region I: Southeast Regional Office

Lee Park, Suite 6010
555 North Lane
Conshohocken, PA 19428-2233
610-832-6130

Counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia

Region II: Northeast Regional Office

2 Public Square
Wilkes-Barre, PA 18711-0790
717-826-2553

Counties: Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, and Wyoming

Region III: Southcentral Regional Office

909 Elmerton Avenue
Harrisburg, PA 17110
717-705-4707

Counties: Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, and York

Region IV: Northcentral Regional Office

208 West Third Street, Suite 101
Williamsport, PA 17701
717-327-3669

Counties: Bradford, Cameron, Clearfield, Centre, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, and Union

Region V: Southwest Regional Office

400 Waterfront Drive
Pittsburgh, PA 15222
412-442-4000

Counties: Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, and Westmoreland

Region VI: Northwest Regional Office

230 Chestnut Street
Meadville, PA 16335-3481
814-332-6942

Counties: Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, and Warren

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