



## STATE OF TENNESSEE

Department of Environment and Conservation  
Division of Water Resources

# GENERAL STATE OPERATION PERMIT FOR THE LAND APPLICATION OF NON-EXCEPTIONAL QUALITY BIOSOLIDS

**PERMIT NUMBER TNB000000**

Under authority of the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101 et seq.), persons covered under this general permit are authorized to land apply non-EQ biosolids in accordance with specific limitations, monitoring requirements, management practices and other conditions set forth herein. Authorization for coverage under this general permit is limited to those facilities and/or operations identified in the notice of intent or separate permit applications that have been accepted in place of a notice of intent.

This permit is issued on:

This permit is effective on:

This permit expires on:

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Jennifer Dodd  
Director

**GENERAL STATE OPERATION PERMIT FOR THE LAND APPLICATION OF  
NON-EXCEPTIONAL QUALITY BIOSOLIDS**

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**Appendix A:** Notice of Intent (NOI) form

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**Appendix C:** Processes to Further Reduce Pathogens (PFRP)

**Appendix D:** Certification Statements

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## **1. COVERAGE UNDER THIS GENERAL PERMIT**

### **1.1. Permit Area and Applicability**

This general permit authorizes the land application of non-exceptional quality (non-EQ) biosolids within the State of Tennessee provided that all conditions in this general permit are complied with. A violation of any of these conditions by a person who has coverage under this General Permit is a violation of the Tennessee Water Quality Control Act (the Act), subject to the civil and criminal penalties stated in the Act. It does not apply to facilities that incinerate sewage sludge, disposal of sewage sludge in a landfill or place sewage sludge in a surface disposal site.

### **1.2. Obtaining Coverage Under this General Permit**

#### **1.2.1. Submitting Notice of Intent (NOI)**

In order for a generator who prepares non-EQ biosolids for land application to be covered under this general permit, the authorized representative shall submit a complete NOI (see Appendix A) to the State Biosolids Coordinator and a Notice of Coverage (NOC) must be issued by the division.

#### **1.2.2. Denial of General Permit Coverage**

The director may deny coverage under this general permit and require submittal of an application for an individual State Operation Permit (SOP) based on characteristics of the biosolids or the site as shown by a review of the NOI and/or other information. The director shall notify the applicant in writing that an individual permit application is required. The notification will include a brief statement of the reasons for this decision.

## **2. NOTICE OF INTENT REQUIREMENTS**

### **2.1. Land Application Sites with Existing Approval**

All non-EQ biosolids land application sites that have been approved by the division prior to the effective date of this permit will be covered under this permit upon receipt of the signed certification statement in the NOI. The applicant should submit the completed NOI with the certification statement to the State Biosolids Coordinator within 60 days of the effective date of this permit.

### **2.2. New Land Application Sites**

A generator who prepares non-EQ biosolids for land application in the State of Tennessee on new sites without existing approval letters, must submit a complete NOI (see Appendix A) in accordance with the requirements of this permit and obtain the NOC from the division prior to land applying non-EQ biosolids on any site. Coverage for additional land application sites (not identified in the original NOI or submitted for review under the previous permit) begins 30 days after submittal of a complete NOI unless the permittee is notified otherwise by the division.

### **2.3. Contents of the NOI Form**

The NOI form in Appendix A and its instructions set forth the information that must be submitted. The applicable portions of the NOI form must be filled in completely.

### **3. SPECIFIC REQUIREMENTS FOR LAND APPLICATION OF NON-EQ BIOSOLIDS**

#### **3.1. Specific Limitations and Self-Monitoring Requirements for Land Application**

In addition to the permittee's obligation to comply with all other aspects of this general permit, all non-EQ biosolids that are land applied shall meet the requirements of this section and sections 3.1.1., 3.1.2., 3.1.3. and subpart 3.2.

All non-EQ biosolids that are land applied shall comply with paragraphs (a) and (b) below:

- (a) PCBs shall be monitored at least once every 5 years unless otherwise specified by the State Biosolids Coordinator.
- (b) A Toxicity Characteristic Leaching Procedure (TCLP) using SW-846 Method 1311 in accordance with [40 CFR 261.24](#) shall be conducted at least once every 5 years unless otherwise specified by the State Biosolids Coordinator.

##### **3.1.1. Contaminant Limitations for Land Application**

Non-EQ Biosolids that are land applied must meet the maximum contaminant concentrations in Table 1 and the monthly average contaminant concentrations in Table 3. If the monthly average contaminant concentration found in Table 3 is exceeded for any pollutant, the cumulative contaminant loading rates in Table 2 must be adhered to.

Biosolids subject to the cumulative contaminant loading rates in Table 2 (subsection 3.1.1.2.) shall not be land applied if any of the cumulative contaminant loading rates in Table 2 have been reached.

Non-EQ biosolids that do not meet these requirements cannot be land applied.

##### **3.1.1.1. Notification Requirements for Exceedance of Contaminant Limitations**

The permittee must provide written notification to the State Biosolids Coordinator within 90 days of the date of coverage under this permit of the location of any land application site that was approved by the division prior to the effective date of this general permit on which non-EQ biosolids that contained any contaminant in excess of the concentration limitations in Table 3 have been applied. Notification must also be given for any site as soon as practicable, but no later than 30 days after learning that the concentration of any contaminant in the non-EQ biosolids has exceeded the concentration limitations in Table 3. Submitting this information in the annual report meets this requirement. The appropriate certification in Appendix D must be used.

**3.1.1.2. Tables 1, 2, and 3 of Contaminant Limitations**

Contaminant	Table 1	Table 2	Table 3
	Maximum Concentration [mg/kg] <sup>a b c d</sup>	Cumulative Contaminant Loading Rate [kg/ha] <sup>a</sup>	Monthly Average Concentration [mg/kg] <sup>a c e</sup>
Total Arsenic	75	41	41
Total Cadmium	85	39	39
Total Copper	4,300	1,500	1,500
Total Lead	840	300	300
Total Mercury	57	17	17
Total Molybdenum	75	N/A	N/A
Total Nickel	420	420	420
Total Selenium	100	100	100
Total Zinc	7,500	2,800	2,800

- a) See Part 7. for definition of terms.
- b) The limitations represent maximum allowable concentration of contaminants in any non-EQ biosolids that are land applied, never to be exceeded.
- c) The concentration is mg of contaminant per kg of total solids (dry-weight basis).
- d) Any violation of these limitations shall be reported to the State Biosolids Coordinator within 24 hours of discovery.
- e) These limitations represent the maximum allowable levels of contaminants based on an average of all samples taken during a 30-day period.

**3.1.2. Pathogen Requirements**

If non-EQ biosolids are to be land applied, they shall meet all pathogen requirements of either Class A or Class B (including the site restrictions) as described below. If non-EQ biosolids do not meet Class A or Class B pathogen requirements, they cannot be land applied.

**3.1.2.1. Class A Pathogen Requirements**

In order for biosolids to be designated Class A with respect to pathogens, they shall meet one of the following six pathogen reduction alternatives for Class A:

**Pathogen reduction alternatives for Class A biosolids**

**Class A—Alternative 1**

- (i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

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- (ii) The temperature of the biosolids that are applied to the land shall be maintained at a specific value for a period of time.
- (I) When the percent solids of the biosolids are seven percent or higher, the temperature of the biosolids shall be 50 degrees Celsius or higher; the time period shall be 20 minutes or longer; and the temperature and time period shall be determined using Equation (1), except when small particles of sewage sludge are heated by either warmed gases or an immiscible liquid.

$$\text{Equation (1)} \quad D = \frac{131,700,000}{10^{0.1400t}}$$

Where,

D = time in days,  
t = temperature in degrees Celsius.

- (II) When the percent solids of the biosolids are seven percent or higher and small particles of sewage sludge are heated by either warmed gases or an immiscible liquid, the temperature of the biosolids shall be 50 degrees Celsius or higher; the time period shall be 15 seconds or longer; and the temperature and time period shall be determined using equation (2).
- (III) When the percent solids of the biosolids are less than seven percent and the time period is at least 15 seconds, but less than 30 minutes, the temperature and time period shall be determined using equation (2).
- (IV) When the percent solids of the biosolids are less than seven percent; the temperature of the biosolids are 50 degrees Celsius or higher; and the time period is 30 minutes or longer, the temperature and time period shall be determined using Equation (2).

$$\text{Equation (2)} \quad D = \frac{50,070,000}{10^{0.1400t}}$$

Where,

D = time in days,  
t = temperature in degrees Celsius.

### **Class A—Alternative 2**

- (i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.
- (ii) (I) The pH of the biosolids that are applied to the land shall be raised to above 12 and shall remain above 12 for 72 hours.
- (II) The temperature of the biosolids shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the biosolids is above 12.

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- (III) At the end of the 72 hour period during which the pH of the biosolids are above 12, the biosolids shall be air dried to achieve a percent solids in the biosolids greater than 50 percent.

### **Class A—Alternative 3**

- (i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.
- (ii)
  - (I) The biosolids shall be analyzed prior to pathogen treatment to determine whether the biosolids contains enteric viruses.
  - (II) When the density of enteric viruses in the biosolids prior to pathogen treatment is less than one Plaque-Forming Unit per four grams of total solids (dry weight basis), the biosolids are Class A with respect to enteric viruses until the next monitoring episode for the biosolids.
  - (III) When the density of enteric viruses in the biosolids prior to pathogen treatment is equal to or greater than one Plaque-Forming Unit per four grams of total solids (dry weight basis), the biosolids are Class A with respect to enteric viruses when the density of enteric viruses in the biosolids after pathogen treatment is less than one Plaque-Forming Unit per four grams of total solids (dry weight basis) and when the values or ranges of values for the operating parameters for the pathogen treatment process that produces the biosolids that meets the enteric virus density requirement are documented.
  - (IV) After the enteric virus reduction in item III of this subpart is demonstrated for the pathogen treatment process, the biosolids continues to be Class A with respect to enteric viruses when the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented in item III of this subpart.
- (iii)
  - (I) The biosolids shall be analyzed prior to pathogen treatment to determine whether the biosolids contains viable helminth ova.
  - (II) When the density of viable helminth ova in the biosolids prior to pathogen treatment is less than one per four grams of total solids (dry weight basis), the biosolids are Class A with respect to viable helminth ova until the next monitoring episode for the biosolids.
  - (III) When the density of viable helminth ova in the biosolids prior to pathogen treatment is equal to or greater than one per four grams of total solids (dry weight basis), the biosolids are Class A with respect to viable helminth ova when the density of viable helminth ova in the biosolids after pathogen treatment is less than one per four grams of total solids (dry weight basis) and when the values or ranges of values for the operating parameters for the pathogen treatment process that produces



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the biosolids that meets the viable helminth ova density requirement are documented.

(IV) After the viable helminth ova reduction in item III of this subpart is demonstrated for the pathogen treatment process, the biosolids continues to be Class A with respect to viable helminth ova when the values for the pathogen treatment process operating parameters are consistent with the values or ranges of values documented item III of this subpart.

(iv) The use of Alternative 3 for Class A pathogen reduction requires prior, written approval from the State Biosolids Coordinator.

### **Class A—Alternative 4**

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

(ii) The density of enteric viruses in the biosolids shall be less than one Plaque-Forming Unit per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

(iii) The density of viable helminth ova in the biosolids shall be less than one per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

(iv) The use of Alternative 4 for Class A pathogen reduction requires prior, written approval from the State Biosolids Coordinator.

### **Class A—Alternative 5**

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of *Salmonella*, sp. bacteria in the biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

(ii) Biosolids that are applied to the land shall be treated in one of the [Processes to Further Reduce Pathogens](#).

### **Class A—Alternative 6**

(i) Either the density of fecal coliform in the biosolids shall be less than 1000 Most Probable Number per gram of total solids (dry weight basis), or the density of *Salmonella*, sp. bacteria in the biosolids shall be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the biosolids are applied to the land.

(ii) Biosolids that are applied or disposed shall be treated in a process that is equivalent to a [Process to Further Reduce Pathogens](#) as determined by EPA Region 4.

**The appropriate certification in Appendix D must be used.**

### **3.1.2.2. Class B Pathogen Requirements**

In order for biosolids to be designated Class B with respect to pathogens, they shall meet one of the three pathogen reduction alternatives for Class B found below.

The site restrictions in subsection 3.1.2.3. must be met when biosolids that meet Class B pathogen requirements are applied to the land.

#### **Pathogen reduction alternatives for Class B biosolids**

##### **Class B—Alternative 1**

- (i) Seven representative samples of the biosolids that are applied to the land shall be collected.
- (ii) The geometric mean of the density of fecal coliform in the samples collected in subpart (i) of this part shall be less than either 2,000,000 Most Probable Number per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

##### **Class B—Alternative 2**

Biosolids that are applied to the land shall be treated in one of the [Processes to Significantly Reduce Pathogens](#).

##### **Class B—Alternative 3**

Biosolids that are applied to the land shall be treated in a process that is equivalent to a [Process to Significantly Reduce Pathogens](#), as determined by USEPA.

**The appropriate certification in Appendix D must be used.**

### **3.1.2.3. Site Restrictions for Class B Biosolids**

If the biosolids are Class B with respect to pathogens, the permittee shall comply with all the site restrictions listed below:

- a) Food crops with harvested parts that touch the biosolids/soil mixture and are totally above the land surface shall not be harvested for 14 months after application.
- b) Food crops with harvested parts below the land surface shall not be harvested for 20 months after application if the biosolids remain on the land surface for four months or more prior to incorporation into the soil.
- c) Food crops with harvested parts below the land surface shall not be harvested for 38 months after application if the biosolids remain on the land surface for less than four months prior to incorporation into the soil.
- d) Other food crops and feed crops shall not be harvested from the land for 30 days after application.

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- e) Animals shall not be allowed to graze on the land for 30 days after application.
- f) Turf grown on land where biosolids are applied shall not be harvested for one year after application if the harvested turf is placed on either land with a high potential for public exposure or a lawn.
- g) Public access to land with a high potential for public exposure shall be restricted for one year after application.
- h) Public access to land with a low potential for public exposure shall be restricted for 30 days after application.

### **3.1.3. Vector Attraction Reduction Limitations for Land Application**

If non-EQ biosolids are land applied, they shall meet one of the following vector attraction reduction options:

- a) The mass of volatile solids in the biosolids shall be reduced by a minimum of 38 percent prior to land application.
- b) When the 38 percent volatile solids reduction requirement in the paragraph a) above cannot be met for anaerobically digested biosolids, vector attraction reduction can be demonstrated by digesting a portion of the previously digested biosolids anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. When at the end of the 40 days, the volatile solids in the biosolids at the beginning of that period are reduced by less than 17 percent, vector attraction reduction is achieved.
- c) When the 38 percent volatile solids reduction requirement in the paragraph a) above cannot be met for aerobically digested biosolids, vector attraction reduction can be demonstrated by digesting a portion of the previously digested biosolids that have a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. When at the end of the 30 days, the volatile solids in the biosolids at the beginning of that period are reduced by less than 15 percent, vector attraction reduction is achieved.
- d) The specific oxygen uptake rate (SOUR) for biosolids treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.
- e) Biosolids shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the biosolids shall be higher than 40 degrees Celsius and the average temperature of the biosolids shall be higher than 45 degrees Celsius.
- f) The pH of biosolids shall be raised to 12 or higher by the addition of alkaline material and, without the addition of more alkaline material, shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.
- g) The percent solids of biosolids that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials.

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- h) The percent solids of biosolids that contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials.
- i) The biosolids shall be injected below the surface of the land and no significant amount of biosolids shall be present on the land surface within one hour after the biosolids are injected. If the biosolids meet the Class A pathogen requirements, the biosolids shall be injected below the land surface within 8 hours after the biosolids are discharged from the pathogen reduction process.
- j) Non-EQ biosolids sludge applied to the land surface shall be incorporated into the soil within 6 hours after application to the land. Non-EQ biosolids that are incorporated into the soil and meets the Class A pathogen requirements shall be applied to or placed on the land within 8 hours after being discharged from the pathogen treatment process.

The appropriate certification in Appendix D must be used.

### **3.1.4. Self-Monitoring Requirements for Land Application**

At a minimum, upon the date of coverage under this permit, the permittee shall monitor biosolids related activities as specified below. The monitoring results shall be reported annually to the State Biosolids Coordinator. Samples or measurements shall be representative of the quantity and quality of the biosolids that are land applied.

- a) The permittee shall monitor the biosolids for the contaminants listed in subsection 3.1.1.2. See paragraph 3.1.4. (e) below for the minimum frequency of monitoring. The concentrations shall be reported as mg/kg (dry weight basis) and the average and maximum concentrations shall be reported. If the concentration of any contaminant in biosolids that are land applied exceeds the limitations in Table 3 (monthly average limitation) in subsection 3.1.1.2., the limitations in Table 2 must be used for each site where those biosolids are land applied. The permittee shall determine cumulative contaminant loadings for all of the contaminants listed in subsection 3.1.1.2. for each land application site where those biosolids were land applied. This must be done for each succeeding application of biosolids to that site, unless the concentrations of contaminants meet the limitations in Table 3.
- b) In the annual report, the permittee shall provide a brief description of the method used during the reporting year to meet the applicable pathogen requirements given in section 3.1.2. For Class B pathogen requirements met by fecal coliform densities and for Class A pathogen requirements, the permittee shall monitor the biosolids for the applicable pathogens. The results shall be reported in the units used in the limitations (e.g., fecal coliform, MPN/gram of total solids). For Class A pathogen requirements the samples shall be collected at approximately the time of the land application of biosolids. In addition, for Class A pathogen requirements, the permittee shall monitor the appropriate process parameters. For each sampling event for Class B pathogen requirements, a minimum of seven discrete samples shall be collected and analyzed separately for either fecal coliform or *Salmonella* sp. bacteria.
- c) In the annual report, the permittee shall provide a brief description of the method used to meet the applicable vector attraction reduction requirements given in section 3.1.3. If the vector attraction reduction requirements are met by a treatment process, the permittee shall monitor the appropriate process parameters in the treatment of the sewage sludge. If the facility produces biosolids that meet Class A pathogen requirements, the determination of meeting the vector attraction reduction requirements shall include the final sewage sludge treatment process involved. See paragraph (e) below for the minimum frequency of monitoring.

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- d) In the annual report, the permittee shall provide the average and maximum concentrations of ammonia (as N), total Kjeldahl nitrogen (TKN), organic nitrogen, nitrates (as N), and total solids (percent solids) of biosolids that were land applied during the reporting year. The nitrogen parameters shall be reported as percent (%) of total solids (dry weight basis). See paragraph (e) below for the minimum frequency of monitoring.
- e) The permittee shall monitor non-EQ biosolids for contaminant concentrations, pathogen densities, and vector attraction reduction requirements at least at the frequency listed below.

<b>Amount of biosolids *</b> (dry metric tons per calendar year)	<b>Frequency</b>
$0 < \text{Amount} < 290$	Once per year
$290 \leq \text{Amount} < 1,500$	Once per quarter (four times per year)
$1,500 \leq \text{Amount} < 15,000$	Once per 60 days (six times per year)
$\text{Amount} \geq 15,000$	Once per month (12 times per year)

\* Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a person who prepares biosolids that are sold or given away in a bag or other container for application to the land (dry weight basis).

- f) Sample collection, preservation and analysis shall be performed in a manner consistent with the requirements of methods most recently approved by USEPA found in 40 CFR Part 503 or 40 CFR Part 136 and/or other criteria specified in this permit.
- g) In the annual report, the permittee shall provide the total amount of non-EQ biosolids land applied during the reporting year at all application sites.
- h) In the annual report, the permittee shall provide the amount of non-EQ biosolids applied at each land application site.

### **3.2. Management Practices for the Land Application of Non-EQ Biosolids**

The permittee shall ensure that any land application site is operated and maintained in accordance with the requirements described in this subpart. The appropriate certification in Appendix D must be used.

#### **3.2.1. Water-Quality Setbacks**

The land application of non-EQ biosolids shall be conducted in a manner that will not cause a violation of any receiving water quality standard from discharges of surface runoff from the land application sites. Non-EQ biosolids shall not be land applied unless all of the following setbacks are met:

- a) 100 feet or more from surface waters of the state which are down gradient of the application site;
- b) 33 feet or more from surface waters of the state which are up gradient for the application site;
- c) 100 feet from all drinking water wells;
- d) 100 feet from all water supply reservoirs; and
- e) 100 feet from active sinkholes.

#### **3.2.2. Agronomic Rate for Nitrogen**

Application of biosolids shall be conducted in a manner that does not exceed the agronomic rate for available nitrogen of the crops grown on the site unless prior written approval is given by the State

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Biosolids Coordinator. The facility shall provide written notification to the applier of the biosolids of the concentration of total nitrogen (as N on a dry weight basis) in the biosolids.

For the purposes of determining the agronomic rate, the person applying biosolids shall comply with all five of the following:

1. Determine crop yields and crop nitrogen (N) requirements based upon Table 4. The average of the actual yields documented from the best three years during a 5-year cycle is typical and is recommended.

Table 4 – Crop Nitrogen Requirements

<b>CROP</b>	<b>EXPECTED YIELD</b>	<b>NITROGEN REQUIREMENT (lbs N per Acre per Year)</b>
Corn (grain)	100-125 bu/ac	120
	125-150 bu/ac	150
Corn (silage)	20 tons/ac	120-150
Bermuda grass	5-10 tons/ac	200
Soybeans(1)	30 bu/ac	100
	40 bu/ac	150
	50 bu/ac	190
Wheat	40 bu/ac	60
Summer Annual Grass	6 tons (1 cutting)*	60-120
Hybrid Hay	8 tons (4 cuttings)*	400(2)
Tall Fescue Hay	3 tons (2 cuttings)*	120
Orchard Grass Hay	4 tons (2 cuttings)*	60-120
Sorghum (grain)	60 bu/ac	60
Cotton	1 bale/ac	50
	1.5 bales/ac	90
Other (3)	(3)	(3)

\*When less than the indicated number of harvests is expected, the total nitrogen rate shall be reduced proportionally.

(1) Soybeans are a legume and can obtain 50% to 60% of their nitrogen needs from atmospheric nitrogen. The acceptable “nitrogen requirement” will vary and shall be approved by the State Biosolids Coordinator.

(2) Highly dependent on field conditions and harvesting schedule.

(3) Any recommendation from the [University of Tennessee Extension](#) and/or approved by the State Biosolids Coordinator.

2. The volatilization factors (Kv) in Table 5 shall be used:

Table 5 – Biosolids Volatization Factors (Kv)

<b>Biosolids form and application method</b>	<b>Kv</b>
Liquid and surface applied	0.50
Liquid and injected into the soil	1.00
Dewatered and applied in any manner	0.50

3. The Mineralization Rates in Table 6 shall be used in calculating the agronomic rate:

Table 6 – Mineralization Rates for various sewage sludge processes

<b>PROCESS</b>	<b>Fraction of Organic Nitrogen Mineralized (Fm)</b>
None (Unstabilized)	0.40
Alkaline Stabilization	0.30
Aerobic Digestion	0.30
Anaerobic Digestion	0.20
Composting	0.10

The mineralization rates in Table 6 shall be used unless actual mineralization rates have been established with proper documentation and approved by the State Biosolids Coordinator.

4. Follow the example procedures for determining plant available nitrogen (PAN) as shown in Appendix E of this general permit and apply the whole biosolids application rate that provides no more than the amount of nitrogen required by the crop or crops to be grown unless otherwise specified by the State Biosolids Coordinator.
5. In cases where the biosolids have substantial liming value, the agronomic rate shall be the lesser of the whole biosolids application rate that provides crop nitrogen needs or required liming equivalent necessary to raise the soil pH to the value most conducive for productivity of the crop(s) to be grown. Since moderately alkaline soil ranges from 7.9 to 8.4, the upper limit for soil pH is 8.4.

**3.2.3. Weather-Related Restrictions**

Application of biosolids to flooded, frozen, ice-covered, or snow covered sites is prohibited. When weather and or soil conditions prevent adherence to the biosolids application procedure, biosolids shall not be applied on the site.

**3.2.4. Restrictive Site Conditions**

Biosolids shall not be applied to any site area with standing surface water or if the annual high groundwater level is known or suspected to reach the surface of the land application site as determined by the department.

Biosolids should not be land applied in any manner so that the bulk biosolids enter a wetland or other waters of the State of Tennessee.

Liquid biosolids with a percent solids content less than 17% shall not be applied to slopes exceeding 8%; except where they will be injected or incorporated into the soil, and then slopes up to 15% are acceptable. Biosolids with a percent solids of 17% or greater can be applied on slopes up to 15%.

**3.2.5. Threatened and Endangered Species**

The biosolids or the application of the biosolids shall not cause or contribute to the harm of a threatened or endangered species or result in the destruction or adverse modification of critical habitat of a threatened or endangered species after application.

### **3.2.6. Notification to Land Owners**

The permittee shall provide notice and necessary information (contaminant and nitrogen concentrations, pathogen reduction method and/or level, and vector attraction reduction method and/or level) to the person who land applies the biosolids and the owner or lease holder of the land on which the biosolids are applied.

### **3.3. Storage of non-EQ Biosolids Prior to Land Application**

Long term field storage of biosolids prior to land application is not advisable. If non-EQ biosolids must be field stored, they shall be staged in a manner to prevent runoff or leachate from the designated storage area.

### **3.4. Recordkeeping for Land Application**

#### **3.4.1. Contents of the Annual Report**

In the annual report, the permittee shall provide the following information:

- a) Site Name
- b) Site Owner
- c) Site Operator
- d) Applier
- e) Latitude and Longitude of Site
- f) Street address, other location description
- g) Size (acres)
- h) Crop
- i) Application Rate (tons/acre) and, if applicable, the cumulative loadings for each contaminant.
- j) The concentration of each contaminant listed in subsection 3.1.1.2.
- k) The analytical results for PCBs and TCLP that are less than five years old.
- l) A description of how the pathogen reduction requirements in section 3.1.2. are met
- m) A description of how the vector attraction reduction requirements in section 3.1.3. are met
- n) Average and maximum concentrations of ammonia (as N), total Kjeldahl nitrogen (TKN), organic nitrogen, nitrates (as N), and total solids (percent solids) of biosolids that were land applied during the reporting year in accordance with section 3.1.4.(d).
- o) The appropriate certification statement(s) contained in Appendix D

The permittee is required to keep the above information indefinitely for each site subject to the cumulative contaminant loading rate of Table 2. For other sites the information shall be retained for five years.

#### **3.4.2. Permittee Recordkeeping Requirements**

The permittee is required to keep the following information in a document that contains the appropriate signed certification statement(s) in item (h) for at least 5 years:

- a) Concentration of each contaminant in Table 3 (subsection 3.1.1.2.).
- b) PCBs and TCLP analytical results that are less than five years old.
- c) A description of how the pathogen requirements in section 3.1.2. were met and the results of any monitoring.
- d) A description of how the vector attraction reduction requirements in section 3.1.3. were met and the results of any monitoring.



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- e) A description of how the management practices in subpart 3.2. were met (if necessary) and the results of any monitoring.
- f) A description of how the site restrictions in subsection 3.1.2.3. were met (if necessary).
- g) The results of any other monitoring required under section 3.1.4. (Self-Monitoring Requirements for Land Application).
- h) All of the appropriate and applicable certification statement(s) that have been signed in accordance with the requirements of subpart 6.7. found in Appendix D.

### **3.4.3. Monitoring Information Records**

Records of monitoring information shall include:

- a) The date, exact place, and time of sampling or measurements;
- b) The initials or name(s) of the individual(s) who performed the sampling or measurements;
- c) The date(s) analyses were performed;
- d) The time(s) analyses were initiated;
- e) The initials or name(s) of individual(s) who performed the analyses;
- f) References and written procedures, when available, for the analytical techniques or methods used; and,
- g) The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.
- h) The records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit and records of all data used to complete the application.

## **4. MONITORING, RECORDING AND REPORTING REQUIREMENTS**

### **4.1. Representative Sampling**

Biosolids samples used to measure compliance with part 4. of this general permit shall be representative of the quality of biosolids generated and/or treated at the operation covered by this permit.

### **4.2. Monitoring Procedures**

Monitoring shall be conducted according to subparts 3.1. and 4.1.

### **4.3. Reporting of Monitoring Results and Other Information**

By no later than February 19 of each year, the permittee shall submit a report including all information that the permit requires be recorded during the previous calendar year. (This includes, but is not limited to, items listed under Recordkeeping requirements for the permittee's land application practices in subpart 4.4.). The report shall include the results of all monitoring performed and the required information on pathogen requirements, vector attraction reduction requirements, management practices, land application sites, site restrictions, and the required signed certification statements. If no biosolids were land applied during the reporting period, "*no biosolids were land applied*" shall be reported in a signed letter to the State Biosolids Coordinator.

The EPA or the State of Tennessee presently does not have a standard form for reporting biosolids monitoring results or other information required by the permit to be reported. Unless otherwise approved by the State Biosolids Coordinator, the permittee shall submit the required information on letter size (8.5" x 11") paper. Monitoring results may be reported in the testing laboratory's normal format, and may be photocopies of the laboratory reports. We accept and encourage submittal of electronic documents.

Legible copies of all documents required herein, shall be signed and certified in accordance with the Signatory Requirements (see subpart 6.7.), and submitted to the State Biosolids Coordinator at the following address:

**DIVISION OF WATER RESOURCES**  
**Attn: Biosolids Annual Report**  
**WILLIAM R. SNODGRASS - 11<sup>th</sup> FLOOR**  
**312 ROSA L. PARKS AVENUE**  
**NASHVILLE, TN 37243**

#### **4.4. Additional Monitoring by the Permittee**

If the permittee monitors any contaminant more frequently than required by this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the annual report required in subpart 4.3. above. Such increased frequency shall also be indicated.

#### **4.5. Twenty-four Hour Notice of Noncompliance Reporting**

The permittee shall report any noncompliance with the provisions of this permit, including transportation accidents, spills, and uncontrolled runoff from non-EQ biosolids transfer sites, storage sites, or land application sites, etc., which may seriously endanger health or the environment, as soon as possible, but no later than 24 hours from the time the permittee first became aware of the circumstances. The report shall be made to the appropriate [Environmental Field Office](#) staff of the Division of Water Resources.

#### **4.6. Inspection and Entry**

The permittee shall allow the director, or authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

- a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, including, but not limited to, sewage sludge and biosolids treatment, collection, storage facilities or area, transport vehicles and containers, and land application sites; and,
- d) Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location, including, but not limited to, digested sewage sludge before dewatering, dewatered sewage sludge, sewage sludge and biosolids transfer or staging areas, any ground or surface waters at the land application sites, or sewage sludges and biosolids, soils, or vegetation at the land application sites.
- e) The permittee shall make the necessary arrangements with the land application site landowner or leaseholder to obtain permission or clearance, so that the Director, or authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, will be permitted to enter without delay for the purposes of performing their responsibilities.

## **5. COMPLIANCE RESPONSIBILITIES**

### **5.1. Duty to Comply**

The permittee must comply with all conditions of this permit. Any permit noncompliance is grounds for enforcement action; for permit termination, revocation and reissuance, or modification, or denial of a permit renewal application.

### **5.2. Need to Halt or Reduce Activity not a Defense**

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

### **5.3. Duty to Mitigate**

The permittee shall take all reasonable steps to minimize or prevent any discharge or biosolids use in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

### **5.4. Proper Operation and Maintenance**

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related equipment), including but not limited to all treatment, transportation, and application equipment which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

#### **5.4.1. Biosolids Transportation**

- a) Liquid biosolids shall be transported in sealed, watertight containers.
- b) Tracking of biosolids or sewage sludge onto public roadways is prohibited.
- c) The nearest Environmental Field Office shall be notified by telephone of any spill within 24 hours of occurrence.

## **6. STANDARD PERMIT CONDITIONS**

### **6.1. Planned Changes**

The permittee shall give notice to the State Biosolids Coordinator as soon as possible of any planned physical alterations or additions to the permitted facility or activity. Notice is required only when:

- a) The alteration or addition could significantly change the nature or increase the quantity of contaminant that is land applied. This notification applies to contaminants which are not subject to limitations in the permit; or
- b) The alteration or addition results in a significant change in the permittee's biosolids land application practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit. This includes notification of additional land application sites not reported during the permit application process or not reported pursuant to an approved land application plan.

## **6.2. Anticipated Noncompliance**

The permittee shall give advance notice to the State Biosolids Coordinator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

## **6.3. Permit Actions**

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

## **6.4. Continuing Coverage**

This permit expires five years after the effective date. All permitted facilities shall submit a notice of intent to continue coverage at least 180 days prior to the expiration date of this permit.

When a facility has submitted a timely and sufficient notice of intent, coverage under an expiring permit remains in effect and enforceable until any of the following occur:

1. The notice of intent has been denied and time for any appeal has expired; or
2. A replacement general permit has been issued by the Division and time for any appeal has expired

Coverage under the permit for permittees who fail to submit a timely and sufficient notice of intent shall cease on the expiration date of this permit.

## **6.5. Duty to Provide Information**

The permittee shall furnish to the State Biosolids Coordinator, within a reasonable time, any information which the State Biosolids Coordinator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the State Biosolids Coordinator or field office staff representative, upon request, copies of records required to be kept by this permit.

## **6.6. Other Information**

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the State Biosolids Coordinator, it shall promptly submit such facts or information.

## **6.7. Signatory Requirements**

All applications, reports or information submitted to the State Biosolids Coordinator shall be signed and certified.

All permit applications shall be signed by either a principal executive officer or ranking elected official.

All reports required by the permit and other information requested by the State Biosolids Coordinator shall be signed by a person described above or by a duly authorized representative of that person.

### **6.7.1. Duly Authorized Representative**

A person is a duly authorized representative only if:

- a) The authorization is made in writing by a person described above and submitted to the State Biosolids Coordinator; and
- b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

### **6.7.2. Changes to Authorization**

If an authorization under section 6.7.1. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of section 6.7.1. must be submitted to the State Biosolids Coordinator prior to or together with any reports, information, or applications to be signed by an authorized representative.

### **6.8. Penalties for Falsification of Reports**

Any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

### **6.9. Availability of Reports**

Except for data determined to be confidential, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State Biosolids Coordinator. Permit applications, permits and all data necessary to determine compliance with the permit conditions shall not be considered confidential.

### **6.10. Property Rights**

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges. Additionally, it does not authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

### **6.11. Severability**

The provisions of this permit are severable, and if any provision of this permit (or the application of any provision of this permit to any circumstance) is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

### **6.12. Transfers**

This permit may be automatically transferred to a new permittee if:

- a) The current permittee notifies the State Biosolids Coordinator at least 30 days in advance of the proposed transfer date;

- b) The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and
- c) The director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph b) above.

### **6.13. State Laws**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law.

### **6.14. Reopener Provision**

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate biosolids limitations (and compliance schedule, if necessary), or other appropriate requirements if, among other things, any applicable standards for biosolids land application have been promulgated under section 405(d) of the CWA and/or Chapter 0400-40-15 which are more stringent than the requirements in this permit or not covered by this permit.

## **7. DEFINITIONS**

*Agronomic rate* is the lesser of the whole biosolids application rate (dry weight basis) designed to:

- a) Provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and
- b) Minimize the amount of nitrogen in the biosolids that passes below the root zone of the crop or vegetation grown on the land to the ground water.

*Animals* for the purposes of this permit means domestic livestock.

*Annual contaminant loading rate* is the maximum amount of a contaminant that can be applied to a unit area of land during any calendar year. The units may be in terms of “pounds per acre”, “kilograms per hectare” etc. (i.e., weight per unit area)

*Annual whole biosolids application rate* is the maximum amount of biosolids (dry weight basis) that can be applied to a unit area of land during any calendar year.

*Active Sinkhole* is one with fresh exposure, sloughing of soil into the sinkhole throat, wilted or leaning vegetation around the sinkhole, or an open surface hole measuring three (3) feet deep or deeper.

*Agricultural land* is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

*Apply biosolids* or biosolids applied to the land means land application of biosolids.

*Application site* or land application site means all contiguous areas of a users' property intended for biosolids application.

*Base flood* is a flood that has a one percent chance of occurring in any given year (i.e., a flood with a magnitude equaled once in 100 years).

## General SOP for the Land Application of Non-EQ Biosolids

*Batch* is when a pile of biosolids is created, allowed to treat for a specific period of time and then removed from the site. A batch of biosolids could be compost piles or long-term treatment piles.

*Beneficial use of biosolids* means the application of biosolids to the land for the purposes of improving soil characteristics including tilth, fertility, and stability to enhance the growth of vegetation consistent with protecting human health and the environment.

*Biosolids* are treated sewage sludge that have contaminant concentrations less than or equal to the contaminant concentrations listed in Tables 1 and 3 of Part 3.1.1.2., meet any one of the ten vector attraction reduction options listed in Part 3.1.3., and meet either one of the six pathogen reduction alternatives for Class A listed in Part 3.1.2.1. or one of the three pathogen reduction alternatives for Class B listed in Part 3.1.2.2.

*Bulk biosolids* means biosolids that are not sold or given away in a bag or other container for application to the land (i.e., biosolids that are not put in packages, bags, or other containers for sale, but are sold, given away, applied to the land, or disposed of in larger quantities).

*Ceiling concentration* means the maximum concentration of a contaminant in any biosolids sample, beyond which level the biosolids would be classified as sewage sludge not suitable for application to the land. Ceiling concentrations are established in Table 1 of Part 3.1.1.3.

*Commissioner* means the Commissioner of the Tennessee Department of Environment and Conservation.

*Composting* means the biological degradation of organic material under controlled conditions designed to promote aerobic decomposition. This does not include the treatment of sewage sludge in a digester at a wastewater treatment plant.

*Contaminant* means an organic substance, an inorganic substance, a combination of organic and inorganic substances that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could, based upon information available to the Commissioner, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms, depending upon the concentration

*Contaminant limit* is a numerical value that describes the amount of a contaminant allowed per unit amount of biosolids (e.g., milligrams per kilogram of total solids); the amount of a contaminant that can be applied to a unit area of land (e.g., kilograms per hectare); or the volume of a material that can be applied to a unit area of land (e.g., gallons per acre).

*Composite biosolids* (or sewage sludge) sample is a sample taken either in a wastewater treatment process, dewatering facility, or application device consisting of a series of individual grab samples. For liquid biosolids or sewage sludge, a minimum of three grab samples of 500 milliliters taken during the first one-third, second one-third and final one-third of a pumping cycle and combined in equal volumetric amounts. For semi-dewatered, dewatered or dried biosolids or sewage sludge, a composite sample consisting of a minimum of three grab samples of 0.5 pounds taken over a period of 24 hours not less than two hours apart or another representative sample as defined or approved by the State Biosolids Coordinator.

*Cover crop* is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

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*Cumulative contaminant loading rate* is the maximum amount of a contaminant that can be applied to an area of land from biosolids that exceed the contaminant concentration limits established in Table 3 of Part 3.1.1.3.

*CWA means* the Clean Water Act (formerly referred to as either the Federal Water Pollution Act or the Federal Water Pollution Control Act Amendments of 1972), Public Law 92–500, as amended by Public Law 95–217, Public Law 95–576, Public Law 96–483, Public Law 97–117, and Public Law 100–4.

*Daily Maximum* (Daily Max.) is the maximum measured value for a contaminant discharged during a calendar day or any 24-hour period that reasonably represents a calendar day for purposes of sampling. For contaminants with daily maximum limitations expressed in units of mass (e.g., kilograms, pounds), the daily maximum is calculated as the total mass of contaminant discharged over the calendar day or representative 24-hour period. For contaminants with limitations expressed in other units of measurement (e.g., milligrams/liter, parts per billion), the daily maximum is calculated as the average of all measurements of the contaminant over the calendar day or representative 24-hour period. If only one measurement or sample is taken during a calendar day or representative 24-hour period, the single measured value for a contaminant will be considered the daily maximum measurement for that calendar day or representative 24-hour period.

*Department* means the Department of Environment and Conservation for the State of Tennessee.

*Director* means the Director of the Division of Water Resources or his or her authorized representative.

*Division* means the Division of Water Resources.

*Domestic septage* is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater nor does it include grease removed from a grease trap at a restaurant.

*Domestic sewage* is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

*Dry weight basis* means calculated on the basis of having been dried at 103-105 degrees Celsius until reaching a constant mass (i.e., essentially 100 percent solids content).

*Exceptional Quality Biosolids* or *EQ biosolids* are biosolids that meet the ceiling concentrations in Table 1 of Part 3.1.1.3. and the contaminant concentrations in Table 3 of Part 3.1.1.3., one of the six Class A pathogen reduction alternatives listed in Part 3.1.2.1.; and one of the eight vector attraction reduction options listed in Part 3.1.3.1. through Part 3.1.3.8.

*EPA* means the United States Environmental Protection Agency.

*Facility* means a treatment works treating domestic sewage as defined in this chapter, unless the context of the rule requires otherwise. For the purposes of this chapter a facility is considered to be new if it has not been previously approved for the treatment, storage, application, or disposal of biosolids.

*Feed crops* are crops produced primarily for consumption by animals.

*Fiber crops* are crops such as flax and cotton.



## General SOP for the Land Application of Non-EQ Biosolids

*Flood Plain* is the nearly level plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

*Food crops* are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

*General permit* means a permit issued by the Division in accordance with the procedures established in this chapter that authorizes the application of biosolids to the land under which multiple treatment works treating domestic sewage may apply for coverage.

*Geometric mean* means the antilogarithm of the arithmetic average of the logarithms of the sample values, or the nth root of the product of n sample values.

*Grit and screenings* are sand, gravel, cinders, other materials with a high specific gravity and relatively large materials such as rags generated during preliminary treatment of domestic sewage at a treatment works. (Note: The disposal of grit and screenings are not regulated under this permit. They should be disposed of in accordance with applicable State and local regulations.)

*Ground water* is water below the land surface in the saturated zone.

*Ha* means hectares. One hectare equals 2.47 acres.

*High potential for public contact site* is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

*Individual permit* means a permit issued by the Division to a single treatment works treating domestic sewage in accordance with this chapter, which authorizes the management of biosolids.

*Industrial wastewater* is wastewater generated in a commercial or industrial process.

*Instantaneous measurement*, for monitoring requirements, is defined as a single reading, observation, or measurement.

*Land application* is the application of biosolids to the land surface by means such as spreading or spraying, the injection of biosolids below the land surface, or the incorporation of biosolids into the soil, for the purpose of beneficial use.

*Liquid Sewage Sludge* or *Liquid Biosolids* means a sewage sludge or biosolids having a dry weight solids content less than or equal to 8% of the total weight of the sewage sludge or biosolids.

*Long-term treatment* is the process where Class B biosolids is treated in batch piles over a minimum of two summers in order to achieve a Class A biosolids with respect to pathogens.

*Low potential for public contact site* is land with a low potential for contact by the public. This includes, but is not limited to, farms, ranches, reclamation areas, and other lands which are private lands, restricted public lands, or lands which are not generally accessible to or used by the public.

*Material derived from biosolids* is biosolids to which any substance has been added.

*Material derived from sewage sludge* is sewage sludge to which any substance has been added.

*Monthly average* is the arithmetic mean of all measurements taken during the month.

## General SOP for the Land Application of Non-EQ Biosolids

*Municipality* means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal Agency of two or more of the foregoing entities) created by or under State law; or a designated and approved management Agency under section 208 of the CWA, as amended. The definition includes a special district created under State law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201(e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use, application, or disposal of biosolids and sewage sludge.

*Municipal solid waste landfill (MSWLF) unit* means a discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR Part 257.2. A MSWLF unit also may receive other types of RCRA subtitle D wastes, such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste and industrial solid waste. Such a landfill may be publicly or privately owned. A MSWLF unit may be a new MSWLF unit, and existing MSWLF unit or a lateral expansion.

*Other container* is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

*Owner* means any person with ownership interest in a site or facility, or who exercises control over a site or facility, but does not include a person who, without participating in management of the site or facility, holds indicia of ownership primarily to protect the person's security interest.

*Paint filter test* is a test (SW 9095) where a predetermined amount of sewage sludge or biosolids are placed in a paint filter. If any portion of the material passes through the filter in a five minute test period, the material is deemed to contain free liquids.

*Pasture* is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

*Pathogen* means an organism that is capable of producing an infection or disease in a susceptible host.

*Permit* means an authorization, license, or equivalent control document issued by the Division to implement the requirements of this chapter. Unless the context requires differently, the use of the term in this chapter refers to individual permits, general permits, and coverage under general permits.

*Person* is an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

*Person who prepares biosolids* is either the person who generates biosolids during the treatment of domestic sewage in a treatment works or the person who derives a material from biosolids.

*PFRP* means Processes to Further Reduce Pathogens, as described in detail in Appendix C, using composting, heat drying, heat treatment, thermophilic aerobic digestion, irradiation or pasteurization.

*PSRP* means Processes to Significantly Reduce Pathogens, as described in detail in Appendix B and consists of aerobic digestion, air drying, anaerobic digestion, composting, or lime stabilization.

*Public contact site* is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

*Publicly owned treatment works (POTW)* means a treatment works treating domestic sewage that is owned by a municipality, public utility, the State of Tennessee, or the federal government.

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*Range land* is generally open, uncultivated land dominated by herbaceous or shrubby vegetation that may be used for grazing or browsing, either by wildlife or livestock.

*Reclamation site* is drastically disturbed land that is reclaimed using biosolids. This includes, but is not limited to, strip mines and construction sites.

*Restrict public access* means to minimize access of nonessential personnel to land where biosolids are applied, through the use of natural or artificial barriers, signs, remoteness, or other means.

*Runoff* is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off of the land surface.

*Sewage sludge* is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

*Site* means all areas of land, including buffer areas, which are identified in the scope of an approved site specific land application plan. A site is considered to be new or expanded when biosolids are applied to an area not approved in a site specific land application plan or that was not previously disclosed during a required public notice process.

*Specific oxygen uptake rate (SOUR)* is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in the sewage sludge.

*State* is the State of Tennessee

*State Biosolids Coordinator* is the person designated by the Commissioner to be in responsible charge of the State of Tennessee's Biosolids program.

*Store or storage of biosolids or sewage sludge* is the placement of biosolids or sewage sludge on land on which it remains for 2 years or less. This does not include the placement of biosolids or sewage sludge on land for treatment.

*Stover* is the non-grain, above-ground part of a grain crop, often corn or sorghum.

*Surface disposal of biosolids* is the disposal of biosolids on land in such a manner that does not meet the definition of the beneficial use of biosolids.

*Surface disposal of sewage sludge* is the disposal of sewage in accordance with the requirements of 40 CFR Part 503-Subpart C.

*Surface impoundment* means a facility or part of a facility which is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials (although it may be lined with man-made materials), and which is designed to hold an accumulation of liquids or sludges. The term includes holding, storage, settling, and aeration pits, ponds, or lagoons, but does not include injection wells.

*Tank* means a stationary device designed to contain an accumulation of liquid or semisolid materials and which is constructed primarily of non-earthen materials to provide structural support.

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*Temporary, small-scale storage* is the storage of biosolids or sewage sludge for no more than 30 days in a tank holding no more than 10,000 gallons with a total on-site maximum volume of no more than 20,000 gallons.

*Total solids* are the materials in the sewage sludge or biosolids that remain as residue if the sewage sludge or biosolids are dried at 103 to 105 degrees Celsius.

*Toxicity characteristic leaching procedure* (TCLP) is the test method, Method 1311 (1992 or latest version) of Test Methods for Evaluating Solid Wastes (EPA Publication SW-846), Volume 1C: Laboratory Manual, Physical/Chemical Methods) used to determine the mobility of both organic and inorganic contaminants present in liquid, solid and multiphase wastes.

*Treat or treatment of sewage sludge or biosolids* is the preparation of sewage sludge or biosolids for final land application. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge or biosolids. This does not include storage of either sewage sludge or biosolids.

*Treatment works* is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

*Treatment works treating domestic sewage* means a publicly owned treatment works or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership, used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, sewage sludge, or biosolids, including land dedicated for the disposal of sewage sludge or biosolids.

*Unstabilized solids* are organic materials in sewage sludge or biosolids that have not been treated in either an aerobic or anaerobic treatment process.

*Upset* means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

*Vector attraction* is the characteristic of sewage sludge or biosolids that attracts rodents, flies, mosquitoes or other organisms capable of transporting infectious agents.

*Volatile solids* is the amount of the total solids in sewage sludge or biosolids lost when the sewage sludge or biosolids are combusted at 550 degrees Celsius for 15-20 minutes in the presence of excess air.

*Waters of the State* are any and all water, public or private, on or beneath the surface of the ground, that are contained within, flow through, or border upon Tennessee or any portion thereof, except those bodies of water confined to and retained within the limits of private property in single ownership that do not combine or effect a junction with natural surface or underground waters.

*Wetlands* means those areas that are inundated or saturated by surface water or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

**Appendix A – Notice of Intent (NOI)**

(next page)



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**E. VECTOR ATTRACTION REDUCTION LEVEL ACHIEVED:** Indicate the option used to achieve the vector attraction reduction.

- Option 1**       **Option 2**       **Option 3**       **Option 4**  
 **Option 5**       **Option 6**       **Option 7**       **Option 8**

If one of the vector attraction reduction Options 1 - 5 is selected, do the biosolids meet Class A pathogen reduction requirements prior to or at the same time as meeting the vector attraction reduction requirements?

- Yes**       **No**

Provide a detailed description of the vector attraction reduction treatment process. Attach laboratory analytical and/or process monitoring results, as appropriate, that demonstrate vector attraction reduction is being achieved:

**F.** If one of the vector attraction reduction Options 1 - 8 above was not performed, indicate how the vector attraction reduction will be performed on the field as part of the land application process:

- Option 9 (Subsurface Injection)**       **Option 10 (Incorporation)**

**G. SAMPLING PLAN:** Include a detailed copy of the biosolids sampling plan as specified in the instructions. The sampling plan must address sampling protocols for contaminants, pathogen reduction, and vector attraction reduction quality criteria.

**H. CERTIFICATION:** I certify under penalty of law that contaminant concentrations in the biosolids, pathogen reduction, vector attraction reduction, and other quality criteria of the biosolids stated in the regulations have been met or, if appropriate, will be met prior to land application of biosolids. I further certify that other information in this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my own knowledge as well as the inquiry of the person(s) who manage the system, or those directly responsible for gathering the information, the information submitted, to the best of my knowledge and belief, is true, accurate and complete. I further acknowledge that the facility or generator of biosolids described above is eligible for coverage under TDEC's General Permit for the Land Application of Biosolids. I am aware that there are significant penalties for submitting false information, including possibility of fines and imprisonment for knowing violations.

**Name:** \_\_\_\_\_ **Title:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Telephone:** ( ) \_\_\_\_\_ - \_\_\_\_\_ **Date Signed:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**NOTE:** In evaluating NOI forms, TDEC may request additional information to complete its review to determine the eligibility for coverage under TDEC's General Permit.

**Appendix B: Processes To Significantly Reduce Pathogens (PSRP)**

1. Aerobic digestion—Sewage sludge or biosolids are agitated with air or oxygen to maintain aerobic conditions for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 40 days at 20 degrees Celsius and 60 days at 15 degrees Celsius.
2. Air drying—Sewage sludge or biosolids are dried on sand beds or on paved or unpaved basins. The sewage sludge or biosolids dry for a minimum of three months. During two of the three months, the ambient average daily temperature is above zero degrees Celsius.
3. Anaerobic digestion—Sewage sludge or biosolids are treated in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 15 days at 35 to 55 degrees Celsius and 60 days at 20 degrees Celsius.
4. Composting—Using either the within-vessel, static aerated pile, or windrow composting methods, the temperature of the sewage sludge or biosolids is raised to 40 degrees Celsius or higher and remains at 40 degrees Celsius or higher for five days. For four hours during the five days, the temperature in the compost pile exceeds 55 degrees Celsius. Passively aerated static pile composting is not an acceptable PSRP.
5. Lime stabilization—Sufficient lime is added to the sewage sludge or biosolids to raise the pH of the sewage sludge or biosolids to 12 after two hours of contact.



**Appendix C: Processes to Further Reduce Pathogens (PFRP)**

1. Composting—Using either the within-vessel composting method or the static aerated pile composting method, the temperature of the sewage sludge or biosolids is maintained at 55 degrees Celsius or higher for three days. Passively aerated static pile composting is not an acceptable PFRP.

Using the windrow composting method, the temperature of the sewage sludge or biosolids is maintained at 55 degrees or higher for 15 days or longer. During the period when the compost is maintained at 55 degrees or higher, there shall be a minimum of five turnings of the windrow.

2. Heat drying—Sewage sludge or biosolids are dried by direct or indirect contact with hot gases to reduce the moisture content of the sewage sludge or biosolids to 10 percent or lower. Either the temperature of the biosolids particles exceeds 80 degrees Celsius or the wet bulb temperature of the gas in contact with the biosolids as the biosolids leaves the dryer exceeds 80 degrees Celsius.
3. Heat treatment—Liquid sewage sludge or biosolids are heated to a temperature of 180 degrees Celsius or higher for 30 minutes.
4. Thermophilic aerobic digestion—Liquid sewage sludge or biosolids are agitated with air or oxygen to maintain aerobic conditions and the mean cell residence time of the sewage sludge or biosolids is 10 days at 55 to 60 degrees Celsius.
5. Beta ray irradiation—Sewage sludge or biosolids are irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad at room temperature (ca. 20 degrees Celsius).
6. Gamma ray irradiation—Sewage sludge or biosolids are irradiated with gamma rays from certain isotopes, such as <sup>60</sup> Cobalt and <sup>137</sup> Cesium, at dosages of at least 1.0 megarad at room temperature (ca. 20 °Celsius).
7. Pasteurization—The temperature of the sewage sludge or biosolids is maintained at 70 degrees Celsius or higher for 30 minutes or longer.

## Appendix D: Certification Statements

### Certification Statement 1

“I certify, under penalty of law, that the information that will be used to determine compliance with the Class A pathogen requirements in Part 3.1.2.1. and the vector attraction reduction requirement in [insert one of the vector attraction reduction requirements in Section 3.1.3. (a) through (h)] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”

### Certification Statement 2

*“I certify, under penalty of law, that the information that will be used to determine compliance with the Class A pathogen requirements in Part 3.1.2.1.1. was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 3

*“I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in Section 3.2. and the vector attraction reduction requirement in [insert either Section 3.1.3. (i) or (j)] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 4

*“I certify, under penalty of law, that the information that will be used to determine compliance with the Class B pathogen requirements in Part 3.1.2.2. and the vector attraction reduction requirement in [insert one of the vector attraction reduction requirements in Section 3.1.3. (a) through (h) if one of those requirements is met] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 5

*“I certify, under penalty of law, that the information that will be used to determine compliance with the management practices in Section 3.2., the site restrictions in Subsection 3.1.2.3., and the vector attraction reduction requirement in [insert either Section 3.1.3. (i) or (j) if one of those requirements is met] was prepared for each site on which bulk biosolids are applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

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### Certification Statement 6

*“I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements in [insert either Part 3.1.2.1. or Part 3.1.2.2.] and the vector attraction reduction requirement in [insert one of the vector attraction reduction requirements in Section 3.1.3. (a) through (h) if one of those requirements is met] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 7

*“I certify, under penalty of law, that the information that will be used to determine compliance with the requirement to obtain information in Subsection 3.1.1.1. was prepared for each site on which bulk biosolids were applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 8

*“I certify, under penalty of law that the information that will be used to determine compliance with the management practices in Section 3.2. was prepared for each site on which bulk biosolids were applied under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 9

*“I certify, under penalty of law, that the information that will be used to determine compliance with the site restrictions in Subsection 3.1.2.3. for each site on which Class B biosolids were applied was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 10

*“I certify, under penalty of law, that the information that will be used to determine compliance with the vector attraction reduction requirement in [insert either Section 3.1.3. (i) or (j)] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

### Certification Statement 11

*“I certify, under penalty of law, that the information that will be used to determine compliance with the management practice in Section 3.2., the Class A pathogen requirement in Part 3.1.2.1., and the vector attraction reduction requirement in [insert one of the vector attraction reduction requirements in Section 3.1.3. (a) through (h)] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”*

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**Appendix E: Example of Agronomic Rate Calculation**

Determine how many tons per acre of aerobically digested biosolids can be applied as dewatered cake to a hayfield (Tall Fescue) expected to yield 3 tons per acre in 2 cuttings, based upon following biosolids analysis:

Biosolids Analysis	DRY WT	Units
Total Kjeldahl Nitrogen (TKN)	47,000	mg/kg
Ammonium nitrogen, (NH <sub>4</sub> -H)	<650	mg/kg
Nitrate plus Nitrite Nitrogen, (NO <sub>3</sub> -N + NO <sub>2</sub> -N)	22,000	mg/kg

Crop Type Tall Fescue Hay (See Table 4)  lb N/acre/year

To convert milligram per kilogram to pounds per ton multiply by 0.002.

	Calculated	Units
<b>1. Available nitrogen from biosolids</b>		
a. Total Kjeldahl Nitrogen (TKN) (TKN(mg/kg) x 0.002)	47,000 x 0.002 = <input type="text" value="94"/>	lbs/ton
b. Ammonium nitrogen (NH <sub>4</sub> -N) (NH <sub>4</sub> -N (mg/kg) x 0.002)	<650 x 0.002 = <input type="text" value="&lt;1.3"/>	lbs/ton
c. Nitrate plus Nitrite nitrogen (NO <sub>3</sub> -N + NO <sub>2</sub> -N) (NO <sub>3</sub> -N + NO <sub>2</sub> -N mg/kg x 0.002)	22,000 x 0.002 = <input type="text" value="44"/>	lbs/ton
d. Total available inorganic nitrogen. (1b x Kv) plus 1c	<input type="text" value="&lt;1.3 x 0.5"/> + 44 =	lbs/ton
Obtain Kv from Table 5	<input type="text" value="0.5"/>	
e. Organic nitrogen in biosolids. (Subtract 1b from 1a.)	94 - 1.3 = <input type="text" value="93"/>	lbs/ton
f. Available organic nitrogen for the first year of application (Multiply 1e by F <sub>m</sub> for anaerobic or aerobic process.)	93 x 0.3 =	lbs/ton
Obtain F <sub>m</sub> from Table 6	<input type="text" value="0.3"/>	
g. Total nitrogen available from biosolids. (Add 1d and 1f)	45 + 28 = <input type="text" value="73"/>	lbs/ton
<b>2. Available nitrogen in the soil</b>		
a. Soil test results of background nitrogen in soil	<input type="text" value="10"/>	lbs/acre
Default - Experience		
b. Or, Estimate of available nitrogen from previous biosolids applications (If estimate, attach explanation of how estimated.)		
<b>3. Nitrogen supplied from other sources.</b>		
a. Nitrogen from supplemental fertilizers (if appropriate)	<input type="text" value="0"/>	lbs/acre
b. Nitrogen from irrigation water. (if appropriate)	<input type="text" value="0"/>	lbs/acre
c. Nitrogen from previous crop. (Unless #2 is based in soil testing.)	<input type="text" value="0"/>	lbs/acre

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<b>d. Other (If appropriate) (specify)</b>	<b>0</b>	lbs/acre
<b>e. Total Nitrogen from other sources: add a,b,c, and d if available</b>	<b>0</b>	lbs/acre
<b>4. Total nitrogen available from existing sources</b>	<b>10</b>	lbs/acre
Add 2 and 3e		
<b>5. Total nitrogen requirement of crop.</b>	<b>120</b>	lbs/acre
Obtain information from Table 4 or agricultural extension agents or other agronomy professional		
<b>6. Supplemental nitrogen needed from biosolids.</b>	<b>120 - 10 =</b>	<b>110</b> lbs/acre
(Subtract 4 from 5)		
<b>7. Agronomic loading rate</b>	<b>110 / 73 =</b>	<b>1.5</b> tons/acre
(Divide 6 by 1g)		