Kentucky Department for Environmental Protection
Division of Waste Management
Solid Waste Branch
300 Sower Boulevard – Frankfort KY 40601
(502) 564-6716

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Annual Biosolids Land Application Report

1. Permittee Information

Agency Interest Number for WWTP:	Name of WWTP:
If more than one WWTP, provide information as Attachment 1.	KPDES Number:
Agency Interest Number for Permittee:	Permittee Name:
Address:	
City:	State: Zip Code:
Phone Number: ( ) -	Email:

2. Biosolids Management Information

Type of management of biosolids	Quantity (choose one)		% solids
☐ **Treated and land applied, sold, or given away**	(Gallons, Yd³, or Wet Tons)	Dry metric tons	
☐ **Sent to landfill (Include landfill name and county & state it is located in Attachment 1)**	Gallons	Dry metric tons	
☐ **Sent to another permitted facility for treatment (Include facility name and county & state it is located in Attachment 1)**	Gallons	Dry metric tons	
☐ **Long term storage at treatment facility (e.g., lagoon, drying bed)**	Gallons	Dry metric tons	
☐ **Other (Describe method of disposition as Attachment 2)**	Gallons	Dry metric tons	

3. Biosolids Analysis Information

Monitoring frequency	☐ Once per year	☐ Once per quarter	☐ Once per 60 days	☐ Once per month
Metric tons	Less than 290	290 or greater but less than 1,500	1,500 or greater but less than 15,000	Equal to or greater than or 15,000
US tons	Less than 319	319 or greater but less than 1,650	1,650 or greater but less than 16,500	Equal to or greater than 16,500
Date(s) of sampling:				

Average of Reporting Year Analyses Summary Table

Parameter	Wet Weight	Dry Weight
pH	SU	
Total Solids Content	%	
Volatile Solids Content	%	
Total Potassium	ppm	ppm
Total Phosphorous	ppm	ppm
Total Kjeldahl Nitrogen	ppm	ppm
Ammonium Nitrogen (NH_4-N)	ppm	ppm
Nitrate Nitrogen (NO_3-N)	mg/L	mg/kg
Arsenic	mg/L	mg/kg
Cadmium	mg/L	mg/kg
Copper	mg/L	mg/kg
Lead	mg/L	mg/kg
Mercury	mg/L	mg/kg
Molybdenum	mg/L	mg/kg
Nickel	mg/L	mg/kg

Selenium	mg/L	mg/kg
Zinc	mg/L	mg/kg
Other:	mg/L	mg/kg
Other:	mg/L	mg/kg
Other:	mg/L	mg/kg

Attachment 3. Submit a copy of the actual laboratory analysis sheets.

What Class are the biosolids?	☐ Class A	☐ Class B

Alternative used to meet Class A or Class B pathogen reduction pursuant to 40 CFR 503.32

Class A Alternatives

Biosolids have been tested for:
☐ fecal coliform
☐ salmonella

☐ Alternative 1: Thermally treated biosolids
☐ Alternative 2: Biosolids treated in a high pH-high temperature process
☐ Alternative 3: Biosolids treated in other processes that meet enteric virus and helminth ova criteria
☐ Alternative 4: Biosolids treated in unknown processes that meet enteric virus and helminth ova criteria
☐ Alternative 5: Use of a Process to Further Reduce Pathogens
- ☐ a) Composting
- ☐ b) Heat drying
- ☐ c) Heat treatment
- ☐ d) Thermophilic aerobic digestion
- ☐ e) Beta ray irradiation
- ☐ f) Gamma ray irradiation
- ☐ g) Pasteurization

☐ Alternative 6: Use of a process equivalent to a Process to Further Reduce Pathogens.
Identify:

Class B Alternatives

☐ Alternative 1: Monitoring of fecal coliform as the geometric mean of the density of fecal coliform of seven representative samples (select option met)
- ☐ Less than 2 million Most Probably Number per gram of solids (dry weight basis)
- ☐ Less than 2 million Colony Forming Units per gram of total solids (dry weight basis):

☐ Alternative 2: Biosolids treated in one of the Processes to Significantly Reduce Pathogens:
- ☐ a) Aerobic digestion
- ☐ b) Air drying
- ☐ c) Anaerobic digestion
- ☐ d) Composting
- ☐ e) Lime stabilization

☐ Alternative 3: Biosolids treated in a process that is equivalent to a Process to Significantly Reduce Pathogens.
Identify:

Option used to meet vector attraction reduction requirement of 40 CFR 503.32

In-plant options:
☐ Option 1: 38 percent reduction in volatile solids content.
- ☐ Full mass balance equation
- ☐ Approximate mass balance equation
- ☐ Van Kleeck equation
- ☐ Volatile solids loss across all sewage sludge treatment processes

☐ Option 2: Bench-scale anaerobic digestion for 40 additional days at 30 degrees Celsius to 37 degrees Celsius
☐ Option 3: Bench-scale aerobic digestion for 30 additional days at 20 degrees Celsius
☐ Option 4: SOUR test at 20 degrees Celsius (only for material with less than 2 percent solids with no dilution)
☐ Option 5: Aerobic treatment for at least 14 days over 40 degrees Celsius with an average temperature of over 45 degrees Celsius
☐ Option 6: Alkali addition to raise pH to at least 12 at 25 degrees Celsius, maintain a pH greater than or equal to 12 for 2 hours, and a pH greater than or equal to 11.5 for 22 additional hours
☐ Option 7: Drying with no unstabilized (primary) solids to at least 75% solids
☐ Option 8: Drying with unstabilized (primary) solids to at least 90% solids

Site management options:
☐ Option 9: Injection with no biosolids present on land surface 1 hour after injection (Class A biosolids only- injection within 8 hours of pathogen reduction)
☐ Option 10: Incorporation within 6 hours of application (Class A biosolids only- incorporation within 8 hours of pathogen reduction)

Did any non-compliance with 40 CFR 503 or 401 KAR Chapter 45 occur during this reporting period?	☐ Yes. If yes, provide a description of the non-compliance(s) and remedial actions taken as **Attachment 4**.	☐ No

4. Laboratory Information

Name of Testing Laboratory:		
Address:		
City:	State:	Zip Code:

Phone Number: ( ) -

5. Biosolids Application Summary for Reporting Year

Agency Interest Number for Permittee:

Subplot Number	Grand Total Biosolids Applied Dry Metric Tons	Total Amount Per Hectare Dry Metric Tons	Approved Rate Per Hectare Dry Metric Tons

6. Land Application - Application Log

Biosolids Generator(s):		Subplot Number:
Subplot size in Hectares:	Monitoring Year:	Agency Interest Number:

Date of Application	Application Quantity in Metric tons	Applier's Initials	Date of Analysis

7. Residual Nitrogen Worksheet
Table 1

	Organic Nitrogen Content of Biosolids					
	2.0	2.5	3.0	3.2	4.0	4.5
Number of years since last application of biosolids	**Pounds of N released per US ton of biosolids applied**					
1	1.0	1.2	1.4	1.7	1.9	2.2
2	0.9	1.2	1.4	1.6	1.8	2.1
3	0.9	1.1	1.3	1.5	1.7	2.0

Calculations should be done for each subplot which has received biosolids

<u>One year ago:</u>

Lbs. of Nitrogen released per ton of biosolids x tons of biosolids applied = Residual N (one year)

_____x_____=_____ Residual N (one year)

<u>Two years ago:</u>

Lbs. of Nitrogen released per ton of biosolids x tons of biosolids applied = Residual N (two years)

_____x_____=_____ Residual N (two years)

<u>Three years ago:</u>

Lbs. of Nitrogen released per ton of biosolids x tons of biosolids applied = Residual N (three years)

_____x_____=_____ Residual N (three years)

<u>Total Residual Nitrogen:</u>

Residual N (one year) + Residual N (two years) + Residual N (three years) = Total Residual Nitrogen

_____+_____+_____=_____ = Total Residual Nitrogen

Note: To calculate Residual Nitrogen for year 2 and 3 you must find the organic nitrogen content of biosolids from each year. Refer to your previous annual reviews for organic nitrogen content.

8. Worksheet for Calculating Application Rates

Subplot Number:	Crop:

Biosolids Composition (Parameter in ppm or mg/kg ÷ 10,000 = %)

Nutrient	Amount in ppm or mg/kg	÷	10,000	=		%
Total Kjeldahl Nitrogen (TKN)		÷	10,000	=		
Ammonium Nitrogen (NH4-N)		÷	10,000	=		
Nitrate Nitrogen (NO3-N)		÷	10,000	=		
Total Phosphorus		÷	10,000	=		
Total Potassium		÷	10,000	=		

1. Percent Available Organic Nitrogen = (%TKN) – (%NH4-N) – (%NO3-N)

_____ = (_____) – (_____) – (_____)

2. Available Nitrogen in waste:

(a) Incorporation:

(%NH4Nx20) + (%NO3Nx20) + (%available organic N x 4) = lbs. available N/ton

(_____x20) + (_____x20) + (_____x4) = _____ lbs. available N/ton

(b) Surface Application:

(%NH4Nx10) + (%NO3Nx20) + (%available organic N x 4) = lbs. available N/ton

(_____x10) + (_____x20) + (_____x4) = _____ lbs. available N/ton

3. Residual Nitrogen (N): _____

(Calculated Residual N by utilizing the formulas found on the Residual N worksheet)

4. Annual Application Rate:

(a) (Crop N requirement – Residual N) / Acre ÷ lbs. available N/ton = Dry Tons/acre

(_____-_____) ÷ _____ = _____ Dry Tons/acre

(b) 0.44 lbs. of available Cd/acre ÷ (mg./kg of Cd in sample X 0.002) = Dry Tons/acre

_____ ÷ (_____x0.002) = _____ Dry Tons/acre

Annual Application Rate: (LOWER of (a) or (b).)

Annual Application Rate = _____

**Nitrogen Required – (lbs. available N/ton X maximum tons waste to be applied/acre) = lbs. of additional fertilizer nitrogen applied. (additional nitrogen may be needed by fertilization if the annual application rate is limited by cadmium)

5. Conversion Formula: Dry Tons to Wet Gallons- move to conversion factors?

(Tons of biosolids x 2000) ÷ (8.34x% solids in the biosolids/100) = wet gallons/acre

(_____x2000) ÷ (8.34x_____) = _____ wet gallons/acre

6. Additional Phosphorous and Potassium needed:

(a) Phosphorus (P_2O_5) in waste:

Tons waste/acre (from 4a or 4b) x % P in waste x 45.8 = lbs. P_2O_5 added/acre

_____x_____x45.8 = _____ lbs. P_2O_5 added/acre

(b) Additional P_2O_5 fertilizer needed:

Total phosphorous ($92O_5$) needed/acre – P_2O_5 added from biosolids = lbs. P_2O_5/acre

_____ - _____ = _____ lbs. of additional P_2O_5 needed/acre

*A negative answer means no additional P_2O_5 fertilizer is needed.

(c) Potassium (K_2O) in waste:

Tons waste (from 4a or 4b) /acre x % K in waste x 24 = lbs. K_2O added/acre

_____x_____x24 = lbs. K_2O added/acre

(d) Additional K_2O fertilized needed"

Total K_2O needed/acre – K_2O added from biosolids = lbs. K_2O/acre

_____ - _____ = _____ lbs. of additional K_2O needed/acre

*A negative answer mean no additional K_2O fertilizer is needed.

9. Certification	
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure the qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for such violation."	
Name (*Print)*	Signature:
Title/Position:	Date: / /
Name of Permittee:	
Subscribed and sworn to before me by	
Notary public signature	
My commission expires	/ /

IMPORTANT NOTE: *All information submitted on this form will be subject to public disclosure to the extent provided by Kentucky law. Persons filing this form may make claims of confidentiality in accordance with 400 KAR 1:060.*

Cumulative Pollutant Loading Rates (CPLR)											
Subplot Number:					Subplot latitude and longitude:						
Agency Interest Number for Permittee:					Permittee Name:						
Subplot Size in Hectares:					Application rate in metric tons/hectare:						
Reporting Year:											
Pollutant	**Regulatory Allowable CPLR in kg/ha**		**Calculation for determining cumulative loading**								
	100%	**90%**	**Concentration in Class B biosolids in mg/kg (dry weight)**	**X**	**Class B biosolids application rate in metric tons/hectare**	**X**	**0.001 (conversion factor)**	**+**	**Amount of Pollutants Applied Since July 20, 1993 in kg/ha**	**=**	**Total Amount of Pollutant Applied to Date (kg/ha)**
Arsenic	**41**	**37**		**X**		**X**	**0.001**	**+**		**=**	
Cadmium	**39**	**35**		**X**		**X**	**0.001**	**+**		**=**	
Copper	**1,500**	**1,350**		**X**		**X**	**0.001**	**+**		**=**	
Lead	**300**	**270**		**X**		**X**	**0.001**	**+**		**=**	
Mercury	**17**	**15**		**X**		**X**	**0.001**	**+**		**=**	
Nickel	**420**	**378**		**X**		**X**	**0.001**	**+**		**=**	
Selenium	**100**	**90**		**X**		**X**	**0.001**	**+**		**=**	
Zinc	**2,800**	**2,520**		**X**		**X**	**0.001**	**+**		**=**	

GENERAL INSTRUCTIONS
Annual Biosolids Land Application Report

Instructions provided are for the DEP 4506, Annual Biosolids Land Application Report form. For any questions regarding any section of this form, please call the Division of Waste Management's Solid Waste Branch (SWB). This form must be completed either by typing or by printing legibly with black ink.

If a previous year's report is needed, request a copy by completing an open records request through the Department of Environmental Protection at (502) 564-3999 or EEC.KORA@ky.gov.

All sections of this form must be completed to be accepted by the cabinet. Be sure to include all information for every location permitted, even if this information was previously submitted on previous reports. For any future changes in permit information, an amended application form shall be submitted pursuant to 401 KAR 45:105.

Submit DEP 4506 form via mail to the following address:

Kentucky Department for Environmental Protection
Division of Waste Management
Solid Waste Branch
300 Sower Boulevard, Second Floor
Frankfort, KY 40601
Phone: (502) 564-6716

Submit DEP 4506 electronically using the eForms portal: https://dep.gateway.ky.gov/eForms/Account/Home.aspx

Conversion Factors	
1 acre = 0.404686 hectare	1 hectare = 2.47105 acres
1 pound = 0.453592 kilogram	1 kilogram = 2.20462 pounds
1 US ton = 0.907185 metric ton	1 metric ton = 1.10231 US ton

Section	**1.**	**Permittee Information** • **Agency Interest Number for WWTP:** Provide the Agency Interest Number assigned to the wastewater treatment facility that is the biosolids source. • **Name of WWTP:** Provide the name of the wastewater treatment facility that is the source of the biosolids to be land applied. If more than one wastewater treatment plant provides biosolids to this land application site, provide a list of all facilities with their Agency Interest and KPDES numbers as **Attachment 1**. • **KPDES Number:** Provide the Kentucky Pollutant Discharge Elimination System number assigned to the facility that is the biosolids source. • **Agency Interest Number for Permittee:** Provide the Agency Interest Number for the entity that holds the permit for the land application site. • **Permittee Name**: Provide the name of the entity that is the permittee for the biosolids land application permit as well as the address and contact information for the permittee
Section	**2.**	**Biosolids Management Information-** Complete the table for biosolids that were managed in the reporting year. • **Type of Management:** Check the box or boxes that correspond to how biosolids were managed. • **Quantity:** Provide amount of biosolids managed by the method listed in each checked row in either dry metric tons or gallons. • **% solids:** Provide the percent solids result for the biosolids managed using the method of each checked row.
Section	**3.**	**Biosolids Analysis Information** • **Monitoring frequency**: Check the box that corresponds to the required monitoring frequency for biosolids analysis. Refer to the rows for metric tons or US tons to determine the appropriate monitoring frequency. • **Dates of sampling:** Provide the dates when biosolids samples were taken. • **Average of Reporting Year Analyses Summary Table:** Provide the averages of all samples taken in wet and dry weight. Do not complete boxes that are grayed out. If required by facility permit to monitor additional parameters beyond those listed, provide name of parameter in "other" row and enter analysis date in table for the parameter. • **Attachment 3:** Provide the laboratory reports for all required analyses. • **What Class are the biosolids?** Check the box indicated whether the biosolids are Class A or Class B • **Alternative used to meet Class A or Class B pathogen reduction pursuant to 40 CFR 503.32:** Check the box(es) that correspond to the pathogen reduction alternative(s) used. If an equivalent process was used, describe the process. • **Option used to meet vector attraction reduction requirement of 40 CFR 503.33:** Check the box(es) that correspond to the method used to meet the vector attraction reduction requirement used.

		• **Did any non-compliance with 40 CFR 503 or 401 KAR Chapter 45 occur during this reporting period?** Check the box that indicates whether any non-compliance occurred. If yes, provide a description of the non-compliances(s) and remedial actions taken as **Attachment 4**.
Section	**4.**	**Laboratory Information:** Provide the name, address, and phone number for the laboratory that analyzed the biosolids samples.
Section	**5.**	**Biosolids Application Summary** • **Agency Interest Number for Permittee-** Provide the Agency Interest number for the biosolids land application site. • **Grand Total Biosolids Applied**- Provide the total amount of biosolids applied for each subplot where biosolids were land applied in the reporting year. Check US tons or gallons to indicate the unit of the amount reported. • **Total Amount Per Acre**- Provide the total amount of biosolids applied per acre for each subplot where biosolids were land applied in the reporting year. Check US tons or gallons to indicate the unit of the amount reported. • **Approved Rate Per Acre:** Provide the amount in US Tons or Gallons that is allowed to be applied per the approved permit application and permit. Check the box indicating the unit for the amount reported.
Section	**6.**	**Land Application - Application Log-** If the land application has more than one subplot, copy this page and provide a copy for each subplot. • **Biosolids Generator(s):** Provide the name of the generator(s) of biosolids that were applied for the subplot. • **Subplot Number:** Provide the identification number for the subplot that received biosolids. • **Subplot Acreage:** Provide the acreage of the subplot • **Monitoring Year:** Provide the year for which this data is supplied. • **Agency Interest Number:** Provide the Agency Interest Number assigned to the biosolids land application permit. • **Date of Application:** For each day that biosolids were applied to the subplot identified, provide the date. • **Application Quantity in US tons:** Provide the amount of biosolids applied to the subplot on the date identified in US tons. • **Applier's Initials:** Provide the initials of the person who applied the biosolids. Check the box or boxes that correspond to the type of site where biosolids will be land applied. • **Date of Analysis:** Provide the date the analysis was done for the biosolids that were land applied. • If the land application site has **more than one subplot, provide separate log for each subplot as Attachment 5.**
Section	**7.**	**Residual Nitrogen Worksheet:** Complete the residual nitrogen worksheet using the formulas provided to calculate residual nitrogen for each subplot.
Section	**8.**	**Worksheet for Calculating Application Rates:** Complete the application rate worksheet for each subplot and crop to determine the nutrients applied.
Section	**9.**	**Certification-** Complete the certification statement(s) that apply to the type of biosolids management.
Section	**10.**	**Cumulative Pollutant Loading Rates-** Complete the worksheet for each subplot. • **Subplot Number:** Provide the number of the subplot. • **Subplot latitude and longitude:** Provide the latitude and longitude of the subplot. • **Agency Interest Number for Permittee:** Provide the Agency Interest Number for the biosolids land application site. • **Permittee Name:** Provide the name of the biosolids land application permittee. • **Subplot Size in Hectares:** Provide the size of the subplot in hectares. • **Application rate in metric tons/hectare:** Provide the approved application rate in metric tons/hectare. • **Reporting Year:** Provide the year for which data are provided. • **Concentration in Class B biosolids in mg/kg (dry weight):** Provide the concentration of each pollutant in milligrams per kilogram dry weight. • **Class B biosolids application rate in metric tons/hectare:** Provide the approved application rate in metric tons/hectare. • **Amount of Pollutants Applied Since July 20, 1993 in kg/ha:** Provide the total amount of each pollutant applied to the land application site since July 20, 1993. • **Total Amount of Pollutant Applied to Date (kg/ha):** Multiply the concentration in mg/kg by the amount in metric tons per hectare and the conversion factor. Add this amount to the amount applied since July 20, 1993 to get the total amount of pollutant applied to date.