Manure Sampling

CAFO Workshops 2025

Overview

- What are the sampling requirements?
- What are the record keeping requirements?
- When do we need to see these?
- Why does this need to be done?

Permit and Code Citation

S. NR 243.19(1)(c), Wis. Admin. Code

Lays out the parameters that need manure or process wastewater needs to be analyzed for

- Nitrogen
- Phosphorus
- Percent Solids

Laboratory certified under s. ATCP 50.50

Analyzed using applicable methods specified in ch. NR 219, Wis. Admin. Code

The department can specify the density of sampling required

Permit Section 1.6.2 – Sampling Requirements

“The permittee shall collect and analyze representative samples of land applied manure and process wastewater for the parameters outlined in the monitoring requirements for each sample point..”

References s. NR 243.19(1)(c)

Sampling Densities

Liquid Manure and Process Wastewater	Minimum of two samples are required per calendar month, per liquid manure source (WSF), when spreading
Solid Manure	Minimum of one sample per solid manure source taken quarterly when spreading

*Increased sampling frequency is encouraged if consistency of material or technology changes

Permit Specifics

- Liquids

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limits and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Total		lb/1000gal	2/Month	Grab	
Nitrogen, Available		lb/1000gal	2/Month	Calculated	
Phosphorus, Total		lb/1000gal	2/Month	Grab	
Phosphorus, Available		lb/1000gal	2/Month	Calculated	
Solids, Total		Percent	2/Month	Grab	

- Solids

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limits and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Total		lbs/ton	Quarterly	Grab	
Nitrogen, Available		lbs/ton	Quarterly	Calculated	
Phosphorus, Total		lbs/ton	Quarterly	Grab	
Phosphorus, Available		lbs/ton	Quarterly	Calculated	
Solids, Total		Percent	Quarterly	Grab	

Sampling Scenario

- A farm is applying manure from a single pit over the course of 5 to 6 days. Assume the pit was properly agitated.
  - How many liquid samples should be taken?
    - Answer: Two samples to meet permit requirements
- A farm is applying manure from a single pit. Started applying manure on July 29th and completed applications on August 3rd.
  - How many liquid samples should be taken?
    - Answer: Four samples to meet permit requirements

*Additional samples can be useful to better meet your farm's agronomic needs

Record Keeping Requirements

s. NR 243.19(2)(c)

- For each sample taken, the permittee shall record the following
  - Date, place, method, and time of sampling
  - Individual or lab that performed the sampling
  - Analysis date
  - Who performed the analysis
  - Analytical method used
  - Results of analysis

Submitted with the annual nutrient management update

Manure Analysis

AgSource LABORATORIES

Submitted By
[redacted]

Submitted For
[redacted]

Date Sampled
8/2/2023

Date Received
03-Aug-2023

Laboratory Sample #
CP68454

Test Package
Basic

Date Reported
08-Aug-2023

Information Sheet No.
M230349

Location Pack-3rd Qtr **Sample ID** 1 **Livestock Type** Dairy **Handling Type** Solid

Analysis	Results as Received	Results as Dry Basis	LIQUID Application Methods Est. Available Nutrient Credits (as received, lbs / 1000 gal)						DRY Application Methods Est. Available Nutrient Credits (as received, lbs / ton)						
			Nutrients as lbs/1000 gal	In 1st Year Incorporated* Injected	In 1st Year Incorporated* 1-72 Hours	In 1st Year Broadcast**	In 2nd Year	In 3rd Year	Nutrients as lbs/ton		In 1st Year Incorporated* <1 Hour	In 1st Year Incorporated* 1-72 Hours	In 1st Year Broadcast**	In 2nd Year	In 3rd Year
Dry Matter	55.15 %														
Moisture	44.85 %														
Total N, (TKN)	0.20 %	0.36 %	16.50	5.78	4.95	4.13	1.65	0.83	TKN	4.0	1.39	1.19	0.99	0.40	0.20
Phosphorus, P_2O_5	0.16 %	0.30 %	13.7	10.94	10.94	10.94	Residual After Uptake		P_2O_5	3.3	2.62	2.62	2.62	Residual After Uptake	
Potassium, K_2O	0.43 %	0.78 %	35.8	28.67	28.67	28.67	Residual After Uptake		K_2O	8.6	6.88	6.88	6.88	Residual After Uptake	
Sulfur, S	0.04 %	0.08 %	3.7	2.02	2.02	2.02	0.37	0.18	S	0.9	0.48	0.48	0.48	0.09	0.04

Estimated Value of Available Nutrients: 1st Year - $24.54 2nd Year - $1.23 3rd Year - $0.62 | 1st Year - $5.88 2nd Year - $0.30 3rd Year - $0.15

Value based on commercial ferilizer costs as of 07/28/2023. N(Urea) $0.61 / lb, P2O5(Diammonium Phosphate(DAP)) $0.76 / lb, K2O(Potash) $0.4 / lb, S(Elemental Sulfur) $0.61 / lb.

*Surface applied liquid or solid manure incorporated within 1- 72 hours after application.

**Liquid or solid manure left on the surface 4 or more days without incorporation. Wind and high temperature will result in greater loss of available nitrogen.

The Total N (TKN) values are the sum of Ammonium and Organic N. Avaialbility estimates are corrected for ammonia volatilization loss due to each application method .

Application of this manure on the same field for 2 consecutive years increases the availability of N and S by 10%, and for 3 or more years by 15%.

References: Nutrient application guidelines for field, vegetable, and fruit crops in Wisconsin (A2809), Table 9.1

Liquid manure applied as irrigation will lose more nitrogen from volatilization. An additional 15% of the Liquid TKN value should be subtracted off the Liquid Broadcast TKN Range .

106 North Cecil Street, PO Box 7 • Bonduel, WI 54107 • P: 715.758.2178 • bonduel@agsource.com

Reasons to Sample?

HELP GROWERS MEET NUTRIENT NEEDS OF A CROP

RESULTS DIRECTLY SUPPORT FUTURE NMP RECOMMENDATIONS

NUTRIENT VALUES CAN DIFFER BASED ON ANIMAL DIETS AND TECHNOLOGY USED AT THE FARM

HELPS MAKE BETTER DECISIONS ON COMMERCIAL FERTILIZER USAGE ($$$)

DEMONSTRATE COMPLIANCE WITH CAFO PERMIT REQUIREMENTS

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Questions?

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"WILD WISCONSIN:
OFF THE RECORD"