

Chapter 9 Record Keeping

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Introduction

Regular monitoring of structures, equipment, and other critical control points and thorough record keeping is essential on all animal feeding operations. It is your best insurance against accidental discharges, and in the event of a compliance inspection, it documents that you are doing things correctly. Keeping accurate records, along with implementing proper BMPs on your operation, is the primary way you prove to state water quality agencies and to the general public that farm is not causing an environmental impact. Assistance with record keeping can be obtained from Certified Crop Advisors and other technical specialists, the Cooperative Extension Service, the NRCS, and the local SWCD (see chapter 12, Resources).

Record keeping is a major component of site inspections. Often a complaint leading to an inspection can easily be resolved if proper records are available. Larger operations with permits are required to keep records, but all operations should consider keeping them for their own benefit (Table 1).

Nutrient Management Plan (NMP)

Most records will be part of a NMP, and you should store them with your plan. These records should be maintained for at least five years or as long as they are useful. For items such as soil and manure testing, be sure to include the procedures used for sampling and analysis of each test. It is important to remember that a NMP is just a plan of what you intend to do. Without records that indicate what you actually did, the NMP is of little use in documenting compliance on the farm.

Weather

Weather records should include daily rainfall records. These can be obtained through simple rain gauges or more complex weather stations. Rainfall data is very useful in both managing crops and irrigation scheduling and in monitoring your manure storage. Where odor is an issue, some producers have also found it useful to keep wind speed and direction data.

Manure Storage

For all lagoons or manure storages, you should record weekly lagoon level (freeboard) records as well as inspection records. Often routine inspections get overlooked unless they are regularly scheduled and recorded. These records not only prevent emergencies but can also aid in a better understanding of your storage structures.

Equipment

Equipment maintenance records seem trivial, especially when maintenance is only performed when equipment breaks down, but well-maintained equipment is more reliable and efficient. Good maintenance programs can save you money in the long run. Many

people regularly change the oil in their cars, and as a result, get improved gas mileage and longer engine life. Do we do the same thing with our irrigation pumps? What will happen when the lagoon is 2 inches into the freeboard and it finally decides to breakdown?

Assessments and Testing

Water quality monitoring or environmental assessments are proactive measures that producers should use to track their environmental performance. Usually, this type of monitoring is not required but could be very helpful; these records are very useful in alerting you to problems early as well as documenting that the operation is not the source of a problem. Testing all wells at least bi-annually for drinking water contaminants is also recommended. For surface water flowing through your operation, semi-annual upstream and downstream testing for nitrate would be the cheapest and most effective strategy. Third parties such as consultants, the NRCS, or your local SWCD can conduct environmental assessments or you can use one of the many readily available self-assessment tools such as Georgia Farm*A*Syst. More information about these types of assessment tools is available in the reference section or from your local Extension office.

Table 1. List of Record-Keeping Requirements for Land Application and Other Activities at Large CAFOs, these are also recommended for small un-permitted farms.

Parameter	Units	Frequency
Nutrient Management Plan		
CAFO operators must maintain on-site a current, site-specific NMP that reflects the existing operational characteristics. Operators must also maintain on-site all necessary records to document that the NMP is being properly implemented with respect to manure and wastewater generation, storage and handling, and land application.	N/A	N/A
Soil and Manure/Wastewater Nutrient Analysis		
Analysis of manure to determine N and P content	ppm lbs/ton	Conduct initial sampling, then at least annually.
Analysis of soil in all fields where land application activities are conducted to determine P content.	lbs/acre	Conduct initial sampling, then at least once every 5 yrs.
Operation and Maintenance		
Visual inspection of all water lines	N/A	Daily
Document depth of manure and process wastewater in all liquid impoundments	Ft	Weekly
Document all corrective actions taken	N/A	As necessary
Document animal mortality practices	N/A	As needed
Design documentation for all manure, litter, and wastewater storage structures including the following information: <ul style="list-style-type: none"> • Volume for solids accumulation • Design treatment volume • Total design volume • Days of storage capacity 	Cubic yd/gal Cubic yd/gal Cubic yd/gal Days	Once/permit term unless revised weekly

Table 1 continued...		
Parameter	Units	Frequency
Operation and Maintenance continued...		
Document all overflows from all manure and wastewater storage structures including their: <ul style="list-style-type: none"> Date and time Estimated volume 	Mo/day/yr hr gal	Per event Per event
Document manure application equipment inspection and calibration.	N/A	Seasonally
Land Application		
For each application event where manure, litter or wastewater is applied, document the following by field: <ul style="list-style-type: none"> Date of application Method of application Weather conditions at the time of application Total amount of N and P applied 	Mo/day/yr N/A N/A Lbs/ac	Daily Daily Daily Daily
Document the crop and expected yield for each field.	Bushel/ac	Seasonally
Test methods and sampling protocols used to sample and analyze manure, litter, wastewater, and soil.	N/A	Once/permit term unless revised
Documentation showing the total N and P to be applied to each field including nutrients from the application of manure, litter, and wastewater and other sources as well as how these rates were determined	Lbs/ac	Once/permit term unless revised
Manure Transfer		
For all manure transfer off the farm, operators must maintain the following records: <ul style="list-style-type: none"> Date of transfer Name and address of recipient Approximate amount of manure, litter, or wastewater transferred 	N/A N/A Tons/gallons	As necessary As necessary As necessary
Water Quality and Environmental Assessment *Not required unless specified in permit		
Documentation on any surface or groundwater testing and analysis conducted on the farm. Common test parameters may include nitrate, ammonia, total N, P, and fecal coliform bacteria. May also voluntarily include results from regular environmental assessments.	ppm or cfu/100ml	As necessary

Land Application

Operators should maintain records on all nutrient applications including manure, commercial fertilizer, or waste materials, such as municipal biosolids or industrial residuals. These records should include the analytical results, application rates, and soil tests for each application site. A certain amount of record keeping is needed to manage the manure application system and calibrate the equipment. The record-keeping forms provided here will help you document site-specific data that is currently limited on many animal operations. These forms will allow you to easily track your applications and provide you with an easy resource to ensure that you do not exceed recommended application targets on any fields. When combined with such site-specific data as your waste analysis, plant analysis, soils analysis, crop yields, and other plan items, these forms will provide evidence that you are managing your manure application properly and not exceeding agronomic rates.

The forms included here are as follows:

IRR-1: Irrigation Field Record is used to record each irrigation event. The IRR-1 or 2 forms can be used with all types of irrigation systems including solid-set sprinklers, solid-set volume guns, hard hose travelers, center pivots, and liner move irrigation systems.

IRR-2: Cumulative Irrigation Field Record is used to record the total annual manure application to one field per crop cycle. It enables operators to calculate the total N and P application to the field and compare it to recommended loading rates.

SLUR-1: Liquid Manure Slurry Field Record is used to record manure application from liquid tanks. These forms would be used to record the broadcast or injection of any liquid manure, effluent, and sludge.

SLUR-2: Cumulative Liquid Manure Slurry Field Record is used to record the total annual manure application to one field per crop cycle with a slurry or pump and haul system. It enables operators to calculate the total N and P application to the field and compare it to the recommended loading rates.

SLD-1: “Solid” or Semisolid Manure Field Record is used to record each application event from a manure box, flail, or side-discharge spreader. These forms would be used to record the broadcast of any solid manure, separated manure solids, bedding, litter, or compost.

SLD-2: Cumulative Solid Field Record is used to record the total annual manure application to one field per crop cycle. It enables operators to calculate the total N and P application to the field and compare it to the recommended loading rates.

The record forms IRR-2, SLUR-2, and SLD-2 require operators to calculate the amount of N that has been applied to a given crop. The necessary formulas to complete the forms are provided in the first row of the form. For recording purposes, field size is that portion of the field that receives manure applications. When using irrigation, this is often referred to as the “wetted” or “irrigated” area. Wetted area is equal to or less than field size due to the irrigation system layout, the area required for required or recommended buffers, and the shape of the field. Application areas within fields may also be reduced because their slope, seasonal wetness, or soil type makes them inaccessible to spreader equipment.

It is important that operators obtain permission to land apply manure on land that is rented from or owned by another person. A legal manure application agreement could be your only protection in the event of a spill or environmental investigation. It also may be required as part of an NMP on operations that are land limited. Several example agreements are included in this module to assist you in developing these forms. They are only examples and may not be legally binding.

Records should also be kept on all manure transported off the operation. When transporting manure off-site or selling manure, the records should include the amount sold or given away, the recipient, the manure nutrient content and the intended use. It is also advisable to give the recipient a copy of the manure analysis and to provide information about appropriate utilization. Manure should be treated in the same manner as commercial fertilizer; most people would not purchase fertilizer of unknown nutrient content that did not have proper directions for utilization.

UGA Extension Engineers have translated these forms into simple to use Excel spreadsheet files for computer based record keeping including some automatic calculations. Visit <http://www.agp2.org/aware>, click on search, type “record” in the blank and hit enter.

Form IRR-2

**Irrigation Field Record
One Form for Each Field per Crop Cycle**

Tract # Field #

Field Size, ac = **(A)**

Farm Owner

Facility Number -

Irrigation Operator

From Manure Utilization Plan

Crop Type Recommended PAN Loading, lb/acre = **(N)** Crop P needs, lbs/acre =P

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Irrigation										
Date (mm/dd/yr)	Start Time (hr:min)	End Time (hr:min)	Total Minutes (3) - (2)	# of Sprinklers Operating	Flow Rate, gal/min	Total Volume, gal (4) × (5) × (6)	Volume Per Acre, gal/ac (7) ÷ (A)	Waste Analysis ¹ PAN, lb/1,000 gal	PAN Applied, lb/ac [(8) × (9)] ÷ 1,000	N Balance ² , lb/ac (N) - (10)
								Add column for P		Add column for P
Crop Cycle Totals							<input type="text"/>		<input type="text"/>	

Owner's Signature

Operator's Signature

¹ See your manure management plan for sampling frequency. A recent manure analysis is your best method of properly utilizing your manure nutrients.
² Enter the value received by subtracting column (10) from **(B)**. Continue subtracting column (10) from column (11) following each application event.

Form SLUR-1

**Slurry and Sludge Application Field Record
For Recording Slurry Application Events on Different Fields**

Farm Owner
 Spreader Operator

Facility Number -

Tract #	Field #	Date (mm/dd/yr)	Crop Type	Field Size, ac	Application Method ³	# of Loads Per Field	Volume of Loads ⁴ , gal

³ SI = soil incorporated (disked); BR = broadcast (surface applied)
⁴ Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.

Form SLUR-2

**Slurry and Sludge Application Field Record
One Form for Each Field per Crop Cycle**

Tract # Field #

Field Size, ac = **(A)**

Farm Owner

Facility Number -

Spreader Operator

From Manure Utilization Plan

Crop Type

Recommended PAN Loading, lb/ac = **(B)** P entry

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Date (mm/dd/yr)	# of Loads Per Field	Volume of Loads ⁵	Total Volume, gal (2) × (3)	Volume Per Acre, gal/ac (4) ÷ (A)	Waste Analysis ⁶ PAN, lb/1,000 gal	PAN Applied, lb/ac [(5) × (6)] ÷ 1,000	N Balance ⁷ , lb/ac (B) - (7)
					Panalysis		P balance
Crop Cycle Totals				<input type="text"/>		<input type="text"/>	

Owner's Signature

Operator's Signature

⁵ Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.
⁶ See your manure management plan for sampling frequency. A recent manure analysis is your best method of properly utilizing your manure nutrients.
⁷ Enter the value received by subtracting column (7) from **(B)**. Continue subtracting column (7) from column (8) following each application event.

Form SLD-1

**Solid Manure Application Field Record
For Recording Solid Manure Application Events on Different Fields**

Farm Owner	
Spreader Operator	

Facility Number		-	
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Tract #	Field #	Date (mm/dd/yr)	Crop Type	Field Size, ac	Application Method ⁸	# of Loads Per Field	Volume of Loads ⁹ , tons

⁸ SI = soil incorporated (disked); BR = broadcast (surface applied)

⁹ Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.

Form SLD-2

**Solid Manure Application Field Record
One Form for Each Field per Crop Cycle**

Tract # Field #

Field Size, ac = **(A)**

Farm Owner

Facility Number -

Spreader Operator

From Manure Utilization Plan

Crop Type

Recommended PAN Loading, lb/ac = **(B)** Pneeds

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Date (mm/dd/yr)	# of Loads Per Field	Weight of Loads ¹⁰ , tons	Total Weight, tons (2) × (3)	Weight Per Acre, tons/ac (4) ÷ (A)	Waste Analysis ¹¹ PAN, lb/ton	PAN Applied, lb/ac (6) × (5)	N Balance ¹² , lb/ac (B) - (7)
					P analysis		P balance
Crop Cycle Totals				<input type="text"/>		<input type="text"/>	

Owner's Signature _____

Operator's Signature _____

¹⁰ Can be found in operator's manual for the spreader. Contact a local dealer if you do not have your owner's manual.
¹¹ See your manure management plan for sampling frequency. A recent manure analysis is your best method of properly utilizing your manure nutrients.
¹² Enter the value received by subtracting column (7) from **(B)**. Continue subtracting column (7) from column (8) following each application event.

Example of Manure Agreement Wording

Manure Utilization Agreement for Leased Land

I, _____, hereby give _____ permission to apply waste from his poultry production facility on _____ acres of my land for the duration of the time shown below.

I understand that this manure contains nitrogen, phosphorus, potassium, and trace elements, and when properly applied should not harm my land or crops. I also understand that the use of animal manure will reduce my need for commercial fertilizer.

Adjacent Landowner: _____ Date: _____

Manure Producer: _____ Date: _____

Technical Representatives: _____ Date: _____

Term of Agreement: _____, 20__ to _____, 20__.

Example of Third Party Form:

Manure Utilization–Third Party Applicator Agreement

I, _____ hereby acknowledge that I have received a copy, have read, and understand the Nutrient Management Plan dated _____ that was developed for/by _____ for their facility located at _____
in _____ County.

I hereby agree to manage and land apply the manure that I received from this facility in a manner consistent with all federal, sState, and local laws.

Third Party Receiver: _____ Date: 20__

Manure Producer: _____ Date: 20__

Technical Representatives:

Term of Agreement: _____, 20__ to _____, 20__

Note: This chapter was adapted from the Livestock and Poultry Environmental Stewardship (LPES) curriculum, Lesson 30 authored by Pat Murphy, Kansas State University; Lesson 31 authored by Karl Shaffer, North Carolina State University; Lesson 32 authored by Ron Sheffield, now at the University of Idaho; Lesson 33 authored by Ron Sheffield, now at the University of Idaho, and Pat Murphy, Kansas State University; Lesson 34 authored by Andrew Sharpley, USDA-Agricultural Research Service, and Ron Sheffield, now at the University of Idaho; Lesson 35 authored by Karl Shaffer, North Carolina State University, and Ron Sheffield, now at the University of Idaho; and Lesson 36 authored by Ron Sheffield, now at the University of Idaho, courtesy of MidWest Plan Service, Iowa State University, Ames, Iowa, 50011-3080.