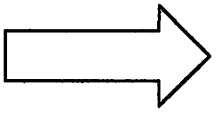
Widman Ranches

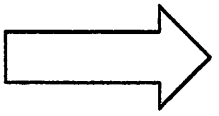
Feedlot

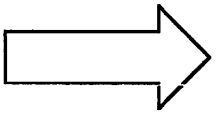
color-coded maps. Kent copy in Salem. Ron Seely original.

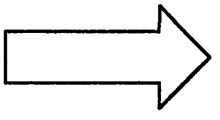
Animal Waste Management Plan

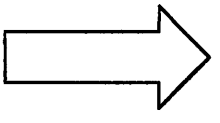
180694
06028

Summary of CAFO Operation 

Specific Descriptions & Calculations 

Record Keeping & Reporting Requirements 

Large CAFO Additional Requirements 

Miscellaneous 

Contact Name, Address, Phone Number

Facility Address

Type of Operation

Number and size of animals by species

Manure, litter and process waste system- provide a general narrative description of each

Collection- How is manure, litter and process waste removed from housing, confinement lot? How is clean water diverted from storage?

Storage- Types and size of manure, litter and process waste storage tanks, ponds

Transfer- How is manure, litter and process waste moved to storage, application areas?

Use- How is manure, litter and process waste treated (composted, separated, anaerobic digestion or storage, aeration)? How is manure, litter and process waste water used on crops? If export is utilized, describe that process

The plan copy for the operator could include identified sections to store soil and manure, litter and process waste test reports, field application records, crop yield records, and other records related to the plan

Animal Waste Management Plan
October 2005

Widman Ranches

Operated by:
Michael J. Widman
43444 Old Trail Rd
Baker City, OR 97814
(541) 523-2758

Facility Address:
43444 Old Trail Rd
Baker City, OR 97814

Operation:
Beef Feedlot

~~180694~~

NFC
06029
180694

As owner and operator of Widman Ranches. I intend to manage in accordance with the practices and operation and maintenance described in this Animal Waste Management Plan.

Signature Michael J. Widman Date 10/31/05

GENERAL NARRATIVE DESCRIPTION

Widman Ranches is located at 43444 Old Trail Rd in Baker City, Oregon and is owned by Michael J. Widman. The operation is a beef backgrounding feedlot and is set on 475 acres available for manure application in Baker County. The beef feedlot is in full operation from November through May at which time, animal numbers may reach 300 head. The cattle are of mixed breeds. A majority of young animals are brought on to the feedlot each fall at a weight of approximately 600 pounds. Most animals are shipped off the operation in the spring at approximately 800 pounds. The average weight of the animals during the confinement period is 625 pounds.

Manure Collection Methods

All cattle are confined in earthen pens. The manure is collected in the pens where it dehydrated and used as bedding for the cattle. Manure is left in the pens, mounded and packed for bedding.

Manure Storage Facilities and Transfer

The manure generated at the facility is handled in a dry solid form. Dry manure is scraped and stacked within feedlots during the confinement period. All manure will be contained within the facilities. Clean water is diverted around the system, except in extreme conditions, when some rainfall enters the feedlots.

The solid manure is stored within the dry lots.

Manure Utilization

The land available for manure application is owned and/or leased by Michael J Widman. There are 475acres adjacent to the operation.

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

OPERATION AND MAINTANENCE

Widman Ranches
Name of Operation

Mark all that apply to your operation.

☐ Animal Access Lanes or Walkways
Damaged components will be repaired or replaced as needed. Debris and excess manure will be removed from roadway surfaces, road ditch and drainage areas. Maintain drainage area capacities. Maintain good vegetative cover on all slopes and watercourses.

☐ Culverts
Inspect annually or after large rainfall event. All foreign objects restricting water flow will be removed. Damaged sections will be repaired or replaced. Erosion around inlet or outlet will be corrected.

☐ Dry Stack Storage Facility
Solid manure storage facility will be inspected annually. Broken slabs and curbs will be repaired. Repair or replace rusted or damaged areas on roof structure. Broken gutters and/or downspouts will be repaired or replaced. Check for adequacy and function of drain away from downspouts. Check floor, side and back walls for soundness. Manure solids and leachate will not escape through cracks in the facility.

☒ Feedlot Pens
(ODA does not advise long-term manure storage in open feedlot pens, even in low rainfall areas. Research is currently underway to determine environmental impacts of such practices.)
Maintaining a firm, dry feedlot surface is an important factor in good animal health and the environment. Diversion ditches or berms should direct clean water flow away from feedlot pens and holding areas. Storm water runoff from pens will be collected and stored appropriately. Dry manure will be contained within the pen until removed for storage or field application. Manure accumulations created by manure packs or mounding will be managed such that a pollution hazard is not created. Short-term mounding may be used in conjunction with quick clean-ups used to reduce manure pack from around aprons and under fences. Manure will be removed annually from pens. When removing manure from pens, care is taken to maintain the integrity of the compacted protective seal or "hard pan".

☐ Fencing
Fences will be inspected periodically. Broken or decayed posts will be replaced. Sagging wire will be tightened. Broken wire will be spliced or replaced. Broken or missing insulators for electric fencing will be replaced. Vegetation will be controlled under the fences. Electric fencing will be sufficiently charged to detour animals.

❑ Irrigation Water Management

Irrigation water application will be at rates that minimize transport of sediment, nutrients, and chemicals to surface water and ground water. Equipment modifications and/or soil amendments such as polyacrylamides and mulches should be considered to reduce erosion if needed.

❑ Filter Strips

Maintain vigorous growth of vegetative covering. This includes reseeding, fertilization and application of herbicides when necessary. Periodic mowing, harvesting or grazing may also be needed to control height. Remove all foreign debris that hinders system operation. Limit the traffic from filter strip area. Limit livestock usage to vegetative growth periods when the animals will not damage vegetative root system or compact the soil. Eradicate or otherwise remove all rodents or burrowing animals. Immediately repair any damage.

❑ Manure Application Equipment

All manure application equipment (including but not limited to sprinklers, big gun irrigators, spreaders and/or tank wagons) will be operated and maintained according to the manufacturer's manual. Equipment found to be broken or worn will be replaced. Equipment will be calibrated to ensure recommended rates are applied. Liquids will be drained from sprinklers or big guns prior to freezing weather. When system is flushed, rinse water is used following waste, and liquid and sediment is applied agronomically. Nozzles will be checked periodically and if worn, nozzles will be replaced. Minimize exposure to animal and organic waters and manure gasses. Wear protective clothing when appropriate. When cleaning equipment after nutrient application, remove and save wastes in an appropriate manner. Avoid applying manure near surface water by establishing buffer strips and set backs, and use extreme care to avoid contaminating ground water.

❑ Manure Effluent and Irrigation Transfer Lines.

Manure, effluent and irrigation lines shall be flushed with clean water periodically to prevent particle buildup and plugging. Manure flushed from the lines will be applied agronomically so that surface and groundwater will be protected. Manure, effluent and irrigation lines shall be inspected periodically for leaks or worn out nozzles, and repairs or replacements made as needed. Special inspection shall be done to pressure relief valves, risers and control valves. Shut off valves will be inspected annually. Avoid unnecessary travel over pipelines that will damage their integrity. Equipment found to be broken or worn will be replaced. Water will be drained during cold weather to prevent frozen or broken lines. These lines can explode if not properly maintained and may cause human injury.

❑ Pumps

Pumps will be maintained in accordance with manufacturer's operation and maintenance manual. Effluent will be drained from pumps prior to freezing weather. Pumps will be inspected periodically to identify and remove debris wrapped around impeller or worn parts. Appropriate action will be taken to repair any worn parts. Liquids will be drained from pump prior to freezing weather to prevent breakage. It is recommended to have a spare pump or back up system in case a pump must be removed for an extended time for repair.

❑ Trough or Tank Ritchie Tanks

Watering facility will be inspected periodically. Damaged tank/trough will be repaired or replaced. Float valves will be maintained in good working order. Area immediately surrounding the

trough/tank will be maintained in a stable condition. Watering facilities will not be allowed to overflow if additional liquid will affect waste storage capacities.

☐ Evaporation Waste Storage Pond

Prior to the storage season, empty the pond to provide storage capacity for the accumulation of wastewater and precipitation during the winter storage period. Sludge and accumulated solids will be removed from the pond periodically when buildup limits storage capacity in the pond. Depth markers are installed to assure maximum volume will be maintained and checked weekly. A 2-foot free board will be maintained to prevent spillage.

Maintain all pumps, pipeline, valves, and electrical and mechanical equipment in good operating condition following the manufacturer's recommendations. Immediately repair any vandalism, vehicular, or livestock damage to any earth fill. Immediately remove any obstructions or blockage of spillways, trash racks or pipe inlets. Settlement or cracks in earthen sections should be investigated to determine cause and immediately repaired. Maintain vigorous growth of vegetative coverings on the dikes to eliminate soil erosion. Eradicate or otherwise remove all rodents or burrowing animals and repair any damage caused by their activity. Fences and/or warning signs should be maintained as necessary to unauthorized human or livestock entry. Operate systems in a manner that minimizes odor and drift.

☐ _____

_____

_____

_____

_____

☐ _____

_____

_____

_____

_____

Signature of Legally Authorized Representative: Michael J Widman

Print Name: Michael J Widman Date: 10/31/05

Narrative of production area & land application locations

Aerial photo/topographical map showing numbered fields, production area, clean water diversions, surface water features Soil maps of all application fields & map unit descriptions

Manure, Litter and Process Waste Volumes

Manure, litter and process waste output collected & stored in this system. Bedding added & collected. Processed & wash water collected. Silage & feed processing leachate

Contaminated Storm Water

Direct rainfall into storage, slab or lot runoff collected, overflow from gutters or diversions

Nutrient Content of Manure, Litter & Processed Waste

Content & volume of nutrients in manure, litter & process waste generated. Actual test values are required of large CAFOs

Farm Nutrient Balance

Show amount of nutrients (N,P,K) generated, lost in storage, lost in application, or exported off farm annually. Nutrient applications must balance to most limiting nutrients as determined by NRCS Agronomy Tech Note 26 & NRCS Phosphorus Index. Include all acres required to balance nutrients owned or leased by the operator

Application Schedule & Limitations

Show scheduled applications of solids & liquids. Include date, amount & method of application to identified fields, describe calibration of equipment used to apply manure, litter & processed waste. Describe limitations to applications, indicate buffer areas & management to avoid frozen or saturated soils. Justify buffer width & management. Calculate the minimum storage required for liquids & solids. Indicate timing & application rates of irrigation water, irrigation must not allow leaching of soluble nutrients or runoff

Animal Mortality Management

Describe how the farm handles mortalities

SPECIFIC DESCRIPTIONS AND CALCULATIONS

Land Application Areas

Aerial photos showing numbered field locations for all manure application acreage and surface water features, a topography map and a schematic of the feedlot headquarters are included in this Animal Waste Management Plan.

There are 2 soil types found on the property including, Wingville Silt Loam and Wingdale Silt Loam. A soils map and soil map unit descriptions for all manure application areas are included in this Animal Waste Management Plan.

Manure and Waste Volumes

Calculated volumes of all manure, bedding, wash water, silage leachate, and contaminated storm water have been completed using an excel worksheet based from the NRCS Agricultural Waste Field Handbook. The worksheet is included in this Animal Waste Management Plan.

Nutrient Content of Manure, Little and Process Waste Water

The same excel worksheet was used to estimate volume of manure. On farm manure test results are used in the worksheet to estimate manure nutrient content.

Farm Nutrient Balance

The excel worksheet also includes calculated data for nutrient balance for the operation. Widman Ranches Feedlot is balancing for nitrogen which is the most limiting nutrient as determined by the NRCS Phosphorus Index, which indicated a Site Vulnerability Class of MEDIUM.

Application Schedule and Limitations

Solid manure is stirred and dried during the summer months within the pens. The manure is then mounded for use in the pens as winter bedding for the cattle. No manure is land applied at this time, but Widman Ranches has land available for manure application if the need arises.

Irrigation water from Baker Valley Irrigation District is used on all of the acreage that could be used for manure application. Flood irrigation is used from April through September. To decrease non-point source pollution of surface and groundwater resources, irrigation water is applied at the volume, frequency and application rate in a planned conservation management system. An irrigation system adapted for the site conditions (soil, slope, crop grown, climate, and water quantity) will be available and capable of applying water to meet the intended purpose. Water will not be applied at rates of more than 2 inches per application or at rates that exceed soil infiltration or crop ET. No tile lines or other form of artificial drainage are used on the property.

A 30 foot vegetated buffer along the Baker Valley Irrigation Ditch is in place that does not receive manure application. This area is naturally vegetated with grasses.

Animal Mortality Management

Deceased animals are removed from the facilities and buried according to Oregon state rules.

CAFO

Customer(s): MICHAEL J WIDMAN

Tract: 422

Legend

Tract Boundary

130 0 130 260 390 520 Feet

N

CAFO SOILS

Customer(s): MICHAEL J WIDMAN

Tract: 422

Agronomy Technical Note 26 - Appendix 4

Soils Data for the Eastern Oregon Phosphorus Index

SOIL SURVEY AREA NO.	SOIL SURVEY AREA NAME	MAP UNIT SYMBOL	COMPONENT NAME	COMP. PCT.	HYD. GROUP	SLOPE LOW (%)	SLOPE HIGH (%)	P INDEX RUNOFF CLASS	SURFACE TEXTURE	Kw	Kf
OR604	Baker	4B	APPLEGATE	85	C	2	7	medium	SIL	0.32	0.32
OR604	Baker	4C	APPLEGATE	85	C	7	15	high	SIL	0.32	0.32
OR604	Baker	11A	BAKER	85	C	0	2	medium	SIL	0.37	0.37
OR604	Baker	11B	BAKER	85	C	2	7	medium	SIL	0.37	0.37
OR604	Baker	12A	BAKER	85	C	0	2	medium	SIL	0.37	0.37
OR604	Baker	12B	BAKER	85	C	2	7	medium	SIL	0.37	0.37
OR604	Baker	13A	BALDOCK	85	D	0	2	medium	SIL	0.32	0.32
OR604	Baker	15A	BALM	85	D	0	3	medium	L	0.28	0.28
OR604	Baker	16B	BARNARD	85	C	2	7	medium	SIL	0.37	0.37
OR604	Baker	16C	BARNARD	85	C	7	12	high	SIL	0.37	0.37
OR604	Baker	16D	BARNARD	85	C	12	20	high	SIL	0.37	0.37
OR604	Baker	17C	BARNARD	85	C	7	20	high	CB-SIL	0.32	0.43
OR604	Baker	18B	BENDERLY	85	A	0	7	negligble	GR-FSL	0.15	0.28
OR604	Baker	23A	BOYCE	85	D	0	2	medium	SIL	0.37	0.37
OR604	Baker	25C	BROWNLEE	60	B	2	12	medium	L	0.32	0.32
OR604	Baker	26D	BROWNLEE	50	B	12	35	high	L	0.32	0.32
OR604	Baker	27C	BROWNSCOMBE	85	C	2	12	high	SIL	0.32	0.32
OR604	Baker	31A	BURKEMONT	85	C	0	2	medium	SICL	0.43	0.43
OR604	Baker	32A	BURNTRIVER	85	B	0	2	low	SIL	0.37	0.37
OR604	Baker	35A	CATHERINE	85	C	0	2	medium	SIL	0.28	0.28
OR604	Baker	36C	KEATING	40	C	2	12	high	SIL	0.32	0.32
OR604	Baker	41A	DAMORE	50	C	0	3	medium	SIL	0.32	0.32
OR604	Baker	50C	ENCINA	85	B	2	12	medium	GR-SIL	0.28	0.32
OR604	Baker	54B	GOODRICH	85	B	0	3	low	GR-L	0.28	0.32
OR604	Baker	55B	GOODRICH	50	B	0	7	low	GR-L	0.28	0.32
OR604	Baker	55B	BENDERLY	35	A	0	7	negligble	GR-FSL	0.15	0.28
OR604	Baker	63A	HALFWAY	85	D	0	3	medium	C	0.17	0.17
OR604	Baker	70A	HERSHAL	85	D	0	2	medium	SIL	0.28	0.28
OR604	Baker	81C	IMMIC	85	C	2	12	high	SIL	0.37	0.37
OR604	Baker	84D	JETT	85	B	0	3	low	SIL	0.24	0.24
OR604	Baker	90B	LADD	85	B	2	7	low	L	0.32	0.32
OR604	Baker	91A	LA GRANDE	85	C	0	3	medium	SIL	0.28	0.28
OR604	Baker	92A	LANGRELL	85	B	0	3	low	GR-L	0.17	0.28
OR604	Baker	93A	LANGRELL	85	B	0	3	low	CBV-L	0.17	0.37
OR604	Baker	105C	MARACK	85	C	2	12	high	GR-SICL	0.28	0.43
OR604	Baker	107C	MARACK	50	C	2	12	high	GR-SICL	0.28	0.43
OR604	Baker	107C	MARACK	40	C	2	12	high	SIL	0.43	0.43
OR604	Baker	114C	NORTH POWDER	85	C	2	12	high	L	0.24	0.24
OR604	Baker	126A	POWVAL	85	B	0	3	low	SIL	0.37	0.37
OR604	Baker	127A	POWVAL	85	B	0	3	low	SIL	0.37	0.37
OR604	Baker	129B	RASTUS	85	C	1	7	medium	GRV-L	0.20	0.32
OR604	Baker	131C	RIDLEY	50	C	2	12	high	SIL	0.37	0.37
OR604	Baker	131C	KEATING	40	C	2	12	high	SIL	0.32	0.32
OR604	Baker	159A	STANFLOW	50	C	0	2	medium	SIL	0.43	0.43
OR604	Baker	162A	SUMPLEY	50	C	0	3	medium	SIL	0.37	0.37
OR604	Baker	169C	UKIAH	85	D	2	12	high	SICL	0.32	0.32
OR604	Baker	169D	UKIAH	85	D	12	20	very high	SICL	0.32	0.32
OR604	Baker	171B	VIRTUE	85	C	2	7	medium	SIL	0.32	0.32
OR604	Baker	172B	VIRTUE	85	C	2	7	medium	GRV-SIL	0.28	0.32
OR604	Baker	175A	WINGDALE	85	D	0	2	medium	SIL	0.28	0.28
OR604	Baker	176A	WINGVILLE	85	D	0	2	medium	SIL	0.28	0.28

Data is from the NASIS database as of 7/2001

WATER, WASTE, AND NUTRIENT COMPUTATIONS

Number of Animals

	Animals	Avg. Weight lb	Total 1000# Animal Units	Confinement Period (Days)
1	300	625	187.5	180
2			0	
Total	**300**	**625**	**187.5**	

Solid Storage (Feedlot pen size)

Pens 1-4 10 acres

Evaporation Ponds for storm runoff

Pond 1

Pond 2

Total weight and volume of manure produced during confinement

*Estimated values from NRCS Agricultural Waste Management Handbook)

Manure Produced

	lb/day/Animal Unit	Total Weight ton (as excreted)	Total Weight ton (at application)
1	58.2	982	295
2		0	0
Total		**982**	**295**

	Cu ft/day/Animal Unit	Total Volume Cu ft
1	0.93	31388
2		0
Total		**31388**

Total Nutrient Production

*Estimated values from NRCS Agricultural Waste Management Handbook

	Nutrients Produced lb/day	Total Nutrients Produced lb
Nitrogen	0.30	10125
Phosphorus	0.10	3375
Potassium	0.20	6750

Nutrient Losses

*Estimate from NRCS ORAWM Program and OSU Extension Publication EC 1094

Loss	Remaining N	Remaining P	Remaining K
Storage	50%	70%	60%
Application	70%	100%	100%
Denitrification	95%	100%	100%

Loss	Remaining N lbs	Remaining P lbs	Remaining K lbs	
Storage	5063	2363	4050	
Application	3544	2363	4050	
Denitrification	**3367**	**2363**	**4050**	Available for crop production

Nutrients Utilized

*Estimate from NRCS ORAWM Program

Crop	Acres	Yield Units per acre	Yield	N Utilized (lbs/acre)	P Utilized (lbs/acre)	K Utilized (lbs/acre)
Alfalfa		ton	6.5	293	66	293
Corn, silage		ton	28	216	112	257
Corn, grain		ton	6	193	77	58
Wheat, grain		bushel	110	176	93	41
Total	0					

Volume and Nutrients Exported

100% of manure is retained in pens for winter bedding

Exported tons	N exported lbs	P exported lbs	K exported lbs
295	**3367**	**2363**	**4050**

Nutrients remaining for crop production on farm **after** export

Remaining N lbs	Remaining P lbs	Remaining K lbs
0	**0**	**0**

Crop Utilization

Crop	Acres needed	lbs of N applied	lbs of P applied	lbs of K applied
Alfalfa		0	0	0
Corn, silage		0	0	0
Corn, grain		0	0	0
Wheat, grain		0	0	0
Total	0	0	0	0

Gross Nutrient Balance	Acres	lbs of N	lbs of P	lbs of K
	0	**0**	**0**	**0**

Climatic and Hydrologic Data

Climatic Station- Malheur Branch Experiment Station

25 year- 24 hour storm rainfall = 1.8 inches

Month	Average Monthly in Inches Precipitation	Evaporation	% Lot Runoff Factors Concrete*	Unpaved
January	1.26	0.74	100	0
February	0.98	1.09	100	0
March	0.92	2.06	100	0
April	0.70	3.79	100	0
May	0.98	5.12	100	0
June	0.83	6.08	100	0
July	0.19	7.62	100	0
August	0.38	6.51	100	0
September	0.49	4.03	100	0
October	0.71	1.98	100	0
November	1.21	0.50	100	0
December	1.32	0.71	100	0
Annual	**9.97**	**40.23**		

**No concrete lot runoff contributing to the manure system.*

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

ANIMAL MORTALITY

Management of Animal Mortalities for: Widman Ranches
NAME OF OPERATION

Animal mortalities will be disposed of in a manner that will comply with local, state and federal regulations. Please mark and describe the method(s) of animal mortality management used on this operation:

☐ REMOVAL SERVICE: _____

☐ COMPOSTED: _____

☐ INCINERATED: _____

☒ BURIED: _____

☐ OTHER: _____

Signature of Legally Authorized Representative: Michael J Widman

Print Name: Michael J Widman Date: 10/31/05

Record Keeping and Reporting Requirements

Testing-Monitoring

Include the protocol for testing manure, litter and process waste

Include the protocol for testing and measuring crop nutrient removals

Include the protocol for soil testing to evaluate nutrient application and crop uptake

Record Keeping- Include the following

Date and amount of manure, litter and process waste applied by field. Calculate N & P applied.

Manure, litter and process waste volume exported

Reporting to Oregon Department of Agriculture

Any discharge within 24 hours

Amount of manure, litter and process waste applied annually

Amount of manure, litter and process waste exported annually

APPENDIX E - ANIMAL WASTE SAMPLING

Animal waste analysis is a key component of nutrient management. Complete analyses provide critical information about the animal waste composition, including pH and nutrient content. Actual nutrient content of animal waste varies with the type of animal, feed, storage system, and method of animal waste application. You should sample animal waste stored on site each time it is to be removed (for land application on or off site). Sample daily spread operations (if you land-apply daily) several times throughout the year to obtain a good estimate of nutrient content.

Description

Animal waste sampling is relatively simple, but must be done properly for reliable results. The sampling method differs based on the type of animal waste you generate at your farm (e.g., liquid, semi-solid, solid). Animal waste sampling generally consists of two to seven steps, depending on the type of animal waste. Although the number of steps varies based on the physical state of the animal waste, all of the methods rely on collecting a representative animal waste sample for analysis. Where bedding is collected with the animal waste, include both bedding and animal waste in the sample. Also, conduct sampling as close to the time of land application as possible. Specific techniques for gathering poultry litter, liquid animal waste, semi-solid animal waste, and solid animal waste samples are described below; you can use these to help develop sampling procedures at your farm. Remember that you should sample and analyze all animal waste at your farm. Work with your state and local agricultural Cooperative Extension Offices to ensure that you develop the proper procedures for your conditions and animal waste management methods.

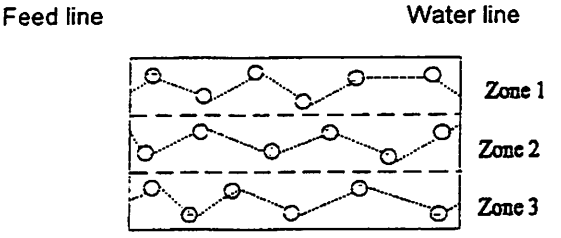
Before sampling, know where the samples are to be shipped, how to pack and ship the sample, and what to use as sample containers. Many laboratories will furnish the proper sample containers for a small charge. Samples should never be collected and shipped in glass bottles, and they should be shipped on wet ice unless otherwise instructed by the laboratory. Contact your state or local agricultural Cooperative Extension Office for a list of laboratories that can perform your analyses. You should also wear gloves at all times, to protect yourself and the sample from contamination.

The test should analyze for such parameters as percentage of dry matter, ammonium-nitrogen, total-nitrogen, phosphorus (P or P_2O_5), and potassium (K or K_2O). Request results in the same units as your calibrated animal waste application system (see Appendix J for more information about calibrating animal waste spreaders and irrigators). For example, if your animal waste application is measured in tons per acre, request that your analysis be reported as pounds of nutrient per ton of animal waste.

Instructions for Collecting Poultry Litter Samples

Poultry litter is a mixture of poultry animal waste and the bedding (e.g., sawdust or rice hull) from houses used to raise broilers, turkeys, and other birds. You will need a clean 5-gallon bucket, a narrow, square-ended spade (or a soil spade), and a 1-quart plastic freezer bag to collect and store your sample. The five steps to collecting a representative poultry litter sample are described below.

Step 1: Mentally divide the poultry house into three zones of equal size. Within each zone, you'll take six cores (i.e., samples) as shown in the diagram below.



Sampling Pattern for Poultry Houses

Step 2: Take the first core within 1 foot of the feed line using your spade. Clear a small trench the width of the spade to the depth of the litter and remove a 1-inch slice, making sure to get equal amounts of litter from all depths. Empty the sample into your bucket.

Step 3: Repeat the process, gathering six cores from each zone, taking your last core within each zone within 1 foot of the water line. Walk the length of the building in each zone in a zigzag pattern taking cores with the spade at random points along your path (as shown in the diagram above). Take a representative number of cores under feeders and waterers. If the bucket becomes full before all 18 samples are taken, dump the contents onto a plastic sheet and continue sampling.

Step 4: After collecting samples from all three zones, crumble and thoroughly mix all of the litter in the bucket. It may be easier to pour the material onto a piece of plastic, or plywood, or into a wheelbarrow to facilitate mixing. Thorough mixing is critical to ensure that the analyzed sample is representative of the entire house.

Step 5: After the litter is well mixed, fill your plastic freezer bag with a subsample (i.e., a small sample) from your composite. Fill the bag only two-thirds full and squeeze the air out before sealing. Keep the sample cool (on ice if possible) until it is shipped.

Instructions for Collecting Liquid Animal Waste Samples

Liquid animal waste is typically stored in tanks, lagoons, or ponds. For tanks, collect only one sample, but collect several subsamples of liquid animal waste to get a representative sample from lagoons and ponds. You will need a clean 5-gallon bucket, a plastic cup, wire, and a long pole to collect liquid animal waste samples from lagoons and ponds. Sample containers are required to collect liquid animal waste samples from all sources. The two steps to collect a representative liquid animal waste sample are described below.

Step 1: For lagoons and ponds, collect several samples from around the shore of the lagoon or pond and mix them together in a clean 5-gallon bucket. You can collect the samples by wiring a plastic cup to the end of a long pole. When taking the sample, turn the cup upside down and push it a few feet below the surface. Then turn the cup right side up and pull out the sample.

If you store your liquid waste in tanks, your tanks must be well agitated before sampling. Often the only practical time to do this is as you are pumping the animal waste into your spreader.

Step 2: Fill a sample container with your sample, making sure to leave 2 inches of air space. Tightly seal the container and keep cool (on ice if possible) until it is shipped.

Instructions for Collecting Semi-Solid Animal Waste Samples

Collecting a representative sample of semi-solid animal waste is best done using a simple sampling device. You will need a 2-inch PVC pipe, nylon rope, a rubber ball, a dowel, a clean 5-gallon bucket, and sample containers. The seven steps to collecting a representative semi-solid animal waste sample are described below.

Step 1: Get a length of 2-inch PVC pipe long enough to reach well into your animal waste storage facility. Cut a notch 2 inches long and 1/4 inch wide at one end of the pipe. Cut a length of nylon rope 2 feet longer than the PVC pipe and tie a knot at one end. Drill a hole through a 2.5 inch rubber ball. Thread the rope through the ball until it is snug against the end knot. Tie a second knot to hold the ball at the end of the rope. Thread the rope through the PVC pipe and pull it until the ball plugs the end of the pipe. Slip your end of the rope into the notch and tie a knot; this will create a "latch" to keep the pipe sealed after you collect the sample. Tie a short dowel to the free end of the rope to serve as a hand grip. Cut a length of 1-inch PVC pipe and seal one end. Use this pipe to push samples out of the tube.

Step 2: With the ball sealing the end of the pipe, push the pipe through the top layer of animal waste to form a sample hole.

Step 3: Release the rope from the notch so that the ball dangles freely from the end of the pipe. Push the pipe into the sample hole in the animal waste crust. Make sure the ball does not block the pipe opening.

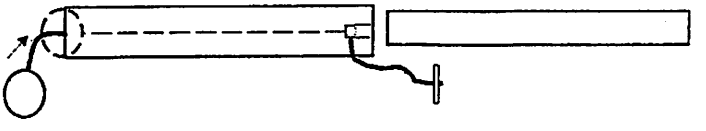
Step 4: Ease the pipe back slightly and pull the rope until the ball seals the end of the pipe. Slip the rope in the notch to anchor the ball in place and withdraw the pipe.

Step 5: Pour the sample into a clean 5-gallon bucket. You may need the 1-inch PVC pipe to force the sample from the pipe. Two people will need to operate a long pipe. To avoid backwash, keep the bottom of the pipe lower than your end.

Step 6: Repeat this process at several locations around the pit.

Step 7: Mix samples thoroughly in the bucket, then fill your sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

A diagram of the sampling apparatus is shown below.



Sample Apparatus for Semi-Solid Animal Waste

Instructions for Collecting Solid Animal waste

Collecting a representative sample of solid animal waste is best done using a simple sampling device. You will need thin-walled metal tubing (1-inch diameter), a drill, a dowel or short metal rod, a clean 5-gallon bucket, and sample containers. The four steps to collecting a representative solid animal waste sample are described below.

Step 1: Cut a 3-foot length of thin-walled metal tubing and sharpen the bottom edge. Near one end, drill

through the tubing and slide in a dowel or short metal rod to make a handle. Cut a 4-foot length of broomstick to force samples from the tube.

Step 2: Push and twist the tubing all of the way into the animal waste pile. Use the broomstick to push the animal waste into a clean 5-gallon bucket.

Step 3: Repeat Step 2 at several random locations around the pile. It is recommended that the more samples the better, so try to get at least 20 samples.

Step 4: Mix samples in the 5-gallon bucket, and fill the sample container with the mix, leaving 2 inches of air space. Tightly seal the container and keep the sample cool (on ice if possible) until it is shipped.

Animal Waste Sample Analyses

Contact your state or local agricultural Cooperative Extension Office for a list of available laboratories that can analyze your animal waste samples. Some Cooperative Extension Offices may even provide free analysis (e.g., in Maryland).

Label, package, and ship your samples to your contracted laboratory. The laboratory should be able to provide their proper protocol for packaging and shipping samples.

Your animal waste sample is typically analyzed for the following constituents:

- Nitrogen;
- Phosphorus;
- Potassium;
- pH;
- Moisture content;
- Calcium;
- Manganese;
- Magnesium;
- Sulfur;
- Zinc; and
- Copper.

The first step in interpreting analytical results of an animal waste test is to check the units used to report the results. They may be reported as percent nutrient (%) or parts per million (ppm), or, on rare occasions, on a dry-weight basis. (Most animal waste is measured on a wet-weight [i.e., as-is] basis.) The phosphorus and potassium may be reported on an elemental basis (P and K) rather than the phosphate (P_2O_5) and potash (K_2O) basis, which is typical of fertilizers. You will need to convert your animal waste test results into the proper fertilizer units for calculating your animal waste application rate.

Animal waste is an excellent fertilizer if it is spread uniformly on a field and at the proper rate. A pound of animal waste phosphate or potash has a nutrient value equivalent to that of commercial fertilizer. Although it has a value as a fertilizer, typically 50 to 80% of the total nitrogen applied is available to crops.