A/F

~~MA# 991188~~
~~AWMP# 05124~~ OK
~~Due date for review: 10/9/05~~

Phillips Ranch, Inc.

MA
173037

Feedlot

RECEIVED
AUG 25 2005
NATURAL RESOURCES
DIVISION

Animal Waste Management Plan

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

Animal Waste Management Plan
August 2005

Phillips Ranch, Inc.

Operated by:
Phillips Ranch, Inc.
26188 Middle Bridge Loop
Baker City, OR 97814
(541) 523-7083

Facility Address:
26188 Middle Bridge Loop
Baker City, OR 97814

Operation:
Beef Feedlot
Large Federal CAFO

As owner and operator of Phillips Ranch, Inc. I intend to manage in accordance with the practices and operation and maintenance described in this Animal Waste Management Plan.

Signature F. Phillips III Date 8/22/05

GENERAL NARRATIVE DESCRIPTION

Phillips Ranch, Inc is located at 26188 Middle Bridge Loop in Baker City, Oregon and is owned by Phillips Ranch, Inc. The operation is a beef backgrounding feedlot and is set on 500 acres available for manure application in Baker County. The beef feedlot is in full operation from December through April at which time, animal numbers may reach 1800 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 500 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 725 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. When the cattle are removed from the facility, the pens are cleaned and the dry manure is used as a soil amendment. Some manure is left in the pens, mounded and packed for bedding in the fall.

Earthen berms and grass filter strips are maintained around the pens to reduce potential for runoff during a storm.

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, and then land applied during the growing season. 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. Solid manure is transported to fields and spread using dump trucks. The majority of the manure is scraped and remounded annually for winter cattle bedding. Any excess manure buildup will be applied as necessary.

Alfalfa and grain barley are stored in a facility adjacent to the feedlot. Any contaminated runoff is contained and evaporated.

Manure Utilization

The land available for manure application is owned and/or leased by Phillips Ranch, Inc. There are 500 acres adjacent to the operation. Currently, 500 acres of alfalfa which yields 5.0 tons per acre, 500 acres of grass/meadow hay which yields 2 tons per acre. The crops are used as feed in a high roughage ration for the cattle. Additional feedstuffs are imported to the feedlot.

Manure is applied via dump trucks. Manure is applied to alfalfa in the fall prior to being farmed and disced into the soil. Approximately 75% of the dry manure is retained in the pens and maintained for winter bedding.

Manure is not only used for nutrient benefits, but also to improve soil tilth via the inputs of organic material. This plan is balanced for nitrogen production and use.

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

OPERATION AND MAINTANENCE

PHILLIPS RANCH, INC.
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

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: F. Phillips III

Print Name: F. PHILLIPS III Date: 8/22/05

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 6soil types found on the property including, 11B Baker silt loam, 13A Baldock silt loam, 15A Balm loam, 126A Powval silt loam, 170A Uma Pine silt loam and 176A Wingville 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 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. Phillips Ranch, Inc. 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 applied and incorporated into the soil primarily in the fall of each year. Manure applied to alfalfa ground in the fall is incorporated, and then the soil is rested for the alfalfa which is planted the following spring. Manure applied to the grass/meadow hay ground is spread and allowed to decompose.

Irrigation water supplied by the Lower Powder Irrigation District is used on all of the manure application acreage. Flood and sprinkler 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 Basche, Perkins and Cranston Irrigation Ditches are in places that do not receive manure application. This area is naturally vegetated with grasses and alfalfa.

Animal Mortality Management

Deceased animals are buried in accordance with the State of Oregon's burial regulations. Livestock will not be buried near domestic wells or near live water.

WATER, WASTE, AND NUTRIENT COMPUTATIONS

Number of Animals

	Animals	Avg. Weight lb	Total 1000# Animal Units	Confinement Period (Days)
1	1800	725	1305	150
2	0	0	0	0
Total	**1800**	**725**	**1305**	

Solid Storage (Feedlot pen size)

Pens 1-10	6 acres

Evaporation Ponds for storm runoff

Pond 1	0
Pond 2	0

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	59.1	5784	1735
2		0	0
		Total **5784**	**1735**

	Cu ft/day/Animal Unit	Total Volume Cu ft
1	0.95	185963
2		0
		Total **185963**

Total Nutrient Production

*Estimated values from NRCS Agricultural Waste Management Handbook

	Nutrients Produced lb/day	Total Nutrients Produced lb
Nitrogen	0.30	58725
Phosphorus	0.10	19575
Potassium	0.20	39150

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	29363	13703	23490	
Application	20554	13703	23490	
Denitrification	19526	13703	23490	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	286	Tons	5	225	50	225
Total	286					

Volume and Nutrients Exported

75%	of manure is utilized for bedding

Exported tons	N exported lbs	P exported lbs	K exported lbs
1301	14645	10277	17618

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

Remaining N lbs	Remaining P lbs	Remaining K lbs
4882	3426	5873

Crop Utilization

Crop	Acres needed	lbs of N applied	lbs of P applied	lbs of K applied
Alfalfa	286	64350	14300	64350
Corn, silage		0	0	0
Corn, grain		0	0	0
Wheat, grain		0	0	0
Total	286	64350	14300	64350

Gross Nutrient Balance	Acres	lbs of N	lbs of P	lbs of K
	0	-59468	-10874	-58478

Climatic and Hydrologic Data

Climatic Station- Malheur Branch Experiment Station

25 year- 24 hour storm rainfall = 1.8 inches

This is the closest station to Baker Co. with similar precip.

Month	Average Monthly in Inche: 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.

October 2001

PHOSPHORUS INDEX WORKSHEET – **EASTERN** OREGON

Producer: PHILLIPS RANCH County: BAKER Tract No. _____ Field No(s). _____ Date: 8/22/05

Soil Map Unit(s): 11B, 13A, 15A, 126A, 170A 176A Soil Test P: _____ ppm Lab. Method: _____ Sample Depth: _____

Crop Rotation: ALFAFA PASTURE ROTATION Nutrient Application Method(s) USED BOOK VALUES & ESTIMATES

Planner: _____ Notes: _____

		PHOSPHORUS LOSS RATING					Weighted Rating Value	
TRANSPORT FACTORS	Factor Weight	None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Current	Planned
Soil Erosion – tons/ac/yr (RUSLE and/or WEQ)	1.50	< 1 (0)	1 – 3 (1.5)	4 – 6 (3.0)	7 – 15 (6.0)	> 15 (12.0)	~~3~~	
Soil Erosion from Sprinkler Irrigation	0.25	No sprinkler irrigation (0)	Application rate < infiltration rate OR No visible runoff at field borders (0.25)	Application rate = infiltration rate OR Little to no visible runoff at field borders (0.5)	Application rate > infiltration rate OR Visible runoff at field borders (2.0)	Application rate > infiltration rate OR Excessive runoff visible at field borders. Rills and gullies present. (4.0)	.5	
Soil Erosion from Surface Irrigation – tons/ac/yr (SISL)	1.00	< 1 (0)	1 – 3 OR tail water return flow in place (1.0)	4 – 6 (2.0)	7 – 15 (4.0)	> 15 (8.0)	~~2~~	
Runoff Class	1.00 – nonirrigated 0.50 - irrigated	Negligible (0)	Very low or low (0.5 IRR, 1.0 NIRR)	Medium (1.0 IRR, 2.0 NIRR)	High (2.0 IRR, 4.0 NIRR)	Very High (4.0 IRR, 8.0 NIRR)	1	
Distance to Perennial Surface Waters / Buffer Widths	0.50	> 500 feet OR buffer > 30 ft. wide (or meets NRCS standards) next to surface waters (0)	300 – 500 feet OR buffer 20 - 30 ft. wide next to surface waters (0.5)	200 – 299 feet OR buffer 10 -19 ft. wide next to surface waters (1.0)	100 – 199 feet AND buffer < 10 ft. wide next to surface waters (2.0)	< 100 feet AND No buffer next to surface waters OR Return flow from surface irrigation occurs with no buffer (4.0)	.5	

PHOSPHORUS INDEX WORKSHEET – **EASTERN** OREGON

Subsurface Drainage	0.50	No tile drains (0)	Tile drains present Soil Test P (Olsen) < 40 ppm (0.5)	Tile drains present Soil Test P (Olsen) 40 - 120 ppm (1.0)	Tile drains present Soil Test P (Olsen) 121 - 170 ppm (2.0)	Tile drains present Soil Test P (Olsen) > 170 ppm (4.0)	0	
						Transport Factors Subtotal (TFS)	7 1/2 4	

Tract _____ Fields _____

SOURCE FACTORS	Factor Weight	PHOSPHORUS LOSS RATING None (0)	Low (1)	Medium (2)	High (4)	Very High (8)	Weighted Rating Value Current	Planned
Soil Test P – 0-12" ppm (Olsen $NaHCO_3$)	1.00	(Soil Test P – 20) x 0.10 (_____ (Soil Test P) - 20) x 0.10 = _____ Assign 0 points if Soil Test P < 20 ppm					2	
Commercial P Fertilizer Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					2	
Commercial P Fertilizer Application Method	1.00	None Applied (0)	Placed with planter OR Injected deeper than 2 inches OR Incorporated by plowing (1.0)	Incorporated deeper than 3 inches by disking, chiseling, etc. (2.0)	Incorporated less than 3 inches deep by harrowing, etc. (4.0)	Surface applied – not incorporated prior to irrigation or winter precipitation (8.0)	4	
Organic P Source Application Rate	1.00	lbs/ac P_2O_5 x 0.02 _____ (lbs/ac P_2O_5) x 0.02 = _____					2	
Organic P Source Application Method	1.00	None Applied (0)	Injected deeper than 2 inches OR Incorporated immediately (1.0)	Incorporated deeper than 3 inches by disking, chiseling, etc. within 5 days of application (2.0)	Incorporated less than 3 inches deep by harrowing, etc. within 21 days of application (4.0)	Surface applied – not incorporated prior to irrigation or winter precipitation (8.0)	2	

Total Rating Value TFS x SFS	Site Vulnerability Class

	Current	Planned
Transport Factors Subtotal (TFS)	7 1/2 4	
Source Factors Subtotal (SFS)	12	

PHOSPHORUS INDEX WORKSHEET – **EASTERN**

< 30	**Low**
30 – 100	**Medium**
100 – 400	**High**
> 400	**Very High**

Total Rating Value (TFS x SFS)	84	
Site Vulnerability Class	MEDIUM	

Non-Technical Descriptions

Soil Survey Area: Baker County Area, Oregon
Survey Status: Published
Correlation Date: 10/10/1988
Distribution Date: 04/26/2004

Map Unit: 11A Baker silt loam, 0 to 2 percent slopes
Description Category: SOI
The Baker soil is over 60 inches deep to bedrock, a hardpan is at 20 to 40 inches. It is loamy, well drained and occurs on terraces. Permeability is very slow. This soil is alkaline. Water erosion is a potential hazard.

Map Unit: 11B Baker silt loam, 2 to 7 percent slopes
Description Category: SOI
The Baker soil is over 60 inches deep to bedrock, a hardpan is at 20 to 40 inches. It is loamy, well drained and occurs on terraces. Permeability is very slow. This soil is alkaline. Water erosion is a potential hazard.

Map Unit: 15A Balm loam, 0 to 3 percent slopes
Description Category: SOI
The Balm soil is over 60 inches deep to bedrock. It is loamy over sandy, the subsoil is high in gravel, somewhat poorly drained and occurs on floodplains. Permeability is very rapid below 30 inches. This soil is subject to flooding. A water table is present during winter, spring and early summer.

Map Unit: 84D Jett silt loam, 0 to 3 percent slopes
Description Category: SOI
The Jett soil is over 60 inches deep to bedrock. It is silty, well drained and occurs on floodplains. This soil is subject to flooding. A water table is present during winter and spring.

Map Unit: 95C Legler gravelly loam, 8 to 20 percent slopes
Description Category: SOI
The Legler soil is over 60 inches deep to bedrock. It is loamy, well drained and occurs on terraces and fans. This soil is subject to flooding. Water erosion is a potential hazard.

Map Unit: 126A Powval silt loam, 0 to 3 percent slopes
Description Category: SOI
The Powval soil is over 60 inches deep to bedrock. It is silty, well drained and occurs on terraces. A water table is present during winter and spring.

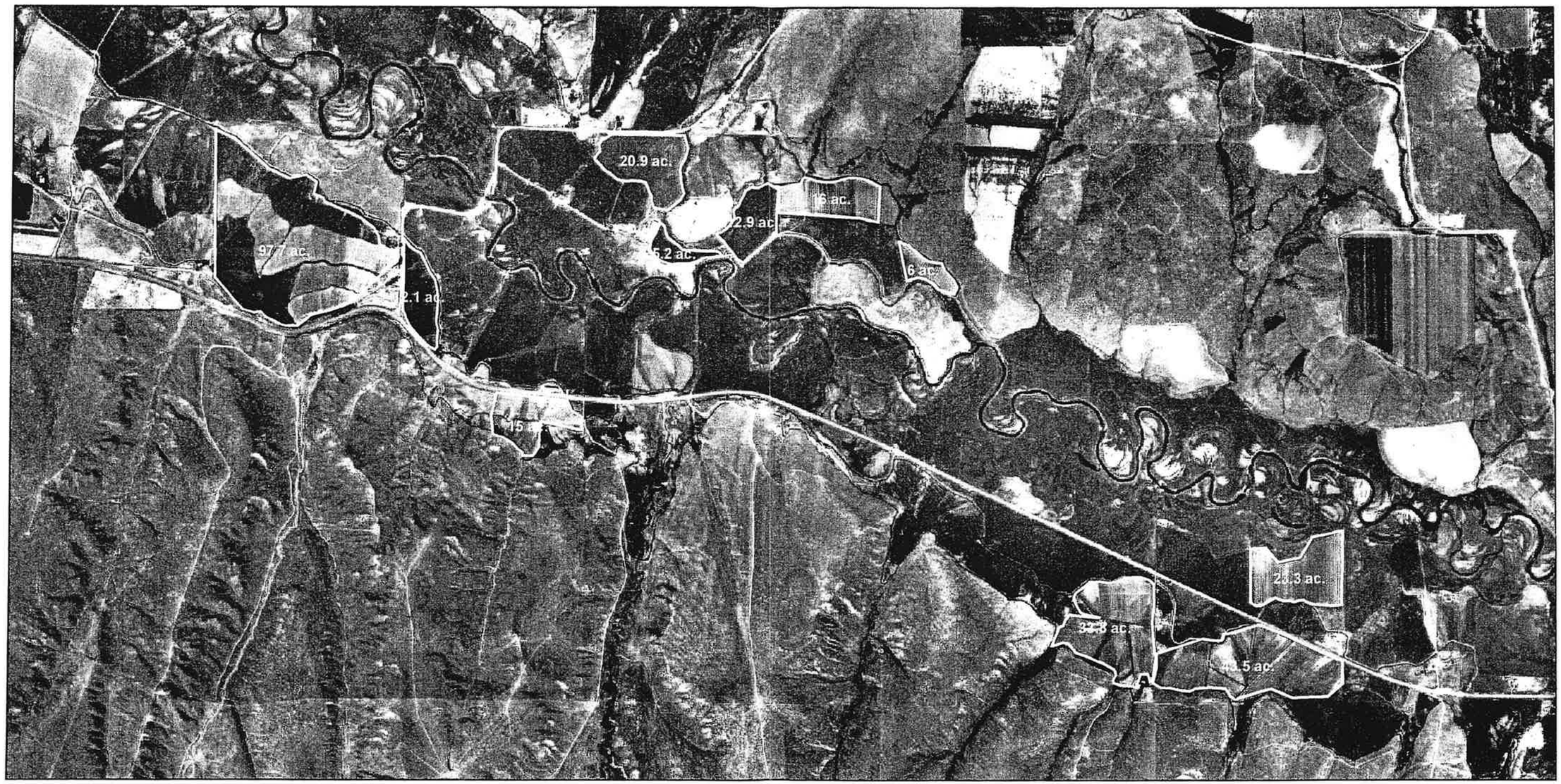
Map Unit: 170A Umapine silt loam, 0 to 2 percent slopes
Description Category: SOI
The Umapine soil, rarely flooded phase, is over 60 inches deep to bedrock. It is silty, somewhat poorly drained and occurs on terraces. This soil is alkaline and saline. This soil is subject to flooding. A water table is present during late winter, spring and summer.

Map Unit: 171B Virtue silt loam, 2 to 7 percent slopes

Phillips Ranch CAFO

Customer(s): PHILLIPS RANCH INC

Field Office: BAKER CITY SERVICE CENTER
Agency: NRCS
Assisted By: Anthony M Sunseri



1,200 0 1,200 2,400 3,600 4,800
Feet

Legend

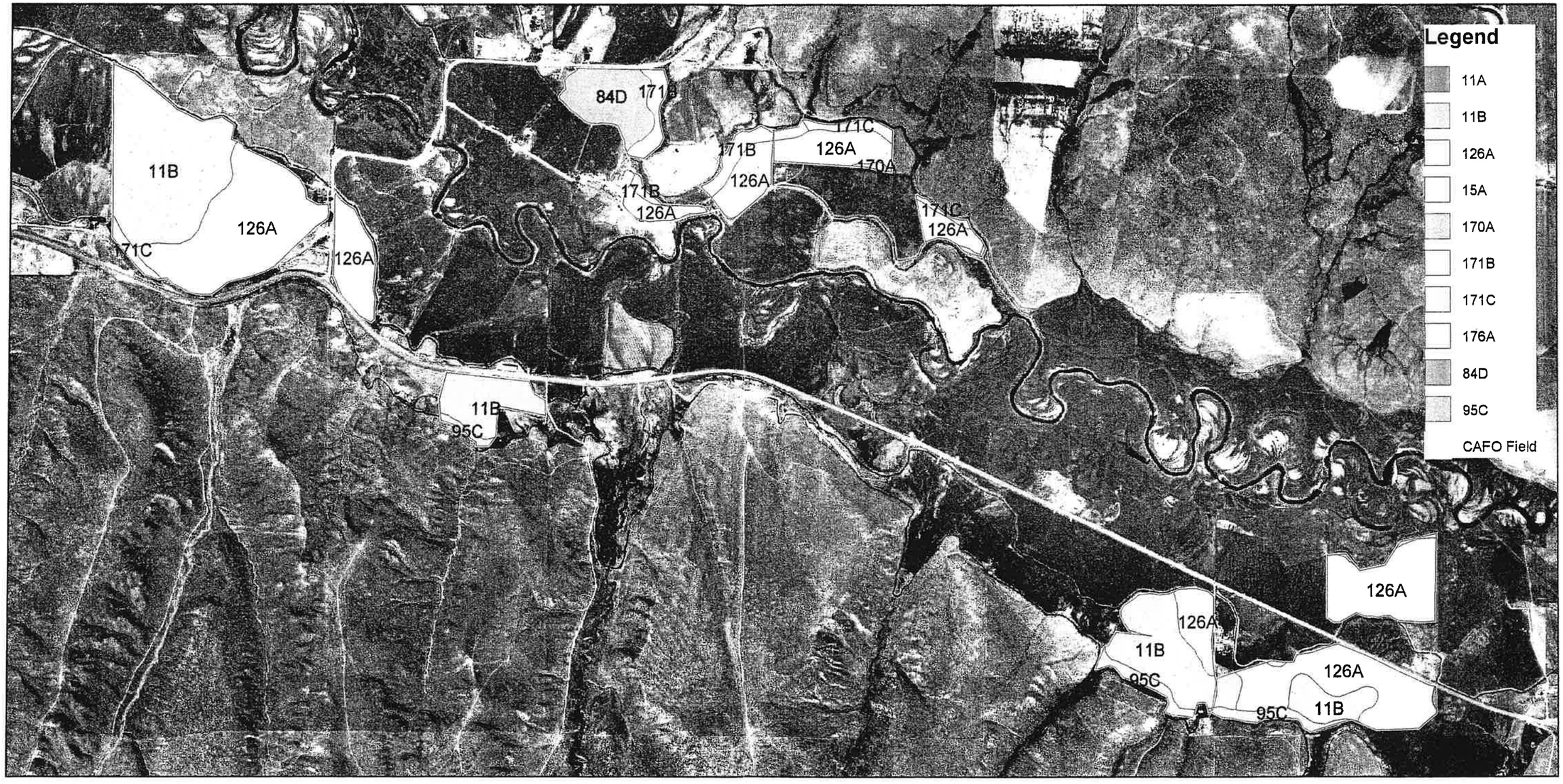
CAFO Field

N

Phillips Ranch CAFO Soils

Customer(s): PHILLIPS RANCH INC

Field Office: BAKER CITY SERVICE CENTER
Agency: NRCS
Assisted By: Anthony M Sunseri



950 0 950 1,900 2,850 3,800
Feet

N

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	IMMIG	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

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

ANIMAL MORTALITY

Management of Animal Mortalities for: PHILLIPS RANCH, INC.
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: according to State laws

☐ OTHER: _____

Signature of Legally Authorized Representative: F. Phillips III

Print Name: FRED PHILLIPS III Date: 8/22/05

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

Record Keeping and Reporting

Soil samples will be taken in each field, once every 5 years. A manure sample will be taken yearly just prior to field application. Protocol for sampling and testing soil, manure and crops are included in this Animal Waste Management Plan.

Phillips Ranch Inc. Feedlot records date and amount of manure applied to each field. As a large Federal CAFO, the following inspections will occur and records kept:

	FREQUENCY OF INSPECTIONS	ITEM(S) TO BE INSPECTED
INSPECTIONS:	DAILY	• Water lines
	WEEKLY	• Storm water diversions • Run-off diversions • Waste transport • Storage structures • Storage structure volume
	PERIODIC	• Application equipment leaks

Record results of:

1) Daily inspections.
2) Weekly inspections.
3) Periodic inspections.
4) Corrective actions taken, explain those not corrected.
5) Expected crop yields (if not in the plan).
6) Weather conditions at the time of manure, litter or process water application and 24 hours before and after application.
7) Total amount of manure or wastewater transferred to other persons, including date and amount of each transfer and the name and address of each recipient. Nutrient content data will be given to the recipient.

Phillips Ranch Inc. Feedlot will report any discharge within 24 hours to the Oregon Department of Agriculture. Annual reports including amount of manure and wastewater applied and exported will be submitted each year.

Manure application record sheet

Field I.D. ______ Nitrogen requirement for field [lb/ac/y] Application basis (Circle one)

Year ______ Phosphorus requirement for field [lb/ac/y] Nitrogen Phosphorus

Date	Amount	X	nitrogen content per unit	=	Nitrogen applied		amount applied x phosphous content per unit	=	Phosphorus Applied	Total N Applied	Total P applied
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ODA Soil Sampling Standard Methodology
March, 2001

This document is intended to describe a standard procedure for collecting, storing, and shipping soil samples collected by ODA staff and/or contractors. All ODA staff involved in soil sampling should have received training in Departmental protocols for soil sampling. The procedures described are intended to be used for non-hazardous samples that are not going to be analyzed for volatile constituents. Soil samples collected with the methods described can not be considered undisturbed samples.

Considerations for Choosing Laboratory Analyses

Before conducting any soil sampling, first decide what parameters you will be looking for and how they should be analyzed. This is important for choosing an appropriate analytical laboratory, for budgeting, and for knowing how soon the laboratory must receive your samples. Most of the sampling done by CAFO/NRD staff involves looking for nitrogen compounds, phosphorus compounds, potassium compounds, bacteria, and organic matter or total organic carbon. This section will focus on the analytical techniques for these compounds, and how to decide which chemical species to look for. If you are planning on analyzing for other compounds, consult with the NRD technical staff.

Nitrogen compounds: The nitrogen compounds we are usually concerned with are nitrate (NO_3), nitrite (NO_2), ammonia (NH_3), ammonium (NH_4), and total Kjeldahl nitrogen (organic nitrogen compounds, typically NH_2). Typically, the older the manure source, the more likely that the nitrogen will be in the form of nitrate. Manure starts as being mostly NH_2 to NH_4, and eventually oxidizes to NO_2 and NO_3.

Analysis of total Kjeldahl nitrogen (TKN) is standardized, so telling a laboratory you want a TKN analysis will get you about the same thing every time. The same is true for ammonia and ammonium. However for nitrate and nitrite, there are two widely used methods to choose from. EPA Method 300, which is an ion chromatography method, and EPA Method 353.2, which uses cadmium reduction. These analyses report nitrate and nitrite combined, or separately. You can specify how you'd like the results presented. However, if you do want nitrite reported separate from nitrate, then the sample must be analyzed (using either method) within 48 hours after collection. EPA Method 300 has a 48 hour holding time whether or not speciation of NO_2/NO_3 is requested, so usually EPA Method 353.2 is the better choice for nitrate/nitrite analyses.

Phosphorus compounds: In most cases, we are concerned with all phosphorus compounds that are not tied up with silicate minerals (e.g., apatite). However, standard total phosphorus analyses use an acid digestion, which will liberate phosphorus tied up in minerals. Because of this, the preferred method is AOAC Official Method 977.01. This method uses a water extraction of phosphorus, so that mineralized forms are not brought into solution. If the laboratory can not do this method, then request a weak acid extraction, which would use citric or acetic acid. Make sure the laboratory can supply a reference for any alternative method they propose, other than AOAC Official Method 977.01. If you are sure that there will be no significant mineral phosphorus component in the sample, then the laboratory can use a more traditional total

phosphorus (TP) analysis. The NRD hydrogeologist or hydrologist can give you advice on whether there is a potential for the presence of mineral phosphorus.

Potassium compounds: Sampling and analysis for potassium compounds has a lot in common with analyzing for phosphorus compounds. Standard analyses also use an acid extraction, which can liberate silicate-bound potassium. Generally we want to detect all water soluble forms of potassium. To avoid sampling mineral forms of potassium, request a STLC (soluble threshold limit test) extraction analysis, instead of EPA Method 3010. STLC is routinely done for toxic metals, but can also be performed successfully for potassium.

Bacteria sampling: Appropriate bacteria sampling and analysis is dependant mostly on getting the sample to the laboratory immediately. For identifying issues relating to manure, either fecal coliform or E. coli sampling is valid, but in both cases the samples should be analyzed by the laboratory the same day they are collected. Make sure the lab can give you a population count of the bacteria, a presence/absence analysis is usually not meaningful for the purposes of our investigation. Also, make sure the lab can analyze soil samples for bacteria - it is not commonly as available as analysis of water samples.

Hand Auger Sampling

Hand auger sampling is done by advancing the auger to approximately six inches below the desired depth of sampling, and then removing soil from the central portion of the auger barrel. The soil from the central part of the barrel should be used as the sample, because it is less likely to have been contaminated from material sloughing off the walls of the boring. Ideally, the sample should be placed in a laboratory supplied container, however new sealable plastic bags can be used if laboratory containers are not available. Whenever possible, take two samples at each sampling location. These should be labelled as 'A' and 'B' samples, so that you have a back up sample if something happens to one of them, or if you want to augment regular quality assurance/quality control procedures. Both 'A' and 'B' samples should be sent to the laboratory, but not necessarily analyzed. This is discussed further in the Sample Handling and Documentation section of this methodology.

Always backfill hand augered borings after sampling is finished. Do not advance hand augered borings into groundwater (including perched water), unless groundwater samples are needed.

Trowel or Shovel Sampling

Trowels, shovels, and other implements can also be used to obtain soil samples. Usually these are not very efficient for sampling below about one foot, and they are not accurate for sampling at a designed depth. They are appropriate for shallow soil sampling. When using these types of implements, follow the decontamination procedures described below. Remove all soil from the excavated area before obtaining a sample, so that the sample will be representative of the desired area.

Equipment Decontamination (Decon)

Decontamination is important to prevent false positive or erroneous analytical results for soil sampling. Generally decontamination involves removing as much of the soil from the sampling equipment as possible before using the equipment on another sample. Usually this can be done with tap water, an approved detergent, a brush, two buckets, plastic sheeting or some other portable clean surface, and deionized (or distilled) water in a spray bottle. Sampling equipment should be rinsed with deionized water after being washed and scrubbed with a detergent solution, especially if any metals will be the sample analytes. The scrub brush size must be appropriate to clean all surfaces that may contact samples, including the barrel of the auger. Sampling equipment should be deconned before each use, even if the equipment has been in clean storage. Sampling equipment should also be deconned before replacing equipment into the field vehicle between sample points and at the end of the day. Choose an area to do decon in advance, being carefull to avoid areas where small spills of detergent or wash water would be a problem. Use plastic sheeting or other portable clean surface for holding deconned equipment between uses. Decontamination methods should be appropriate for the planned analytes. For example, if the analysis will be for sodium, then you should not use a detergent containing sodium carbonate. Many common detergents contain either sodium carbonate or some type of phosphorus compound, so be careful not to use these when sodium or phosphorus are the analytes. Other commercially available detergents - like Liquinox - should be used instead. If there are any questions as to the appropriateness of detergent, contact the appropriate ODA technical staff for assistance.

Sampling Strategies

Various methods can be used to determine how many samples to take, and where to take them. Economic limitations must also be considered, especially when the intended chemical analyses will be expensive. Most sampling schemes employed by ODA staff will be simple "Judgemental" schemes, where there will be some visible or olfactory evidence to justify sampling. Statistically valid sampling schemes are discussed in two EPA documents, "Preparation of Soil Sampling Protocols: Sampling Techniques and Strategies" and "Site Characterization for Subsurface Remediation." Comprehensive statistically relevant sampling plans should be peer-reviewed by ODA technical staff.

Sample Handling and Documentation

Sterile, clean sampling containers should be obtained from the lab complete with any specific instructions relating to the planned analytes. Make sure to follow the laboratory's guidance on holding times and quality assurance/quality control for each planned analyte.

After obtaining a sample, it should be labelled immediately to reduce the possibility of misidentification. The label should include the sample number (including 'A' and 'B' designations), date and time of collection, the collector's initials, and some name reference to the geographic location of the sampling. This information should also go into field notes taken during the sampling. The sample should then be placed in a chilled container, preferably with "blue ice" as opposed to wet ice. If wet ice is used, seal the samples in closeable plastic bags (providing a double seal against moisture) before storing. A chain-of-custody form must

accompany all samples collected, and must be signed by all parties who handle the samples. This form is needed to document where the samples have been and who has handled them. Information from the sample label should be repeated on a chain-of-custody form, along with laboratory instructions. Make sure to indicate which samples you want analyzed - typically you will not have the 'B' samples analyzed immediately, if at all. These are usually kept as a back-up. Ideally, the samples should be hand-delivered to a laboratory, however in many instances they will have to be shipped. Most of the time companies like UPS and Federal Excess will not sign chain-of-custody forms. In this case, provide a signed seal over every access to the shipping container. Make sure the laboratory receiving the samples documents the condition of the seal.

Along with information specific to each sample, field logs should contain a detailed description of where and when each sample was taken. This description should include sample depth, sampling equipment used, sampling location justification, approximate distances from reference points (this is usually best accomplished with a sketch), whether the samples had any obvious odors or discoloration, and what weather conditions were like during the field work. Sampling location justification should include a description of the area where the sample was taken, including any discoloration or obvious odors. Photographs of the sampling locations and their surroundings should also be taken.

Appendix A: Soil Sampling Procedure

The following procedure may be used as a step-by-step soil sampling procedure. If it should become necessary to deviate from this procedure in a way that may invalidate the sampling results, contact appropriate ODA technical staff for recommendations on modifications to the procedure.

1. Before going to the field location, inventory sampling equipment to ensure all necessary equipment is available (a sample list is available in Appendix B).
2. At the field location, select appropriate location for decontamination station. Ideally, this location will be proximal to sampling locations, but will have a very low risk of becoming contaminated due to site conditions (e.g., wind, traffic, etc.).
3. Set up decontamination station. Be careful not to contaminate the station. This area will allow you to store decontaminated equipment until ready for use.
    a. Fill sprayer with demineralized (deionized) water.
    b. Mix soap solution (Liquinox® or other approved soap) as directed by the label.
    c. If bacteria sampling will occur, prepare the sterilizing agent as directed on the label or in Appendix E.
4. Decide why sampling will occur, and select appropriate analytes (see Appendix C).
5. Map out the location of the sampling sites, showing their locations relative to permanent landmarks and/or GPS coordinates. If you are doing sampling to establish an area-wide soil condition assessment (e.g., finding out if land application of manure has exceeded agronomic rates throughout a field), then state how many samples per unit area, and draw a dimensionless map of their locations.
6. Perform initial decontamination of equipment for appropriate analytes (i.e., you do not need to disinfect the equipment if bacteria will not be analyzed).
7. <u>Decontamination procedure:</u>
    a. Clean as much soil off the auger as possible utilizing mechanical agitation (e.g., dry brush, garden spade, tapping barrel lightly on rock, etc.).
    b. Use tap water to remove more dirt if desired.
    c. Scrub sampling equipment with soapy water (including all areas where the equipment is touched by the technician). Ensure scrub brushes fit in all orifices and cracks of equipment.
    d. Perform tap water rinse.
    e. Shake to remove excess water.
    f. If sampling for bacteria, apply sterilizing agent and satisfy contact times described on label or in department approved procedures.
    g. Perform demineralized water rinse, then shake off excess water.

h. Place decontaminated equipment on a clean (i.e., area known to be free of contamination) surface until equipment is to be used.

8. To collect a soil sample:

   a. Auger or dig to six inches above the desired sample interval.

   b. Decontaminate the equipment used, and put on clean gloves.

   c. Auger or dig to collect the sample.

   d. Adjacent to the decontamination station, place the sample in a laboratory supplied or approved sampling container. Split the sample for all analytes except bacteria.

   e. Once the sample is sealed (for additional security, seal sample containers with adhesive that bears your signature), label the sample. Information should include sample number (including A or B for split samples), sample technician, date, and farm name. Your field log should include this information, plus complete location descriptions and time of sampling. If storage on ice is required, place sample containers in sealed zip-lock bags.

   f. Place the sample in the shipping or handling container. Ensure laboratory recommendations are followed (e.g., ice).

   g. If another sample is to be taken from the same hole, return to step 6 and continue. If sampling is completed for this hole, decontaminate sampling equipment.

9. If other holes are to be sampled, return to step 6 and continue. If sampling is completed for this operation, decontaminate and store sampling equipment using the decontamination procedure. If equipment has not been allowed to air dry before storage, ensure the storage area is well ventilated, and that equipment can thoroughly dry in this location. (Note: Ensure contaminated equipment is never stored in your clean equipment storage area of your vehicle. If this occurs, decontaminate this area and allow it to air dry before returning sample equipment.)

10. Once sampling is complete, clean up the decontamination station and backfill the auger hole.

    a. For disposable equipment, decontaminate any gross contamination before cleaning re-usable equipment.

    b. For re-usable equipment, ensure that the outsides of the containers are decontaminated when necessary. The insides of the containers need only be cleaned using subsequent steps of the decontamination procedure (e.g., the soapy water bucket should be rinsed with tap-water, washed with any disinfectant used, rinsed with demineralized water, and allowed to air dry. The tap-water equipment need only be washed with any disinfect used, rinsed with demineralized water, and allowed to air dry. And so on.).

    c. Unless label restrictions indicate otherwise, all fluids may be safely disposed of by pouring them onto the land surface (preferably in a grassy area where runoff to a drainage is unlikely). Most fluids may also be poured down drains connected to sanitary sewers or septic systems. DO NOT POUR DISINFECTANTS INTO

SEPTIC SYSTEMS. Septic systems rely on beneficial bacteria for proper operation.

d. If any equipment is not dry when placed in storage, ensure it is placed in a well ventilated storage area in the vehicle.

e. For disposable equipment:

   i. Remove excess water.

   ii. Place all disposable items in the center of the decontamination pad (i.e. the plastic sheeting).

   iii. Remove gloves and place in center.

   iv. Making sure you do not touch the upper surface of the decontamination pad (the bottom has not been impacted by sampling), fold the pad over onto itself, and place the entire assembly into a large garbage bag. Seal the garbage bag, and dispose of in any trash receptacle. If necessary, the sealed sack allows you to transport the trash in your vehicle without contaminating your "clean" equipment storage.

f. When backfilling, make sure the soil put into the hole is compacted as much as possible.

Appendix B: Sample Equipment List

The following is an example of a typical equipment list for soil sampling. Personal preference may result in substitution or addition of equipment.

1. Hand auger with appropriate extensions and barrels.
2. Gardening trowel.
3. Shovel.
4. Lab supplied sample (wide-mouth) jars.
5. Adhesive sample labels that allow assignment of sample number, date, time, person conducting sampling, and farm name.
6. Chain of custody forms that contain sufficient blocks to establish that hold-time criteria are not exceeded.
7. One or more buckets for wash water.
8. Round scrub brush that fits into auger barrels.
9. Liquinox soap (or other soap that meets chemical criteria).

10. Demineralized water in spray rig for final rinse.

11. Chlorine bleach or other effective disinfectant.

12. Plastic sheeting to act as clean area (may want to include rocks to hold sheeting down in windy conditions).

13. Equipment that allows adequate field location of sample sites (e.g., GPS unit, compass, tape measure).

14. Camera.

15. Write-in-the-Rain notebook with pen that writes in the rain on both labels and the notebook.

16. Trash sacks for disposal of used supplies.

17. Ice chest and ice for sample preservation.

18. Security seals for containers to be shipped.

19. Box of latex gloves.

Appendix C: Soil Sampling Depth Matrix

Soil sampling occurs primarily for one of three reasons: 1) to determine that wastes are being applied at agronomic rates; 2) to ascertain whether or not deep leaching of waste constituents are occurring; and 3) to determine if wastes have run off to an area where wastes are prohibited. The following table provides guidance on sampling depth and pollutants of concern.

REASON FOR SAMPLING	SAMPLE DEPTHS	ANALYTES
Determination of agronomic application.	6 inch sample	Mineralizable N test or TKN, ammonium, and nitrate; ortho-phosphorus; and potassium.
Suspicion of deep leaching.	1 foot, 3 feet, and deepest rooting depth if significantly different than 3 feet.	Ammonium, nitrate+nitrite, ortho-phosphorus, and potassium.
Wastes suspected in prohibited area.	Collect visibly impacted soils. If soils are not visibly impacted, collect 6 inch sample. If deep leaching is suspected, also follow above guidance.	Use the determination of agronomic application analytes above for 6 inch and shallower samples, plus add total organic carbon. For deeper samples use the analytes above for suspected deep leaching.

Normally, bacteria analysis of soils will not be required. If soil areas are periodically subject to concentrated flow that may result in suspension of sediment in a water column, bacteria analysis may be appropriate. For unusual sampling situations, contact appropriate ODA technical staff for advice on sampling methodology.

Appendix D: Recommended Analytic Methods

The following is a list of the recommended methods of analysis for **soil samples only**. Some of the methods discussed can be used for water samples, but the rationale used in this document for choosing an analytical method is meant only for soil samples.

Nitrogen compounds: Analyses for total Kjeldahl nitrogen (TKN), ammonia, and ammonium are mostly standardized, so any method a reputable lab chooses should be fine. Nitrate and nitrite, have two widely used methods to choose from. EPA Method 300, which is an ion chromatography method, and EPA Method 353.2, which uses cadmium reduction. These analyses report nitrate and nitrite combined, or separately. You can specify how you'd like the results presented. However, if you do want nitrite reported separate from nitrate, then the sample must be analyzed (using either method) within 48 hours after collection. EPA Method 300 has a 48 hour holding time whether or not speciation of NO2/NO3 is requested, so usually EPA Method 353.2 is the better choice for nitrate/nitrite analyses.

Phosphorus compounds: In most cases, we are concerned with all phosphorus compounds that are not tied up with silicate minerals (e.g., apatite). Use AOAC Official Method 977.01. which is a water extraction of phosphorus, so that mineralized forms are not brought into solution. If the laboratory can not do this method, then request a weak acid extraction, which would use citric or acetic acid. Make sure the laboratory can supply a reference for any alternative method they propose, other than AOAC Official Method 977.01. If you are sure that there will be no significant mineral phosphorus component in the sample, then the laboratory can use a more traditional total phosphorus (TP) analysis. Analyses for phosphate (PO_4) are fairly standardized, so any method a reputable lab chooses should be fine.

Potassium compounds: Sampling and analysis for potassium compounds has a lot in common with analyzing for phosphorus compounds. Standard analyses also use an acid extraction, which can liberate silicate-bound potassium. Generally we want to detect all water soluble forms of potassium. To avoid sampling mineral forms of potassium, request a STLC (soluble threshold limit test) extraction analysis, instead of EPA Method 3010.

Bacteria sampling: Appropriate bacteria sampling and analysis is dependant mostly on getting the sample to the laboratory immediately. For identifying issues relating to manure, either fecal coliform or E. coli sampling is valid, but in both cases the samples should be analyzed by the laboratory the same day they are collected. Make sure the lab can give you a population count of the bacteria, a presence/absence analysis is usually not meaningful for the purposes of our investigation. Also, make sure the lab can analyze soil samples for bacteria - it is not commonly as available as analysis of water samples.

Appendix E: Recommended Disinfectants

All disinfectants should be used in accordance with the label instructions. General disinfectants (e.g., chlorine bleach) may also be used with concentrations and contact times as specified in this appendix. The only other disinfectant currently recommended for use is Virkon S, which is also used by the Animal Health division.

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.

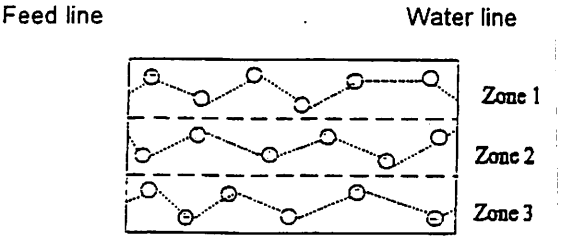
Before sampling, know where the samples are to be shipped, how to pack and ship the sample, and what to use as sample containers. Many laboratories will furnish the proper sample containers for a small charge. Samples should never be collected and shipped in glass bottles, and they should be shipped 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 tc 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.

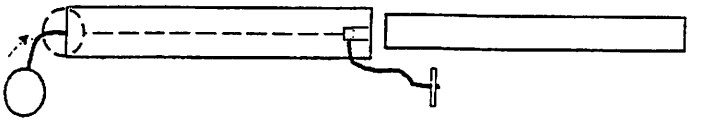
Step 4: Ease the pipe back slightly and pull the rope until the ball seals the end of the pipe. Slip the rope in the notch to anchor the ball in place and withdraw the pipe.

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.

Additional Requirements for Large CAFO's

Inspections

Storm water diversions, runoff diversions, waste transport, storage structures, storage volume weekly

Water lines daily

Application equipment leaks periodically

Record Keeping

Results of daily inspections

Results of weekly inspections

Results of periodic inspections

Corrective actions taken, explain those not corrected

Expected crop yields if not in plan

Weather conditions 24 hours before, during, and after application

ANIMAL WASTE MANAGEMENT PLAN
MINIMUM REQUIRED ELEMENT

ADDITIONAL REQUIREMENTS FOR LARGE FEDERAL CAFOs

PHILLIPS RANCH, INC
NAME OF OPERATION

	FREQUENCY OF INSPECTIONS	ITEM(S) TO BE INSPECTED
A) INSPECTIONS:	DAILY	• Water lines
	WEEKLY	• Storm water diversions • Run-off diversions • Waste transport • Storage structures • Storage structure volume
	PERIODIC	• Application equipment leaks

B) RECORD KEEPING:

Record results of:

1) Daily inspections.
2) Weekly inspections.
3) Periodic inspections.
4) Corrective actions taken, explain those not corrected.
5) Expected crop yields (if not in the plan).
6) Weather conditions at the time of manure, litter or process water application and 24 hours before and after application.
7) Total amount of manure or wastewater transferred to other persons, including date and amount of each transfer and the name and address of each recipient.

C) OPERATION REQUIREMENTS:

1) Must have depth markers in all surface liquid impoundments (i.e. lagoons, ponds, tanks). Markers must indicate:
   a. Maximum design volume.
   b. Minimum capacity necessary to contain 25-year, 24 hours rainfall event.
   c. Depth of manure and process wastewater.
2) Maintain setback area within 100 feet of any down gradient surface water, open tile line intake structure, sinkholes, agricultural wellheads, or other conduits to surface waters where manure, litter, and other process wastewaters are prohibited. As a compliance alternative, and if demonstrated to the satisfaction of ODA, the permittee may:

a. Establish a 35 ft vegetated buffer where manure, litter and other process waste waters are prohibited: or
b. Demonstrate that a setback or vegetated butter is not necessary or may be reduced.

D) MONITORING:

1) Collect and analyze manure, litter and other process wastewaters annually for nutrient content, including nitrogen and phosphorus.
2) At least once, during the term of the permit, collect and analyze representative soil samples for phosphorus and nitrogen content from all fields where manure, litter and other process waste waters are applied

Signature of Legally Authorized Representative: F. Phillips III

Print Name: FRED PHILLIPS III Date: 8/22/05

Inspection record sheet

A Check mark indicates a daily inspection was performed. A Plus sign indicates a weekly inspection was performed. An Astrix indicates that a problem was found, see coments section for that date

Daily inspections	Weekly Inspections	Periodical inspections
Water lines	Storm water Diversions	Application Equipment
	Runnoff Diversions	
	waste transport system	
	Storage Structures	
	Storage structure content level	

Month _____

Date and Inspections performed		Problems and solutions
1		
2		
3		
4		
5		
6		
7		
8		
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11		
12		
13		
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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