APPENDIX F

√ NRCS STANDARD 633, APPENDIX B

RECOMMENDED MANAGEMENT PRACTICES TO REDUCE NITROGEN AND PHOSPHORUS LOSSES

APPENDIX B

RECOMMENDED MANAGEMENT PRACTICES TO REDUCE NITROGEN AND PHOSPHORUS LOSSES

Nitrogen:

1. Set realistic yield goals and follow University of Illinois' nitrogen recommendations.
2. Take credit for nitrogen from **all** sources: previous legume crop, incidental nitrogen contained in diammonium phosphate (DAP) and other fertilizers, manure applications, etc.
3. Determine nitrate loss potential using **Table 1** (following this Appendix). Use this as a guideline to determine application timing for fields with various soil textures. (More detailed information on total nitrogen loss potential is available in the University of Illinois Agricultural Experiment Station Bulletin 784, Nitrogen-Loss Potential Ratings for Illinois Soils.)
4. In fields where spring applications are not usually troublesome, apply the majority of the nitrogen shortly before or after planting.
5. For fall applications, use a nitrification inhibitor or wait until the soil has cooled down to 50° F. Even when applying a nitrification inhibitor, do not apply nitrogen until soil has cooled to 60° F. Probable dates when these soil temperatures are expected are contained in the *Illinois Agronomy Handbook*. In most cases, fall nitrogen applications should not begin prior to the third week in October.
6. Use adequate levels of phosphorus, potassium, and other nutrients to ensure optimum yields and nitrogen use efficiency.
7. Conduct a post-harvest evaluation of the nitrogen program:
   - Compare actual yields vs. yield goal;
   - Evaluate factors affecting yields and nitrogen use efficiency;
   - Consider using plant tissue analyses and an end-of-season corn stalk nitrate test to evaluate plant nitrogen sufficiency;
   - Refine nitrogen rates for future years.
8. Review each nutrient management plan annually to determine if changes in the nutrient budget are needed.
9. Calibrate application equipment annually, at minimum, to ensure uniform distribution of material at planned rates.
10. Use filter strips and riparian forest buffers to intercept nutrients transported surface runoff to the stream. (Note: these practices will have minimal effect in areas with extensive subsurface drainage.)
11. Avoid applying nitrogen around environmentally sensitive areas such as sinkholes, wells, gullies, ditches, surface inlets, or rapidly permeable areas.
12. Use cover crops, such as rye, to capture residual nitrogen after harvest and prevent nitrogen from being lost between harvest and planting of the next crop.
13. Utilize water table management to reduce artificial drainage when it is not needed for crop growth or field operations.

NRCS, Illinois
January, 2002

Table 1. Nitrogen Risk Assessment

Nitrate loss potentials based on soil texture, timing, and nitrification inhibitors			
Application Timing[1]	Soil Texture[2]		
	Coarse	Medium	Fine
Fall with an inhibitor > 60° F	High	High	High
Fall with an inhibitor < 60° F	High	Medium	Medium
Fall without an inhibitor > 50° F	High	High	High
Fall without an inhibitor < 50° F	High	Medium	Medium
Spring without an inhibitor	Medium	Medium	Medium-Low
Spring with an inhibitor	Medium-Low	Low	Low
Spring split applied or sidedress	Medium-Low	Low	Low

Foot notes:

1. Temperatures refer to soil temperature measured at a depth of 4 inches. For this assessment, inhibitors refer to nitrification inhibitors.
2. Soil Texture: Coarse - sand, loamy sand, sandy loam
   Medium - silt, silt loam, loam
   Fine - silty clay loam, silty clay, clay, clay loam, sandy clay, loam, sandy clay

When developing recommendations to be included in a nutrient management plan, the planner needs to use the results of the assessment above with knowledge of locally significant transport processes.

For example, in large areas of northern and central Illinois, nitrates are detected in surface water resources at concentrations above 10 part per million. Soils in much of the region only have a moderate nitrogen loss potential. The presence of extensive tile drainage, however, increases the risk of nitrate transport to surface water resources.

By contrast, in southern Illinois, there are large areas of level, poorly drained soils. The climate is warmer and there is more rainfall than in northern and central Illinois. The conditions favor the formation of nitrate. The loss of nitrate, however, is primary to the atmosphere due to denitrification.

APPENDIX G

√ WASTEWATER STORAGE CAPACITY
√ MANURE STORAGE CAPACITY PLANNER

Wastewater Storage Capacities

WASTEWATER STORAGE PLANNER: ANAEROBIC LAGOON SYSTEM - 2 STAGE

Wastewater Lagoon #1

FACILIITY: Midwest Poultry Services, LP Hi-Grade Egg Producers Loda, Illinois
DATE: 12/24/2008

Total Annual Wastewater Volume	1,727,130	gallons	(1)
Total Annual Wastewater Volume to be stored:	1,727,130	gallons	(1)
Annual volume needed for precipitation on pond:	156,996	gallons	(2)
Total annual wastewater and precip. volume to be stored:	1,884,126	gallons	
Total existing storage volume provided, cu.ft.	226,125	cu. ft.	(3)
Total Existing Storage Volume, gallons	1,691,641	gallons	(3)
Annual Precipitation	37	inches	(4)
Annual Evaporation %	75		(4)
25 yr, 24 hr. storm	5.04	inches	(4)
Freeboard height	1	ft.	
Extra height for 25-yr., 24-hr. storm	0.40	ft.	(5)
Total pond depth (D)	15.0	ft.	
"MAX OPERATING LEVEL"	13.6	ft.	
Inside slope ratio	3	:1	
Pond top inside width (W)	165	**ft. width**	
length (L)	165	**ft. length**	
Wastewater width (@ design)	157	ft. width	
length	157	ft. length	
Pond bottom width (w)	75	ft. width	
length (l)	75	ft. length	

Volume Calculation Used: D/3*(WL+wl+(WLwl)^0.5)

SUMMARY

POND (top) WIDTH:	165	ft.	
POND (top) LENGTH:	165	ft.	
STORAGE VOLUMES			
TOTAL STORAGE VOLUME:	1,691,641	gallons	(3)
MAX OPERATING VOLUME:	1,420,773	gallons	(6)
WW & PRECIP VOLUMES			
ANNUAL WW VOLUME:	1,727,130		(1)
ANNUAL PRECIP. VOLUME:	156,996	gallons	(2)
TOTAL ANNUAL VOLUME, INCL. PRECIP.:	1,884,126	gallons	(1)(2)
STORAGE PROVIDED, THIS STRUCTURE:	275	days	(7)

(1) Annual average wastewater generated at facility.
(2) Annual precip. volume, this structure, not including 25-yr., 24-hr. storm.
(3) Total storage volume for this structure.
(4) Iroquois Co. climate data, from NRCS.
(5) 25-yr., 24-hr. storm volume allowance
(6) Working depth of pond (less freeboard & 25-yr, 24-hr storm)
(7) Days of storage this structure (ww generated + annaul precip.)

Wastewater Storage Capacities

WASTEWATER STORAGE PLANNER: ANAEROBIC LAGOON SYSTEM - 2 STAGE

Wastewater Lagoon #2

FACILIITY: Midwest Poultry Services, LP Hi-Grade Egg Producers Loda, Illinois
DATE: 12/24/2008

Remaining Annual Wastewater Volume	306,357	gallons	(1)
Remaining Annual Wastewater Volume to be stored:	306,357	gallons	(1)
Annual volume needed for precipitation on pond:	125,597	gallons	(2)
Annual wastewater and precip. volume to be stored:	431,954	gallons	
Total existing storage volume provided, cu.ft.	140,573	cu. ft.	(3)
Total Existing Storage Volume, gallons	1,051,626	gallons	(3)
Annual Precipitation	37	inches	(4)
Annual Evaporation %	75		(4)
25 yr, 24 hr. storm	5.04	inches	(4)
Freeboard height	1	ft.	
Extra height for 25-yr., 24-hr. storm	0.40	ft.	(5)
Total pond depth (D)	10.0	ft.	
"MAX OPERATING LEVEL"	8.6	ft.	
Inside slope ratio	3	:1	
Pond top inside width (W)	165	**ft. width**	
length (L)	132	**ft. length**	
Wastewater width (@ design)	157	ft. width	
length	124	ft. length	
Pond bottom width (w)	105	ft. width	
length (l)	72	ft. length	

Volume Calculation Used: D/3*(WL+wl+(WLwl)^0.5)

SUMMARY

POND (top) WIDTH:	165	ft.	
POND (top) LENGTH:	132	ft.	
STORAGE VOLUMES			
TOTAL STORAGE VOLUME:	1,051,626	gallons	(3)
MAX OPERATING VOLUME:	836,642	gallons	(6)
WW & PRECIP VOLUMES			
ANNUAL WW VOLUME:	306,357		(1)
ANNUAL PRECIP. VOLUME:	125,597	gallons	(2)
TOTAL ANNUAL VOLUME, INCL. PRECIP.:	431,954	gallons	(1)(2)
STORAGE PROVIDED, THIS STRUCTURE:	707	days	(7)
TOTAL SYSTEM STORAGE PROVIDED	2,257,415	gallons	
LAGOONS I & II:	410	days	(8)

(1) Ramaining wastewater generated at facility, not stored in lagoon #1
(2) Annual precip. volume, this structure, not including 25-yr., 24-hr. storm.
(3) Total storage volume for this structure.
(4) Darke Co. climate data, from NRCS.
(5) 25-yr., 24-hr. storm volume allowance
(6) Working depth of pond (less freeboard & 25-yr, 24-hr storm)
(7) Days of storage this structure (remaining ww + annaul precip.)
(8) Days of storage provided by entire system (all ww + annaul precip.)

Manure Storage Capacity Planner

Midwest Poultry Services, LP Hi-Grade Egg Producers Loda, IL Facility

Storage Capacities based on Operating Records

Barn Number	Bird Numbers	Days Facility Occupied Annually:	Pounds of As-Is Manure per Year:	Tons of As-Is Manure per Year:	Manure Density: Lb./CF	Annual CF Manure Generated:	Manure Storage Dimensions			CF of Storage	Days of Storage
							Length (feet)	Width (feet)	Average Depth (feet)		
Pit Scraper Manure System											
HG-1	93,375	365	2,258,919.9	1,129.5	25.0	90,356.8	480	11.5	0.5	2,760.0	11
HG-2	93,375	365	2,258,919.9	1,129.5	25.0	90,356.8	480	11.5	0.5	2,760.0	11
HG-3	93,375	365	2,258,919.9	1,129.5	25.0	90,356.8	480	11.5	0.5	2,760.0	11
HG-4	93,375	365	2,258,919.9	1,129.5	25.0	90,356.8	480	11.5	0.5	2,760.0	11
HG-5	93,375	365	2,258,919.9	1,129.5	25.0	90,356.8	480	11.5	0.5	2,760.0	11
HG-6	96,796	365	2,341,680.4	1,170.8	25.0	93,667.2	480	11.5	0.5	2,760.0	11
Storage HG-1-6	563,671	365	13,636,280.0	6,818.1	25.0	545,451.2	250	45	10	112,500.0	263
Storage HG-1-6							280	100	10	280,000.0	
Deep Pit Manure System											
HG-7	232,500	365	5,624,619.8	2,812.3	25.0	224,984.8	650	98	5	318,500.0	517
HG-8	232,500	365	5,624,619.8	2,812.3	25.0	224,984.8	650	98	5	318,500.0	517
HG-9	232,500	365	5,624,619.8	2,812.3	25.0	224,984.8	650	98	5	318,500.0	517
Stacked Cage Belt Battery Manure System											
HG-10	456,155	365	11,035,262.2	5,517.6	25.0	441,410.5	152	74	15	168,720.0	140
Totals:	1,717,326			20,772.7		1,315,887.2				727,560.0	

Backwash Storage Capacities

STORAGE PLANNER: IRON FILTER BACKWASH WATER

Iron Filter Backwash Holding Pond

FACILIITY: Midwest Poultry Services, LP Hi-Grade Egg Producers Loda, Illinois
DATE: 12/17/2008

Total Annual Wastewater Volume	**766,500**	gallons	(1)
Total Annual Wastewater Volume to be stored:	766,500	gallons	(1)
Annual volume needed for precipitation on pond:	201,831	gallons	(2)
Total annual wastewater and precip. volume to be stored:	**968,331**	gallons	
Total existing storage volume provided, cu.ft.	238,906	cu. ft.	(3)
Total Existing Storage Volume, gallons	1,787,257	gallons	(3)
Annual Precipitation	37	inches	(4)
Annual Evaporation %	75		(4)
25 yr, 24 hr. storm	5.04	inches	(4)
Freeboard height	1	ft.	
Extra height for 25-yr., 24-hr. storm	0.40	ft.	(5)
Total pond depth (D)	10.0	ft.	
"MAX OPERATING LEVEL"	8.6	ft.	
Inside slope ratio	3	:1	
Pond top inside width (W)	**125**	**ft. width**	
length (L)	**280**	**ft. length**	
Wastewater width (@ design)	117	ft. width	
length	272	ft. length	
Pond bottom width (w)	65	ft. width	
length (l)	220	ft. length	

Volume Calculation Used: D/3*(WL+wl+(WLwl)^0.5)

SUMMARY

POND (top) WIDTH:	**125**	**ft.**	
POND (top) LENGTH:	**280**	**ft.**	
STORAGE VOLUMES			
TOTAL STORAGE VOLUME:	**1,787,257**	**gallons**	(3)
MAX OPERATING VOLUME:	**1,442,192**	**gallons**	(6)
WW & PRECIP VOLUMES			
ANNUAL WW VOLUME:	**766,500**		(1)
ANNUAL PRECIP. VOLUME:	**201,831**	**gallons**	(2)
TOTAL ANNUAL VOLUME, INCL. PRECIP.:	**968,331**	**gallons**	(1)(2)
STORAGE PROVIDED, THIS STRUCTURE:	**544**	**days**	(7)

(1) Annual average wastewater generated at facility.
(2) Annual precip. volume, this structure, not including 25-yr., 24-hr. storm.
(3) Total storage volume for this structure.
(4) Iroquois Co. climate data, from NRCS.
(5) 25-yr., 24-hr. storm volume allowance
(6) Working depth of pond (less freeboard & 25-yr, 24-hr storm)
(7) Days of storage this structure (all ww generated + annaul precip.)