LIQUIDS WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

Step 1. Nutrients Generated (As Excreted)

	Animal Type (See Table 1.1)	Number of Animals	x	Percent Waste as Liquid [a]	x	Average Weight (lbs)	÷	1,000	x	Confinement Period [b] (days/year)	=	Animal Unit Days		Table 1.1 Values		N	P_2O_5	K_2O
1.)			x		x		÷	1,000	x		=		x	N	=			
														P_2O_5	=			
														K_2O	=	+	+	+
2.)			x		x		÷	1,000	x		=		x	N	=			
														P_2O_5	=			
														K_2O	=	+	+	+
3.)			x		x		÷	1,000	x		=		x	N	=			
														P_2O_5	=			
														K_2O	=	=	=	=
														Step 1 Total	=			

Step 2. Manure Generated (As Excreted)

	Animal Unit Days (from Step 1)	x	Manure/A.U. (See Table 1.1)	x	Conversion	=	Volume of Manure	
1.)		x		x	7.5	=		gallons
2.)		x		x	7.5	=		gallons
3.)		x		x	7.5	=		gallons

Step 2 Total = _____ **gallons**
1 + 2 + 3

Step 3. Water Added by Flushing, Wastage, or Cleaning

	Gallons/Day (See Table 1.1)	x	Number of Animals	x	Confinement Period (from Step 1)	=	Volume of Water	
1.)		x		x		=		gallons
2.)		x		x		=		gallons
3.)		x		x		=		gallons

Step 3 Total = _____ **gallons**
1 + 2 + 3

Step 4. Water Added by Feedlot Runoff

	Width (feet)	x	Length (feet)	x	Days Before Pump [c]	x	Conversion	=	Feedlot Runoff	
Paved Surface [d]		x		x		x	18.75	=		gallons
					(days before pump ÷ 365)					
Unpaved Surface [e]		x		x		x	11.25	=		gallons
					(days before pump ÷ 365)					

Step 4 Total = _____ **gallons**
Paved + Unpaved

Step 5. Water Added from Rainfall minus Evaporation on Storage Pond

	Width (feet)	x	Length (feet)	x	Frequency of Pump [c]	x	Conversion	=	Net Rainfall on Storage Pond
Lagoon/Pond Surface Area		x		x		x	11.25	=	
					(days before pump ÷ 365)				

Step 5 Total = _____ **gallons**

Step 6. Total Volume of Manure Produced

Step 2	+	Step 3	+	Step 4	+	Step 5	=	
	+		+		+		=	

Step 6 Total = _____ **gallons**

Step 7. Weighted Nutrient Values Before Nutrient Losses

	Step 1	÷	Step 6 Total	x	Conversion	=
N		÷		x	1,000	=
P_2O_5		÷		x	1,000	=
K_2O		÷		x	1,000	=

	N	P_2O_5	K_2O
Step 7 Total =			
	(lbs/1,000 gallons)		

[a] The percent of the manure that is handled as a liquid.

[b] Confinement period should be adjusted for animals that are only in confinement for a portion of the day. For example, if animals spend 16 hours on pasture and 8 hours in confinement, then the confinement period would be 1/3 of a day or 122 days/year.

[c] The number of days before the storage pond/lagoon is pumped for land application divided by 365. For example, if the pond is pumped twice a year, it would be .5 (180 ÷ 365 = .5).

[d] Impervious surface areas such as concrete, asphalt, and roofs without gutters that contribute water to storage pond/lagoon.

[e] Pervious surface areas such as gravel, dirt, or soil cement that contribute water to storage pond/lagoon.

Table 1.1 Manure and Nutrients as Excreted Per 1,000 Pound Live Weight/Day

Animal Type	Volume of Manure Per Animal Unit (cu.ft..)	Dry Matter Manure (lbs.)	Wastewater (gal/day)	Total Nitrogen (lbs.)	Total P as P_2O_5 (lbs.)	Total K as K_2O (lbs.)	Bedding
Beef (all cattle and calves)[1]	1	8.5	0	0.34	0.21	0.25	33
Dairy Cows[1]	1.4	12	5	0.45	0.21	0.35	33
Dairy Heifers[5]	0.9	8.5	5	0.27	0.11	0.14	33
Swine Lactating Sows w/litters[6]	0.96	11	2	0.52	0.41	0.35	33
Swine Gestating Sows, Boars, Gilts[6]	0.5	5.5	2	0.26	0.2	0.17	33
Swine Wean to Finish Pigs[6]	1.15	7.3	2	0.52	0.41	0.35	33
Swine Grow to Finish Pigs[5]	1.1	6.5	2	0.54	0.21	0.29	33
Poultry Caged Layer[5]	0.93	15	0	1.1	0.76	0.47	74
Poultry Caged Layer Pullet[5]	0.73	11.4	0	0.62	0.55	0.31	74
Poultry Litter Broiler[2]	1.4	22	0	0.96	0.64	0.65	74
Poultry Litter/Slats Breeder Layer[5]	0.93	16	0	0.84	0.69	0.36	74
Poultry Litter Breeder Pullet[5]	0.73	11.4	0	0.62	0.55	0.31	74
Poultry Turkeys (toms)[3]	0.57	8.8	0	0.53	0.37	0.3	74
Poultry Turkeys (hens)[4]	0.77	12.5	0	0.72	0.46	0.37	74
Horses[5]	0.82	7.6	0	0.25	0.11	0.14	32
Sheep and Lambs[5]	0.63	10	0	0.45	0.16	0.36	33
Goats[5]	0.65	13	0	0.45	0.25	0.37	33

[1] Adapted from 1999 ASAE Standards

[2] Adapted from NRCS Agricultural Waste Management Field Handbook, March 2008. Based on 2.6 lb. average weight and 48 days on feed

[3] Adapted from NRCS Agricultural Waste Management Field Handbook, March 2008. Based on 17.0 lb. average weight and 133 days on feed

[4] Adapted from NRCS Agricultural Waste Management Field Handbook, March 2008. Based on 7.6 lb. average weight and 105 days on feed

[5] Adapted from NRCS Agricultural Waste Management Field Handbook, March 2008.

[6] From Dr. Richard Coffey, Extension Swine Specialist and Director of the University of Kentucky Research and Education Center at Princeton