

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 ₂ O ₅	K ₂ O	
1.) _____	_____	x	_____	x	_____	÷	1,000	x	_____	=	_____	N P ₂ O ₅ K ₂ O	=	_____	_____	_____
2.) _____	_____	x	_____	x	_____	÷	1,000	x	_____	=	_____	N P ₂ O ₅ K ₂ O	=	_____	_____	_____
3.) _____	_____	x	_____	x	_____	÷	1,000	x	_____	=	_____	N P ₂ O ₅ K ₂ O	=	_____	_____	_____
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	=	_____ gallons (days before pump ÷ 365)								
Step 5 Total								= _____ gallons								
Step 6. Total Volume of Manure Produced																
Step 2	+	Step 3	+	Step 4	+	Step 5	=	_____ gallons								
Step 6 Total								= _____ gallons								
Step 7. Weighted Nutrient Values Before Nutrient Losses																
Step 1	÷	Step 6 Total	x	Conversion	=											
N	÷	_____	x	1,000	=	_____										
P ₂ O ₅	÷	_____	x	1,000	=	_____										
K ₂ O	÷	_____	x	1,000	=	_____										
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 P₂O₅ (lbs.)	Total K as K₂O (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