LIQUIDS WORKSHEET 1 – ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

1. Nutrients Generated (As Excreted)

Animal Type (Table 1)	Number of Animals	x	Percent Waste as Liquid *	x	Average Weight (lbs)	/	1000	x	Time Between Clean Outs/Land Applications * (Confinement Period)	=	Animal Unit		Table 1 Value	=	N	P_2O_5	K_2O
Dairy Cows												N	0.45	=	1,492		
												P_2O_5	0.21	=		696	
	103	x	100%	x	1,400.0	/	1000	x	23	=	3,317	x K_2O	0.35	=			1,161
												N		=			
												P_2O_5		=			
		x		x		/	1000	x		=	0	x K_2O		=			
												N		=			
												P_2O_5		=			
		x		x		/	1000	x		=	0	x K_2O		=			
														Step 1 Total =	1,492	696	1,161
																(lbs)	

2. Manure Generated (As Excreted)

Animal Unit Days	x	Manure/A.U.	=	Volume of Manure (gallons)	
3,317	x	1.4	=	34,824	gallons
0	x	0	=	0	gallons
0	x	0	=	0	gallons

Step 2 Total = 34,824 gallons

3. Water Added by Wastage or Cleaning

Gallons/Day	x	No. of Head	x	Time Between Applications	=	Volume of Water (gallons)
5	x	103	x	182.5	=	93,988
FALSE	x	0	x	182.5	=	0
FALSE	x	0	x	182.5	=	0

Step 3 To = 93,988 gallons

4. Water Added by Feedlot Runoff

	Width (feet)	x	Length (feet)	x	Frequency of Pumps *	x	Conversion	=	Feedlot Runoff (gallons)
Impervious Surfaces	85	x	560	x	0.5 (days before pump / 365)	x	18.75	=	446,250
Pervious Surfaces *		x		x	(days before pump / 365)	x	11.25	=	0

Step 4 Total = 446,250 gallons

5. Water Added from Rainfall minus Evaporation on Storage Pond

	Width (feet)	x	Length (feet)	x	Frequency of Pumps *	x	Conversion	=	Net Rainfall on Storage Pond (gallons)
Lagoon/Pond Surface Area	240	x	270	x	0.5 (days before pump / 365)	x	11.25	=	364,500

Step 5 Total = 364,500 gallons

6. Total Volume of Manure Produced

Step 6 Total = 939,562 gallons

7. Weighted Nutrient Values Before Nutrient Losses

	N	P_2O_5	K_2O
Step 7 Totals =	1.6	0.7	1.2
	(lbs/1,000 gallons)		

The milking cows are in total confinement, but when they are not being milked (21 hours per day) the manure is scraped into a dry stack pad. When the cows are being milked the manure is mixed in with the milk house wastewater where it goes into the lagoon. The cows are milked twice a day for 1.5 hours each. We are making this worksheet for six months because they will spread liquid manure in spring & fall.
1.5 (hrs) X 2 (milked twice a day) = 3(hrs. per day) x 182 (days in six months) = 546 (hours spent milking in six month)/ 24 (hours in a day) =22.75 hrs. The rest of the volume comes from impervious surfaces (roof structures) & two lagoons.

SOLIDS WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

1. Nutrients Generated (As Excreted)

Animal Type (Table 1)	Number of Animals		Percent Waste as Solid *		Average Weight (lbs.)	/	1000	x	Time Between Clean Outs/Land Applications * (Confinement	=	Animal Unit Days				N	P_2O_5	K_2O
Dairy Cows	103	x	100%	x	1,400.0	/	1000	x	319	=	46,000	x	N	0.45	=	20,700	
													P_2O_5	0.21	=		9,660	
													K_2O	0.35	=			16,100
Dairy Heifers	60	x	100%	x	316.0	/	1000	x	365	=	6,920	x	N	0.27	=	1,869	
													P_2O_5	0.11	=		761	
													K_2O	0.14	=			969
Dairy Cows	25	x	100%	x	1,200.0	/	1000	x	182	=	5,460	x	N	0.45	=	2,457	
													P_2O_5	0.21	=		1,147	
													K_2O	0.35	=			1,911
														Step 1 Total	=	25,025	11,568 (lbs.)	18,980

2. Manure Generated (As Excreted)

Animal Unit Days	x	Manure/A.U.	=	Volume of Manure (cu.ft.)
46,000	x	1.4	=	64,400
6,920	x	0.9	=	6,228
5,460	x	1.4	=	7,644

Step 2 Total = 78,272 cu.ft.

3. Total Tons

Step 2	/	Conversion Factor	=	Total Tons
64,400	/	33	=	1,952
6,228	/	33	=	189
7,644	/	33	=	232

Step 3 Total = 2,372 tons

4. Weighted Nutrient Values Before Nutrient Losses

	N	P_2O_5	K_2O
Step 4 Total =	10.6	4.9	8.0
		(lbs./ton)	

All solid manure is scraped into a covered stack pad & exported off the farm. For this example you will only need to fill out worksheet 1 for solid manure. I made this worksheet for 1 year because we are not applying it to fields, so we don't have to do worksheet 2/3. The dairy cows spend 21 hours a day in confinement where their manure is scraped into a dry stack pad.

Milking Cow- 21 (hours a day in confinement) where manure is scraped into stack pad) **Heifers**- There are two different sets of heifer, I added them together (60 total) because we didn't have enough space in the worksheet to put them in separately. **Dry cows/spring heifers**- This group spends time grazing and in confinement because they drink, eat, & rest in a building where manure is collected. Because this group grazes they spend more time in confinement during the winter (16 hours per day) and less during the spring (8 hours per day). Fall/winter- 16 (hrs. per day in confinement) X 182 (day in six months) = 2912 (hours spent in confinement, during fall/winter)/24 (hours in a day) = 121 days. Spring/summer- 8 (hours in confinement) x 182 (days in six months)= 1456 (hours in confinement during the spring/summer)/24 (hours in a day)= 60.66 (hours spent in confinement during the spring/summer). 121 (day in confinement during fall/winter) + 61 (days spend in confinement during the spring/summer)= 182 (days spent in confinement per year).