

WKU Dairy Example

When writing a KYNMP for a dairy facility, there will be solid & liquid manure and/or milkhouse wastewater. A plan must be made for liquid and solid manure, even if there is just milkhouse wastewater. It is very important (but not required) to get a manure sample.

For this example, it covers the Western Kentucky University dairy facility. The milking cows grazed 6 months out of the year for 8 hours per day, the other 6 months (late fall-early spring) they stayed in confinement. All the manure is scraped into a stack pad, but they have milkhouse wastewater. A sample was taken of the milkhouse wastewater and it should be used for the nutrient amounts for the liquid manure. The heifers stay on pasture while the baby calves stay in the barn.

There will need to be two worksheet 1s made for solid manure because they graze for 6 months and are in full confinement for 6 months. The amount of manure collected will change.

The liquid manure (milkhouse wastewater) will not change from season to season because they are always going to be milked. The manure is scraped out into a stack pad, but they still have wastewater. We will override step 2 with 1 gallon because we are not collecting manure, so it is very important to collect a sample of the waste water because it is almost impossible to determine the nutrient amounts by this tool. There is some manure that goes into the wastewater because of runoff from the impervious areas (exposed concrete). With this facility, there was a lot of impervious surfaces that mixed in with the milkhouse wastewater. We made this worksheet for 182 days because they spread liquid manure spring & fall, so this is only for 6 months.

LIQUIDS WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

1. Nutrients Generated (As Excreted)

Animal Type	Number of Animals	Percent Waste as Liquid *	Average Weight (lbs)	TIME BETWEEN Clean Outs/Load Applications ¹ (Confinement Period)	Animal Unit	Table 1 Value	N	P ₂ O ₅	K ₂ O
Dairy Cows	21	100%	1,400.0	182	1	N 0.45 P ₂ O ₅ 0.21 K ₂ O 0.35	0	0	0
					0	N P ₂ O ₅ K ₂ O			
					0	N P ₂ O ₅ K ₂ O			
Step 1 Total =							0	0	0

2. Manure Generated (As Excreted)

Animal Unit Day	Manure/A.U.	Volume of Manure (gallons)
1	1.4	1 gallons
0	0	0 gallons
0	0	0 gallons
Step 2 Total = 1 gallons		

Override Volume of Manure For Step 2	
1	gallons
	gallons
	gallons

3. Water Added by Wastage or Cleaning

Gallons/Day	No. of Head	Time Between Applications	Volume of Water (gallons)
10	21	182.5	38,325
10	0	182.5	0
10	0	182.5	0
Step 3 Total = 38,325 gallons			

Override Gallons Per Day For Step 3
10

4. Water Added by Feedlot Runoff

Width (feet)	Length (feet)	Frequency of Pumps *	Conversion	Feedlot Runoff (gallons)
200	150	0.5	18.75	281,250
		(days before pump / 365)		
			11.25	0
Step 4 Total = 281,250 gallons				

5. Water Added from Rainfall minus Evaporation on Storage Pond

Width (feet)	Length (feet)	Frequency of Pumps *	Conversion	Net Rainfall on Storage Pond (gallons)
100	100	0.5	11.25	56,250
Step 5 Total = 56,250 gallons				

6. Total Volume of Manure Produced

Step 6 Total = 375,826 gallons

7. Weighted Nutrient Values Before Nutrient Losses

	N	P ₂ O ₅	K ₂ O
Step 7 Totals =	0.0	0.0	0.0
	(lbs/1,000 gallons)		

Worksheet 2 (Liquids)

Go to Worksheet 1 (Solids)

Manure Test Report

**University of Kentucky
Division of Regulatory Services**

AG. ENGINEERING DEPT. County Extension Office

Owner

Steve Higgins

Sample Identification

UK Lab No County Code
90044 471

KY County ID Owner ID
 X X

Manure Type: None Given Liquid

Received Reported
 2/18/2016

Nutrient Results (*in lbs/1000gal*)

N 2 Zn 0

P2O5 1 Cu 0.01

K2O 2 Mn 0

Ca 0

Mg 0

equivalent fertilizer grade assuming
50%, 80%, and 100% of N, P2O5, and
K2O are available:

0 - 0 - 0.01

Extension Agent

Information on land applying manure can be found in UK Extension publications ID-123, AGR-146 and 146A (poultry litter), and ASC-80 (swine manure).

SOLIDS WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

1. Nutrients Generated (As Excreted)

Animal Type	Number of Animals	Percent Waste as Solid ^a	Average Weight (lbs.)	1000	Time Between Clean Outs/Land Applications ^b (Confinement)	Animal Unit Days	N	P ₂ O ₅	K ₂ O
Dairy Cows	24	100%	1,400.0	1000	182	6,115	0.45 = 2,752	0.21 = 1,284	0.35 = 2,140
Dairy Heifers	8	100%	250.0	1000	182	364	0.27 = 98	0.11 = 40	0.14 = 51
				1000		0			
Step 1 Total =							2,850	1,324	2,191
							(lbs.)		

2. Manure Generated (As Excreted)

Animal Unit Days	Manure/A.U.	=	Volume of Manure (cu.ft.)
6,115	1.4	=	8,561
364	0.9	=	328
		=	
Step 2 Total =			8,889 cu.ft.

3. Total Tons

Step 2	Conversion Factor	=	Total Tons
8,561	33	=	259
328	33	=	10
		=	
Step 3 Total =			269 tons

4. Weighted Nutrient Values Before Nutrient Losses

Step 4 Total =	N	P ₂ O ₅	K ₂ O
	10.6	4.9	8.1
(lbs./ton)			

^a The percent of the manure that is handled as a solid.

^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.

For this worksheet the cows & calves are in confinement for 182 day (late fall –early spring) so the manure would be spread in the spring.

SOLIDS WORKSHEET 1 - ESTIMATING NUTRIENTS GENERATED PER CONFINEMENT PERIOD

1. Nutrients Generated (As Excreted)

Animal Type	Number of Animals	Percent Waste as Solid *	Average Weight (lbs.)	1000	Time Between Clean Outs/Land Applications ^b (Confinement)	Animal Unit Days	N	P ₂ O ₅	K ₂ O
Dairy Cows	24	100%	1,400.0	1000	121	4,066	1,830	854	1,423
Dairy Heifers	8	100%	250.0	1000	182	364	98	40	51
				1000		0			
Step 1 Total =							1,928	894	1,474
							(lbs.)		

2. Manure Generated (As Excreted)

Animal Unit Days	x	Manure/A.U.	=	Volume of Manure (cu.ft.)
4,066	x	1.4	=	5,692
364	x	0.9	=	328
	x		=	
Step 2 Total =				6,019 cu.ft.

3. Total Tons

Step 2	/	Conversion Factor	=	Total Tons
5,692	/	33	=	172
328	/	33	=	10
	/		=	
Step 3 Total =				182 tons

4. Weighted Nutrient Values Before Nutrient Losses

Step 4 Total =	N	P ₂ O ₅	K ₂ O
	10.6	4.9	8.1
(lbs./ton)			

^a The percent of the manure that is handled as a solid.

^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.

For this worksheet the calves are still in confinement and the milking/dry cows are grazing 8 hrs. a day.

16 (hrs. in confinement) X 182 (time in days between clean out)= 2,912 (hrs. in confinement)/ 24 (hrs. in day) = 121.3 days in confinement within 182 days.