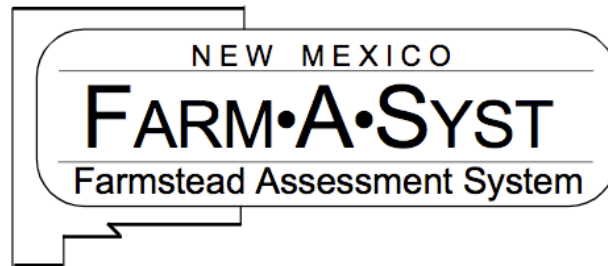




Worksheet #10
*Assessing the Risk of Groundwater Contamination from
Milking Center Wastewater Treatment*





Worksheet #10

Assessing the Risk of Groundwater Contamination from Milking Center Wastewater Treatment

Why should I be concerned?

Dairy wastewater is usually considered a dairy sanitation problem. If not carefully managed, however, dairy wastewater can contaminate both groundwater and surface water.

The amount of wastewater generated varies with milking preparation, equipment used and the number of cows. A 100-cow free-stall operation may use anywhere from 100 to 1000 gallons of water per day in the milking center alone.

Milking center wastewater is contaminated with organic matter, nutrients, chemicals and microorganisms. Poorly designed or mismanaged waste disposal systems can contaminate water with ammonia, nitrate, phosphorus, detergents and disease-causing organisms. If not managed properly, these contaminants can be carried directly to a well or cause groundwater or surface water contamination. Surface water can also be affected by manure, milk solids, ammonia, phosphorus and detergents.

The goal of Farm•A•Syst is to help you protect the groundwater that supplies your drinking water.

How will this worksheet help me protect my drinking water?

- It will take you step by step through your milking center wastewater treatment practices.
- It will rank your activities according to how they might affect the groundwater that provides your drinking water supplies.
- It will provide you with easy-to-understand rankings that will help you analyze the “risk level” of your milking center wastewater treatment practices.
- It will help you determine which of your practices are reasonably safe and effective, and which practices might require modification to better protect your drinking water.

How do I complete the worksheet?

Follow the directions at the top of the chart on the next page. It should take you about 15-30 minutes to complete this worksheet and figure out your ranking.

Information derived from Farm•A•Syst worksheets is intended only to provide general information and recommendations to farmers regarding their own farmstead practices. It is not the intent of this educational program to keep records of individual results.

Glossary

Milking Center Wastewater Treatment

These terms may help you make more accurate assessments when completing Worksheet #10. They may also help clarify some of the terms used in Fact Sheet #10.

Aerial application: Method of field application using pressurized sprinkler nozzles to broadcast wastewater in droplet form to the soil.

Field application: Application of wastewater to croplands and pastures by irrigation ditches or equipment.

Rapid surface infiltration: Application of wastewater to coarse-textured soils to encourage rapid percolation of water into the soil. Allows effluent to move quickly toward groundwater without benefit of natural filtering or crop uptake of nutrients.

Slab separator: A type of settling tank used for removing fine particles and sand from wastewater prior to pumping into a holding tank or lagoon.

Slow surface irrigation: Application of wastewater to level or gently sloping fields to provide nutrients for actively growing crops.

Soil permeability: The quality that enables the soil to transmit water or air. Fine (heavy) soils such as clay are slowly permeable. Coarse (light) soils such as sand are highly permeable.

Solids separator: A screen apparatus over which milkhouse wastewater slurry is passed, allowing liquids and fine particles to pass through while retaining larger solids.

Milking Center Wastewater Treatment: Assessing Drinking Water Contamination Risk

- Use a pencil. You may want to make changes.
- For each category listed on the left that is appropriate to your farmstead, read across to the right and circle the statement that **best** describes conditions on your farmstead. (Skip and leave blank any categories that don't apply to your farmstead.) For categories separated by "OR," choose only one category.
- Then look above the description you circled to find your "rank number" (4, 3, 2 or 1) and enter that number in the blank under "your rank."
- Directions on overall scoring appear at the end of the worksheet.
- Allow about 15-30 minutes to complete the worksheet and figure out your risk ranking for milking center wastewater treatment practices.

YOUR RANK

RANK 1

RANK 2

RANK 3

RANK 4

NO DISCHARGE METHODS

| | | | | | | |
|--|--|-------|-------|-------|---|-------|
| All wastewater to manure storage with waste applied to fields * | Wastewater delivered directly to liquid manure storage. No discharge expected. | _____ | _____ | _____ | Wastewater delivered to leaking manure storage. | _____ |
|--|--|-------|-------|-------|---|-------|

** If using this practice, do not complete the rest of this worksheet. Put ranking for above section in the "total" box at the end of this chart.*

| | | | | |
|----------------------------------|---|---|--|---|
| Total evaporation lagoons | Lined lagoon professionally designed. Regularly maintained. More than 300 feet from well. | Lined lagoon professionally designed. Not maintained. More than 300 feet from well. | Lagoon lined but not maintained. Less than 300 feet from well. | No liner , no maintenance. Less than 300 feet from well. |
|----------------------------------|---|---|--|---|

PRETREATMENT

| | | | | |
|----------------------------------|--|---|--|--|
| Milking cleanup practices | First pipeline rinsed and added to barn manure. Waste milk never poured down drain. Manure and excess feed removed from parlor before wash-down. | Waste milk sometimes poured down drain. Manure and excess feed usually removed before washdown. | Waste milk frequently poured down drain. Manure and excess feed often washed down drain. | All waste milk poured down drain. Manure and excess feed frequently washed down drain. |
|----------------------------------|--|---|--|--|

| | | | | |
|----------------------------|---|-------|---|--|
| Pretreatment method | Includes solids separator, slab separator and lagoon storage. | _____ | Some solids separation by storage and settling. | No storage or settling. Untreated wastewater discharged to soil. |
|----------------------------|---|-------|---|--|

LOCATION OF DISCHARGE

| | | | | |
|--|---|---------------------------------------|---|---------------------------------------|
| Distance from drinking water well | More than 250 feet downslope from well. | More than 250 feet upslope from well. | Less than 250 feet downslope from well. | Less than 250 feet upslope from well. |
|--|---|---------------------------------------|---|---------------------------------------|

Boldface type: Besides representing a higher-risk choice, this practice also violates New Mexico law.

YOUR
RANK

RANK 1

RANK 2

RANK 3

RANK 4

DISCHARGE METHODS *

Aerial application

Total discharge system professionally designed and constructed. Nitrogen levels of effluent regularly checked and credited to crop fertilizer plan. Discharged to growing crop on a regular basis. Vegetation regularly removed.

Sprinkler system professionally designed and constructed. Nitrogen levels sometimes checked and credited to crop fertilizer plan. No seasonal discharge plan. Vegetation removed on a regular basis.

Not a professionally designed system. Nitrogen levels not regularly checked or credited to crop fertilizer plan. No seasonal discharge plan. Vegetation regularly removed.

Not a professionally designed system. Nitrogen levels not checked or credited to crop fertilizer plan. No discharge plan. Vegetation not removed.

OR

Slow surface irrigation

Combined with high-level pretreatment. Medium- or fine-textured soil (silt loam, loam, clay loams, clay) more than 10 feet to water table or bedrock. Extended rest period between loadings. Vegetation removed.

Combined with high-level pretreatment. Medium- or fine-textured soil (silt loam, loam, clay loams, clay) more than 3 feet to water table or bedrock. Extended rest period between loadings. Vegetation removed.

Some pretreatment. Medium- or fine-textured soil (silt loam, loam, clay loams, clay) more than 2 to 3 feet over bedrock or high water table. Vegetation not removed.

No pretreatment. 1 foot of medium- or fine-textured soil (silt loam, loam, clay loams, clay) above bedrock or high water table. Vegetation not removed.

OR

Rapid surface infiltration

Direct discharge on sandy loam or loamy sand soil.

*Discharge methods are listed in order, beginning with the most effective treatment.

TOTAL

Use this total to calculate risk ranking on back page of worksheet.

What do I do with these rankings?

Step 1: Begin by determining your overall milking wastewater risk ranking. Total the rankings for the categories you completed and divide by the number of categories you ranked:

$$\frac{\text{total of rankings}}{\text{\# of categories ranked}} \text{ divided by } \frac{\text{\# of categories ranked}}{\text{\# of categories ranked}} \text{ equals } \boxed{\text{risk ranking}}^*$$

*Carry your answer out to one decimal place.

3.6–4=low risk 2.6–3.5=low to moderate risk 1.6–2.5=moderate to high risk 1–1.5=high risk

This ranking gives you an idea of how your milking center practices **as a whole** might be affecting your drinking water. This ranking should serve only as a **very general guide, not a precise diagnosis**. Because it represents an **averaging** of many individual rankings, it can mask any **individual** rankings (such as 1's or 2's) that should be of concern. (See Step 2.)

Enter your boxed milking wastewater risk ranking on page W12.1. Later you will compare this risk ranking with other farmstead management rankings. Worksheet #11 will help you identify your farmstead's site conditions (soil type, soil depth and bedrock characteristics), and Worksheet #12 will show you how these site conditions affect your risk rankings.

Step 2: Look over your rankings for individual activities:

- Low-risk** practices (4's): ideal; should be your goal despite cost and effort
- Low-to-moderate-risk** practices (3's): provide reasonable groundwater protection
- Moderate-to-high-risk** practices (2's): inadequate protection in many circumstances
- High-risk** practices (1's): inadequate; pose a high risk of polluting groundwater

Regardless of your overall risk ranking, any individual rankings of "1" require immediate attention. Some concerns you can take care of right away; others could be major—or costly—projects, requiring planning and prioritizing before you take action.

Find any activities that you identified as 1's and list them under "High-Risk Activities" on pages W12.6-W12.7 of Worksheet #12.

Step 3: Read Fact Sheet #10, *Improving Milking Center Wastewater Treatment*, and consider how you might modify your farmstead practices to better protect your drinking water.