MINNESOTA DEPARTMENT OF AGRICULTURE
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FERTILIZER SECONDARY CONTAINMENT

Precipitation Management

INTRODUCTION

This fact sheet provides information about proper precipitation management in fertilizer storage secondary containment systems.

Precipitation that accumulates in these systems can adversely affect them by:

1. Reducing the capacity of the containment system – accumulated precipitation reduces the amount of product the system can contain in the event of a release;
2. Promoting corrosion – accumulated precipitation can accelerate tank and appurtenance corrosion; and
3. Reducing tank stability – accumulated precipitation can decrease the stability of tanks within the system.

These effects are minimized if the precipitation is promptly removed. However, the precipitation that accumulates can be contaminated. The main problem then becomes how to manage the collected precipitation. **Preventing accumulation is the best way to manage precipitation**.

The easiest way to manage precipitation accumulation is to:

■ Cover containment and load areas

The Minnesota Department of Agriculture (MDA) strongly recommends covering secondary containment systems and load areas. By covering the areas, precipitation cannot accumulate, preventing the problem.

■ Keep secondary containment and load areas clean

It is not always possible or practical to cover containment and load areas. An alternative is to prevent the precipitation from becoming contaminated. This can be done by keeping secondary containment and load areas clean. Avoid drips and spills in these areas. Clean load areas after each use, clean up spills and sweep up dry products. Use tertiary containment such as drip pans and covered liquid hose connections, pumps and valves. Keeping these areas clean reduces the need to manage contaminated precipitation.

TESTING ACCUMULATED PRECIPITATION

Do not assume that precipitation is clean water and pump it out. If precipitation has accumulated in a containment system, it should be tested for nutrient concentrations before discharging it to the environment. Testing is the only way to actually determine if the precipitation is contaminated.

Precipitation can be tested with a field test kit or in a laboratory. With a field test kit, the water can be tested and immediately used or disposed (see the following section entitled Disposal Methods for Accumulated Precipitation).

If the water is tested by a laboratory, the precipitation should be stored until test results are received, usually 7-10 days. An empty tank or tanks can be used for storage. A permit may be required to add tanks to an existing system. Contact MDA to determine if a permit is required.

Precipitation can be stored in the secondary containment system. However, storing precipitation in secondary containment is only allowed if the precipitation:

- ✓ Is being tested by a laboratory;
- ✓ Does not reduce the capacity of the containment system below that needed to hold a release;
- ✓ Will not cause corrosion of the tanks or appurtenances; and
- ✓ Does not reduce tank stability.

All of these conditions must be met to store precipitation in the secondary containment system. In addition, the precipitation should only be stored for the length of time it takes to get the test results back from the laboratory.

Test precipitation quarterly unless contamination above safe discharge levels occurs (see Disposal Methods for Accumulated Precipitation below). If contamination occurs above safe discharge levels, test accumulated precipitation after every precipitation event or treat all precipitation as though it is contaminated. Continue testing the precipitation until the contamination drops below safe discharge levels, then resume quarterly testing.

Protect yourself and the environment by testing the water before discharging!

DISPOSAL METHODS FOR ACCUMULATED PRECIPITATION

Once the precipitation has been tested, several methods are available to dispose of or use accumulated precipitation. The selected method must comply with all local, state and federal regulations.

- **Reuse**

  Pump the accumulated precipitation and use it as makeup water. The water may need to be stored temporarily.

- **Land application (including irrigation)**

  Pump and land apply the accumulated precipitation. Land application should follow fertilizer best management practices (BMPs). BMPs are available from your county extension agent. The following equation should be used to calculate how much nutrient is in the precipitation before land applying it:

  The pounds of nutrient in the precipitation should be added to the field's application credits.

- **Sanitary Sewer discharge**

  If the appropriate approvals and/or permits are obtained, the precipitation can be pumped and discharged into a sanitary sewer. This usually requires testing before discharge.

- **Pump over the side**

Figure 1.

$$\left\{\text{gal. of water} \times \frac{8.34 \text{ lbs.}}{1 \text{ gal.}}\right\} \times \left\{\frac{\text{ppm nutrient}}{1{,}000{,}000}\right\} = \text{lbs. of nutrient in the water}$$

Under certain circumstances, the precipitation can be pumped over the side of a secondary containment system. This includes discharging the precipitation near a ditch, wetland, or surface water body. Only precipitation that is below safe discharge levels can be disposed of in this manner.

SAFE DISCHARGE LEVELS

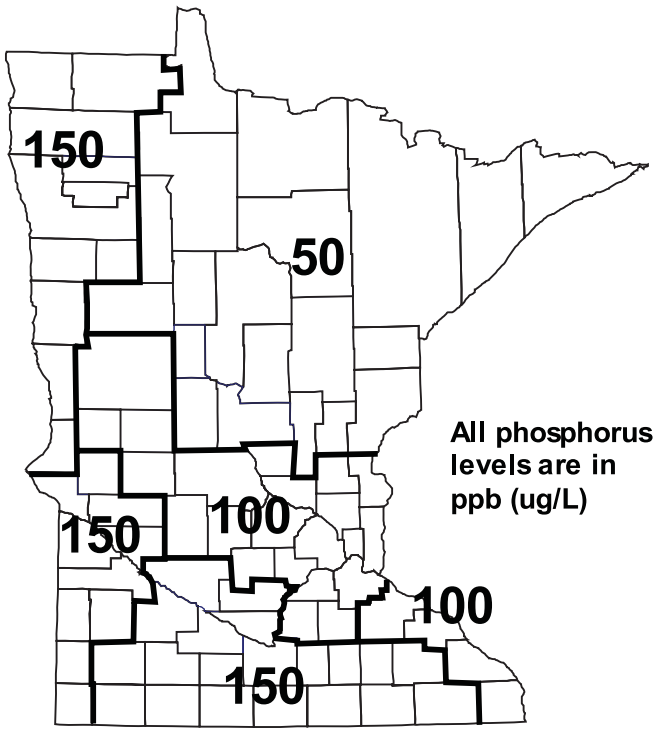
- **Ground Water**

  If there are no surface water bodies nearby then the safe discharge levels must be protective of ground water. The combined nitrate (NO3) and un-ionized ammonia (NH3) value should be below the Minnesota Department of Health, drinking water standard of 10 ppm (mg/L). Phosphorus (Total P) does not generally cause ground water problems.

- **Surface Water**

  If the water is being discharged near a surface water body (a ditch, wetland, or lake for example), then the safe discharge levels are equal to the Minnesota Pollution Control Agency (MPCA) surface water standards. These standards are 10 ppm (mg/L) for nitrate and 16 ppb (ug/L) for un-ionized ammonia. For phosphorus, use the MPCA phosphorus best management practice level shown in the following map (figure 2).

Figure 2. **MPCA's Phosphorus BMP Levels**



Water at or below these safe discharge levels can be pumped onto adjacent property. Remember to obtain the property owner's permission before discharging the water.

Before discharging the water, calculate the amount of nutrient being applied. Use the equation in the land application section to do this. The amount of fertilizer discharged over an area should not exceed what would be allowed by fertilizer BMP's for a similarly sized area.

Large amounts of water can cause considerable erosion. Minimize erosion by:

- ✓ Discharging the water through an irrigation system; or
- ✓ Changing the location of the discharge frequently *(move the end of the hose frequently).*

AMOUNTS OF PRECIPITATION

The amount of precipitation you need to manage depends on:

1. The amount of precipitation received;
2. The time of year the precipitation occurs;
3. The size of the containment system used; and
4. How clean the containment system is kept.

MDA recommends that a precipitation management plan be prepared. This plan should describe how precipitation will be managed at different times of the year. The map *(see figure 3)* shows the total amount of precipitation that may need to be managed in any given year. Approximately 70% of the year's precipitation falls between the months of May and September.

Figure 3.

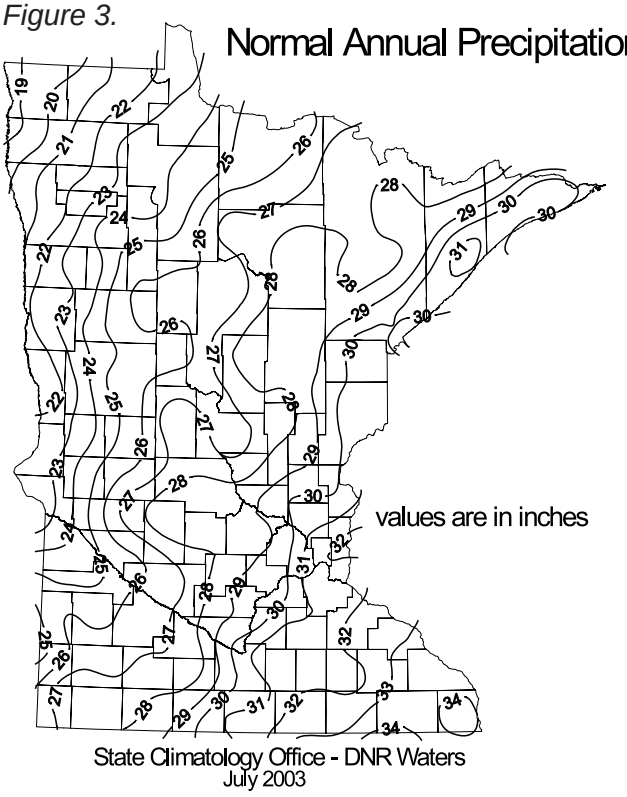


Figure 4. **Precipitation Accumulation in Average**

Annual Rainfall (Inches)	Accumulation in a Small Dike[1] (Gallons)	Accumulation in a Medium Dike[2] (Gallons)	Accumulation in a Large Dike[3] (Gallons)
19	5,900	14,200	296,100
26	8,100	19,450	405,200
33	10,290	24,690	514,290

[1] Small Dike = one to two 12-ft. diameter tanks (area = approx. 500 ft.^{2})
[2] Medium Dike = four 12-ft. diameter tanks (area = approx. 1,200 ft.^{2})
[3] Large Dike = two 72-ft. diameter tanks (area = approx. 25,000 ft.^{2})

The table in *figure 4* shows the approximate amount of water that would accumulate in an average small, medium, and large dike in one year. Minnesota's high, average and low rainfall values were used.

PRECIPITATION MANAGEMENT REGULATIONS

Precipitation Management is regulated under several sections of Minnesota law. It is your responsibility to know and follow these laws. Bulk fertilizer law is found in Minnesota Statutes, Chapter 18C, and in Minnesota Rules, Parts 1510.0375 - 1510.0380 and Parts 1510.0400 - 1510.0408.

BULK PESTICIDE PRECIPITATION MANAGEMENT

Disposal of accumulated precipitation in bulk pesticide containment systems must comply with Minnesota Regulations. Regulations pertaining to disposal or use of accumulated precipitation in bulk pesticide containment systems are found in Minnesota Statutes, Chapter 18B, and in Minnesota Rules, Parts 1505.3010 - 1505.3150.

ENFORCEMENT ACTIONS FOR IMPROPER PRECIPITATION DISPOSAL

The MDA is the state lead agency responsible for agricultural chemical regulation. The MDA investigates and enforces violations of the law and has taken action for improper management of contaminated precipitation.

SUMMARY

Covering containment areas prevents the need to manage large amounts of precipitation. If management of accumulated precipitation is necessary, several options are available. Some of the options include land application, reusing water as makeup water, discharging water to adjacent property (if concentrations are below safe discharge levels), or discharging the water to a sanitary sewer (with appropriate approvals and permits).

For more information regarding fertilizer secondary containment, permitting, or to obtain a copy of the regulations listed in this fact sheet, call the MDA at 651-201-6121.