

Phosphorus: reducing releases from industrial cleaning and sanitizing operations

Housekeeping, janitorial operations, and process cleaning or sanitizing can be sources of significant amounts of phosphorus released to wastewater treatment plants. This fact sheet provides examples of how to reduce phosphorus through purchasing and procedure changes.

In order to sustain aquatic life and provide recreational use, Minnesota's waters must be clean and healthy. Although phosphorus is a nutrient for plant growth, excess phosphorus can stimulate algae growth speeding up the aging process of lakes and streams. As the algae decomposes, the available oxygen supplies decrease creating a high biochemical oxygen demand (BOD), sometimes threatening the survival of fish and other aquatic organisms.

The Minnesota Pollution Control Agency (MPCA) is phasing in effluent phosphorus limits for municipal wastewater treatment facilities. These treatment facilities are asking their industrial users to reduce phosphorus discharges to the treatment plant.

Housekeeping, janitorial operations, and process cleaning or sanitizing can be sources of significant amounts of phosphorus that are released to wastewater treatment plants. Many traditional cleaning chemicals use phosphorus including phosphoric acid or trisodium phosphate as active ingredients for effective cleaning. Alternative low- and non-phosphorus cleaners are effective and available. Additionally, using clean-in-place systems can reduce chemical and water use.

Alternative Cleaners

Compared to traditional phosphorus cleaners, low- and non-phosphorus cleaners can be as effective and are comparable in cost. Alternative cleaners are available to meet a wide variety of industrial cleaning needs. Ask your chemical supplier for more information about changing cleaning chemicals. A sample list of low-phosphorus cleaning chemical suppliers is included at the end of this fact sheet.

Gain control over what chemicals are purchased and used at your facility by establishing purchasing criteria for cleaning chemicals. For example, look for products that are biodegradable

and non-toxic to both humans and aquatic life. Choose products with a phosphate concentration of 0.5% by weight or less.

Coordinating purchases between departments or process areas can help avoid duplication and excess inventory. Reducing the overall number of chemicals at your facility generally cuts the amount of chemicals containing phosphorus. To help minimize the number of different products in your inventory, purchase low- or non-phosphorus cleaners and cleaners that can be used for a variety of cleaning applications.

A simple way to control your inventory is by not accepting sample cleaners from suppliers. Samples can present disposal problems because they may contain components that you do not want to discharge in your wastewater such as phosphorus.

Gustavus Adolphus College

Gustavus Adolphus College in St. Peter adopted policies to green the campus in 2004. One policy provided the impetus for the housekeeping staff to change purchasing practices, moving toward greener cleaners that contained low or no phosphorus.

During Summer 2007, MnTAP supported a student intern in assessing phosphorus containing products at Gustavus. A chemical inventory of college departments was conducted including dining services, housekeeping, laundry, and the heating and cooling plant. A total of ten chemicals were identified that contained phosphorus. Five of those chemicals have non-phosphorus substitutes available. Housekeeping has made a complete switch to non-phosphorus containing chemicals resulting in a phosphorus reduction of 220 pounds per year. This will save the wastewater treatment plant \$2,900 annually through a reduction in chemicals required to remove the phosphorus to meet permit limits.

The Schwan Food Company

The Schwan Food Company, a frozen foods manufacturer in Marshall, reduced phosphorus in its wastewater by switching to low-phosphorus cleaners. Phosphorus loading to the wastewater treatment plant was reduced from 36 pounds to 13 pounds per day for a total reduction of 8,400 pounds per year. This decrease occurred despite a 31% increase in Schwan's water flow.

Clean-in-Place Systems

A clean-in-place (CIP) system eliminates the need to dismantle equipment for cleaning and can help carefully control water and chemical use at your facility. Many production facilities manually run CIP systems, but fully automated CIPs are more consistent than manual operations and are typically more effective. Using final CIP rinses as the pre-rinse for the next cleaning cycle can minimize chemical use and cut the amount of wastewater generated.

Bongards Creameries

Bongards Creameries, a producer of dairy products in Norwood, began looking for ways to reduce phosphorus in 1992. The primary source of phosphorus at Bongards was the whey evaporator. Housekeeping, transfer, and cleaning operations were additional sources.

Phosphorus was reduced by implementing dry cleanup before wet spray cleanup. Spills were reduced to minimize phosphorus from cleaning solutions. CIP recovery systems that automatically reused rinses were installed. Level sensors were installed to keep tanks from overflowing. Extra dairy product was recovered during vat cleanup.

Bongards reduced the total phosphorus loading to its treatment ponds by 40% from 150 pounds per day in 1991 to 90 pounds per day in 1999.

Low-phosphorus Cleaning Chemical Suppliers

MnTAP maintains the following list of low-phosphorus cleaning chemical suppliers solely as a service to Minnesota companies. This is not a complete list of suppliers and does not represent an endorsement by MnTAP. MnTAP, by providing this list, does not guarantee that products or services do or do not comply with environmental and safety laws in any specific application.

Anderson Chemical Company
Litchfield, MN
Marlene Williams
320.693.2477
<www.accommn.com>

Chaska Chemical Company
Savage, MN
Sean Teske
952.890.1820
<www.chaskachem.com>

Ecolab
St. Paul, MN
Food and Beverage
800.392.3392
Institutional
800.352.5326
<www.ecolab.com>

Troy Chemical
St. Paul, MN
Jim Henningsen
612.747.5457
<www.troychemical.com>

DuBois Chemical
Sharnoville, OH
Doug Van Dayne
St. Paul, MN
651.788.6652
<www.duboischemicals.com>



For More Information

MnTAP has a variety of technical assistance services available to help Minnesota businesses implement industry-tailored solutions that maximize resource efficiency, prevent pollution, increase energy efficiency and reduce costs. Our information resources are available online at <mntap.umn.edu>. For personal assistance call MnTAP at 612.624.1300 or 800.247.0015.