



POLLUTION PREVENTION IN TANK UNLOADING



Overview

At many food and beverage manufacturers, particularly those that operate around the clock, raw liquid materials are continuously unloaded in a designated raw receiving area. As a result, leaks and spills can be common. Spilled raw materials can lead to product and cost losses. Larger spills can also generate pollution in stormwater or wastewater; violate local, state, or federal regulations; and incur fines or strength charges for the responsible parties.

Best Management Practices for Unloading

MnTAP staff found practices that could prevent or reduce the frequency and severity of raw ingredient spills could be grouped into three categories:

1. Promote Safety Measures

- Employees should be aware that liquids can exit the tanker at high velocity.
- Employees should always wear appropriate personal protective equipment (PPE). Examples include long pants, rubber boots, chemical resistant gloves, and/or protective eyewear.

2. Inspect Vehicle and Equipment

- Prior to hooking up to facility equipment, the vehicle should be turned off to avoid power surges and connection points should be inspected for leaks.
- Before each use, all equipment should be inspected for proper labeling, damaged hoses, leaks, and product left over from a previous shipment.

3. Supervise the Unloading Process

- An operator should always present when unloading any type of raw liquid materials. This remains one of the best prevention methods against leaks and spills even though it is not required by the Code of Federal Regulations.
- Operators should have a proven track record of minimizing product loss. New employees are trained on how to maintain consistent unloading procedures.

About MnTAP

The Minnesota Technical Assistance Program (MnTAP) is a confidential, no-cost, and non-regulatory program at the University of Minnesota that provides technical assistance focused on pollution prevention to organizations in Minnesota.

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Unloading Pollution Prevention

Annual Pollution Prevention:

1,030 lbs. phosphorus

Cost savings:

\$93,400

Status:

Planned

During a 2025 MnTAP intern project at Michael Foods in Gaylord, Minnesota, it was identified that 1.2 million pounds of liquid eggs are lost when the transfer line is disassembled and cleaned. This egg then went to the plant's onsite wastewater treatment where the plant uses 90 gallons of ferric chloride per day. To capture the egg loss, it was recommended the facility install troughs and train operators to remove all eggs from the transfer hose. Selling the excess egg to animal food companies would potentially generate \$23,000

annually. These measures would also save 98,000 pounds of liquid eggs that can be processed within the facility and 504,000 pounds of eggs potentially sold as repurposed animal food. Collectively, these would lead to annual decreases of 1,030 pounds in phosphorus load and 5,400 pounds in ferric chloride use, resulting in total projected annual savings of \$93,400.



Tank Cleanout Pollution Prevention

Annual Pollution Prevention:

889,000 lbs. of
COD
190,000 lbs. of TSS

Cost savings:

\$96,000

Status:

Under Review

A beverage manufacturer invited MnTAP staff to perform a pollution prevention study at their facility. During the facility's sampling period, MnTAP staff identified raw ingredient discharge as accounting for 50% of the total product discharge along with 46% of the total chemical oxygen demand (COD) and solids discharges to wastewater. While it may be infeasible to completely empty the tanks, MnTAP staff suggested setting a standard level at which tanks may be emptied to wastewater. Implementing this could save 530,000 gallons of raw ingredient, 889,000 pounds of COD, 190,000 pounds of total suspended solids (TSS), and \$96,000 in strength charges per year. In addition, processing that 530,000 gallons of raw ingredients could potentially lead to additional revenue-generating opportunities.

Conclusion

Following MnTAP's investigation and reporting, both facilities gained a clearer picture of the opportunities for raw ingredient saving and wastewater load reduction. Proper raw material unloading techniques and monitoring, as well as standardized tank cleanout procedures, will improve raw ingredient usage, reduce wastewater loading, and reduce costs. MnTAP has used the learnings from these studies in subsequent investigations at other food and beverage manufacturers in Minnesota.