

Effects of Breweries, Distilleries and Wineries on a Publicly Owned Treatment Works

While recent growth in the craft beer, spirits and wine industry has provided economic benefits for local communities, this increased activity has the potential to negatively impact the community's Publicly Owned Treatment Works (POTW). POTWs are typically owned by local government agencies, such as municipalities, and are usually designed to treat domestic wastewater, not industrial wastewater. Domestic wastewater consists of used water from houses and apartments, and has known typical biological and hydraulic characteristics. Industrial wastewater has different biological and hydraulic characteristics depending on the type of manufacturing or chemical processes being performed.

Every POTW is carefully designed to receive and treat incoming wastewater, based on the well-established characteristics of domestic wastewater and perhaps characteristics particular to industries located within a municipality. The wastewater generated from breweries, distilleries and wineries has its own unique characteristics, such as high-strength Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS), as well as hydraulic characteristics such as slug loads. These characteristics and their impacts are further described below.

Negative Impacts of Brewery and Distillery Waste on POTWs

Upsets to the normal biological treatment processes at a POTW can result in effluent discharge limit violations of the POTW's National Pollutant Discharge Elimination System ([NPDES permit](#)) as well as possible fines for discharge permit violations. It can also include loss of a disproportionate amount of biological treatment capacity, resulting in an increase in process upsets and operational costs. Operational costs include labor, chemical usage, energy usage, and sludge production and disposal. Specific negative impacts include:

- **Increase in Biochemical Oxygen Demand (BOD).** BOD is the amount of dissolved oxygen needed or demanded by aerobic biological organisms to break down organic materials in wastewater. Average municipal values range from 100 to 400 mg/L, while high strength BOD values from breweries, distilleries or wineries can range from 5,000 to over 20,000 mg/L. These high-strength BOD discharges originate from bad batches of product, first rinses of process tanks, or wasted product from fill stations and bottling lines when the waste product is washed down the drain. High-strength BOD discharges could stress the POTW to a degree that it fails to meet its discharge permit limits. High strength BOD discharges need more oxygen for biological treatment and also cause increased sludge production, which increases operating and management costs.
- **Increase in Total Suspended Solids (TSS).** TSS are solids in water that can be trapped by a filter. Average municipal values range from 100 to 400 mg/L, while high-strength TSS values from breweries, distilleries or wineries can range from 3,000 to over 15,000 mg/L. These high-strength TSS discharges come from

spent grains, mash, hops, trub, grape skins and waste juice. TSS does not biologically or chemically change through the POTW, and goes directly into sludge production.

- **High flows/hydraulic loading** to the POTW due to process and cleaning operations from the brewery/distillery/winery. High flows can range from 5 to 15+ gallons for each gallon of product made.
- **Potential for high phosphorus loadings** due to cleaning processes at the brewery, distillery or winery.
- **Wide ranging pH values** from cleaning and disinfection processes at the brewery, distillery or winery. The pH can range from 2-12 as a result; the average range of municipal wastewater is 6.5-7.5. These widely ranging pH values can have a negative impact on the POTW, especially on the collection system.
- **High temperature discharges** can have negative impacts on the POTW as well as to the receiving water body, where ambient temperature ranges must be maintained to support native plants and animals.
- **Increase in abnormal wastewater** being discharged to municipal systems from slug loads, or episodic discharges, from the brewing and distilling processes. These municipal systems are not designed for such loads and can experience operational issues as a result.
- **Potential for flammable discharges** are a concern at distilleries. Raw product from the distillation process is 180+ proof alcohol, interim product (barrel aging) is typically around 120-proof alcohol, and finished (bottled) product is around 80 proof; all of which are highly flammable. All floor drains and other connections to the POTW must be protected against discharge of these flammable products, and any alcoholic product that is 48 proof or greater.

Preventing Negative Impacts

Before connecting a brewery, distillery, or winery to the wastewater collection system a POTW should:

- Determine how much hydraulic and load capacity the POTW has left.
- Require the discharger to file an [Industrial Wastewater Indirect Discharge Request \(IDR\)](#) with the New Hampshire Department of Environmental Services (NHDES).
- Issue an industrial discharge permit to the brewery, distillery or winery to control the wastewater discharge.

If the brewery, distillery, or winery is already connected to the wastewater collection system a POTW should:

- Conduct a site visit of the facility and investigate for items that could cause an impact on the collection system and the POTW if discharged (e.g. general housekeeping, solids handling, storage and disposal).
- Sample the process stream when the facility is in full production to determine their contribution to the POTW.
- Require the discharger to implement pollution prevention measures to prevent the high-strength solid and liquid wastes from entering the wastewater discharge.
- Require the discharger to file an [Industrial Wastewater Indirect Discharge Request \(IDR\)](#) with NHDES.
- Issue an industrial discharge permit to the brewery, distillery or winery to control the wastewater discharge.

Any permit issued should require pretreatment of the wastewater stream including but not limited to:

- Reduction of BOD and TSS to acceptable levels before discharge through Best Management Practices (BMPs), IDR and compliance with local Sewer Use Ordinance (SUO).
- Reduction of amount of wastewater generated through BMPs. An efficiently managed process produces 2 to 4 gallons of wastewater for every 1 gallon of product. Whereas a poorly managed process may produce over 15 gallons of wastewater, per gallon of product.
- pH neutralization and flow stabilization before discharge to collection system and POTW.
- Minimization or elimination of phosphorus-based product cleaners.
- Minimization of abnormal discharges.
- Elimination of high-temperature discharges.

If needed, and the authority is granted in the SUO, the POTW can implement a surcharge for high-strength waste or other impacts to POTW. If the authority is not granted in the SUO, update SUO to include the ability to implement a surcharge for high-strength waste or other impacts to POTW.

For more information about industrial wastewater discharge permits, contact the NHDES Wastewater Engineering Bureau Industrial Pretreatment Coordinator at [\(603\) 271-2052](tel:6032712052). **For information on how to** reduce the impact on a POTW using Best Management Practices, contact the NHDES Pollution Prevention Program for additional information at nhppp@des.nh.gov or [\(603\) 271-6460](tel:6032716460).

All other questions may be directed to the NHDES Wastewater Engineering Bureau at [\(603\) 271-3908](tel:6032713908).

Resources:

[NHDES Wastewater Best Management Practices for Breweries](#)