

# A Study of Water Consumption At Brookhaven National Laboratory

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## Abstract

The stigma that bottled water is safer to consume than tap water has been widely accepted by employees at Brookhaven National Laboratory (BNL). As a result, many employees choose to drink bottled water as opposed to the potable water supplied by the Lab. In most cases this is in the form of bottled water dispensers (coolers), purchased using laboratory funding. The Safety & Health Services Division's Environmental Safety and Health guidance states bottled water purchases should first be reviewed and approved by the Environmental Protection Division (EPD). Without a lab-level policy there is no apparent consequence for not following the guidance and no leverage for the EPD to deny a purchase request. This dynamic has raised a number of concerns from the Lab and the EPD. EPD's goal is to reduce the overall use of bottled water on site and increase the use of bottle filling stations. To accomplish this the EPD needs more leverage in the regulation of bottled water and coolers. The goal of this project was to communicate the need for a policy that gives EPD the ability to do this.

## Introduction

The current situation at the lab involves significant monetary, health, and environmental concerns related to the supply of drinking water to employees. Bottled water is being purchased for buildings that already have access to potable water, leading to unnecessary expenses. Additionally, there is no formal policy for monitoring and maintaining bottled water and dispenser units, potentially exposing employees to contamination risks. On the environmental front, tap water proves to be the more sustainable option, as it eliminates the plastic pollution associated with bottled water use and reduces the resources required for delivery. Addressing these concerns through a policy that promotes tap water and regulates bottled water usage would lead to cost savings, improved worker health and safety, and a positive impact on the environment.

## Water Quality

Unlike tap water regulated by the Environmental Protection Agency (EPA), bottled water is governed by the Food and Drug Administration (FDA). The FDA has six main classifications for bottled water, including purified water, which can be sourced from tap water. This classification allows bottled water to be marketed as "higher quality" despite its source. Tap water at BNL complies with the same EPA regulations as publicly supplied tap water outside the lab. The testing requirements for water quality differ between the FDA and the EPA. The FDA mandates testing for 90 compounds in bottled water, while the EPA and BNL test for over 170 compounds in tap water. Tap water testing is more rigorous and covers a wider range of contaminants, including per- and polyfluoroalkyl substances (PFAS). PFAS are a group of man-made chemicals linked to adverse health effects. While the EPA tests for PFAS in tap water, there are no FDA-mandated testing requirements for PFAS in bottled water. Some bottled water brands, not belonging to the International Bottled Water Association (IBWA), may not test for PFAS. The comprehensive testing and reporting requirements demonstrate that tap water undergoes more stringent quality control measures compared to bottled water.

## Cost Burden: Bottled vs Tap

### Bottled

- The Lab spent approximately \$133,044.00 on bottled water deliveries in 2022.
- 126 delivery points across the Lab received bottled water for water coolers.
- Cost only includes 5-gallon jugs; no accurate records for cooler unit purchases.
- Average cost for a heating and cooling water dispenser is around \$250 in the current market.
- Bottled water delivery service provider will be outsourced for dispenser cleaning in the future at a cost of about \$95 per unit. Departments will be required to use their respective funds to pay for cleaning.

### Tap

- Potable water rate for FY23 was \$4.24 per thousand gallons
- Cost of installing a new bottle filling station varies based on the unit and installation requirements.
- Standard Example: Installing a single unit station in building 490 in 2021 cost \$2,565.70, including \$1,511.88 for labor and \$1,053.82 for the unit.
- Individual filter replacements cost about \$30 per filter, with an additional \$65 for installation labor.
- Filters should be replaced every 3,000 gallons or annually, depending on usage.

## Saving Potential

A study in 2022 surveyed 46 buildings on BNL's campus, examining various water units. Information from the study, combined with cost estimates from the previous section, were used to simulate potential savings resulting from transitioning bottled water dispensers to bottle filling stations where applicable.

Cost factors	Bottled water	Cost Factors	Filling station
Dispenser units	\$1,178.857	Units	\$1,053.82
Bottled water delivery (5 gallon jugs)	\$2,442.12	Potable water	\$3.985
Cleaning (twice a year)	\$760	Installation	\$1,511.88
-	-	Filter replacements	\$95
Total expense	\$4,380.98	Total expense	\$5,139.37
Total expense after 2 years	\$7,583.10	Total expense after 2 years	\$5,234.37
Saving potential per year	-	Saving potential per year	\$2,348.73

•Example building 901/901A contained two Elkay brand single unit water fountains and four bottled water dispensers (three Primo brand and one unmarked).

•Price of the unmarked dispenser estimated to match others for consistency.

•Price for bottled water dispenser units calculated by averaging prices of all bottom-loaded hot and cold dispensers offered by Primo.

•Price of potable water calculated per 940 gallons as this was the amount consumed via bottles delivered.

•Delivery cost for water bottles to 901/901A calculated using purchasing data from May 2022 to October 2022 and annualized to provide comprehensive comparison of costs.

•Total delivery cost for bottles to 901/901A amounts to \$2,442.12.

•Potable water rate at the lab is \$4.24 per 1,000 gallons, costing \$3.985 to supply 940 gallons of potable water.

•Cost for standard units is \$2,565.70, assuming no additional retrofitting costs.

•Use of bottle filling stations would save \$2,348.73 per year in this example.

•This saving potential represents only 3 out of 126 delivery sites, indicating substantial potential savings if bottle filling stations are used more widely across the lab.

## Discussion

In conclusion, the comparison between bottled and tap water use at Brookhaven National Lab (BNL) highlights the pressing need for a comprehensive policy to more effectively regulate lab spending on bottled water. By enacting a policy that empowers the Environmental Protection Division (EPD) to regulate the purchase of bottled water and promote the installation of bottle filling stations, BNL can address the economic, environmental, and health concerns associated with bottled water use. Such a policy would encourage responsible water consumption, reduce unnecessary expenses, and reinforce the lab's commitment to sustainability and employee well-being. In conclusion, implementing a policy that promotes the use of tap water and bottle filling stations at BNL is a crucial step toward optimizing water supply practices and reducing financial and environmental burdens. By encouraging employees to embrace tap water and fostering a culture of sustainability, BNL can set an example for other institutions and contribute to a greener, more cost-effective future. It is clear that the time has come for BNL to take proactive measures and adopt a policy that will lead the way in responsible water usage and resource management.



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