

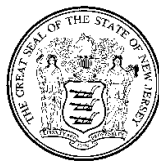
**REPORT
TO THE
NEW JERSEY LEGISLATURE
ASSEMBLY ENVIRONMENT & SOLID WASTE
AND
SENATE ENVIRONMENT & ENERGY
COMMITTEES**

***SUMMARIZING LABORATORY TEST RESULTS ON
THE QUALITY OF BOTTLED DRINKING WATER
FOR THE PERIOD
JANUARY 1, 2021 THROUGH DECEMBER 31, 2021***

OCTOBER 2022

New Jersey Department of Health

**Division of Epidemiology, Environmental & Occupational Health
Consumer, Environmental and Occupational Health Service
Public Health and Food Protection Program**



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INTRODUCTION

The New Jersey Department of Health (NJDOH) is required by Public Law 1994, Chapter 79 (N.J.S.A. 24:12-11), enacted on July 24, 1994, to prepare and submit a report annually on the quality of bottled water to the Senate Environment and Assembly Environment Committees or their successors. The Legislation calls for the Department to summarize test data submitted by water bottlers, both imported and domestic, and any analytical spot checks conducted by the Department. In addition to summarizing the bottled water test data, the report provides information on the ongoing bottled water inspectional activities and consumer services provided by the Department. The report delineates the major activities associated with the certification of bottlers selling water in New Jersey and enforcement actions taken by the Department.

The bottled water industry has had a relatively stable growth rate since 2000 with the exception of 2008 and 2009 which saw a decline in per capita consumption. However, since 2009 the rate has increased steadily from 2.7% per capita consumption up to 4.2 in 2020, but slowed to an increase of only 3.4% in 2021, probably due to the impact of the COVID-19 pandemic. In 2020, bottled water sales in the United States reached over \$18.1 billion in sales, \$300 million less than in 2019, again likely due to the impact of the pandemic. 2021 bottled water sales were not available at the time of this report. The International Bottled Water Association (IBWA) estimates that 15 billion gallons of bottled water were consumed in 2020, up 4.16% from 2019. Growth of New Jersey bottled water sales was comparable to the national bottled water sales trend according to the Beverage Marketing Corporation (BMC). Much of this increase, according to BMC, is attributed to the increasing aversion to sugary carbonated soft drinks and juice products by consumers. 2017 demonstrated that bottled water had overtaken soft drinks by volume consumed for the first time since 1977 when bottled water sales were first tracked, and this trend continued through 2021.

The BMC, which tracks the bottled water consumption throughout the country, ranks the data by region rather than individual states. New Jersey is included in the Northeast region which has consistently ranked higher than the Pacific region since 2006. In 2006, the Northeast overtook the Pacific as the largest bottled water region in the U.S. and has remained the leader since. Although the gap between the two regions shrank in 2009, it has widened in the subsequent 11 years.

The increase in bottled water consumption is largely attributed to health concerns from consuming beverages containing high amounts of sugar and/or corn syrup and their association with the increasing incidence of diabetes and obesity.

PUBLIC HEALTH ASPECTS

With the considerable consumption of bottled water in the United States, there has been a greater awareness and interest in the safety and quality of these products. Bottled water source supplies are subject to the same types of contaminants that can impact public drinking supplies. Bottled water producers primarily rely on springs and wells for their water supplies, and these sources can be influenced by contaminants entering the water-bearing strata. While chemical contaminants are seldom found in bottled or public drinking water supplies at high enough levels to cause acute health affects, small amounts over a long period of time could lead to chronic or long-term adverse health effects.

Specific standards have been developed for impurities that have been detected in ground and surface water supplies. Bottled water sources must meet the same water safety standards that have been developed under the federal and state's Safe Drinking Water Act and the regulations establishing New Jersey Maximum Contaminant Levels (MCLs) for public drinking water supplies. These standards are developed by examining the toxicological data for the contaminants of concern through animal studies or epidemiological human health studies. This information is used to develop an estimate of the concentration of the contaminant that may be toxic, and the concentration determined, if any, that would not cause an adverse health affect. An MCL is the highest amount of a specific contaminant allowed in drinking water, including bottled water products. MCLs are set for carcinogens to expect no more than one cancer case, or other major adverse health effect, to occur in one million persons ingesting the chemical contaminant in a lifetime. The MCLs are based on a daily consumption of two liters of water. Two new MCLs of perfluoroalkyl substances (PFAS), for perfluorooctane sulfonic acid and perfluorooctanoic acid, were introduced by the New Jersey Department of Environmental Protection (NJDEP) in June 2020, and became enforceable in January 2021. This is in addition to the MCL for perfluorononanoic acid, which was adopted by NJDEP in August 2018 and became enforceable in September 2018. PFAS contamination of drinking water is currently of great interest and scrutiny in the scientific community due to their being linked to testicular, kidney, and other cancers, liver damage, high cholesterol, reduced vaccine efficacy, and to neonatal and child developmental disorders.

The New Jersey Drinking Water Quality Institute reviews ongoing scientific studies on the effects of chemicals detected in drinking water and recommends MCLs for each chemical contaminant of concern. The Institute is made up of representatives from the New Jersey Department of Environmental Protection (NJDEP), NJDOH, the academic scientific community, water suppliers, and the general public.

The NJDOH bottled water oversight activities are in place to ensure that bottled

water products sold in the state:

- Meet the established MCLs for chemical, radiological, and microbiological contaminants;
- Are derived from an approved source;
- Are bottled in a safe and sanitary manner; and
- Are properly labeled.

In addition to the potential for chemical contamination, source water supplies can also be subject to microbiological contamination. Spring water supplies can be vulnerable to the infiltration of surface water and pathogenic microorganisms including protozoa, such as *Giardia lamblia* and *Cryptosporidium parvum*. These pathogens may enter the ground water strata from which a bottler draws their supply. While pathogenic bacteria are readily eliminated through disinfection, standard disinfection techniques employed by water bottlers such as ozonation and ultra-violet light (UV) treatment do not eliminate protozoan cysts. In order to address this potential problem, the NJDOH established rules that require water bottlers to evaluate their source of supply for direct surface water influences. Microscopic particulate analysis or other hydrologic evaluations are conducted, and the bottlers must certify that their water is not under the direct influence of surface water or employ additional treatment, which includes submicron filtration to eliminate the potential for the presence of protozoa.

STATUTORY AND REGULATORY PROVISIONS

NJDOH is responsible for enforcing the laws and regulations governing bottled water. The NJDOH's Consumer, Environmental and Occupational Health Service, Public Health and Food Protection Program (PHFPP) in the Division of Epidemiology, Environmental and Occupational Health Services administer the Bottled Water Project.

Title 24 - Food and Drugs

Bottled water is considered, under federal and state laws, to be a food product. As such, bottled water manufactured or sold in the state must comply with the laws governing bottled water under N.J.S.A. 24:12-8 et seq.

The following delineates the major provisions of the law enforced by the NJDOH:

- Bottled water sold in the state must meet the water quality standards adopted

by the NJDEP for drinking water, pursuant to the New Jersey Safe Drinking Water Act (N.J.S.A. 58:12A-1).

- Plant operators must test bottled water for microbiological and hazardous chemical contaminants at prescribed frequencies. Product testing must be conducted in a laboratory certified by the NJDEP (N.J.S.A. 24:12-10).
- Test results must be forwarded to the NJDOH at prescribed frequencies (N.J.S.A. 24:12-11).
- The NJDOH shall prepare and submit an annual report to the Senate Environment and Assembly Environment Committees, or their successors, summarizing the spot check test results collected and analyzed by the NJDOH (N.J.S.A. 24:12-11).
- The law provides specific penalty provisions and actions the Commissioner, NJDOH, can take when bottled water may present an imminent and substantial health endangerment (N.J.S.A. 24:12-14).
- The law requires the Commissioner, NJDOH, to adopt and implement rules for (1) monitoring, sampling, and inspection procedures for source and finished product bottling; (2) maintenance and retention of required records; (3) submission of monitoring and sampling reports to the NJDOH; and (4) other information that the Commissioner deems necessary to determine compliance with the law (N.J.S.A. 24:12-12).

Rules Governing Manufacture, Storage, Distribution, and Handling of Bottled Water:

The rules governing bottled water adopted by the NJDOH are found in the administrative code at N.J.A.C. 8:21-5.1. The major provisions of the rules enforced by the NJDOH relate to the standards and testing criteria for bottled water and are as follows:

- Delineates the good manufacturing practices and sanitary controls for water -
- bottling plants operating in the state.
- Requires bottlers to address the potential for groundwater contaminants impacting their source of supply and requires adequate treatment systems in place when groundwater influences are identified.
- Sets the specific water quality standards and testing frequencies. (The microbiological, physical, chemical, and radiological standards, including

testing frequencies, are listed in the Water Quality Standards section of the report.)

- Adopts by reference the NJDEP Safe Drinking Water Act Water Quality Standards. This will ensure that the water quality standards are kept current without formal rule changes each time the NJDEP amends or adds new water quality standards.
- Establishes the procedures for submission of required test results by laboratories certified by the NJDEP. A list of certified laboratories is available from NJDEP.
- Adopts federal labeling standards and nomenclature requirements promulgated by the U.S. Food and Drug Administration (FDA) for bottled water products.
- Requires certification of in-state, out-of-state, and foreign bottling plants selling water in New Jersey.
- Requires certification fees to support inspections of water bottlers, conduct expanded spot checks of bottled water products, and administer bottled water project activities.

NEW JERSEY BOTTLED DRINKING WATER STANDARDS

All in-state and out-of-state certified bottled water firms must submit water analysis test results to the NJDOH on both source water and each finished bottled water type (i.e., spring, distilled, mineral or well water). Sampling frequencies and bottled drinking water standards are listed as follows:

SAMPLING FREQUENCIES

Frequency of Sampling		
Type of Analysis	Source Water*	Finished Bottled Water
Volatile Organics	Annually	Annually
Inorganics	Annually	Annually
Synthetic Organics	Annually	Annually
Secondary Standards	Annually	Annually
Radiological	Every 4 years	Every 4 years
Microbiological	Weekly	Weekly

* Source water is water from an approved source that has not been treated or disinfected.

Note: If an approved Community Water System (municipal water supply) is used as a water supply for bottled water, the results from the water utility may be used to prevent duplication in testing.

New Jersey Bottled Drinking Water Standards

VOLATILE ORGANIC COMPOUNDS		INORGANIC COMPOUNDS	
CONTAMINANTS	MCL (ug/l or ppb)	CONTAMINANTS	MCL (ug/l or ppb)
Benzene	1.0	Antimony	6.0
Carbon Tetrachloride	2.0	Arsenic	10.0
Meta-Dichlorobenzene	600.0	Asbestos	7x10 ⁶ fibers/l >10 um
Ortho-Dichlorobenzene	600.0	Barium	2000.0
Para-Dichlorobenzene	75.0	Beryllium	4.0
1,1-Dichloroethane	50.0	Cadmium	5.0
1,2-Dichloroethane	2.0	Chromium	100.0
1,1-Dichloroethylene	2.0	Copper	1000.0
<i>Cis</i> -1,2-Dichloroethylene	70.0	Cyanide	200.0
<i>Trans</i> -1,2-Dichloroethylene	100.0	Fluoride	2400.0
1,2-Dichloropropane	5.0	Lead	5.0
Ethylbenzene	700.0	Mercury	2.0
Methyl tertiary Butyl Ether	70.0	Nitrate (as nitrogen)	10000.0
Methylene Chloride	3.0	Nitrite (as nitrogen)	1000.0
Monochlorobenzene	50.0	Nitrate/Nitrite combined	10000.0
Napthalene	300.0	Selenium	50.0
Perfluorononanoic Acid	.013	Thallium	2.0
Styrene	100.0	Turbidity	5 NTU
1,1,2,2-Tetrachloroethane	1.0		
Tetrachloroethylene	1.0		
Toluene	1,000.0	TOTAL TRIHALOMETHANES (THMs) INCLUDES:	
1,2,4-Trichlorobenzene	9.0	Bromoform	
1,1,1-Trichloroethane	30.0	Dibromochloromethane	
1,1,2-Trichloroethane	3.0	Chloroform	
1,2,3 – Trichloropropane	.03	Dichlorobromomethane	
Trichloroethylene	1.0	Sum of the four compounds:	80.0
Vinyl Chloride	2.0		
Xylenes (total)	1,000.0	Phenols	1.0
Disinfectant/Disinfectant By-Products			
Chlorine	4,000.0	Perfluorooctanoic Acid	.014
Chloramine	4,000.0	Perfluorooctanesulfonic Acid	.013
Chlorine Dioxide	800.0		
Haloacetic Acids	60.0		
Chlorite	1,000.0		
Bromate	10.0		

KEY: One microgram per liter (ug/l) is equal to one part per billion (ppb).

New Jersey Bottled Drinking Water Standards (continued)

SYNTHETIC ORGANIC COMPOUNDS		SECONDARY STANDARDS	
CONTAMINANTS	MCL (ug/l or ppb)	PHYSICAL & CHEMICAL CHARACTERISTICS	RECOMMENDED UPPER LIMIT
Alachlor	2.0	Color	10 color units
Atrazine	3.0	Odor	3 threshold odor units
Benzo [a] pyrene	0.2	PH	6.5 to 8.5 (optimum range)
Carbofuran	40.0	Taste	No objectionable taste
Chlordane	0.5	MBAS (foaming agents)	0.5 ppm
Dalapon	200.0	Aluminum	0.2 ppm
Dibromochloropropane	0.2	Chloride	250.0 ppm
Di[2-ethylhexyl] adipate	400.0	Fluoride	2.0 ppm
Di[2-ethylhexyl] phthalate	6.0	Hardness as CaCO ³	250.0 ppm
Dinosep	7.0	Iron	0.3 ppm
Diquat	20.0	Manganese	0.05 ppm
Endothall	100.0	Silver	0.1 ppm
Endrin	2.0	Sodium	50.0 ppm
Ethylene dibromide (ED)	0.05	Sulfate	250.0 ppm
Glyphosate	700.0	Total dissolved solids	500.0 ppm
Heptachlor	0.4	Zinc	5.0 ppm
Heptachlor Epoxide	0.2	MICROBIOLOGICAL STANDARDS	
Hexachlorobenzene	1.0	Total Coliform	Membrane Filter Method <1 cfu/100 ml
Hexachlorocyclopentadiene	50.0	Total Coliform	Absent by Presence/Absence Method
Lindane	0.2	RADIONUCLIDES STANDARDS	
Methoxychlor	40.0	MCL in pCi/l (picocuries per liter)	
Oxamyl	200.0	Gross Alpha	15
PCBs (Polychlorinated Biphenyls)	0.5	Combined Radium 226 and 228	5
Pentachlorophenol	1.0		
Picloram	500.0		
Simazine	4.0		
Toxaphene	3.0		
2,3,7,8-TCCD (Dioxin)	3x10 ⁻⁵		
2,4-D (2,4 - Dichlorophenoxyacetic Acid)	70.0		
2,4,5-TP (Silvex)	50.0		

KEY: One microgram per liter (ug/l) is equal to one part per billion (ppb)

Microbiological methodology is established in the most recent edition of *Standard Methods for the Examination of Water and Waste Water*.

BOTTLED WATER PROJECT ACTIVITIES

The NJDOH certifies out-of-state firms marketing products in the state as well as New Jersey bottled and bulk water facilities. The project reviews all test results that are required to be submitted to the NJDOH and takes regulatory action to gain compliance, when necessary. As part of the NJDOH's regulatory responsibilities and consumer health service activities, the project responds to consumer inquiries and complaints, collects samples for analysis by the NJDOH's Public Health and Environmental Laboratories (PHEL), and conducts compliance inspections of water bottling plants. Product labels are also reviewed before approval is given to market a product in the state. The following is a summary of the NJDOH's major activities during the 2021 reporting period to regulate the bottled water industry and respond to consumers' requests for information concerning these products:

In continuation of our food defense initiatives, the Bottled Water Project maintains a strong partnership with the FDA Imports Branch which notifies the Project of unlicensed imported bottled water entries whenever an importer files a Prior Notice of Importation with FDA.

- For over a decade, NJDOH prioritized the investigation of imports based upon notification from FDA. Investigations of these bottled water imports revealed that much of these products were intended for distribution into New Jersey. It is important for NJDOH to certify the source and license the foreign bottling facility, as some countries do not have the same strict water quality standards as New Jersey. However, the early emergence of the COVID-19 pandemic severely curtailed field inspections and investigations in 2021.
- Analysis of Pedras Salgadas Mineral Water by the NJ Public Health Environmental and Agricultural Laboratory revealed elevated beryllium (9.06 ppb), a toxic heavy metal, and elevated gross alpha radiation (95.7 pCi/L). The supply of this mineral water from Portugal was voluntarily destroyed at the Newark, NJ, importer/distributor's warehouse, an administrative order to the importer/distributor directing the cessation of importation of this product was issued by the Bottled Water Project, and FDA Imports Branch was notified.
- There was one discovery of imported unlicensed bottled water products. 2,527 cases totaling 5,803 gallons were embargoed and subsequently released once the firm applied for licensure. Since 2004, the number of investigations steadily rose to a peak of 61 in 2008 and have precipitously fallen since then. Bottled Water Project management believes that this is due to the reputation the Project has in aggressively monitoring and enforcing

bottled water regulations.

- Project staff licensed 184 companies in 2021 to sell bottled water in New Jersey. This is 20 less than the previous year, which may be due to the economic impact of COVID-19. There were 17 new applications to operate a bulk water or bottled water facility received and processed during this period. All but one were out-of-state bulk or bottled water establishments, 10 of them foreign. Thirty-seven firms either went out of business or ceased distribution into New Jersey.
- Project staff handled 317 requests throughout 2021 for information from individuals or firms concerning New Jersey's regulatory requirements, such as test result submission requirements, labeling requirements, and information on obtaining New Jersey bottled water certification.
- Project staff investigated one consumer complaint during 2021, which is one less than the number received during the previous reporting period. The complaint involved an allegation of a domestic brand of bottled water having a chemical taste, with no adverse health effects reported. The complaint was investigated, the bottled water was tested, but the laboratory analyses did not substantiate the complaint. Subsequently, the investigation was closed.
- Of the 17 in-state bottlers and bulk water facilities, six were inspected in 2021. Four were issued satisfactory inspection ratings and found to be in substantial compliance with the good manufacturing practice rules enforced by the NJDOH. Two were rated conditionally satisfactory for sanitation violations, were then reinspected and found to be satisfactory.
- Project staff conducted 47 spot checks of bottled water products to confirm test results submitted to the NJDOH. All were found to be safe for human consumption.

SUMMARY OF TEST SUBMISSION RESULTS

Bottled water test submission results for 2021 continue to follow the same pattern as the findings reported during the 1995 through 2020 reporting periods. The findings indicate that the vast majority of bottled water sold in the state continues to meet the water quality standards. Some of the mineral waters continue to be high in sodium and other inorganic compounds. Most exceedances occurred in secondary water quality standards and were aesthetic rather than public health concerns. The pH exceedance is an example of this. Any exceedance noted in the standards, other than the Secondary Standards, was reviewed with the firm in non-

compliance. The product was subject to corrective action, additional sampling, and review for adherence to the New Jersey Bottled Drinking Water Standards.

Microbiological Results:

The NJDOH reviewed over 2,000 microbiological tests for total coliform and standard plate count. There were six exceedances of the total coliform standard in source water tests, but none for finished products. They ranged from one to 24 colony forming units/mL. The source water coliform positives were found to be negative for fecal coliforms, which is the target organism of concern. In all of these incidents, corrective actions were taken, and the coliforms were eliminated in subsequent testing. Total coliform must be less than one colony forming unit per 100 ml or the absence of any total coliform bacteria. In these cases, the finished products produced from the source was reported to be free of coliform bacteria. Coliform bacteria are indicator organisms of potential microbiological contamination of water supplies, and if present, the treatment processes in place by the bottler must be capable of eliminating microbiological contaminants in the finished product.

Chemical Results:

pH Results:

The pH test submissions exceeded the recommended range of 6.5 - 8.5 pH units in 118 of the bottled water analyses submitted for licensure. pH is not a significant health issue, unless extremely acidic or alkaline. Neutral water is 7.0; below that the water is acid and above 7.0 the water is alkaline. They ranged from 4.13 to 9.9. Acidic water is often caused by various dissolved salts and in the case of distilled water, from dissolved carbon dioxide forming a dilute solution of carbonic acid. Much of the higher alkalinity waters are deliberately modified as a marketing strategy, due to the popularity of alkaline water products.

Hardness Results:

The hardness test submissions exceeded the recommended level of 250 parts per million in 31 of the laboratory analyses submitted. Hardness is not a significant health issue but does cause scaling of plumbing fixtures. The elevated levels ranged from 260 ppm to 1,200 ppm.

Volatile Organic Compound Results:

The phenol test submissions exceeded the maximum contaminant level of 1 ppb in 27 of the laboratory analyses submitted. Phenol is a toxin, found in nature as

well as synthetic materials, that can cause adverse gastrointestinal, metabolic, blood, and liver effects in chronically exposed humans. In all 27 cases, the phenol occurred in surface source waters and was eliminated from finished products by various treatment methods. The elevated levels ranged from 1.1 to 6.0 ppb.

One test submission exceeded the maximum contaminant level of 3 ppb for methylene chloride. This sample measured at 4.3 ppb. Methylene chloride, a synthetic solvent, may cause cognitive impairment and is classified as a carcinogen in humans. In this case, the methylene chloride was found in a surface source water and was eliminated from finished products by various treatment methods.

Sodium Results:

The sodium test submissions exceeded the MCL of 50 parts per million in 23 of the laboratory analyses submitted. The levels ranged from 51.8 ppm to 1,900 parts per million. Sodium is a naturally occurring element found in nearly all geological formations and bodies of water. Elevated sodium can contribute to hypertension and cardiovascular diseases. Individuals on a sodium-restricted diet should be aware that some bottled waters may contain elevated levels of sodium and should pay attention to the sodium declaration on bottled water product labels.

Under FDA labeling requirements enforced by the NJDOH, bottled water products containing levels of sodium greater than 50 mg/l require a nutritional labeling statement and a sodium declaration on the label. Many of the bottled water manufacturers make low sodium or sodium-free claims, and the sodium content appears on the product label. The bottled water products that exceeded the sodium standard reflect this excess with a sodium labeling declaration.

Total Dissolved Solids Results:

The total dissolved solids (TDS) submissions exceeded the recommended level of 500 ppm in 14 of the laboratory analyses, with a range of 530 to 4,800 ppm. Elevated levels of this secondary standard are highly prized in marketing mineral waters, although some consumers consider high levels to present an unpleasant odor and taste.

Manganese Results:

The Manganese test submissions exceeded the recommended level of 50 ppb in 10 of the laboratory analyses submitted. Manganese is not a significant health issue but does cause staining of plumbing fixtures and clothing. The elevated levels ranged from 56 ppb to 304 ppb.

Iron Results:

The Iron test submissions exceeded the recommended level of 0.3 ppm in 5 of the laboratory analyses submitted. Iron is not a significant health issue but does cause staining of plumbing fixtures and clothing, and an unpleasant metallic taste. The elevated levels ranged from 0.32 ppm to 6.2 ppm.

Turbidity Results:

The turbidity test submissions exceeded the recommended level of 5 Nephelometric Turbidity Units (NTUs) in 5 of the laboratory analyses submitted. Turbidity is merely an aesthetic measure of water quality. There are no adverse health effects attributed to the turbidity of water alone, although the solids causing the discoloration may be significant. The levels ranged from 5.2 to 68 NTUs.

Arsenic Results:

The Arsenic test submissions exceeded the maximum contaminant level of 10 ppb in two of the laboratory analyses submitted. Arsenic is a naturally occurring element which can cause cardiovascular disease, diabetes, skin lesions, and cancer. In both cases, the Arsenic occurred in highly mineralized source waters and was reduced to safe levels or eliminated completely by various treatment methods. The elevated levels ranged from 12 to 19 ppb.

Chloride Results:

Chloride was reported in two test submissions at 270 and 480 ppm, in excess of the MCL of 250 ppm. Chloride is a naturally occurring ion, which typically occurs from dissolved salt (sodium or potassium chloride). Chloride itself is not considered harmful, but as it is often accompanied by sodium ions, they could be of concern to people with hypertension. In these two cases, the chloride occurred in source waters and were subsequently eliminated by various treatment methods.

Bromate Results:

The bromate test submissions exceeded the Maximum Contaminant Level of 10 ppb in one laboratory analysis submitted. Bromate is a suspected carcinogen, created by the ozonation of water containing high levels of bromide, a naturally occurring halide salt. All bottled water must contain an ozone residual of 0.1 to 0.4 ppm, but the bromate production must be controlled to below 10 ppb. This is typically achieved by lowering the ozone concentration closer to 0.1 ppm or treating the water for the removal of the bromide ions. In this isolated case measured at 18 ppb, corrective actions were taken by the processor to lower the bromate levels

below the MCL.

Odor Results:

The odor test submissions exceeded the recommended level of three threshold odor units (TOUs) in one of the laboratory analyses submitted. Odor is a subjective analysis and is not a significant health issue in itself but may indicate that there are other substances present which may be of public health significance. The elevated levels were 86 TOUs. This submission originated from source water and was subsequently treated to undetectable levels in the finished products.

Sulfate Results:

The sulfate test submissions exceeded the MCL of 250 ppm in one of the test submissions at 550 ppm. Excess sulfates can cause a laxative effect on the gastrointestinal tract. This submission was from source water and was subsequently treated to levels well below the MCL in the finished products.

Fluoride Results:

Fluoride was reported in one test submission at 7.0 ppm, in excess of the MCL of 2 ppm. Fluoride is a naturally occurring ion and is also deliberately added into some public water supplies to prevent cavities and strengthen teeth in populations served, particularly for children. In this case, the fluoride occurred in source waters and was subsequently eliminated by various treatment methods.

Nitrate Results:

Nitrate was reported in one test submission at 20 ppm, in excess of the MCL of 10 ppm. Nitrate is a naturally occurring ion, as well as a component of various agricultural fertilizers, explosives, and gunpowder. Nitrate can cause headache, dizziness, lightheadedness, nausea, and low blood pressure in lower concentrations and methemoglobinemia in higher concentrations. In this case, the nitrate occurred in a surface source water and was subsequently eliminated by various treatment methods.

Radiological Results:

Gross Alpha Radionuclide Results:

The gross alpha radionuclide test submissions exceeded the maximum contaminant level of 15 pCi/L in two laboratory analyses submitted. Gross alpha is the cumulative count of radionuclides which could cause radiation poisoning and

cancer in chronically exposed humans. In all both cases, the radionuclides in the source waters were reduced to safe levels or eliminated altogether by various treatment methods. The elevated levels were reported at 20 and 52 pCi/L.

Radium was reported in one test submission of 44 pCi/L in excess of the MCL of 5 pCi/L. Radium is a naturally occurring radioactive element which could cause radiation poisoning and cancer in chronically exposed humans. In this case, reported at 12.1 pCi/L, the radium in the source water was reduced to safe levels or eliminated altogether by various treatment methods.

SPOT CHECK SUMMARY TESTING

The NJDOH conducts spot checks of bottled water product annually to determine if these results are in conformity with those submitted to the NJDOH by bottled water manufacturers as required. The samples are representative of popular and imported brands being sold in the state. Forty-seven spot check samples were collected in 2021. Eighteen were imported brands, and 29 were domestically-produced brands.

The 2021 spot check samples were analyzed for microbiology, volatile organics, synthetic organics, (pesticides & herbicides), inorganics, secondary standards, radiological, physical characteristics, and trihalomethanes.

The results of the spot check sampling showed no exceedances in the total coliform standard. The standard plate count ranged from <1/ml up to >59,000 ml. There is currently no upper limit set for standard plate count in the regulations; however, a level in excess of 59,000 ml may indicate a potential problem.

*SECONDARY STANDARDS

There were many instances where product exceeded the secondary aesthetic standard parameters which included pH (18), hardness (6), sodium (1), total solids (1), and sulfates (1). The secondary standards are not based on adverse health consequences and are not considered to be of public health significance.

*The pH test submissions exceeded the recommended range of 6.5 – 8.5 pH units in 18 of the bottled waters tested. The lowest pH was detected at 5.26 and the highest at 9.9. Bottled water outside the recommended pH range is not a health or safety issue, but one of concern only to the bottling plant operator, since water with low or high pH may be corrosive or scale forming. High pH values are mostly due to the addition of alkaline minerals to produce functional bottled water products.

*The MCL for Hardness is 250 ppm and was exceeded six times with a

range from 268 to 679 ppm. Elevated hardness causes scaling of plumbing fixtures.

*The MCL for sodium is 50 ppm and was exceeded only once with a value of 54.6 parts per million (ppm). Excess sodium is typically found in some mineral waters and is of concern to people who have hypertension or object to a salty taste.

*The MCL for total dissolved solids is 500 ppm and was exceeded only once with a value of 872 ppm. Elevated levels of this secondary standard generally involve objectionable odor and taste.

*The MCL for sulfates is 250 ppm and was exceeded only once with a value of 424 ppm. Excessive levels of sulfates may cause a laxative effect and may cause the product to have an objectionable taste.

INORGANIC COMPOUNDS

The standards for inorganic elements and compounds were found in compliance.

SYNTHETIC ORGANIC COMPOUNDS

The standards for synthetic organic compounds were found in compliance.

RADIONUCLIDES STANDARDS

The standards for radionuclides were found in compliance.

VOLATILE ORGANICS

The standards for volatile organic compounds were found in compliance.

CONCLUSION

For 2021, bottled water in New Jersey generally met regulatory standards in order to ensure a safe, wholesome, and truthfully labeled product. Over the last two decades, bottled water quality has continually improved in meeting or exceeding regulatory standards. The NJDOH will continue to closely monitor bottled water quality and safety through spot check sampling, with a significant emphasis on imported products, and thorough review of the required laboratory test submissions.

Although bottled water is not considered a “high risk food,” continued regulatory oversight is necessary in part due to the explosive growth in the bottled water industry. This growth, for more than a decade, has placed bottled water in nearly every supermarket and vending machine, where dozens of brands compete

for consumer dollars. 2016 was the first year that bottled water has overtaken soda as the beverage of choice in the United States, and it has continued to do so through 2021.

The NJDOH is continuing its partnership with the International Bottled Water Association and the 16 licensed bulk/bottled water firms in New Jersey to bolster food defense initiatives. Based upon vulnerability assessments, food defense experts are in consensus that bottled water is one of the most likely targeted food products by potential terrorists. The primary goal of this partnership is to focus attention on these facilities in order to foil or deter potential tampering or terrorism. Food defense/food security assessments were conducted during each of the bottled water facility inspections in 2021. Furthermore, aggressive enforcement action on imported bottled water products furthered NJDOH's food security initiatives.

New firms are continually entering the market and require additional focused surveillance. Source waters that could potentially be contaminated require ongoing monitoring, and the subsequent removal of any pollutants must be ensured. As new water standards are introduced, systems are needed to ensure compliance. With continued surveillance, the quality and safety of the bottled water market in New Jersey can continue to meet all regulatory and industry standards.

APPENDIX 1

TYPES OF BOTTLED WATER

The Department has adopted the Federal Standards of Identity, and all bottled water products must conform to the nomenclature established in 21 CFR 165.110(a) (identity). Bottled waters can have differing characteristics that affect the taste, odor, and chemical composition. These characteristics are due to the exposure of the water to underground strata from which they are drawn and also to the treatments applied by the manufacturer prior to bottling. The treatments may result in either the addition or removal of minerals to achieve a desired taste. The standards of identity for all regulated bottled water products that are sold are described as follows:

Artesian Water or Artesian Well Water: Artesian water is obtained from a well that is under natural pressure due to the water source being confined by layers of clay or rock. The water rises naturally to a height above the top of the aquifer. Artesian or artesian well water may be collected with the assistance of external force (pumps) to enhance the natural underground pressure.

Mineral Water: Mineral water contains very large amounts of mineral salts in excess of 250 mg/l (milligrams per liter). Mineral waters usually contain such salts as calcium, sodium, chloride, sulfate, carbonates, and bicarbonates. All other waters described here also contain these mineral salts but at much lower concentrations.

Distilled Water: Distilled water is processed by heating it to produce water vapor, then condensing and collecting the water. This process leaves most of the minerals behind and produces a very flat and tasteless water. This type of water is used for batteries, clothing irons, and other domestic uses. This water treatment is also effective in removing microorganisms including bacteria and other larger parasites.

Purified Water or Demineralized Water: Purified water is processed by either (1) distillation described above; (2) reverse osmosis, a process that filters the water through a filter membrane; or (3) deionization, a process in which the minerals are attracted to particles of the opposite electrical charge and removed. All three processes must result in water that meets the established definition of “Purified Water” in “The United States Pharmacopoeia – National Formulary (USP-NF)”, edition 37-32.

Sparkling Bottled Water: Sparkling bottled water is water that has naturally occurring carbon dioxide or effervescence.

Spring Water: Spring water is derived from an underground or subsurface formation where the water flows naturally to the surface and continues as a current of flowing water into a brook, stream, or river. Spring water is collected at the point of discharge or through a borehole tapping the underground formation feeding the spring.

Ground Water: Ground water is derived from a subsurface-saturated zone under pressure equal to or greater than atmospheric pressure. The types of ground water include well, artesian well, spring, and mineral water.

Well Water: Well water is derived from a hole that is bored or drilled into an aquifer or underground water source to extract water. This is accomplished by the installation of a well casing, pumps, and a sanitary seal to extract a safe supply.

APPENDIX 2

BOTTLED WATER RESOURCE INFORMATION

**NJ Department of Health
Consumer, Environmental and Occupational
Health Service**
P.O. Box 369
Trenton, NJ 08625-0369
609-913-5150

General information on bottled water,
bottled water inspections, and
registration requirements
<https://nj.gov/health/ceohs/phfpp/bottledwater/>

**U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water**
Ariel Rios Building
1200 Pennsylvania Avenue NW
Washington, DC 20460-0003
202-564-3750

Safe Drinking Water Hotline
1-800-426-4791
Drinking and bottled water standards
<http://www.epa.gov>

U.S. Food & Drug Administration
200 C Street, S.W.
Building # FB-8
Washington, DC 20204
888-INFO-FDA

Federal bottled water standards,
good manufacturing practices,
procedures, and product labeling
<http://www.fda.gov>

**National Sanitation Foundation
International**
P.O. Box 130140
Ann Arbor, MI 48113-0140
800-673-6275
734-769-8010

Information on bottled water treatment
systems, bottled water dispensing
equipment standards, and bottled
water plant voluntary inspection
<http://www.nsf.org>

International Bottled Water Association
1700 Diagonal Road, Suite 650
Alexandria, VA 22314
703-683-5213
800-WATER-11

General information on bottled water
statistics, processing equipment, and
bottled water products and free
consumer brochures
<http://www.bottledwater.org>