

# 2016 BROOKHAVEN NATIONAL LABORATORY Water Quality CONSUMER CONFIDENCE REPORT

BNL publishes an annual water quality report to provide on-site drinking-water consumers with an overview of the Lab's water quality during the previous calendar year. The purpose of this report is to inform you about where your water comes from; what analytical tests are conducted; what they reveal; how the results compare to New York State standards; and to educate you about the importance of preventative measures—educated consumers are more likely to help protect their drinking water sources.

**BNL's drinking water and the supply and distribution system were in full compliance with all applicable county, state, and federal regulations regarding drinking-water quality, monitoring, operations, and reporting in 2015.**

Overseeing the Lab's water supply system, which includes five wells dedicated to pumping drinking water and the on-site Water Treatment Facility, BNL's Energy & Utilities (E&U) Division is committed to providing over 3,000 employees, facility-users, contractors, and guests annually with safe drinking water.

BNL's drinking water is regularly tested using an independent laboratory approved by the New York State Department of Health (NYSDOH). Analytical data are reviewed by the Lab's Environmental Protection Division (EPD) to ensure that testing results comply with all applicable regulatory standards. In addition, E&U and EPD work with BNL's Groundwater Protection Group to make sure our potable-water supply is not adversely impacted by possible groundwater contamination or remediation operations.



For questions about this report, or to speak with someone regarding your drinking water, please contact:

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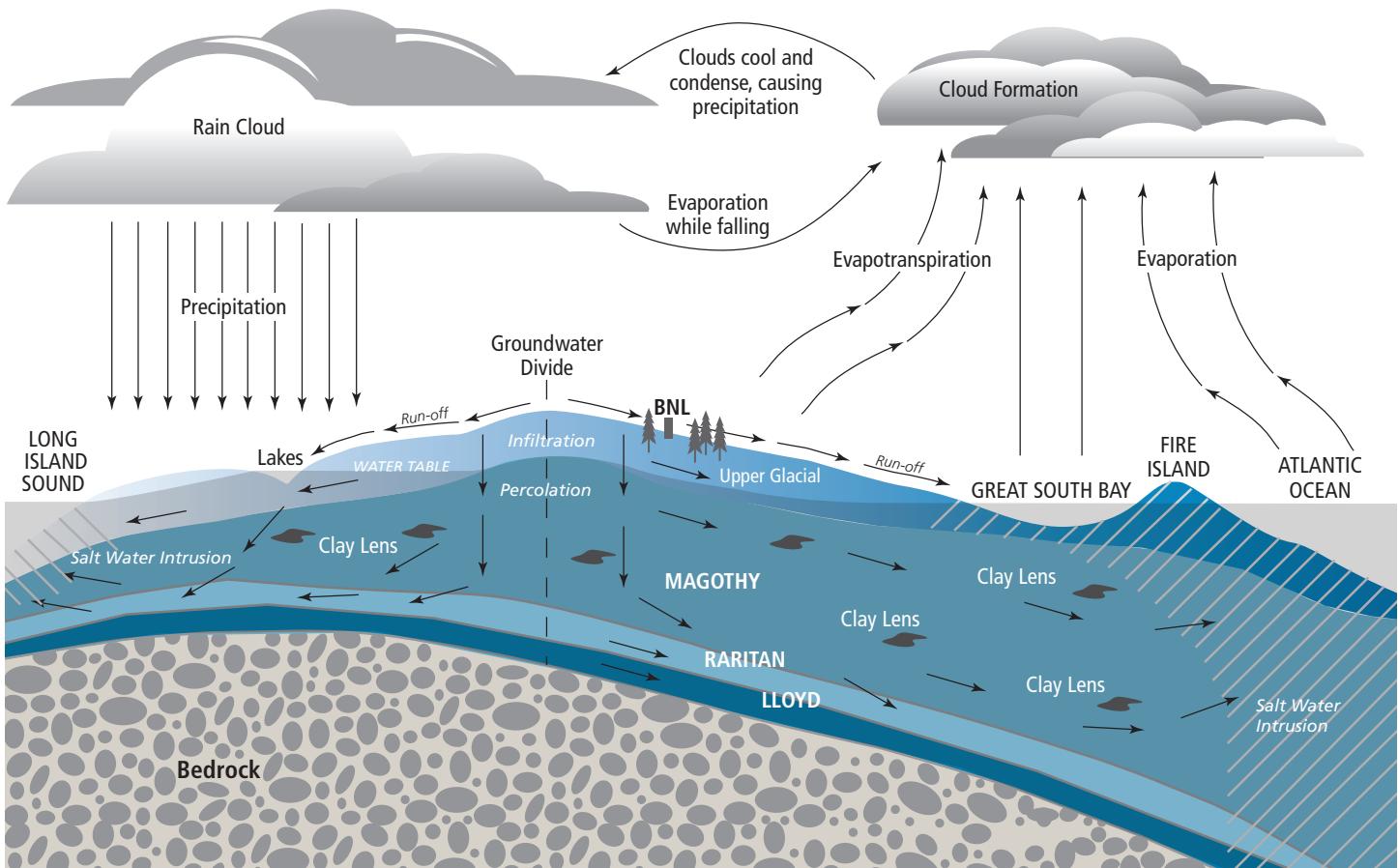
## Where Does Our Water Come From?

The Long-Island aquifer system is made up of three primary formations. From the surface to approximately 150 feet below is the Upper Glacial aquifer, from 150 to 1,000 feet below is the Magothy, and from 1,000 to about 2,000 feet below is the Lloyd. As designated by the U.S. Environmental Protection Agency (EPA), Long Island's aquifer system is

one of 78 "sole source" aquifers in the nation recognized under the aquifer-protection program authorized by the U.S. Safe Drinking Water Act.

The Lab's five in-service drinking-water wells draw up to 1,000 gallons per minute, or about 1.34 million gallons of water per day from the aquifer to supply drinking water, process cooling water, or

fire protection on site. The water from three wells (4, 6, and 7) is processed at BNL's on-site Water Treatment Facility. Water from two other wells (10 and 11) is pumped directly to the distribution system after disinfection and pH adjustments. Last year, BNL pumped approximately 413 million gallons for use on site.



Long Island Aquifer System

## What's in Our Drinking Water?

Although rivers, lakes, streams, ponds, and reservoirs are all sources of tap and bottled drinking water, most Long Island residents get their water from groundwater wells that are drilled into the underlying aquifer system. As water travels over land surfaces or through the ground, it dissolves naturally occurring minerals and radioactive material. Water can also pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: microbiological contaminants; inorganic contaminants; pesticides and herbicides; organic chemical contaminants; and radioactive contaminants.

In order to ensure that tap water is safe to drink, New York State and the EPA prescribe regulations which limit the amount of certain contaminants

in water provided by public water systems. In addition, regulations from NYSDOH and the Food and Drug Administration establish limits for contaminants in bottled water, which must provide the same protection for public health.

Source water is treated to remove substances or reduce their concentration before the water is fit for human consumption. Regardless, drinking water, including bottled water, may reasonably be expected to contain at least small amounts of contaminants; however, that does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling EPA's Safe Drinking Water Hotline at (1-800-426-4791).

Some people may be more vulnerable to disease-causing microorganisms or pathogens in drinking water than others. Immuno-compromised persons such as those with cancer undergoing chemotherapy, who have undergone organ transplants, with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care provider about their drinking water.

Guidelines from EPA and the Centers for Disease Control on appropriate means to reduce the risk of illness from Cryptosporidium, Giardia, and other microbial pathogens are also available at EPA's Safe Drinking Water Hotline.

## **BNL's Source Water Assessment**

As required under the 1996 Safe Drinking Water Act, NYSDOH performed an assessment of the source water used by the Lab's public water system to evaluate known and possible contamination sources. The assessment includes a susceptibility rating for each well based on the risk posed by the presence of potential sources of contamination within the well's contributing area and the likelihood that the contaminants will travel through the environment to reach the well. Although the susceptibility rating is an estimate of the potential for source-water contamination, it does not mean that the water delivered to consumers is or will become contaminated. If a contaminant is present, it does not necessarily mean that there is a health risk.

Results from the assessment concluded that two on-site wells are rated as having a very high susceptibility to industrial solvents, primarily due to point sources of contamination along transportation routes and from previous spills within the source area. If industrial solvents were to impact water quality at a well, the contamination would be removed by treatment facilities (air-stripping or carbon filtration)

before the water is delivered to the consumer. BNL has also identified one well that is susceptible to radionuclide contamination, specifically tritium. Although tritium has never been detected in this well, the Lab controls water-pumping operations to reduce the potential for impact. In addition to testing the supply-well water, BNL uses a network of groundwater monitoring wells to track potential sources and contamination. If a supply well could not provide water that meets drinking-water standards, it would be immediately removed from service.

A copy of the complete assessment may be reviewed by contacting Doug Paquette (631) 344-7046 or Jason Remien (631) 344-3477.



## **Water Conservation Measures**

BNL's water conservation program has achieved dramatic reductions in water use since the mid 1990s. The Lab continually evaluates water conservation as part of facility upgrades, such as replacing existing conventional plumbing fixtures with low-flow devices, or new construction. BNL's Water Management Plan describes how the Lab designs and operates buildings and facilities to be sustainable and water efficient. It also outlines our efforts to meet legislative requirements by implementing best-management practices and details the steps being implemented to reduce BNL's water consumption. For more information on BNL's water use efficiency and management, please see BNL's Site Sustainability Plan for fiscal year 2016 at <https://www.bnl.gov/about/sustainability/reports.php>.

To help the Lab conserve water, start by being conscious of your personal uses, i.e., reduce faucet flow, decrease running water while not in use, and report any drips, leaks, or other plumbing problems promptly to your Facility Project Manager. Regarding process and research use, make sure temperature controls operate properly to minimize flow and specify re-circulating water or air-cooled systems for new devices.

While it is important to conserve water, the EPA encourages that you run your tap water for 30 seconds to 2 minutes and only use cold water for drinking or cooking. Due to the aging infrastructure at BNL, iron and lead may leach into the water from the pipes. Flushing the water will help to remove any contaminants that may have built up while the water was sitting in the pipes.



## BNL's Water-Main Flush Program

In accordance with American Water Works Association recommendations, unidirectional flushing of water mains using fire hydrants within a water-distribution system is the most effective and economical way to cleanse and improve water quality.

Much of Long Island's groundwater is high in iron as a result of naturally occurring iron-containing minerals within the aquifer. The Lab's water-mains are flushed twice per year to improve the quality of the water delivered to facilities by the Lab's on-site taps, and to help

eliminate rusty water.

Visit the Water Quality website at <http://www.bnl.gov/water/index.php> for some tap-water recommendations to be sure your on-site drinking water is the best possible quality.



## Water Treatment Process

BNL's Water Treatment Facility typically treats up to 2 million gallons of "raw" water per day to remove naturally occurring iron and manganese from the groundwater.

Of the five in-service drinking-water wells, wells 4, 6, and 7 provide high-in-iron source water which must be "finished" before being distributed around the site. This water is chlorinated and the pH is adjusted before it enters the distribution system. Chlorine provides a disinfection agent and prevents the spread of water borne diseases.

Water from Wells 4, 6, and 7 is aerated to reduce carbon dioxide gas and aid in iron oxidation. Lime is added to raise the pH and soften the water and a polymer is added to aid in flocculation. Flocculation, or the formation of particle aggregates which settle out of the water as sediment, begins in the retention tank. To help form "floc," water is sent from the retention tank to a slow-mix tank.

Filtration is performed using a rapid sand filter made up of sand and anthracite coal to remove all particles. Filtered water is stored in the "wet well" before it is pumped into air-stripping towers, which



remove volatile organic compounds, if present, from the water being treated.

Up to 250,000 gallons of "finished" water is stored at the clear well before its final chlorination and distribution. Pumps send finished water from the Water Treatment Facility to the two water towers on site. Wells 10 and 11 pump water that is low in iron, and do not require treatment for iron. However, they do receive chlorine for disinfection

and sodium hydroxide for pH correction prior to being sent to the two water towers system. The water from the two storage towers is delivered on site at 55 to 70 pounds of pressure per square inch via 45 miles of distribution pipe.

For more information on the Lab's water treatment process, visit the Water Quality website at <http://www.bnl.gov/water/index.php>.

## Types of Contaminants

- disinfectant and disinfection by-products:** formed when disinfectants used in water treatment plants react with bromide and/or natural organic matter (i.e., decaying vegetation) present in the source water. Different disinfectants produce different types or amounts of disinfection by-products. Disinfection by-products for which regulations have been established have been identified in drinking water, including trihalomethanes, haloacetic acids, bromate, and chlorite.
- microbiological:** bacteria and viruses, which may come from sewage, livestock operations, wildlife, etc.
- inorganic chemicals:** dissolved salts and metals, which can occur naturally or result from storm-water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, farming, etc.
- pesticides & herbicides:** substances for, respectively, eliminating problem insects and plants, which may come from a variety of sources, such as agricultural operations, storm-water runoff, residential uses, etc.
- organic chemicals:** natural and synthetic compounds, including volatile organic compounds (VOCs). These chemicals are by-products of industrial processes, residential uses and petroleum production, and they can also come from gas stations, storm-water runoff, septic systems, etc.
- radioactive:** naturally occurring, or from oil and gas production, mining activities, nuclear facilities, etc.
- synthetic organic chemicals:** man-made compounds used for a variety of industrial and agricultural purposes.
- volatile organic compounds:** emitted by products including contaminants: paints and lacquer; paint strippers; cleaning supplies; pesticides, building materials and furnishings; office equipment such as copiers and printers; correction fluids and carbonless copy paper; graphics and craft materials including glues and adhesives; permanent markers; and photographic solutions.

## BNL's 2015 Drinking Water Sampling Results

As you can see by the table on Page 6, our system had no violations. We have learned through our testing that 19 out of 138 contaminants tested have been detected; however, these contaminants were detected below the level allowed by the State. Other parameters tested for, but were less than the minimum detection limit (MDL), include:

|                           |                           |   |
|---------------------------|---------------------------|---|
| 1,1,1,2-tetrachloroethane | cadmium                   | methomyl                                |
| 1,1,1-trichloroethane     | carbaryl                  | methoxychlor                            |
| 1,1,2,2-tetrachloroethane | carbofuran                | methyl tert-butyl ether                 |
| 1,1,2-trichloroethane     | carbon tetrachloride      | methylene blue active substances (MBAS) |
| 1,1-dichloroethane        | cesium-137                | methylene chloride                      |
| 1,1-dichloroethene        | chlordan                  | metolachlor                             |
| 1,1-dichloropropene       | chlorobenzene             | metribuzin                              |
| 1,2,3-trichlorobenzene    | chlorodifluoromethane     | n-butylbenzene                          |
| 1,2,3-trichloropropane    | chloroethane              | n-propylbenzene                         |
| 1,2,4-trichlorobenzene    | chloromethane             | nitrite                                 |
| 1,2,4-trimethylbenzene    | cis-1,2-dichloroethene    | o-xylene                                |
| 1,2-dichlorobenzene       | cis-1,3-dichloropropene   | odor                                    |
| 1,2-dichloroethane        | chromium                  | oxamyl (Vydate)                         |
| 1,2-dichloropropane       | cyanide (as free cyanide) | pentachlorophenol                       |
| 1,3,5-trimethylbenzene    | dalapon                   | picloram                                |
| 1,3-dichlorobenzene       | di(2-ethylhexyl)adipate   | propachlor                              |
| 1,3-dichloropropane       | di(2-ethylhexyl)phthalate | radium-228 *                            |
| 1,4-dichlorobenzene       | dibromochloropropane      | sec-butylbenzene                        |
| 2,2-dichloropropane       | dibromomethane            | selenium                                |
| 2,4,5-TP (silvex)         | dicamba                   | silver                                  |
| 2,4-D                     | dichlorodifluoromethane   | simazine                                |
| 2-chlorotoluene           | dieldrin                  | strontium-90                            |
| 3-hydroxycardofuran       | dinoseb                   | styrene                                 |
| 4-chlorotoluene           | diquat                    | tert-butylbenzene                       |
| 4-isopropyltoluene        | e.coli                    | tetrachloroethene                       |
| alachlor                  | endothall                 | thallium                                |
| aldicarb                  | endrin                    | toluene                                 |
| aldicarb sulfone          | ethylbenzene              | total coliform bacteria                 |
| aldicarb sulfoxide        | ethylene dibromide (EDB)  | Total polychlorinated biphenals (PCBs)  |
| aldrin                    | fluoride                  | toxaphene                               |
| ammonia                   | glyphosate                | trans-1,2-dichloroethene                |
| antimony                  | heptachlor                | trans-1,3-dichloropropene               |
| arsenic                   | heptachlor epoxide        | trichloroethene (TCE)                   |
| asbestos                  | hexachlorobenzene         | trichlorofluoromethane                  |
| atrazine                  | hexachlorobutadiene       | tritium                                 |
| benzene                   | hexachlorocyclopentadiene | vinyl chloride                          |
| benzo(a)pyrene (PAH)      | isopropylbenzene          | zinc                                    |
| beryllium                 | lindane                   |   |
| bromobenzene              | m,p-xylene                |   |
| bromomethane              | manganese                 |   |
| butachlor                 | mercury                   |   |

\* Radium-228 was tested in 2011 and will be retested in 2020.

| CONTAMINANT AND UNIT OF MEASUREMENT  | DATE OF DETECTION          | VIOLATION (YES/NO)      | LEVEL DETECTED          | DETECTION LOCATION     | RANGE OF RESULTS  | MCLG | REGULATORY LIMIT (MCL) | LIKELY SOURCE OF CONTAMINATION  |
|--|----------------------------|-------------------------|-------------------------|------------------------|-------------------|------|------------------------|---|
| <b>DISINFECTANTS</b>   |                            |                         |                         |                        |                   |      |                        |   |
| <b>DISINFECTION BY-PRODUCTS</b>  |                            |                         |                         |                        |                   |      |                        |   |
| Chlorine Residual (mg/L)   | 01/12/15                   | No                      | 0.7                     | Bldgs. 1005, B49, B930 | 0.3 - 1.1         | NS   | 4                      | Water additive to control microbes.   |
| Haloacetic Acids (ng/L)  | 08/10/15                   | No                      | 7                       | Bldg. 1005             | 3 - 7             | NS   | 60                     | By-product of drinking water disinfection needed to kill harmful organisms.   |
| Total Trihalomethanes (ug/L)   | 08/10/15                   | No                      | 36.4                    | Bldg. 1005             | 21 - 36.4         | NS   | 80                     | By-product of drinking water chlorination needed to kill harmful organisms formed when source water contains large amounts of organic matter. |
| <b>INORGANIC CONTAMINANTS</b>  |                            |                         |                         |                        |                   |      |                        |   |
| Barium (mg/L)  | 06/01/15                   | No                      | 0.053                   | Well 10                | < 0.2 - 0.053 (a) | 2    | 2                      | Erosion of natural deposits.  |
| Chloride (mg/L)  | 06/01/15                   | No                      | 68.5                    | Well 10                | 48.1 - 68.5       | NS   | 250                    | Naturally occurring; indicative of road-salt contamination.   |
| Color (units)  | 06/01/15                   | No                      | 5                       | Well 10, 11            | < 5 - 5           | NS   | 15                     | The presence of metals such as copper, iron, and manganese.   |
| Iron (ug/L)  | 07/06/15                   | No                      | 64                      | Bldg. 400              | < 20 - 64         | NS   | 300                    | Corrosion of plumbing.  |
| Lead (ug/L)  | 06/01/15                   | No                      | 1.2                     | Well 11                | < 1.0 - 1.2       | 0    | 15                     | Corrosion of plumbing; erosion of natural deposits.   |
| Nickel (ug/L)  | 07/06/15                   | No                      | 0.62                    | Bldg. 400              | < 0.5 - 0.62      | NS   | NS                     | Nickel enters groundwater and surface water by dissolution of rocks and soils from atmospheric fallout, or from biological decays.            |
| Nitrate (mg/L)   | 06/01/15                   | No                      | 0.68                    | Well 11                | 0.25 - 0.68       | 10   | 10                     | Leaching from septic tanks and/or sewages; erosion of natural deposits.   |
| Sodium (mg/L)  | 06/01/15                   | No                      | 36                      | Well 10                | 28.4-36           | NS   | NA                     | Naturally occurring; road salt; water softeners.  |
| Sulfate (mg/L)   | 06/01/15                   | No                      | 9.74                    | Well 11                | 8.05-9.74         | NS   | 250                    | Naturally occurring.  |
| <b>RADIOACTIVE CONTAMINANTS</b>  |                            |                         |                         |                        |                   |      |                        |   |
| Gross Alpha Activity (pCi/L)   | 12/15/15                   | No                      | 2.35                    | Well 6                 | < 0.92 - 2.53     | NS   | 15                     | Erosion of natural deposits.  |
| Gross Beta Activity (pCi/L) (b)  | 04/07/15                   | No                      | 3.53                    | Well 10                | < 0.73 - 3.53     | NS   | 50                     | Decay of natural deposits and atmospheric fallout.  |
| <b>VOLATILE ORGANIC CONTAMINANTS</b>   |                            |                         |                         |                        |                   |      |                        |   |
| Bromochloromethane (ug/L)  | 04/06/15                   | No                      | 2.21                    | WTP Effluent           | < 0.5 - 2.21      | NS   | 80                     | By-product of drinking water chlorination needed to kill harmful organisms.   |
| Bromoform (ug/L)   | 10/12/15                   | No                      | 2.82                    | WTP Effluent           | < 0.5 - 2.82      | NS   | 80                     | By-product of drinking water chlorination needed to kill harmful organisms.   |
| Chloroform (ug/L)  | 04/06/15                   | No                      | 3.29                    | Well 11                | < 0.5 - 3.29      | NS   | 80                     | By-product of drinking water chlorination needed to kill harmful organisms.   |
| Dibromochloromethane (ug/L)  | 10/12/15                   | No                      | 3.31                    | WTP Effluent           | < 0.5 - 3.31      | NS   | 80                     | By-product of drinking water chlorination needed to kill harmful organisms.   |
| <b>SAMPLING AT THE CONSUMER'S TAP (Tap water samples were collected throughout the Laboratory site)*</b> |                            |                         |                         |                        |                   |      |                        |   |
| CONTAMINANT AND UNIT OF MEASUREMENT  | DATE OF SAMPLING (MO./YR.) | AL EXCEED-ANCE (YES/NO) | 90th PER-CENTILE RESULT | DETECTION LOCATION     | RANGE OF RESULTS  | MCLG | REGULATORY LIMIT (AL)  | LIKELY SOURCE OF CONTAMINATION  |
| Copper (mg/L)  | 08/10/15                   | No                      | 0.09                    | Bldg. 460              | < 0.02 - 0.12     | 1.3  | 1.3                    | Corrosion of plumbing.  |
| Lead (ug/L)  | 08/10/15                   | No                      | 7                       | Apt. 1A                | < 1.0 - 15        | 0    | 15                     | Corrosion of plumbing.  |

Table Notes:

\* Sampling at the consumer's tap for lead and copper is performed every 3 years; next sampling is scheduled for 2018.

NS = drinking-water standard not specified

WTP = Water Treatment Plant

(a) MDI's may vary throughout the year causing a positive detection below a previous detection limit.

(b) The State considers 50 pCi/l to be the level of concern for beta particles.

## Lead and Copper Testing

Lead and copper enters drinking water primarily through plumbing materials. In 1991, the EPA established a “lead and copper rule” to limit the concentration of lead and copper in public water. BNL is required to sample for lead and copper at 20 consumer taps every 3 years and to notify those occupants of the buildings tested with the results. Results from testing performed in 2015 are shown in the table to the right. While lead was detected in some samples, the action limit was not exceeded. Testing will be performed again in 2018.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women, infants, and young children. It is possible that lead levels in your building may be higher as a result of materials in the plumbing. When your water has been sitting in the pipes for several hours, minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using for drinking or cooking. (See EPA guidelines on “Ac-

tions You Can Take To Reduce Lead in Drinking Water,” at <https://www.epa.gov/dwreginfo/lead-and-copper-rule>. If you are concerned about lead in your water and wish to have it tested, contact Jason Remien, (631) 344-3477.

Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline (1-800-426-4791) or at <http://www.epa.gov/safewater/lead>.



| 2015 Lead and Copper Sampling Results |          |           |           |
|---------------------------------------|----------|-----------|-----------|
| Location                              | Faucet   | Lead      | Copper    |
| Apt. 1A                               | kitchen  | 7.0 µg/L  | 0.02 mg/L |
| Apt. 6A                               | kitchen  | 1.3 µg/L  | < MDL     |
| Apt. 24A                              | kitchen  | 15.0 µg/L | < MDL     |
| Apt. 26A                              | kitchen  | 1.3 µg/L  | < MDL     |
| Apt. 28A                              | kitchen  | 1.2 µg/L  | < MDL     |
| Apt. 42A                              | kitchen  | < MDL     | < MDL     |
| Apt. 4B                               | kitchen  | 1.7 µg/L  | < MDL     |
| Apt. 5B                               | kitchen  | 10.0 µg/L | < MDL     |
| Apt. 36B                              | kitchen  | 3.2 µg/L  | < MDL     |
| Apt. 8C                               | kitchen  | < MDL     | < MDL     |
| Apt. 13D                              | kitchen  | < MDL     | < MDL     |
| Apt. 34E                              | kitchen  | < MDL     | < MDL     |
| Apt. 40M                              | kitchen  | < MDL     | < MDL     |
| Bldg. 153                             | bathroom | < MDL     | 0.02 mg/L |
| Bldg. 170                             | bathroom | < MDL     | < MDL     |
| Bldg. 371                             | bathroom | 4.7 µg/L  | 0.10 mg/L |
| Bldg. 460                             | kitchen  | 2.7 µg/L  | 0.09 mg/L |
| Bldg. 535                             | bathroom | < MDL     | 0.07 mg/L |
| Bldg. 703                             | bathroom | < MDL     | 0.12 mg/L |
| Bldg. 911                             | bathroom | < MDL     | 0.04 mg/L |

Notes:

Action Level for Lead is 15 µg/L.

Action Level for Copper is 1.3 mg/L.

## Other Water Quality Indicators

The following maximum values were measured in samples of well water or finished water at the BNL Water Treatment Plant. Although the Lab is required to test these indicators, there are no MCLs set for these parameters.

Other indicators tested, but not detected, include: ammonia, cyanide, methylene blue active substances, and total coliform.

| Indicator                 | BNL Sample       | MCL |
|---------------------------|------------------|-----|
| alkalinity <sup>†</sup>   | 28.3 mg/L        | NS  |
| calcium <sup>†</sup>      | 12.5 mg/L        | NS  |
| conductivity <sup>†</sup> | 367 µmhos/cm     | NS  |
| pH                        | 6 standard units | NS  |

Notes:

NS = drinking-water standard not specified

† = measure of water hardness or dissolved salts

## Chlorine Disinfectant and Its By-Products

Each day, more than 200 million people in the U.S. consume water that has been disinfected to kill unwanted microorganisms found in source water. Worldwide, one of the most commonly used and effective disinfectants is chlorine. A form of chlorine known as sodium hypochlorite is used by BNL for disinfection of its potable water.

Although disinfectants are effective in killing unwanted microorganisms in source water, they can react with naturally occurring organic matter and inorganics to form disinfectant by-products which may pose health risks. Under the Safe Drinking Water Act, disinfectants and their by-products are regulated. The Lab had no violations in 2015; annual averages for chlorine residual and by-products are based on results from finished tap water.

| Disinfection Residual                | 2015 Annual Running Average | MRDLG   |
|--------------------------------------|-----------------------------|---------|
| chlorine*                            | 0.7 mg/L                    | 4 mg/L  |
| Disinfection By-product              | 2015 Annual Average         | MCL     |
| total trihalomethanes <sup>1</sup>   | 36.4 µg/L                   | 80 µg/L |
| haloacetic acids (five) <sup>2</sup> | 7 µg/L                      | 60 µg/L |

Notes:

\* BNL range of results for chlorine is 0.3 - 1.1 mg/L; maximum found in Bldg. 930.

<sup>1</sup> Total trihalomethanes is the sum of the concentration of chloroform, bromodichloromethane, dibromochloromethane, and bromoform.

<sup>2</sup> Haloacetic acids (five) is the sum of the concentration of mono-, di-, and trichloroacetic acids, and mono- and dibromoacetic acids.

## Definitions Used in this Report

- **90th percentile value:** The reported copper and lead values represent the 90th percentile. A percentile is a value on a scale of 100 that indicates the percent of a distribution that is equal to or below it. The 90th percentile is equal to or greater than 90 percent of the lead and copper values detected in the water system.
- **action level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a drinking-water supplier must follow.
- **maximum contaminant level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLG as possible.
- **maximum contaminant level goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
- **maximum residual disinfectant level (MRDL):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that the addition of disinfectants is necessary for control of microbial contaminants.
- **maximum residual disinfectant level goal (MRDLG):** The concentration of a drinking-water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of using disinfectants to control microbial contamination.
- **micrograms per liter ( $\mu\text{g/L}$ ):** Equals one part of liquid in one billion parts of liquid or parts per billion (ppb).
- **micromhos per centimeter ( $\mu\text{mhos/cm}$ ):** A measure of the ability of water to conduct electricity. Conductivity effectively measures the concentration of ions, such as dissolved salts.
- **milligrams per liter (mg/L):** Equals one part of liquid per million parts of liquid, or parts per million (ppm).
- **minimum detection limit (MDL):** The lowest level to which an analytical parameter can be measured with certainty by the analytical lab performing the measurement. While results below the MDL are sometimes measurable, they represent values that have a reduced statistical confidence associated with them (less than 95 percent confidence).
- **picocuries per liter (pCi/L):** picocuries per liter is a measure of radioactivity in water equal to one trillionth of a curie.
- **treatment technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.
- **volatile organic contaminants (VOCs):** Organic chemicals that have a high vapor pressure at ordinary room temperature. Their high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air. VOCs include both man-made and naturally occurring chemical compounds.



The annual BNL Water Quality Consumer Confidence Report is published by the Environmental Protection Division and the Energy & Utilities Division, with assistance from the Stakeholder and Community Relations Office. It is distributed to approximately 3,300 on-site drinking water consumers served daily by federal public water system No. 5111891 at Brookhaven National Laboratory, Upton, New York 11973, which is managed by Brookhaven Science Associates for the U.S. Department of Energy's Office of Science.