BROOKHAVEN NATIONAL LABORATORY
a passion for discovery

Getting the Iron Out of Our Water Mains

Regular hydrant flushing is reducing 'rusty' water around site

Brookhaven Lab produces its own tap water, which is drawn from six on-site drinking-water wells tapped into Long Island's Upper Glacial aquifer. Last year, as in the past, BNL's water was in full compliance with all county, state, and federal regulations governing drinking-water quality.

Ensuring drinking-water quality in the United States since 1974, the federal Safe Drinking Water Act mandates limits and testing to minimize the contamination of water by microbes, chemicals, and metals such as iron. Under this act, the U.S. Environmental Protection Agency (EPA) has established two sets of national standards to which Brookhaven adheres.

First, there are mandatory, primary drinking water standards for contaminants — such as lead — that present a risk to human health. Second, there are voluntary, secondary standards for 15 items — qualities such as color and odor, quantities such as pH, and substances including iron — that are not usually considered a risk to human health.

When hydrant flushing is conducted on site:

- ***Flush your tap:*** *during and after hydrant flushing, run the water in your sink, shower, or fountain until it runs clear, which may take 5 or 10 minutes.*
- ***Do your laundry another day:*** *to ensure that discolored water which could stain clothing is not used for doing laundry, the on-site laundries in the apartment area and Curie and Fleming Houses are closed during hydrant flushing, but reopened the next day, ready for use with clean water.*

However, because of aesthetic, cosmetic and/or technical effects, water that has secondary contaminants at levels above EPA's voluntary standards may not be appealing to drink — even though it may actually be safe for consumption.

For iron, the EPA's secondary standard is 300 parts per billion or 0.3 milligrams of iron per liter of water. Above that level, noticeable effects include aesthetics such as a metallic odor and/or taste, and rusty color and/or sediment; and technical effects such as reddish or orange staining of porcelain plumbing fixtures.

As employees and others at BNL know, the water coming out of your cold-water tap can be "rusty" — depending upon the type of pipes in your building, where the building sits on the water-distribution map, how heavy the site-wide demand is for water, etc. (Rusty water from a hot-water tap may indicate that there is a problem with the boiler, not necessarily with the water.)

How does the Lab reduce 'rusty' water?

In response to complaints about rusty water, the Lab has renewed and improved its hydrant-flushing program, to clean out the insoluble iron deposited in BNL's water mains.

While individual mains are still flushed as necessary, what is called "unidirectional flushing" of fire hydrants along an entire water-distribution system is, according to the American Water Works Association, the most effective method to remove accumulated corrosion products, debris, biofilms, and other sediment from water piping. By conducting hydrant flushing systematically and regularly, water suppliers such as BNL help to make sure that water quality does not degrade as water travels through the water mains from the well and treatment plant to the consumer's tap.

Therefore, at least three times a year, the Water Treatment Facility (WTF) staff, in cooperation with the Fire/Rescue Group, systematically work their way around site, opening and closing the Lab's fire hydrants and associated valves. By doing this, the water treatment engineers control the water's direction and rate, forcing it through the distribution piping in one direction at a high-enough velocity to scour the mains. The result is that whatever has built up in the mains is removed, flowing along with the water through the hydrant onto BNL's fields and roads.

When hydrant flushing is conducted in spring, summer, and fall (and in winter, weather-permitting), employees and others on site are notified via the Bulletin, broadcast e-mail, and flyers delivered to residents on site. In addition to providing you with the schedule, you are reminded:

- **Flush your tap:** during and after hydrant flushing, run the water in your sink, shower, or fountain until it runs clear, which may take 5 or 10 minutes.
- **Do laundry another day:** to ensure that discolored water which could stain clothing is not used for doing laundry, the on-site laundries in the apartment area and Curie and Fleming Houses are closed during hydrant flushing, but reopened the next day, ready for use with clean water.

Where does the 'rusty' water come from?

Three of the Lab's drinking water wells supply water that is naturally low in iron, containing a non-detectable amount of this metal. After it passes through a carbon filter, water from these three wells is sent directly into the water-supply system for distribution around site.

Water from the three other BNL drinking-water wells is naturally high in iron, as is much of Long Island's groundwater from the Upper Glacial aquifer. To remove the iron, that water is "finished" at BNL's WTF. After undergoing the ten-step finishing process, the iron in this water cannot be detected at the WTF. From the WTF, the finished water is sent to the Lab's two water towers, from which it is delivered around site via 45 miles of underground distribution piping.

Depending upon when the pipe went into the ground, the mains are made of a variety of materials. These include cast iron dating from the Lab's World War II days as Camp Upton, and, later, ductile iron — both of which add insoluble iron into the system as a result of oxidation and are sources of "rusty" water.

In the site's earlier years, there was another source of insoluble iron: between 1941, when Camp Upton was reopened during World War II, and 1963, when the WTF was commissioned, the water on site was not treated for iron. As a result, some 700 pounds of iron per year — or 7.7 tons over 22 years — was deposited in the water mains.

For additional information, contact the following members of the BNL Drinking Water Quality Committee, who can get answers to your drinking-water questions, provide you with the latest copy of the annual BNL Water Quality Consumer Confidence Report, or obtain the most recent complete analysis of the Lab's tap-water samples for you:

- *Ed Murphy, Division Manager, Plant Engineering Division, Ext. 3466, etmurphy@bnl.gov*
- *William Chaloupka, Assistant Manager of Operations & Environment, Plant Engineering Division, Ext. 7136, chaloupka@bnl.gov*
- *Bob Lee, Deputy Manager, Environment & Waste Management Services Division, Ext. 3148, blee@bnl.gov*
- *Ken Erickson, Safety & Health Services Division, Ext. 4935, erickson@bnl.gov*
- *Marsha Belford, Community, Education, Government & Public Affairs, Ext. 5053, belford@bnl.gov*

Or contact:

- *Suffolk County Department of Health Services,*

Pictured above at BNL's Water Treatment Plant are some of the water treatment engineers and others involved in producing the Lab's drinking water. Last year, as in the past, BNL's drinking water was in full compliance with all county, state, and federal regulations governing drinking-water quality.

At BNL, the Plant Engineering Division is responsible for providing safe, high-quality drinking water and a reliable drinking-water supply on site. To ensure that the Lab's drinking water meets all local, state, and federal quality standards, BNL's Environmental Services Division is responsible for having the Lab's drinking water regularly tested and analyzed, using approved independent and in-house laboratories.

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