



Three branches of the Yonkers Pressure Tunnel, 8 feet by 12.5 feet, merge into the 16.6 feet circular pressure section of the Catskill Aqueduct. 1913

### *Croton Filtration Plant*

The City is planning to build a treatment facility to filter water from the Croton System. The federal Surface Water Treatment Rule (SWTR) requires that all surface water supplies be filtered by June 29, 1993, unless the system meets special criteria to receive a waiver. Croton system water is not currently filtered, which constitutes a treatment technique violation under federal and State drinking water regulations. With the exception of the failure to provide filtration, a treatment technique violation, Croton system water continues to meet all federal and State health-related water quality standards. Even though Croton water quality is high, Croton water experiences seasonal water quality problems associated with elevated color levels, resulting from naturally-occurring minerals and organic matter present in the water. This condition is aesthetic and not health-related; however, the filtration facility is expected to reduce color levels in Croton system water, help to reduce the risk of microbiological contamination, and help ensure compliance with stricter water quality standards.

In November 1998, a Consent Decree, committing the City to design, construct, and operate a Croton filtration facility was signed by the City, the United States and the State of New York. In May 2002, the Consent Decree was modified, requiring the City to evaluate and choose between three potential sites for the filtration plant; two in the Bronx, at the Mosholu Golf Course or along the Harlem River in the vicinity of Fordham Road, and one at Eastview in Westchester County. The City will have chosen its preferred site for the facility by April 2003. Until DEP begins to filter Croton water, we are required to make the following statement: Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites, which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

### *Distribution System*

#### *City Water Tunnel No. 3*

The Third Water Tunnel, begun in 1970, is being built in stages. The first stage of Tunnel No. 3, which became operational in July 1998, has already helped to improve the reliability of the City's drinking water distribution system. Stage 2 of Tunnel No. 3 includes two sections. The tunnel component of the first section of Stage 2, which is in Brooklyn and Queens, was completed in May 2001. The supply shafts, which will feed water from this new tunnel to the distribution system, are currently under construction. Once completed, this first section of Stage 2 will improve service to Staten Island, Brooklyn and Queens when it begins delivering water in 2005. The Manhattan leg is now under construction with tunneling to commence in the summer of 2003. The Tunnel is expected to be completed by 2020, encompass 60 miles and cost approximately \$6 billion.

When completed, Tunnel No. 3 will create a more flexible means of supplying drinking water to the entire City and will provide delivery alternatives in the event of disruption in any of the older tunnels. It will also permit New York City to drain, examine and rehabilitate City Tunnel Nos. 1 and 2.

#### *Groundwater System Enhancements*

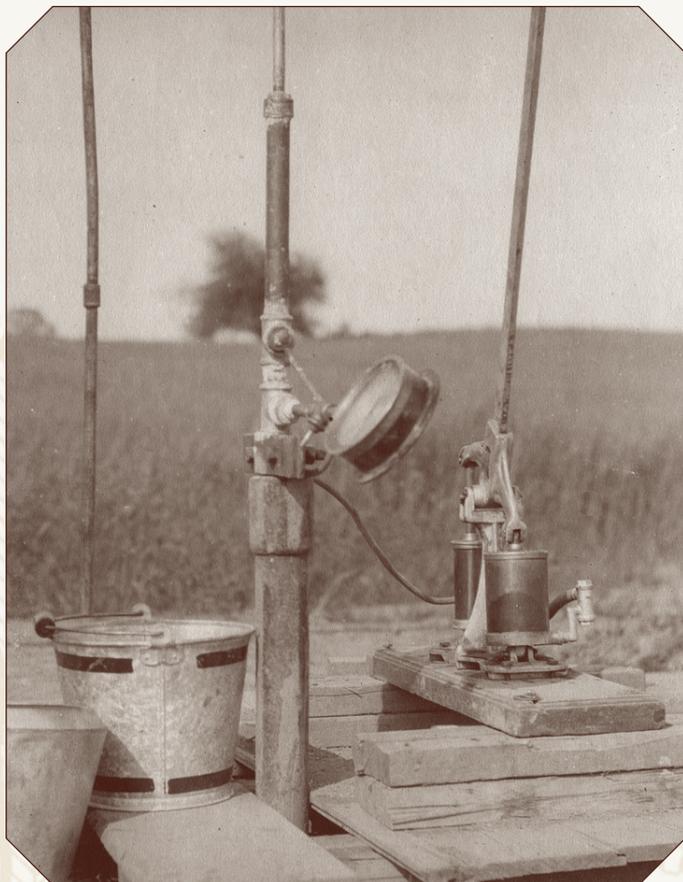
As part of the City's drought plan, and in order to be able to supplement the surface water supply in Queens with additional groundwater, DEP installed granular activated carbon filters at nine wells to provide advanced treatment to wells that were unusable due to the presence of contaminants. While these improvements were completed, these wells were not used in 2002. In addition to the improvements installed under the drought plan, a pilot plant was operated on the

groundwater supply to evaluate various new treatment systems and technologies as part of a study to develop a full scale treatment plant which would enable the City to further increase the use of the groundwater supply in the future.

## Water Treatment

All surface water and groundwater entering New York City's distribution system is treated with chlorine, fluoride, orthophosphate, and, in some cases, sodium hydroxide. New York City uses chlorine to meet the New York State Sanitary Code and federal Safe Drinking Water Act disinfection requirements. Fluoride, at a concentration of one part per million, is added to help prevent tooth decay and has been added since 1966 in accordance with the New York City Health Code. Orthophosphate is added to create a protective film on pipes that reduces the release of metals such as lead from household plumbing. Sodium hydroxide is added to Catskill/Delaware water to raise the pH and reduce corrosivity.

A sequestering phosphate is applied at several wells to prevent the precipitation of naturally occurring minerals, mostly iron and manganese, in the distribution mains and customers' household piping. Air stripper facilities operate at several wells to remove volatile organic chemicals.



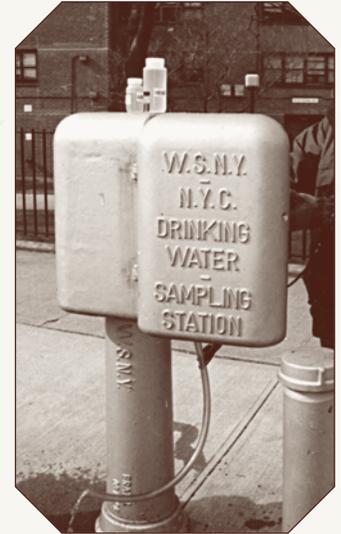
View showing details of testing apparatus at Wallkill pressure tunnel. 1907

## Water Quality

DEP operates the water supply system that delivers water to City residents. DEP's water quality monitoring program – far more extensive than required by law – demonstrates that the quality of New York City's drinking water remains high and meets all health-related State and federal drinking water standards. Color, an aesthetic condition in the Croton and Groundwater Systems occasionally may exceed the standard.

### Drinking Water Monitoring

DEP monitors the water in the distribution system, the upstate reservoirs and feeder streams, and the wells that are the sources for our supply. Water quality is monitored continuously as the water enters the distribution system, and is regularly tested at sampling points throughout the entire City. DEP conducts analyses for a broad spectrum of microbiological, chemical, and physical measures of quality. In 2002, DEP collected more than 45,600 samples from the City's distribution system and performed approximately 560,000 analyses.



DEP conducts most of its distribution water quality monitoring at approximately 1000 fixed sampling stations throughout the City. These stations, which you may have seen in your neighborhood, allow DEP to collect water samples throughout the distribution system in an efficient and sanitary manner.

### Test Results

The results of the tests conducted in 2002 on distribution water samples under DEP's Distribution System Monitoring Program are summarized in the tables in this Report. These tables reflect the compliance monitoring results for all regulated and non-regulated parameters. The tables present both the federal and State standard for each parameter (if applicable), the number of samples collected, the range of values detected, the average of the values detected, and the possible sources of the parameters. The monitoring frequency of each parameter varies and is parameter specific. Data are presented separately for the Catskill/Delaware, Croton, and Groundwater Systems. Whether a particular user receives water from the Catskill/Delaware, Croton, or groundwater supplies, or a mixture, depends on location, system operations, and consumer demand. Those parameters monitored but not detected in any sample are presented in a separate box under the tables.

The State requires monitoring for some parameters less than once per year because the concentrations of these parameters do not change frequently. Accordingly, some of these data, though representative, are more than one year old. Unregulated parameter monitoring is conducted to provide a more robust picture of water quality and to help EPA determine where certain parameters occur and if it needs to regulate those parameters. In 2002, DEP conducted monitoring of certain parameters as required under the federal Unregulated Contaminants Monitoring Rule (UCMR). Those results are presented in a separate box.

### ***Lead in Drinking Water***

New York City water is virtually lead-free when it is delivered from the City's upstate reservoir system, but water can absorb lead from solder, fixtures, and pipes found in the plumbing of some buildings or homes. Mandated at-the-tap lead monitoring is conducted at a set number of households located throughout the City. Based on the results of this monitoring, in 2002, the 90th percentile did not exceed 15 µg/L. Therefore, New York City has met the established standard, or Lead Action Level (AL). The at-the-tap monitoring results are also presented in a separate table.

It is possible that lead levels in your home may be higher than other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. To request a free kit to test for lead in your drinking water, call 311 or from outside NYC call (212) NEW-YORK. Additional information is available from the EPA's Safe Drinking Water Hotline at (800) 426-4791.

### ***Monitoring for Cryptosporidium and Giardia***

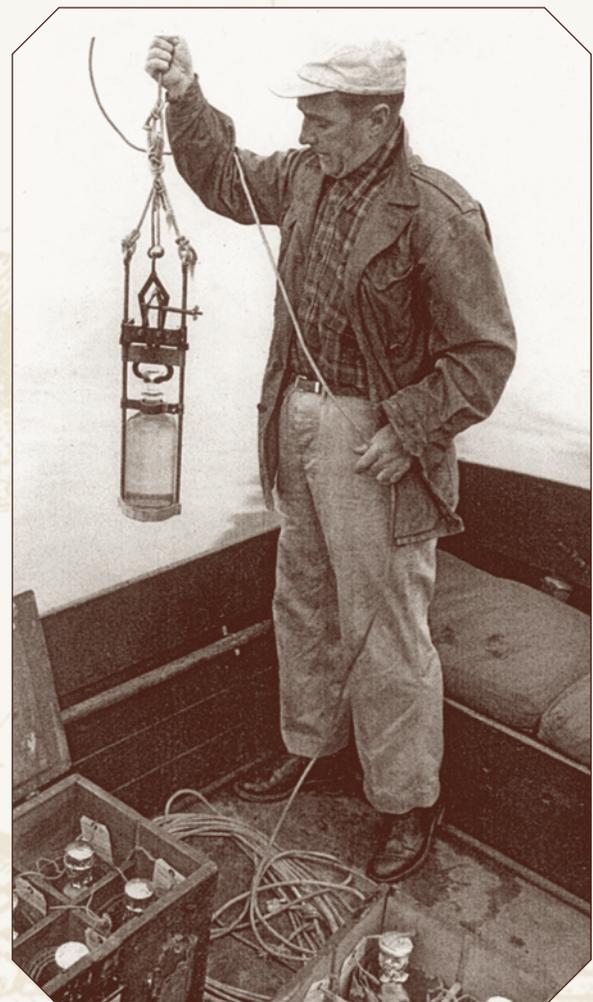
In 1992, the City started a comprehensive program to monitor its source waters and watersheds for the presence of *Cryptosporidium* and *Giardia*. Since then, samples have been collected weekly from the effluents of the Kensico and New Croton Reservoirs, before water is first chlorinated in the Catskill/Delaware and Croton Systems, respectively. Since 1992, DEP has modified its laboratory protocols twice to improve the Department's ability to detect both *Giardia* cysts and *Cryptosporidium* oocysts. Even these new test methods, however, have substantial limitations in that they do not allow us to determine if organisms identified are dead or if they are capable of causing disease.

In 2002, a total of 144 samples of Kensico Reservoir effluent and 66 samples of New Croton Reservoir effluent were collected and analyzed for *Giardia* cysts and *Cryptosporidium* oocysts using Method 1623 HV. Of the 144 Kensico Reservoir samples, 95 were positive for *Giardia* and 38 were positive for *Cryptosporidium*. Of the 66 New Croton Reservoir samples, 28 were positive for

*Giardia* and 13 were positive for *Cryptosporidium*. DEP's *Giardia* and *Cryptosporidium* data from 1992 to the present, along with weekly updates, can be viewed on our web site at [www.nyc.gov/html/dep/html/pathogen.html](http://www.nyc.gov/html/dep/html/pathogen.html). As mentioned, detecting the presence of *Giardia* cysts and *Cryptosporidium* oocysts does not indicate whether these organisms are dead or infectious.

While there is no evidence of illness related to the New York City water supply, federal and New York State law requires all water suppliers to notify their customers about the potential risks of *Cryptosporidium* and *Giardia*. Cryptosporidiosis and giardiasis are intestinal illnesses caused by microscopic pathogens, which can be waterborne. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome both of these diseases within a few weeks. DEP's Waterborne Disease Risk Assessment Program conducts active surveillance for giardiasis and cryptosporidiosis to track the incidence of illness and determine all possible causes, including tap water consumption. To date, no giardiasis or cryptosporidiosis outbreaks have been attributed to tap water consumption in New York City.

FIG N°2      FIG N°3



Safety Engineer collecting water samples. 1949

According to the EPA and the Centers for Disease Control and Prevention (CDC), it is unclear how most cases of cryptosporidiosis or giardiasis in the United States are contracted. The relative importance of various risk factors is unknown. Risk factors include eating contaminated food, swallowing contaminated recreational water while swimming or camping, contact with animals, contact with human waste, certain sexual practices, and drinking contaminated water. Individuals who think they may have cryptosporidiosis or giardiasis should contact their health care provider.

Some people may be more vulnerable to disease-causing microorganisms or pathogens in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with Crohn's disease or 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 providers about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium*, *Giardia* and other microbial contaminants are available from the EPA's Safe Drinking Water Hotline at (800) 426-4791.



Croton Gate House at 135 Street, NYC. 1890

## DEFINITIONS

### Action Level (AL):

The concentration of a contaminant, which if exceeded, triggers treatment or other requirements that a water system must follow. An exceedence occurs if more than 10% of the samples exceed the Action Level.

### 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 Contaminant Level (MCL):

The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

### Maximum Residual Disinfectant Level (MRDL):

The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

### Treatment Technique (TT):

A required process intended to reduce the level of a contaminant in drinking water.

### 90th Percentile Value:

The values reported for lead and copper 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 the value. The 90th percentile is equal to or greater than 90% of the lead and copper values detected at your water system.

## ABBREVIATIONS

CFU/ml = colony forming units per milliliter

mg/L = milligrams per liter ( $10^{-3}$  grams per liter)

NA = Not Applicable

ND = Lab analysis indicates parameter is not present

NDL = No Designated Limit

NTU = Nephelometric Turbidity Units

pCi/L = picocurie per liter (a measure of radioactivity)

$\mu\text{g/L}$  = micrograms per liter ( $10^{-6}$  grams per liter)

$\mu\text{mho/cm}$  = micromhos per centimeter