LEAD IN DRINKING WATER

PROGRAM

FOR

NEW YORK CITY PUBLIC SCHOOLS

NEW YORK CITY DEPARTMENT OF EDUCATION
DIVISION OF SCHOOL FACILITIES
OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY
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ABOUT THIS PROGRAM

The purpose of this program is to ensure, to the extent feasible, that the water use for consumption in New York City's (NYC) public schools meet the Federal acceptable lead in drinking water level of equal or less than 0.020mg/L ($\leq$ 0.020mg/L) set by the United States Environmental Protection Agency (EPA) – Lead in Drinking Water in Schools and Non-Residential Buildings (EPA 812-B-94-002 April 1994).

This program manual demonstrates how the water use for consumption in NYC's public schools will be tested and how lead contamination problems will be addressed if found. In addition, this program manual outlines the interim preventive measures that the NYC Department of Education (DOE) is taking to reduce the potential of lead in dinking water exposure to its buildings' occupants. Furthermore, this manual provides procedures under which the test results will be reported and made available to students, parents, teachers, school principals and custodian engineers.

This program manual is intended for use by school official and personnel responsible for the maintenance and/or safety of the DOE facilities and by the DOE consultants and laboratories performing the water sampling and analysis.

SECTION 1. BACKGROUND INFORMATION

1.1. HEALTH EFFECTS OF LEAD

Lead is a toxic metal that can be harmful to human health when ingested or inhaled. Even small doses of lead can be harmful. Unlike most other contaminants, lead is stored in our bones, to be released later into the bloodstream. Thus, even small doses can accumulate and become significant. The groups most vulnerable to lead include fetuses and young children.

Pregnant Women and Fetuses: Accumulated lead stored in mothers may damage a child before it is born, causing a lower birth weight and slowing down of normal physical and mental development. Recently published studies suggest that even low levels in a mother may later affect an infant's mental performance.

Young Children: Young children, especially those under the age of six, are particularly sensitive to the effects of lead. Because their bodies are still developing, small children process lead differently than adults. Their growing bodies tend to absorb more lead than an adult. Thus, lead can affect them at smaller doses. Even at low levels of lead exposure, children may experience lower IQ levels, impaired hearing, reduced attention span and poor classroom performance. At high levels, lead can seriously damage their brain.

Middle-aged Men and Women: Some studies have found an association between blood-lead levels and slight increase in blood pressure among adults. The relationship is more marked in middle-aged men but is also significant for middle-aged women. The significance of any lead-related increases in blood pressure in connection to more serious cardiovascular diseases remains to be determined.

The degree of harm from lead exposure depends on a number of factors including the frequency, duration and, dose of the exposure(s) and individual susceptibility factors (e.g. age, previous exposure history, nutrition and health). In addition, the degree of harm depends on one's total exposure to lead from all sources in the environment-air, soil, dust, food and water. Lead in drinking water can be a significant contributor to overall exposure to lead, particularly for infants whose diet consists of liquids made of water, such as baby formula.

1.2. DISTRIBUTION AND USES OF LEAD

Lead is distributed in the environment through both natural and man-made means. Today, the greatest contribution of lead to the environment stem from past human activities. Sources that produce excess lead include the following:

- **Lead Based Paint** (which can flake off onto soil or be ingested by children)
- **Lead in the air** (from industrial emissions)

- **Dust and soil** (lead deposits in soil around roadways and streets from past emissions by automobiles using leaded gas, together with paint chips and lead dust, find their way into the mouths of young children living in polluted environments)
- **Lead in food** (deposits from air onto crops or lead glaze on imported dinnerware).
- **Lead in dust** (brought home by individual workers on their clothes and shoes).
- **Lead in water** (through corrosion of plumbing products containing lead).

The U.S. government has taken steps over the past several decades to dramatically reduce new sources of lead in the environment (e.g. by banning the manufacture and sale of lead paint, by phasing out lead additives in gasoline, and by encountering the phase-out of lead seams from food cans). More recently, the government has begun to attack existing sources of lead in the environment. For example, programs have been instituted to minimize the hazards posed by old lead paint covering millions of homes across the United States, more stringent air control standards are being applied to industries emitting lead, and more stringent regulations are in place to control lead in drinking water.

1.3. HOW LEAD GETS INTO DRINKING WATER

Lead can get into drinking water in two ways: (1) by being present in the water entering the treatment plant (i.e. source water) or (2) through an interaction of the water and plumbing materials containing lead (i.e., through corrosion).

1.3.1. At the Source

Most sources of drinking water have no lead or very low levels of lead (i.e., under 5 parts per billion (ppb)). However, lead naturally occurs in the ground and in some instances can get into well water. Lead can enter surface water (e.g., water from rivers, lakes, streams) through direct or indirect discharges from industrial or municipal wastewater treatment plans or when lead in air settles into water or onto city streets and eventually, via rain water, flows into storm sewers. Lead from these sources can be easily removed by existing treatment plan technologies.

1.3.2. Through Corrosion

Most lead gets into drinking water after the water leaves the local treatment plant or private well and comes into contact with plumbing materials containing lead. The physical/chemical interaction that occurs between the water and the plumbing is referred to as corrosion. The extent to which corrosion occurs contributes to the amount of lead that can be picked up by the drinking water.

Drinking water comes into contact with plumbing materials that may contain lead once the water leaves the treatment plant. Some lead may get into water from the distribution system – the network of pipes that carry the water to homes, businesses and schools in the community. Some communities have lead components in their distribution system (i.e., lead joins in cast iron

mains, pipes, service connection, pigtails and goosenecks). However, the public water supplier is responsible, for making sure that the distribution system under the utility's control does not contribute harmful amounts of lead. *See "How Lead in drinking Water is Regulated" (1.4 below) in this section for further information on this topic.*

Interior plumbing, soldered joints, and various drinking water outlets that contain lead materials are the primary contributors of lead in drinking water.

The critical issue is that even though your public water supplier may send you water that meets all Federal and State public health standards for lead, you may end up with too much lead in your drinking water because of the plumbing in your facility. That is why testing water from your drinking water outlets for lead is so important.

1.3.3. Factors Contributing to Corrosion

What causes lead to possibly leak from your plumbing into drinking water? Actually, no single situation or activity causes this interaction. Rather, it is a combination of several factors. The corrosion of lead tends to occur more frequently in "soft" water (i.e., water that lathers soap easily) and acidic (low pH) water. Other factors, however, also contribute to the corrosion potential of the water including water velocity and temperature, alkalinity, chlorine levels, the age and condition of plumbing, and the amount of time water is in contact with plumbing. The occurrence and rate of corrosion depend on the complex interaction between a number of these and other chemical, physical, and biological factors.

Public water system officials routinely undertake activities aimed at controlling the corrosion characteristics of their water supplies. Their treatment activities can lead to a protective coating of minerals being formed on the inside layer of pipes, thereby insulating the drinking water, in effect, from lead. Given that the health effects of lead occur at low levels, these activities are critical. The activities undertaken by individual homeowners and building owners/operators to identify and remove problem plumbing are also critical.

1.4. HOW LEAD IN DRINKING WATER IS REGULATED

Lead is regulated in drinking water under a Federal body of law known as the Safe Drinking Water Act (SDWA). This Act was initially passed in 1974 and, in part, requires EPA to establish regulations for known or potential contaminants in drinking water for the purpose of protecting public health.

The regulations developed by EPA are aimed at public water systems. These systems are defined as those with 15 or more service connections in operation at least 60 days a year or systems serving 25 or more persons daily at least 60 days a year. *Schools or non-residential buildings that own or operate their own water supply and that meet this or the State's definition of a public water supply are subject to the provisions of the SDWA. Facilities in this position*

should already be knowledgeable of their legal responsibilities. Any questions in this regard should be directed to the appropriate State drinking water office.

Major amendments were passed to the SDWA in 1986. These amendments include some specific provisions for controlling lead in drinking water:

- A new regulation by EPA to minimize the corrosivity and amount of lead in water supplied by public water systems (known at the Lead and Copper Rule).

- A requirement that only lead-free materials be used in new plumbing and in plumbing repairs (called the Lead Ban).

- A one-time lead public notification requirement.

In 1988, Congress passed the Lead Contamination Control Act (LCCA), which further amended the SDWA. The LCCA is aimed at the identification and reduction of lead in drinking water at schools and day care facilities.

1.4.1. Public Water Systems Lead and Copper Rule

In June 1991, EPA revised the National Primary Drinking Water Regulation for lead (by promulgating the Lead and Copper Rule). The regulation requires public water systems to take 1-liter tap water samples at representative high-risk residences served by the system. The total quantity and dates by which the samples are to be taken are specified in the regulation and are based on the total population served by the public water system.

If 10 percent or more of the tap samples exceed an action level of 15 parts per billion (ppb) or micrograms per liter (µg/1), then the public water system must conduct additional monitoring, implement or enhance corrosion control programs, educate consumers served by the system about lead, and possibly replace lead service lines owned by the system, if they exist.

[If you purchase your water, you may wish to contact your public water system to determine whether the system is in compliance with the National Primary Drinking Water Regulation for lead. Ask system officials to explain the results of their lead tap water sampling efforts and whether 10 percent or more of these samples exceeded EPA's action level of 15 ppb. If so, ask them what corrosion control measures are being taken to ensure that the drinking water delivered to consumers will minimize lead exposure. Your water supplier may be able to give you a good indication of what you might expect in terms of lead problems in your building, based on the utility's knowledge of the water supply and, lead issues in general. Your water supplier may also be willing to assist you in conducting a lead testing program at your facility, although there is no requirement that they provide this service.]

1.4.2. Requirement that Only Lead-Free Materials be Used in New Plumbing and in Plumbing Repairs (Lead Ban)

This provision of the SDWA requires the use of 'lead-free' pipe, solder, and flux in the installation or repair of any public water system or any plumbing in a residential or non-residential facility connected to a public water system. Solders and flux are considered to be lead-free when they contain less than 0.2 percent lead. (Before this ban took effect in 1986, solders used to join water pipes typically contained about 50 percent lead). The Lead Ban requires that any lead solders carry a warning label indicating that they are not to be used in connection with potable water plumbing. Pipes, pipe linings, faucets, and other fixtures are considered lead-free under the Lead Ban when they contain less than 8 percent lead.

[Under the Lead Ban, States were to adopt a version of the prohibition that is at least as stringent as the Federal version by June 1988. To date, all states have a lead-free plumbing materials requirement in place that is at least as stringent as the Federal Version. All major national plumbing codes have also incorporated these requirements. You may wish to contact your local plumbing code officials to ascertain which code(s) are used in your area, if any. Typically, codes are required on a statewide or smaller jurisdictional basis. In any event, the codes should reflect either the national or State lead-free plumbing requirements.

As another measure, check with plumbers or contractors who are making additions or repairs to any plumbing in your facilities to ensure that only lead-free materials are being used. Test kits may be available to determine the presence of lead solder in plumbing. Any violations of the lead-free requirements should be reported to State officials. You should also insist that any lead materials used in new construction or recent repairs be replaced with lead-free materials.]

1.4.3. One-Time Lead Public Notification Requirement

The SDWA also required that all public water systems provide a one-time special notice by June 1988 to educate their customers about the lead-in-drinking-water issue. The format and content of these notices were specified by EPA. The intent behind the notices was to inform consumers about the lead-in drinking water issue, about the steps their water system was taking to reduce opportunities for lead exposure, and about steps that would be taken in the home to minimize exposure.

1.4.4. The Lead Contamination Control Act (LCCA)

The LCCA required that a number of activities be conducted by Federal and other parties to identify and correct lead-in-drinking-water problems in schools and day care facilities. A listing of some of the major activities and parties responsible is provided in Exhibit 4. One principal activity to be conducted by EPA was the development of a guidance document and testing protocol that could be used by schools to determine the source and degree of lead contamination problems and how to remedy such contamination if found. This document reflects EPA's second edition of the guidance manual and testing protocol developed in response to the LCCA.

At the time the LCCA was passed, considerable attention was being given to water coolers with lead-lined tanks. The law defined these sources as "imminently hazardous consumer products." As a result, the legislation specifically stated requirements to result in the repair, replacement, or recall and refund of these water coolers and attached civil and criminal penalties to the manufacture and sale of any drinking water cooler containing lead. *See EPA 812-B-94-002 April 1994 "Lead in Drinking Water in School and Non-Residential Buildings" Appendix C for a summary of water cooler issues, how to identify whether you have a problem cooler, and what steps can be taken if you do.*

While the LCCA was geared toward identifying and remedying lead contamination problems in school and day care drinking water, lead may also pose problems in other buildings. EPA, therefore, advocates that the owners and/or managers of non-residential buildings also conduct testing of drinking water outlets. Since the lead testing protocol to be followed is the same for non-residential facilities as for school buildings, this guidance manual has been addressed to representatives of both facilities. EPA has a separate manual available that demonstrates how to test drinking water for lead in small nursery schools and day care facilities. In addition, EPA has a brochure for homeowners that are interested in testing their water for lead. *See EPA 812-B-94-002 April 1994 "Lead in Drinking Water in School and Non-Residential Buildings" Appendix D for a listing of lead testing and other information available from EPA.*

Since some States and local jurisdictions have established programs for testing lead in schools and other buildings, it is to a school or non-residential building owner/manager's advantage to learn whether additional requirements beyond those summarized in this section exist. Consult your State or local education or drinking water program to learn whether statewide or local legislation is in effect that relates to lead testing in schools and/or non-residential building. *See EPA 812-B-94-002 April 1994 "Lead in Drinking Water in School and Non-Residential Buildings" Appendix A for a list of State contacts.*

Exhibit 4 Key Provisions of the LCCA

EPA	▪ Publish a list of each brand and model of water cooler that is not lead-free, including a separate list of the brand and model of water coolers with a lead-lined tank and distribute lists to States. ▪ Publish a guidance document and testing protocol to assist schools in determining the source and degree of lead contamination in school drinking water supplies and in remedying such contamination. (Document is to, in part, include a testing protocol for identifying coolers that may contribute lead to drinking water.)
EPA and States	▪ Publish and make available to the public upon request a list of laboratory certified by EPA (or the State if the State has been delegated certification authority) to conduct analyses of lead-in-drinking-water.
Consumer Product Safety Commission (CPSC)	▪ Issue an order requiring manufacturers and importers of water coolers with lead-lined tanks to repair, replace, or recall and provide a refund for such coolers.
Water Cooler Manufactures, Importers, and Others	▪ Do not sell in interstate commerce, or manufacture for sale in interstate commerce, any drinking water cooler listed by EPA or any cooler that is not lead-free, including a lead-lined cooler. (Civil and criminal penalties are associated with violations.)
States and Local Governments	▪ Provide for the dissemination to local educational agencies, private nonprofit elementary or secondary schools, and day care centers EPA's guidance document and testing protocol and list of water coolers. ▪ Establish a program to assist local educational agencies in testing for and remedying lead contamination in drinking water from coolers and other sources of lead contamination at schools under the jurisdiction of such agencies. ▪ Make available any lead testing results in the administrative offices of the local educational agency for inspection by the public, including teachers, other school personnel, and parents. ▪ Notify parent, teacher, and custodian engineer of the availability of lead testing results.

- Repair, replace, permanently remove, or render inoperable water coolers that are not lead-free and that are located in schools, unless the coolers are tested and found (within the limits of testing accuracy) to not contribute lead to drinking water.

SECTION 2. INTERIM PREVENTIVE MEASURES

2.1. INTERIM FLUSHING PROCEDURES

The NYC DOE in order to reduce the potential of lead exposure to its school buildings' occupants established the following interim flushing procedures of potable water outlets/lines in each of its school buildings:

a. Daily flushing of potable water outlets/lines is required only in schools buildings where:

   i. The drinking water is not yet tested for lead.

   ii. The drinking water was tested and lead was found and it was determined that daily flushing will be utilized as an interim/short term corrective measure until a permanent remediation of the lead source(s) takes place.

b. Flushing of potable water outlets/lines is required in all school buildings system wide after weekends, holidays and, school breaks.

c. Daily flushing or flushing after weekends, holidays and school breaks must take place in the morning and completed prior to students arrival.

d. The flushing must be performed by the Custodian Engineers / Building Managers as per the following directions:

   i. Flush each potable water outlet individually; flushing a toilet will not flush your water fountains.

   ii. To flush the interior plumbing of the building, locate the faucet furthest away from the service line on each floor of each wing of the school building. Open the said faucet wide and let the water run for a minimum of 10 minutes. Feel the temperature of the water by placing your hand under the running water and if it did not get colder within the 10 minutes of flushing let the water run until it gets cold.

   iii. Open valves at all drinking fountains without refrigeration units and let the water run for a minimum of 1 minute. Feel the temperature of the water by placing your hand under the running water and if it did not get colder within 1 minute of flushing let the water run until it gets cold.

   iv. Open valves at all drinking fountains with refrigeration units and let the water run for 15 minutes.

   v. Open all kitchen faucets and let the water run for a minimum of 1 minute. Feel the temperature of the water by placing your hand under the running

water and if it did not get colder within 1 minute of flushing let the water run until it gets cold.

vi. Record each flushing event in the Flushing Log (see ATTACHMENT F "Daily Drinking/Food Preparation Water Flush Record") and maintain the said log in the Custodian's/Manager's office.

e. In addition to flushing, the Custodian Engineers / Building Managers must clean/replace frequently the accessible screens on faucets associated with the potable water outlets.

f. The Plant Manager must review the Flushing Log on a regular basis to ensure the required flushing is taking place and is properly documented.

g. The Flushing Log is subject to review by the EHS and its representatives/consultants and by regulatory agencies having jurisdiction over this program which include NYC DOH, NYC DEP, NYS DOH and US EPA. The Flushing Log should be made available to the aforementioned parties when requested.

The aforementioned flushing directions are outlined in a circular issued by DOE Office of Building Services to all Custodian Engineers and Building Managers (see ATTACHMENT A).

SECTION 3. PRELIMINARY ASSESSMENT

3.1. DEVELOPMENT OF PLUMBING PROFILE

Before testing and correcting lead problems, it is useful to assess the factors that can contribute to lead contamination and the extent to which contamination might occur in a NYC public school building (building). These objectives can best be accomplished by developing a plumbing profile of the building. Conducting a survey of the building's plumbing will enable the DOE to:

- Understand whether it has a widespread contamination problem or only localized concerns.
- Identify and prioritize sample sites.
- Plan, establish, and prioritize remedial actions, as necessary.

As a result EHS has developed a Plumbing Profile Questionnaire based on the sample provided in Exhibit 5 of the EPA 812-B-94-002 April 1994 "Lead in Drinking Water in Schools and Non-Residential Buildings" manual. ATTACHMENT B consists of the said Plumbing Profile Questionnaire that has been designed to help DOE plan its testing strategy.

3.2. PLUMBING PROFILE QUESTIONNAIRE COMPLETION PROCEDURES

The Plumbing Profile Questionnaire shall be completed by the school custodian engineer or the building manager and/or the individual most knowledgeable of the building's plumbing system and be reviewed/verified by the plant manager and/or EHS and/or the consultant performing the water sampling as follows:

a. EHS will provide copies of The Plumbing Profile Questionnaire (ATTACHMENT B) to the plant managers.

b. The Plant managers will provide copies of The Plumbing Profile Questionnaire to the school custodian engineers or building managers under his/her jurisdiction. The plant manager shall distribute the said questionnaire within three (3) working days form the date of receipt.

c. The school custodian engineer / building manager and/or the individual most knowledgeable of the building's plumbing system will complete The Plumbing Profile Questionnaire.

d. The school custodian engineer / building manager and/or the individual most knowledgeable of the building's plumbing system are required to complete a separate Plumbing Profile Questionnaire for each building with its own building ID designation under his/her care (i.e. Main building, Annex, Transportable).

e. In addition, the school custodian engineer / building manager and/or the individual most knowledgeable of the building's plumbing system will generate a floor plan drawing and marked the location of the water outlets and service connection. Copies of floor plans can be obtained from the school's AHERA books located in the school principal's office and at the EHS office, 28-11 Queens Plaza North, 4th Floor, Long Island City, NY 11101.

f. The school custodian engineer / building manager and/or the individual most knowledgeable of the building's plumbing system shall complete and return the completed Plumbing Profile Questionnaire and outlet location drawings to the Plant manager within five (5) working days from the date of receipt.

g. The plant manager will review the completed Plumbing Profile Questionnaires and drawings submitted by the custodians/building managers and make sure that all questions on the questionnaire are fully answered and that all requested information is provided. In the event questions are not or fully answered or information is missing the plant manager should take the necessary steps so the Plumbing Profile Questionnaires and/or outlet location drawings are fully completed.

h. Plant manager shall complete the task outlined in (g) above and return the fully completed Plumbing Profile Questionnaires and outlet location drawings to EHS within three (3) business days.

i. Upon receipt of the completed Plumbing Profile Questionnaire(s) and outlet location drawing(s), EHS will make two extra copies. One copy must be placed in the respective school folder, one will be given to the consultant that will perform the water sampling and the original copy will be kept in a central folder with all the plumbing profiles from all the school buildings placed according to their building ID number in ascending order.

3.3. INTERPRETATION OF POSSIBLE ANSWERS TO THE PLUMBING PROFILE QUESTIONNAIRE

This section provides interpretation of possible answers to the plumbing profile questionnaire to aid DOE in developing its sampling plan. The extent to which all questions can be answered will greatly aid DOE in carrying its sampling program.

In addition this section discusses the significance of possible answers to the plumbing profile questionnaire (ATTACHMENT B). This discussion illustrates that a variety of factors affect the extent of lead contamination including: (1) the corrosiveness of the water supply; (2) the amount of lead contained in the plumbing, taps. or outlets dispensing water (i.e., age and condition of the plumbing); (3) the contact time between the water and the materials containing lead; and (4) whether electrical systems are grounded to water pipes.

1. When was the original school building built?

Old Buildings—Up through the early 1900s, lead pipes were commonly used for interior plumbing in public buildings and private homes. Plumbing installed before 1930 is most likely to contain lead. Between 1920 and 1950, galvanized pipes were also used for plumbing. After 1930, copper generally replaced lead as the most commonly used material for water pipes. Up until the mid- to late-1980s (until the lead-free requirements of the 1986 Safe Drinking Water Act took effect), lead solders were typically used to join these copper pipes. The efforts of your public water supplier over the years to minimize the corrosiveness of the water may have resulted in mineral deposits forming a coating on the inside of the water pipes (scaling). This coating insulates the water from the plumbing and results in decreased lead levels in water. If the coating does not exist or is disturbed, the water is in direct contact with the lead in the plumbing system.

2. Were there any additions and/or modernizations since the original construction? If YES, were lead-free plumbing products used?

New Buildings—New buildings are not likely to have lead pipes in their plumbing systems, but they are very likely to have copper pipes with solder joints. Buildings constructed prior to the late 1980s, before the lead-free requirements of the 1986 Safe Drinking Water Act, are likely to have joints made of lead solder. Buildings constructed after this period should have joints made of lead-free solders. You should question the solders used by plumbers who make repairs or additions to your facility. Report my violations of the lead-free requirements to your local plumbing inspector or to the state drinking water program. Furthermore, insist that any lead materials installed be replaced by lead-free materials.

Some brass faucets, fittings, and valves, although they contain less than 8 percent lead in the alloy as required under the SDWA can contribute a significant amount of lead to drinking water. See a more detailed discussion of this issue under the response to Question 6. Request lead leaching test results from the distributor or manufacturer before purchasing any brass plumbing materials.

If lead-free materials were not used in new construction and/or plumbing repairs, very high lead levels can be produced. If the water is non-corrosive, scaling may have occurred (or be occurring) and will minimize lead exposure. However, if the mineral coating does not exist, the lead is in direct contact with the water.

Is the service connector made of lead containing materials?

Lead piping was often used for the service connectors that join buildings to public water supplies. The service connector is the pipe that carries drinking water from a public water main to a building. Some localities actually required the use of lead service connectors up until the lead-free requirements of the 1986 Safe Drinking Water Act took effect. Although a protective layering of minerals may have formed on these pipes, vibrations can cause flaking of any protective build-up and, thus, allow lead contamination to occur.

3. Were any recent plumbing repairs made?

Corrosion occurs (1) as a reaction between the water and the pipes and (2) as a reaction between the copper and solder (metal-to-metal). This latter reaction is known as galvanic corrosion. The reaction can be vigorous in new piping. If lead solders were used in the piping or some brass faucets, valves and fittings containing alloys of lead were installed (see response to Question 6 below for a further discussion of the brass issue), lead levels in the water may be high. After about 5 years, however, this type of reaction slows down and lead gets into water mainly as a result of water being corrosive. If the water is non-corrosive, scaling is likely to have occurred and to have reduced opportunities for lead to get into the water supply.

For these reasons, if the building (or an addition, new plumbing, or repair) is less than 5 years old and lead solder or other materials (e.g., brass faucets containing lead alloy) were used, you may have elevated lead levels. If water supplied to the building is corrosive, lead can remain a problem regardless of the plumbing's age.

4. Specifically, what materials what is the potable water pipes made of in your school? And

5. Do any of the solders connecting the potable water pipes in your school plumbing system contain lead?

Survey your building for exposed pipes, preferably accompanied by an experienced plumber who should be able to readily identify the composition of pipes on site. Most buildings have a combination of different plumbing materials:

Lead pipes are dull gray in color and may be easily scratched by an object such as a knife or key. Lead pipes are a major source of lead contamination in drinking water.

Galvanized metal pipes are gray or silver-gray in color and are usually fitted together with threaded joints. In some instances, compounds containing lead have been used to seal the threads joining the pipes. Debris from this material, which has fallen inside the pipes, may be a source of contamination.

Copper pipes are red-brown in color. Corroded portions may show green deposits. Copper pipe joints were typically joined together with lead solders until the lead-free requirements of the 1986 Safe Drinking Water Act took effect. Full implementation of these lead-free requirements will drastically cut lead contamination in repairs and new plumbing.

Plastic pipes, especially those manufactured abroad, may contain lead. If plastic pipes are used, be sure they meet NSF International standards and are free of plasticizers that contain lead. (Note: NSF International is an independent, third-party testing organization: copies of NSF International standards can be obtained by writing NSF International, 3475 Plymouth Road. P.O. Box 1468, Ann Arbor. MI 48106).

6. Are any brass fittings, faucets, or valves used in your schools potable water system?

Brass pipes, fittings, faucets, and valves are golden yellow in color, similar to copper in appearance, or plated with chrome. Brass is composed of two metals, commonly copper and zinc. Brass fittings commonly used in drinking water outlets such as faucets and water coolers, in general, contain up to 8 percent lead. While this percentage is considered lead-free under the 1986 Safe Drinking Water Act, some contamination problems still may occur. In addition, some older brass faucets may contain higher percentages of lead and lead solder in their interior construction and pose contamination problems.

The degree to which lead will leach from brass products containing alloys with less than 8 percent lead is dependent upon the corrosiveness of the water and the manufacturing process used to develop the product. A recent study comparing the lead leaching performance of several faucets manufactured under different processes and having various lead contents revealed that fabricated faucets tend to contribute less lead to the water than faucets manufactured by the permanent mold process, regardless of the amount of lead in the alloy.

EPA is working with industry and a private, third-party testing organization toward the development of a voluntary industry standard on this issue that would result in minimal amounts of lead being leached from these products. If you purchase any brass plumbing products, ask the distributor or manufacturer to provide information about tests it has performed on the product. Refrain from buying any product from a manufacturer that is unwilling to provide the testing information.

7. Please provide the total number and location of the following outlets which provide water for consumption in your school: Water Coolers, Bubblers, Kitchen Taps, Ice Makers.

In addition to lead components in the plumbing system, lead solders or lead in the brass fittings and valves used in some taps, bubblers, and refrigerated water coolers may be sources of lead. It is important to identify the locations of all such drinking water outlets.

8. Are any water coolers currently providing water for consumption in your school? If YES, please provide brand, model serial number and location.

Water coolers may be a major source of lead contamination. Under the Lead Contamination Control Act of 1988, water coolers with lead-lined tanks are considered to be imminently hazardous consumer products, and manufacturers and importers are to repair, replace, or recall these coolers. The law also requires that solder, flux, and storage tank interior surfaces in contact with drinking water contain not more than 0.2 percent lead. Other parts of water coolers that may come into contact with drinking water are not to contain more than 8 percent lead. In addition, the law attaches criminal and civil penalties for the manufacture and sale of water coolers containing lead.

The CPSC negotiated an agreement with Halsey Taylor through a consent order agreement published in June 1990 to provide a replacement or refund program that addresses all the water coolers listed by EPA as having lead-lined tanks. Halsey Taylor was the only company

identified by EPA as manufacturing some water coolers with lead-lined tanks.

See EPA 812-B-94-002 April 1994 "Lead in Drinking Water in School and Non-Residential Buildings" Appendix C for a summary of EPA's list of water coolers found to contain lead. Use the list to help prioritize your sampling. If your water cooler is listed as having a lead-lined tank, do not use the water for drinking and sample the water immediately as these coolers pose the highest risk of contamination.

9. Do the faucets used to obtain water for drinking and cooking purposes within the school have accessible screens? If YES, are the screens cleaned regularly?

Lead-containing sediments that are trapped on screens can be a significant source of lead contamination. Sediments should be tested for the presence of lead and the screens should be cleaned frequently.

10. Did you detect any signs of corrosion such as frequent leaks, or rust-colored water from taps within your school and/or have been any complains about a bad (metallic) taste to the water? If YES, please provide the location of the taps where the signs of corrosion were detected and how often these signs are noticed within your school water system.

Frequent leaks, rust colored water, and stains on fixtures, dishes, and laundry are signs of corrosive water. Blue/green deposits on pipes and sinks indicate copper corrosion; brown stains result from the corrosion of iron. Where such symptoms occur, high levels of lead, copper, and iron may be present in the water. Although you cannot see, taste, or smell lead dissolved in water, the presence of a bad or metallic taste may indicate corrosion and possible lead contamination.

11. Is any water (e.g. bottled water) other than NYC water used for consumption at your school? If YES, list locations and reasons why other water is provided.

Bottled water needs to be tested or requested from the supplier to provide documentation as to the lead content of the water and that it meets the Federal requirements.

12. Is any electrical equipment grounded to water pipes in the immediate area of the school?

If electrical equipment, such as telephones, has been installed using water pipes as a ground, the electric current traveling through the ground wire will accelerate the corrosion of any interior plumbing containing lead. The practice should be avoided, if possible. However, if existing wires are already grounded to water pipes, the wires should not be removed from the pipes unless a qualified electrician installs an alterative grounding system. Check with your local building inspector on this matter. Your State or local building code may require grounding of the wires to the water pipes. Improper grounding of electrical equipment may cause severe shock.

13. Do you have any records indicating whether any water samples have been taken from your school for any contaminants?

Results of analyses of water quality, such as measures of pH, calcium hardness, and carbonate alkalinity, can provide important clues about the corrosiveness of the water. If your facility owns or operates its own water supply, such test results can help you decide on effective treatment approaches. Effective corrosion control treatment may include reducing the water's acidity, increasing its alkalinity, and/or adding a corrosion inhibitor such as zinc orthophosphate. The best choice among possible treatments will vary depending upon your water quality conditions.

If your facility purchases its water, contact your public water supplier to find out what they are doing to comply with the National Primary Drinking Water Regulation for lead. See also the response to Question 16 below for further information. It is important to know whether and how the water entering your facility is treated. Some kinds of treatment can make the water more corrosive, while others will reduce the problem. Treatment of public water to reduce corrosion can reduce lead levels throughout the system and can save both you and the supplier money by reducing damage to plumbing.

14. Is water used during the night or prior to the daily opening of the school?

When water is used during the night and/or prior to the daily opening of the school it reduces the time which the water is in contact with the plumbing materials.

Answers to the types of questions included on the plumbing profile questionnaire will give you an idea of the type of water you are receiving. From this assessment, you will then have a better sense of how to organize your testing activities.

If your facility purchases its water, contact your public water supplier to:

- Find out whether the system is in compliance with Federal and State lead requirements.
- Learn the results of the system's latest tap water sampling efforts and whether 10 percent or more of these samples have exceeded EPA's action level of 15 ppb (i.e., what are the typical lead levels in water being delivered throughout the community).
- Learn what activities the system employs to minimize the corrosiveness of the water supply; identify what type of water you might be receiving in your facility (e.g., is it corrosive or, non-corrosive water? Is the water soft or acidic?).
- Learn whether protective coatings are likely to have formed on the inside of your plumbing based on the treatment practices of the public water supplier. Identity whether the water distribution system contains lead pipes and whether/when the water system plans to remove these lead materials.

SECTION 4. POTABLE WATER SAMPLING

After reviewing the plumbing profile questionnaire and background regarding what your answers to the profile could mean (Sections 3.2 and 3.3), you have learned that lead contamination may not occur uniformly throughout a building. Large variations in lead concentrations may be found among individual outlets in a facility because of differences in flow rates and/or building materials.

In general, you can expect widespread lead contamination in your drinking water when:

- The building's plumbing is less than 5 years old and lead solder was illegally used (i.e., after the 'lead-free' requirements of the 1986 Safe Drinking Water Act took effect).
- Brass fittings, faucets, and valves were installed throughout the building less than 1 year ago (even though they may contain less than 8 percent lead as required under the lead-free requirements of the Safe Drinking Water Act).
- The water is corrosive.
- Sediment in the plumbing and screens contains lead.
- Lead pipes are used throughout the building.
- The service connector (i.e., the pipe that carries water from the public water system main to the building) is made of lead.

In general, you can expect localized contamination if:

- The water is non-corrosive.
- Lead pipes are used in some locations.
- Some brass fittings, faucets, and valves have been installed in the last year (even though they may contain less than 8 percent lead).
- Numerous lead solder joints were installed in short sections of pipe before 1986 or were illegally installed after 1986 (i.e., after the lead-free requirements of the Safe Drinking Water Act took effect).
- There are areas in the building's plumbing with low flow or infrequent use.
- Sediment in the plumbing and screens at isolated locations contains lead.
- Some water coolers have lead parts or contain lead-lined tanks *(consult Appendix C for a discussion of the water cooler issue and EPA 's listing of coolers).*

4.1. DEVELOPMENT OF SAMPLING PLAN

After identifying potential problem areas in public school facilities, through completion of the plumbing profile questionnaire, the next step is to have the water tested. Testing is the only sure way for DOE to know whether lead is a problem in its school facilities. Prior to embarking on the actual testing, DOE must develop the following sampling plan:

- The designated leader of the sampling program is the director of EHS. As leader he/she will:

1. Take full responsibility of the sampling program.
2. Ensure that the sampling is conducted properly.
3. Ensure that the consultants/laboratories performing the testing and analysis understand and are knowledgeable of DOE sampling protocol and procedures and EPA Lead in Drinking Water in Schools and Non-Residential Buildings (EPA 812-B-94-002 April 1994) document.

- The sampling will be performed by DOE approved consultants.
- The analysis will be performed by DOE approved laboratories certified by ELAP in conducting drinking water analysis.
- The consultants/laboratories will provide EHS with all sampling and sample results records/reports as required by the sampling protocol. These records will be maintained by EHS.
- Sampling will be prioritized on the age of the student occupants and in the following order:
  - First, L.Y.F.E. centers.
  - Second, Elementary schools.
  - Third, Intermediate and High schools.
- Priority of school buildings within each of the above groups will be based on:
  1. The plumbing profile questionnaire responses which will include schools with:
     - Areas containing lead pipes.
     - Areas of recent construction and repair in which lead solder or materials containing lead were used.
     - Areas where the plumbing is used to ground electrical circuits.
     - In buildings where corrosive water having low pH and alkalinity is distributed.
     - Water cooler identified by EPA as having lead-lined storage tanks or lead pans.
     - Areas of low flow and/or infrequent use (where water is in contact for a long time with plumbing containing lead or with particulate matter and lead debris).
  2. The student population.

4.2. POTABLE WATER SAMPLING PROTOCOL

This School Potable Water Sampling Protocol (hereinafter the "protocol") is based on EPA Guidance 812-B-94-002, dated April 1994, *Lead in Drinking Water in Schools and Non-Residential Buildings (*hereinafter, the "EPA Guidance"*).* The purpose of this Protocol is to collect, analyze and measure the concentration of lead in potable water in New York City DOE School Buildings. Initially, the Potable Water Sampling Protocol will be used to sample drinking water outlets at all remaining schools that were not investigated as of October 7, 2002 and/or for re-testing any school within New York City public school DOE system when necessary.

1.0 Prior to the potable[1] water inspection, the environmental consultants shall:

1.1 Obtain a copy of a completed Lead in Drinking Water Plumbing Profile Questionnaire and a copy of the potable water outlet location drawing for the school in question from the DOE Environmental Health and Safety (EHS) office.

1.2 Review the Lead in Drinking Water Plumbing Profile Questionnaire and the potable water outlet location drawing obtained from EHS office.

1.3 In the event that a completed copy of the Lead in Drinking Water Plumbing Profile Questionnaire and/or the potable water outlet location drawing was/were not made available or found to be incomplete, follow the steps outlined in Sections 1.4.e, 2.4 and, 2.5 below.

1.4 Contact the school custodian engineer and:

a. Coordinate and schedule the potable water inspection.

b. Instruct/confirm with the custodian engineer and/or custodial staff that no water outlets in and around the school will be utilized until the sampling is complete which must take place (at minimum eight (8) hours but not more than eighteen (18) hours from the last use of the outlets) the morning after a normal[2] school day.

c. Instruct the custodian engineer and/or custodial to post signs and secure each outlet (e.g. install yellow warning tape to isolate each outlet) to prevent anyone from using the outlet prior to the sampling and to assure that each outlet is ready for sampling.

d. If the sampling will not take place the morning after a normal school day omit b and c above and follow steps outlined in Section 2.1 and 2.2 below.

e. Interview the custodian engineer and obtain the information necessary to complete the Lead in Drinking Water Plumbing Profile Questionnaire (Attachment B). If the custodian engineer is not available for interview at the time of scheduling (a above) the consultant will interview the custodian engineer or a member of his staff and complete the Lead in Drinking Water Plumbing Profile Questionnaire at any time prior or during the school visit but prior to sampling.

2.0 Prior to sampling, the environmental consultant shall visit the school and:

2.1 Flush all potable water outlets to be sampled only when the sampling will take during school breaks or on a morning after a non normal school day (e.g., during

[1] Potable Water = Water use for drinking and food preparation purposes.
[2] Normal School Day=A day during of which the school is fully occupied and normal school activities are taking place.

the summer months, holidays, morning after a holiday or a weekend and etc.) Therefore, the environmental consultant will visit the school and simulate normal water use by flushing all potable water outlets to be sampled at the school for a minimum of two (2) hours. The said flushing should take place no less than eight (8) hours but no more than eighteen (18) hours prior to sampling.

2.2 After the flushing the consultant will instruct/confirm with the custodian engineer and/or custodial staff that no water outlets in and around the school will be utilized until the sampling is complete which must take place at minimum eight (8) hours but not later than eighteen (18) hours after the flushing (Section 2.1 above). The custodian engineer and/or custodial staff must post signs and secure each outlet (e.g. install yellow warning tape to isolate each outlet) to prevent anyone from using the outlet prior to the sampling and to assure that each outlet is ready for sampling.

2.3 If sampling will take place the morning after a normal school day omit steps outlined in Section 2.1

2.4 Interview the school custodian engineer and/or custodial staff to obtain the information necessary to complete the Lead in Drinking Water Plumbing Profile Questionnaire (Attachment B) or to finalize and/or confirm and/or update the information on the existing one.

2.5 During this time the environmental consultant with the assistance of the custodian engineer and/or custodial staff should generate a floor plan/sketch drawing showing the all potable water outlets in the school and/or update the existing one. Copies of floor plans can be obtained from the school's AHERA books located in the school principal's office and at the EHS office, 28-11 Queens Plaza North, 4th Floor, Long Island City, NY 11101.

2.6 At the same time, to the extent feasible based on the information provided to the consultant by DOE and on his/her field observations, the consultant will verify the accuracy of the information provided by the school custodian engineer and/or custodial staff and included in the Lead in Drinking Water Plumbing Profile Questionnaire.

3.0 During the inspection/sampling, the environmental consultant shall:

3.1 Return to the school for sampling at minimum (8) hour after but not later than eighteen (18) hours from the time of last use of the water during a normal school day or flashing (Section 2.1 above).

3.2 Prior to commence sampling the environmental consultant should:

a. Confirm/verify with the custodian engineer and/or custodial staff that no water outlet in and around the school have been operated/utilized within the time period between the last use of water or flushing (Section 2.1 above) and sampling (Section 3.5 below) which is within the minimum of eight (8) maximum eighteen (18) hours. In the event that the environmental consultant confirms/verifies that water outlet(s) in and around the school have been operated/utilized within the aforementioned time period and/or outlet(s) show immediate prior use, do not sample the said outlet(s) at this time and proceed with Section 3.8 below.

b. Identify and mark all water outlets to be sampled on the provided/generated floor plan/sketch drawing showing all the potable only water outlets in the school (Section 2.5). Each water outlet will be numbered according to a consistent protocol.

3.5 Sample representative potable water outlets within the school as follows:

a. The environmental consultant will coordinate the representative potable water outlets to be sampled with the school contact. Custodial slop sinks and bathroom hand washing taps from sinks will not be sampled. Two samples will be collected at each water outlet as follows:

i. Initial screening sample, a first-draw. This sample should be collected before the school opens and before any water is used to assure that no water is withdrawn from the outlets from which the samples are to be collected for a minimum of eight (8) hours prior to sampling but not later than eighteen (18) hours. This protocol assumes that the DOE will be responsible for assuring that water is not drawn from any potable water outlet within the subject school overnight prior to sampling.

ii. Follow-up sample, a thirty (30)-second flush sample. This sample will be collected to indicate if the piping that supplies that outlet with water is a source of lead. This sample will also indicate the extent to which a brief flush can provide temporary remediation at outlets where lead levels above 0.020 mg/L are detected in the first draw sample.

b. Sample volumes will be collected in 250 milliliters (ml) containers. Sample containers will be HDPE or LDPE acid-washed containers preserved with nitric acid.

c. The environmental consultant shall assign a unique sample ID number to each sample collected. This number will be recorded on the sample bottle and clear waterproof tape shall be installed over the sample number to prevent wash off. The sample ID number shall be recorded on the Potable Water Sample Collection Form (Attachment D) along with the date and

time of collection, the name of the sample collector, the sample site address, the type of outlet being tested, the location of the outlet being tested, the name of the manufacturer that produced the outlet, and the outlet's model number. In addition, the environmental consultant shall document all observations in the field on the form (such as low water flow, colors or odors in the water, etc.).

d. To ensure that samples obtained in the field are of satisfactory quality and represent the system from which they are collected, sample handling shall be performed in accordance with the EPA Guidance. In particular, samples shall be collected and handled in a manner that will minimize contamination by dust, dirt, or other impurities. In addition, the sample collector shall don a new pair of latex disposable gloves for each sample.

e. To avoid shipping restrictions and personnel handling hazards, samples shall be sealed immediately on collection and shipped overnight to a certified laboratory for sample preparation and analysis.

3.6 Sample **COLD water only**.

3.7 **DO NOT** sample hot water or mixed hot and cold water.

3.8 Re-coordinate with the NYC ED to return and test outlet(s) that show immediate prior use or where supply valves have been operated on outlet piping within eight (8) hours prior to sampling.

4.0 Following the inspection at each school, the environmental consultant shall:

4.1 Utilize NYC DOE-approved laboratories, certified by NYS ELAP for analysis of lead in drinking water, to analyze all potable water samples collected.

4.2 Instruct the laboratory to analyze only the initial screening samples (1st draw sample of each outlet) first. Follow-up samples (30 sec. flush sample of each outlet) shall be analyzed only when the initial screening sample collected from the same outlet exceeded the EPA Guidance level for lead in potable water of 0.020mg/L (>0.020mg/L).

4.3 Notify the NYC ED immediately (i.e., the same business day) upon receipt of any laboratory analysis sample results that exceed the USEPA guidance level for lead in potable water of >0.020mg/L. Provide an Inspection Report to NYC DOE that will document the number of outlets in the elementary school, the number of outlets sampled, and the reason why particular outlets in the area were not sampled, as well as the name of the person who directed sampling at the site, if any. The Inspection Report will also include short term and long-term remediation recommendations.

4.3. POTABLE WATER SAMPLING PROCEDURES

The only sure way for DOE to know whether lead is present in its facilities in amounts greater than the Federal acceptable levels of ≤20ppb is to perform sampling and analysis of the potable water at each facility. As result DOE established the following potable water sampling procedures:

a. All potable water sampling will be performed in accordance with DOE sampling protocol outline in Section 4.2 above.
b. Sampling will be contacted by DOE approved consultants.
c. Consultants' personnel performing the sampling:
    i. Must fully understand and be knowledgeable of DOE sampling protocol and procedures and EPA Lead in Drinking Water in Schools and Non-Residential Buildings (EPA 812-B-94-002 April 1994) document.
    ii. Must collect all water samples the morning after a normal school day before the school opens and before any water is used. The water should sit in the pipes unused for at least eight hours but not more than eighteen hours before a sample is taken
    iii. Shall not collect samples the morning after weekends, holidays, and school breaks unless the water outlets were flushed at least 8 to 12 hours the evening before the sampling.
    iv. Must make sure that no water is withdrawn from the fountains which the samples are to be collected prior to their sampling.
    v. Must make sure that all water samples collected should be 250 milliliters (ml) in volume and collected in 250 ml containers.
    vi. Must make sure that the sample containers used be HDPE or LDPE acid-washed containers preserved with nitric acid.
    vii. Should be careful not to overfill the sampling container with water and to avoid any contact with the chemicals.
    viii. Must assign a unique sample ID number to each sample collected that is reflective of the type of outlet and outlet location using the codes outlined in the Codes Reference Tables found on the back of DOE's Potable Water Sampling for Lead Concentration Sample Collection Form.
    ix. Shall record the assigned sample ID number on the sampling container and DOE's Potable Water Sampling for Lead Concentration Sample Collection Form.
    x. Shall fully complete and record all required information on the DOE's Potable Water Sampling for Lead Concentration Sample Collection Form which includes DOE's information, Consultants performing the testing information, the building information, sampling date, sample data (sample ID, sample location, outlet information, container information, sample type, length of flush, time of collection), chain of custody, laboratory information and, instructions to the laboratory.
    xi. Shall follow strict chain of custody procedures.

4.4. POTABLE WATER SAMPLE COLLECTION FORM

All consultants performing water sampling are required to utilize DOE's Potable Water Sampling for Lead Concentration Sample Collection Form. ATTACHMENT D consists of the said Potable Water Sampling for Lead Concentration Sample Collection Form.

SECTION 5. LABORATORY AND ANALYSIS

5.1. LABORATORY REQUIREMENTS

5.2. LABORATORY ANALYTICAL METHODOLOGY

5.3. SAMPLE CONTAINER PREPARATION AND HANDLING

As indicated DOE will use laboratories certified in drinking water analysis to perform the analysis of the water samples collected by the consultants. In addition DOE will require the laboratories to provide the actual sampling containers to the consultants performing the sampling with handling instructions. The sample containers must be 250 ml and will have been prepared prior to receipt by the consultants.

Contamination of sample containers by dust, dirt or other impurities containing lead can produce inaccurate test results in an otherwise conscientious sampling program. Contamination of a water sample by the container may indicate higher lead levels than are actually present in the drinking water.

Another source of error that may affect the results of analyses is the absorption of lead from the water onto the surface of the container, which will reduce the amount of lead in the water sample. In such instances, analytical results will indicate lower levels of lead in the sample than are actually present.

In order to avoid analytical errors, pay particular attention to proper collection and handling of the sample before analysis. Preparation of sample containers is described in detail in an EPA manual entitled, *Methods for Chemical Analysis of Water and Wastes.* In brief, the sample container, whether borosilicate glass, polyethylene, polypropylene or Teflon should be thoroughly washed with detergent and tap water, rinsed with 1:1 nitric acid and tap water, 1:1hydrochloric acid and tap water, and finally deionized distilled water-in that order.

Make sure the containers are kept sealed between the time of their preparation and the collection of the sample. This will assure that no contaminants from the outside are introduced. In order to avoid the loss of lead from the sample through absorption onto the sample container wall, the sample will need to be acidified with concentrated nitric acid to a pH of less than 2. If the nitric acid cannot be used at the time of the collection of the sample because of shipping restrictions, preserve the sample by icing and promptly ship it to the laboratory. Upon receipt, the laboratory will acidify the sample. The sample can be held up to 14 days prior to acidification without loss of lead through absorption.

For more detailed information, refer to the following EPA manuals:

Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised edition, March 1983 (available from U.S. EPA, R&D Publications, 26 West Martin Luther King Blvd., Cincinnati, OH 45268).

Methods for the Determination of Metals in Environmental Samples, EPA-600/4-91/010, June 1991 (available from the National Technical Information Service, Pub. No. PB91-231498 (703) 487-4650).

Manual for the Certification of Laboratories Analyzing Drinking Water, EPA-570/9-90/008, April 1990 (available from the National Technical Information Service, (703) 487-4650).

SECTION 6. REMEDIATION

6.1. ROUTINE CONTROL MEASURES

In addition to short term and permanent remediation measures, the following routine activities will be conducted in order to avoid possible exposures to lead:

- Frequent cleaning of debris from all accessible screens (see section 2.1.e).
- Use only cold water for food and beverage preparation in school cafeterias and cooking classes at all times.

6.2. INTERIM/SHORT TERM CONTROL MEASURES

Until more permanent remediation measures are implemented, DOE will implement interim/preventive or short-term control measures to reduce lead contamination in school building's drinking water. Interim/short term control measures are implemented in all schools where the drinking water has not been tested or while waiting for results and in schools where water has been tested and found levels above 20ppb and such short term control measures are implemented until a more permanent remediation of lead sources is feasible. These interim/short term control measures will remain in effect until the school's drinking water is tested or permanent remediation of the lead source(s) is implemented. Before discontinuing any interim/short term control measures DOE must confirm that as a result of testing the lead levels of the drinking water in the school in question does not exceed 20ppb. Some of the interim/short term control measures implemented by DOE include:

1. Flushing of the piping system (see section 2)
2. Provision of bottled water. Where the drinking water is tested and it was found that it contain lead above 20ppb and there is no other source within the school building/floor/classroom for acceptable drinking water
3. Shot down and removal from service all outlets tested and found to dispense water with lead concentration higher than 20ppb.

6.3. PERMANENT REMEDIATION MEASURES

Based on the testing results and the information provided in the plumbing profile questionnaire as well on the availability of safe drinking water in the school, cost, and likelihood of success DOE will determine the type of remediation measure and the priority which will be implemented. Some of permanent remediation measures DOE will employ to reduce or eliminate the lead in drinking water include but limited to the following:

1. Replacement of outlets: If it is determined through testing that the source(s) of lead contamination is localize to a few outlets these outlets will be removed and replaced with outlets made of lead-free materials. It is important to note that some new brass fixtures, valves and fittings under the "lead-free" requirements of the 1986 Safe Drinking Water Act, can leach sufficient amounts of lead in drinking water to warrant concerns. In fact,

these products may leach more lead than the old plumbing product because the water has not had the time to build up a protective scale on the inside of the fixture. Therefore, the plumbing contractor must provide DOE a copy of the manufacturer lead testing data for the plumbing fixture/products he/she intend to install in NYC public school.

2. Replacement of piping and/or service connector: If it is determined through testing that the source(s) of lead contamination is attributed to the service connector and/or a section of piping the said service connector and/or a section of piping will be remove and replace with lead-free plumbing materials.
3. Modification of plumbing system: If it is determined through testing that the source(s) of lead contamination is not easily accessible or the cost associated with its removal is very high, the plumbing system might be modified so that water supplied for drinking and cooking is redirected to bypass the said source(s) of lead contamination.
4. Removal of grounded electrical wire: If it is determined through testing that the source(s) of lead contamination can be attributed to the grounded electrical wire on the plumbing system the existing wires already grounded to the water pipes will be removed by a qualified electrician, and an alternative grounding system will be installed in accordance with applicable NYC code.
5. Closure of outlet: If the remediation of a specific outlet is not feasible the said outlet will be closed and taken out of service permanently.
6. Provision of bottled water: If other remediation measures fail or is impractical, bottled water will be providing as a permanent solution. DOE will require the bottled water supplier to guarantee that the lead levels in the bottled water do not exceed 5ppb.

No outlet will be return to service following remediation without testing as outlined in section 6.4 below.

All plumbing work will be performed by a licensed plumbing contractor.

6.4. POST-REMEDIATION SAMPLING PROCEDURES

Following remediation each outlet will be tested individually in accordance with DOE sampling protocol.

No outlet will be return to service without first obtaining two sets of consecutive satisfactory ($\leq$20ppb) sampling results.

SECTION 7. PUBLIC EDUCATION

7.1. MANDATORY PUBLIC NOTICE REQUIREMENTS
7.2. SCHOOL PRINCIPAL NOTIFICATION PROCEDURES
7.3. SCHOOL CUSTODIAN ENGINEER NOTIFICATION PROCEDURES
7.4. UFT NOTIFICATION
7.5. STUDENTS / PARENTS NOTIFICATION
7.6. LOCAL MEDIA / PRESS RELEASE

SECTION 8. PROGRAM OVERSIGHT – QA/QC

THIS SECTION IS TO BE PROVIDED BY NYC DOH

ATTACHMENT A: INTERIM FLUSHING CIRCULAR
ATTACHMENT B: PLUMBING PROFILE QUESTIONNAIRE
ATTACHMENT C: POTABLE WATER SAMPLING PROTOCOL
ATTACHMENT D: POTABLE WATER SAMPLE COLLECTION FORM
ATTACHMENT E: SAMPLE PUBLIC NOTICE MATERIALS:

- **E-1:** SCHOOL PRINCIPAL
- **E-2:** SCHOOL CUSTODIAN ENGINEER
- **E-3:** UFT
- **E-4:** PARENTS/STUDENTS
- **E-5:** LOCAL MEDIA

ATTACHMENT F: DAILY DRINKING / FOOD PREPARATION WATER FLUSH RECORD

NEW YORK CITY DEPARTMENT OF EDUCATION
DIVISION OF SCHOOL FACILITIES
OFFICE OF BUILDING SERVICES

August 21, 2002

OFFICE OF BUILDING SERVICES CIRCULAR #01 - 2002/03

NOTE: All Circulars are to be kept in a permanent file

TO ALL CUSTODIAN ENGINEERS & BUILDING MANAGERS

1. LEAD CONTAMINATION PREVENTION FOR WATER

In order to prevent the possibility of lead contamination in drinking water Custodian Engineers and Building Managers *must* run all cold water taps used to obtain water for drinking or cooking purposes each morning, prior to students' arrival. This is particularly important following long weekends and holidays. In addition, faucet screens should be replaced/cleaned frequently to avoid possible exposures to lead.

Directions for Flushing

Each drinking water outlet and all outlets for food preparation must be flushed individually. Flushing a toilet will not flush your water fountains. All flushing *must* be recorded daily on a log sheet that is kept and maintained in the Custodian's office. Custodian Engineers and Building Managers must add a sheet pertaining to flushing (copy attached) to the existing School Safety Log.

a. **To flush the interior plumbing, locate the faucet farthest away from the service line on each wing and floor of the school building. Open the faucet wide and let run until water gets cold or for a minimum of 10 minutes.**

b. **Open valves at all drinking fountains without refrigeration units and let the water run until it gets cold or for a minimum of 10 minutes.**

c. **Let the water run on all refrigerated water fountains for 15 minutes.**

d. **Open all kitchen faucets and let the water run until it gets cold or for a minimum of 10 minutes.**

Joseph P. Nappi
Executive Director (Acting)
Division of School Facilities

JPN/SC:ns
Attachment: Water Flush Log
C: Principals

POTABLE WATER SAMPLING PROTOCOL FOR LEAD CONCENTRATION

In

NEW YORK CITY BOARD OF EDUCATION ELEMENTARY SCHOOL BUILDINGS

This Elementary School Sampling Protocol (hereinafter the "protocol") is based on EPA Guidance 812-B-94-002, dated April 1994, *Lead in Drinking Water in Schools and Non-Residential Buildings (*hereinafter, the "EPA Guidance"*).* The purpose of this Protocol is to collect, analyze and measure the concentration of lead in potable water in New York City Board of Education (NYCBOE) Elementary School Buildings. Initially, the Elementary School Sampling Protocol will be used to sample drinking water outlets at elementary schools that were not investigated as of May 31, 2002.

1.0 Prior to the inspection, the environmental consultants shall:

1.1 Contact the custodian engineer at the school to coordinate and schedule the potable water (water use for drinking and food preparation purposes) inspection.

1.2 At the same time the environmental consultant will interview the custodian engineer and obtain the information necessary to complete the Lead in Drinking Water Plumbing Profile Questionnaire (Attachment 1). If the custodian engineer is not available for interview at the time of scheduling (Item 1.1 above) the consultant will interview the custodian engineer or a member of his staff and complete the Lead in Drinking Water Plumbing Profile Questionnaire at any time prior or during the school visit (Item 2.2 below) but prior to sampling.

2.0 Prior to sampling, the environmental consultant shall visit the school and:

2.1 Flush all potable water outlets to be sampled. Since the majority of these elementary school are closed or partially utilized during this sampling period (July – August) it will be necessary to simulate normal water system use. Therefore, the environmental consultant will visit the elementary school and simulate normal water use by flushing all potable water outlets to be sampled at the elementary school for a minimum of two (2) hours. The said flushing should take place no less than eight (8) hours but no more than eighteen (18) hours prior to sampling.

2.2 Interview the school custodian engineer and/or custodial staff one more time to finalize and/or confirm the information on the Lead in Drinking Water Plumbing Profile Questionnaire.

2.3 During this time the environmental consultant with the assistance of the custodian engineer and/or custodial staff should generate a floor plan/sketch drawing showing the all potable only water outlets in the school. (Copies of floor plans can be obtained from the school's AHERA books located at the Board of Education - Environmental Health and Safety (EHS) office, 28-11 Queens Plaza North, 4th Floor, Long Island City, NY 11101).

2.4 At the same time, to the extent feasible based on the information provided to the consultant by BOE and on his/hers field observations, the consultant will verify the accuracy of the information provided by the school custodian engineer and/or custodial staff and included in the Lead in Drinking Water Plumbing Profile Questionnaire.

2.5 After the flushing the consultant will instruct/confirm with the custodian engineer and/or custodial staff that no water outlets in and around the school will be utilized until the sampling is

complete which must take place at minimum eight (8) hours but not later than eighteen (18) hours after the flushing (Item 2.1 above). The custodian engineer and/or custodial staff must post signs and secure each outlet (e.g. install yellow warning tape to isolate each outlet) to prevent anyone from using the outlet prior to the sampling and to assure that each outlet is ready for sampling.

3.0 During the inspection/sampling at each school, the environmental consultant shall:

3.1 Return to the school for sampling at minimum (8) hour after but not later than eighteen (18) hours from the time of flashing (Item 2.1 above).

3.2 Prior to commence sampling the environmental consultant should confirm/verify with the custodian engineer and/or custodial staff that no water outlet in and around the elementary school have been operated/utilized within the time period between the flushing (Item 2.2 above) and sampling (Item 3.5 below). In the event that the environmental consultant confirm/verify that water outlet(s) in and around the elementary school have been operated/utilized within the time period between the flushing (Item 2.2 above) and sampling (Item 3.5 below) and/or outlet(s) show immediate prior use do not sample the said outlet(s) at this time and proceed with Item 3.8 below.

3.3 Prior to commence sampling the environmental consultant should identify all outlets that are most likely used for drinking and food preparation purposes, including, but not limited to, kitchen taps, fountains, coolers, faucets, bubblers, ice makers, and bottled water machines.

3.4 Prior to commencing sampling the environmental consultant should identify and marked all water outlets to be sampled on the generated floor plan/sketch drawing showing all the potable only water outlets in the school (Item 2.3). Each water outlet will be numbered according to a consistent protocol.

3.5 Sample all the identified outlets that are most likely used for drinking and food preparation purposes, including, but not limited to, kitchen taps, fountains, coolers, faucets, bubblers, and ice makers. Bottled water dispensers should be noted but not sampled.

a. The environmental consultant will coordinate the water outlets to be sampled with the school contact. Custodial slop sinks and bathroom hand washing taps from sinks will not be sampled unless they are used by Pre-Kindergarten, Kindergarten or Special Education students. Two samples will be collected at each such water outlet as follows:

i. Initial screening sample, a first-draw. This sample should be collected before the school opens and before any water is used to assure that no water is withdrawn from the outlets from which the samples are to be collected for a minimum of eight (8) hours prior to sampling but not later than eighteen (18) hours. This protocol assumes that the NYC BOE will be responsible for assuring that water is not drawn from any potable water outlet within the subject school overnight prior to sampling.

ii. Follow-up sample, a thirty (30)-second flush sample. This sample will be collected to indicate if the piping that supplies that outlet with water is a source of

lead. This sample will also indicate the extent to which a brief flush can provide temporary remediation at outlets where lead levels above 0.020 mg/L are detected in the first draw sample.

b. Sample volumes will be collected in 250 milliliters (ml) containers. Sample containers will be HDPE or LDPE acid-washed containers preserved with nitric acid.

c. The environmental consultant shall assign a unique sample ID number to each sample collected. This number will be recorded on the sample bottle and clear waterproof tape shall be installed over the sample number to prevent wash off. The sample ID number shall be recorded on the Potable Water Sample Collection Form (Attachment 2) along with the date and time of collection, the name of the sample collector, the sample site address, the type of outlet being tested, the location of the outlet being tested, the name of the manufacturer that produced the outlet, and the outlet's model number. In addition, the environmental consultant shall document all observations in the field on the form (such as low water flow, colors or odors in the water, etc.).

d. To ensure that samples obtained in the field are of satisfactory quality and represent the system from which they are collected, sample handling shall be performed in accordance with the EPA Guidance. In particular, samples shall be collected and handled in a manner that will minimize contamination by dust, dirt, or other impurities. In addition, the sample collector shall don a new pair of latex disposable gloves for each sample.

e. To avoid shipping restrictions and personnel handling hazards, samples shall be sealed immediately on collection and shipped overnight to a certified laboratory for sample preparation and analysis.

3.6 Sample **COLD water only**.

3.7 **DO NOT** sample hot water or mixed hot and cold water.

3.8 Re-coordinate with the NYC BOE to return and test outlet(s) that show immediate prior use or where supply valves have been operated on outlet piping within eight (8) hours prior to sampling.

4.0 Following the inspection at each school, the environmental consultant shall:

4.1 Utilize NYC BOE-approved laboratories, certified by NYS ELAP for analysis of lead in drinking water, to analyze all potable water samples collected.

4.2 Instruct the laboratory to first analyze only the initial screening sample(s) (1st draw sample). Follow-up sample(s) (30 sec. flush sample) shall be analyzed only when the initial screening sample collected from the same outlet exceeded the EPA Guidance level for lead in potable water of >0.020mg/L.

4.3 Notify the NYC BOE immediately (i.e., the same business day) upon receipt of any laboratory analysis sample results that exceed the USEPA guidance level for lead in potable water of >0.020mg/L. Provide an Inspection Report to NYC BOE that will document the number of

outlets in the elementary school, the number of outlets sampled, and the reason why particular outlets in the area were not sampled, as well as the name of the person who directed sampling at the site, if any. The Inspection Report will also include immediate and follow-up remediation recommendations.

New York City Board of Education
Office of Environmental Health and Safety

ATTACHMENT 1

ELEMENTARY SCHOOL SURVEY
POTABLE WATER SAMPLING FOR LEAD CONCENTRATION
PLUMBING PROFILE QUESTIONNAIRE

Attach floor plans identifying the location of outlets that provide water for cooking or drinking.

Name of School _____

Address _____

Main Phone Number _____

Principal _____ Phone # _____ Fax # _____

Custodian Engineer _____ Phone # _____ Fax # _____

1) When was the school constructed? _____

2) Were plumbing repairs made since construction of the school? ☐ YES ☐ NO
If YES, when? _____

3) Do the faucets used to obtain water for drinking and cooking purposes within the school have accessible aerated screens? ☐ YES ☐ NO
If YES, are the screens cleaned regularly? ☐ YES ☐ NO

4) Can you detect signs of corrosion, such as frequent leaks, or rust-colored water from taps, within the school? ☐ YES ☐ NO
If yes, how often and from what locations? (Indicate from cold and/or hot water)
_____

_____

5) Is electrical equipment 'grounded' to water pipes in the immediate area of the school?

☐ YES ☐ NO If yes, note location(s): _____

6) Have there been complaints about a bad (metallic) taste to the water? ☐ YES ☐ NO

7) When, if ever, were water samples from your building collected? _____

8) Is water used during the night or prior to the daily opening of the school? ☐ YES ☐ NO

If YES, for what purpose? _____

9) Complete the table below indicating the number and status of all potable water outlets in and around the school building where water is used for cooking or drinking purposes. Identify the location of each outlet.

Outlet	Number currently operational and in service.	Number Currently Operational and Out of service.	Number Currently Non-Operational.	Describe reason(s) For being out of service.
Water Fountains "bubbler type"				
Water coolers (chilled Storage)				
Bottled water coolers				
Kitchen faucets				
Ice makers				
Other source of drinking water (describe)				

Information provided by _____, _____, _____
(print name) (affiliation) (date)

Information provided by _____, _____, _____
(print name) (affiliation) (date)

Questionnaire completed by _____, _____, _____
(print name) (affiliation) (date)

To the extent feasible as outlined in Item 2.4 of the protocol the information provided by the above mentioned school custodian engineer and/or Custodial staff was verified for accuracy by:

_____, _____, _____
(print name) (affiliation) (date)

POTABLE WATER SAMPLING FOR LEAD CONCENTRATION
SAMPLE COLLECTION FORM

CLIENT INFORMATION

Name: NEW YORK CITY DEPARTMENT OF EDUCATION	
Address: 44-36 Vernon Boulevard, Long Island City, NY 11101	
Client Rep: **Mr. Mohamed Hemida**	W.O. No.

CONSULTANT INFORMATION

Name:	
Address:	
Project Manager:	**Project No.:**
Inspector:	**Field Tech.:**

PROJECT INFORMATION

BLDG ID:	BLDG No./Name:		BLDG Address:					
GEO. DIST.	JUR. DIST.	Sq. Ft. (000):	(0) Year Built	(1) Year 1st Add.	(2) Year 2nd Add.	(3) Year 1st Mod.	(4) Year 2nd Mod.	DATE OF SAMPLING:

SAMPLE DATA

Sample Description/ID (ID must match container label)						SAMPLED OUTLET LOCATION/ COORDINATES	OUTLET INFORMATION				CONTAINER INFO.			SAMPLE TYPE		Length of Flush	Time of Collection	Lead Conc. (ppb)
Floor	Functional Space Code	IN/BY	Room No.	Construction Code	Sample /Outlet Code		Type (Enter Code)	MFS/ Model	Serial #	Date of Installation	Size	#	Preservatives	Initial	Follow-up			
											250 ml		HNO_3					
											250 ml		HNO_3					
											250 ml		HNO_3					
											250 ml		HNO_3					
											250 ml		HNO_3					

CHAIN OF CUSTODY

Relinquished By:	Received By:	Date:	Time:
I.			
II.			
III.			

LABORATORY INFORMATION

Lab Name:	Date	Time	Method of Analysis:
Analyzed By:			
QC By:			

Method of shipment/delivery: ☐ US Mail ☐ UPS ☐ Fed-Ex ☐ Courier ☐ Hand Delivery ☐ Other:

INSTRUCTIONS TO THE LABORATORY

Turnaround Time		Report Results ASAP To:	
☐ RUSH ☐ 24 HOUR ☐ 48 Hour	☐ Analyze follow-up sample(s) **ONLY** when initial sample exceeds 20pbb		
	☐ Analyze both initial and follow up samples	☐Phone	☐Fax: 718-383-7780
☐ OTHER:	☐ Other:	☐Email: andreas@precision-enviro.com	☐Mail report to above address
Comments:			

CODES REFERENCE TABLES

Table 1.
OUTLET/ PLUMBING/ SAMPLE CODE

CODE	TYPE OF OUTLET OR PLUMBING	INITIAL SCREENING (1ST DRAW) SAMPLE	FOLLOW-UP SAMPLES
S	Service Connection to Distribution Main	**1S**	**1M**
A	Bubblers Without Central Chiller	**1A**	**2A**
B	Bubbles with Central Chiller	**1B**	**2B**
-	Central Chiller Unit	**-**	**3B, 4B**
C	Water Cooler	**1C**	**2C, 3C, 4C**
D	Bottled Water Dispensers	**1D**	**2D**
E	Ice Making Machines	**1E**	**2E**
F	Water Faucets (Tap)	**1F**	**2F**
	Interior Plumbing		
G	Laterals	**-**	**1G**
H	Headers	**-**	**1H**
I	Loops	**-**	**1I**
J	Risers	**-**	**1J**

Table 2.
FUNCTIONAL SPACE CODE

CODE	FUNCTIONAL SPACE
KI	Kitchen
GY	Gymnasium
CF	Cafeteria
TC	Teachers' Cafeteria
BC	Boys' Cafeteria
GC	Girls' Cafeteria
CR	Classroom
HA	Hallway
BR	Bathroom
GB	Girls' Bathroom
BB	Boys' Bathroom
RM	Room
OF	Office
LB	Laboratory
LI	Library
MO	Medical Office
BO	Boiler Room
LR	Locker Room
NM	Natatorium
WP	Water Meter/Pump Room
SS	Slop Sink

Table 3.
FLOOR CODE

CODE	FLOOR
SB	Sub Basement
BS	Basement
MZ	Mezzanine
01	1st Floor
02	2nd Floor
03	3rd Floor
04	4th Floor, …..etc.

Table 4.
CONSTRUCTION DATE CODE

CODE	CONSTRUCTION
0	Original Construction
1	1st Addition
2	2nd Addition
3	1st Modernization
4	2nd Modernization

COMMENTS/OBSERVATIONS: