



# Proposed Regulations for Lead in Drinking Water

## Summary

## August 1988

### Requirements For Water Systems Serving Fewer Than 500 People

#### PROPOSED NEW REGULATIONS WILL AFFECT SMALL WATER SYSTEMS

In early August 1988, the U.S. Environmental Protection Agency (EPA) proposed new national primary drinking water regulations (NPDWRs) for controlling lead and copper in drinking water. The proposed regulations are designed to prevent corrosion of lead and copper plumbing materials by water and to remove lead from distributed water.

The proposed NPDWRs require water suppliers to minimize lead levels in tap water. For lead that enters water as a corrosion by-product, suppliers must either meet "no-action" levels for lead, copper, and pH, or install or improve corrosion control treatment. Effective corrosion control treatment may include reducing the water's acidity, increasing its alkalinity, and/or adding a corrosion inhibitor such as zinc orthophosphate. Suppliers that exceed lead "no-action" levels will also be required to conduct a public education program to inform its customers of the health risks associated with lead in drinking water. For drinking water leaving the treatment plant and entering the distribution system, the proposed MCLs establish acceptable concentrations for lead and copper. If water systems exceed the MCLs for lead or copper, they will be required to bring the concentrations down to acceptable levels by either installing a best available technology (BAT) or by taking other steps such as drilling a new well or blending water from other sources. Water suppliers measure compliance with the MCLs by sampling drinking water leaving the plant and compliance with the "no-action" levels by sampling drinking water at the tap of targeted residences. The number of samples required is determined by the population size served by the water system.

*The proposed regulations specify that systems serving fewer than 500 people must begin monitoring to determine compliance with the MCLs no later than 27 months after publication of the final rule. The proposed regulations also specify that systems of this size complete the first round of monitoring to determine compliance with "no-action" levels within 39 months after issuance of the final rule.*

#### MONITORING FOR COMPLIANCE WITH MCLs FOR LEAD AND COPPER

The first action that water suppliers will need to take under the proposed regulations will be to determine if their water system is in compliance with the MCLs for lead and copper. This will be done by collecting water samples at distribution system entry points after conventional treatment has been completed.

##### Sampling Requirements

The frequency of sampling varies with the type of water system, as defined below.

System Type	Frequency of Sampling
Ground-water Systems	One sample per year from each well or entry point to the distribution system
Surface Water Systems	One sample quarterly from each entry point to the distribution system
Mixed Systems	One sample quarterly from surface water entry points to the distribution system, one per year from ground-water entry points to the distribution system

In cases where there are multiple wells drawing on the same aquifer, States may designate representative wells for sampling. For systems with ground-water supplies, a State may reduce the total number of samples by allowing the use of composite samples which combine up to five sources.

In the first year that monitoring is required, water suppliers may use historical data instead of new data to meet the monitoring requirements specified in the proposed rule if the data was gathered in the same manner specified in the proposed regulation.

##### Sample Analysis

Next, water suppliers analyze the samples for lead and copper. The proposed MCLs for water sampled at the entry points to the distribution system are 0.005 mg/l for lead and 1.3 mg/l for copper. A system is in compliance if the lead and copper concentrations are within these levels.



If no violations have occurred in the most recent two years of monitoring, States may reduce the monitoring requirements to once every five years for systems serving less than 500 people.

The average annual cost of monitoring for MCLs is about \$4.60 for a system serving fewer than 500 people.\*

### TREATMENT REQUIREMENTS FOR SYSTEMS EXCEEDING THE MCLs

A system is in noncompliance if it exceeds the MCLs for lead or copper in one sample. States may allow systems that exceed the MCL to take one additional sample and determine compliance based on the average of the two samples. If the analysis shows that MCLs are exceeded, water suppliers will be required to install a treatment technology to reduce the concentrations of lead and copper in distributed water to acceptable levels. The proposed

regulations list several treatment technologies that EPA has designated as BATs. They are: ion exchange, reverse osmosis, lime softening, and coagulation/filtration. Other methods, including blending or installing a new well, may also be used to comply with the MCLs. However, in order to be eligible for a variance from the MCLs, a system will be required to install one of the four technologies listed above.

All of the proposed technologies are currently available, have been proven to effectively reduce the concentrations of these contaminants to the required levels, and are compatible with other water treatment processes used in different regions of the U.S.. See Exhibit 1 for an outline of the proposed requirements for compliance with MCLs for lead and copper in systems serving fewer than 500 people.

EPA has estimated the cost of installing and operating the best available treatment technologies for a water supply system serving fewer than 500 people to be as follows:\*\*

Treatment Technology	Total Capital Cost	O&M Cost (per year)
Ion Exchange	\$ 49,000 - 85,000	\$ 2,000 - 5,000
Reverse Osmosis	\$105,000 - 210,000	\$12,000 - 36,000
Lime Softening	\$150,000 - 175,000	\$ 9,000 - 21,000
Direct Filtration	\$102,000 - 132,000	\$ 3,000 - 3,500
Coagulation/Filtration	\$164,000 - 192,000	\$11,000 - 27,000

\*All cost information provided in this summary was obtained from the "Appendix Material for the Regulatory Impact Analysis of Proposed National Primary Drinking Water Regulations for Lead and Copper" (June

1, 1988 Draft) Costs were derived from data on page V-40

\*\*Costs were derived from data on pages II-4 through II-8 of previously cited source

### MONITORING FOR COMPLIANCE WITH THE TREATMENT TECHNIQUE REQUIREMENT

The treatment technique establishes "no-action" levels and is designed to ensure that corrosion of lead plumbing materials by water is controlled so that lead concentrations in drinking water are minimized at consumers' taps.

#### Sampling Requirements

Under the proposed regulations, water systems will sample drinking water from targeted residences to determine compliance with the "no-action" levels. Systems would collect 10 samples during the first year of sampling and repeat the process every five years. *Systems serving fewer than 500 people must complete the first round of monitoring within 42 months after release of the final regulations*

Samples will be morning first draw or other 8 to 18 hour standing samples. Samples will be one liter in volume and collected at the cold water kitchen taps of targeted residences. Systems with lead service connections will be required to take half of their water samples as morning first draw samples and half as service line samples (i.e., samples of water that have stood for 8 to 18 hours in the service connection). In general, targeted residences will be single-family houses. Systems may include multiple-family housing such as apartments if more than 20 percent of the homes served by the system fall in this category.

EPA proposes that samples be taken from houses determined to be at high risk for lead or copper problems including:

- Residences at the ends of the distribution system (i.e., dead-ends or areas of low or no flow); and either
- Residences that have lead solder that is less than five years old in their plumbing systems; or
- Residences with lead service connections and/or lead interior plumbing.

Half of the samples collected must be from each of these latter two categories.

#### Sampling Analysis

Water suppliers will then be required to analyze the samples for lead, copper, and pH. The proposed regulation requires that the following "no-action" levels be met:

- 1) Lead average level less than or equal to 0.010 mg/l;
- 2) No more than 5% of the samples contain greater than 1.3 mg/l of copper; and
- 3) No more than 5% of the samples have pH less than 8.0.

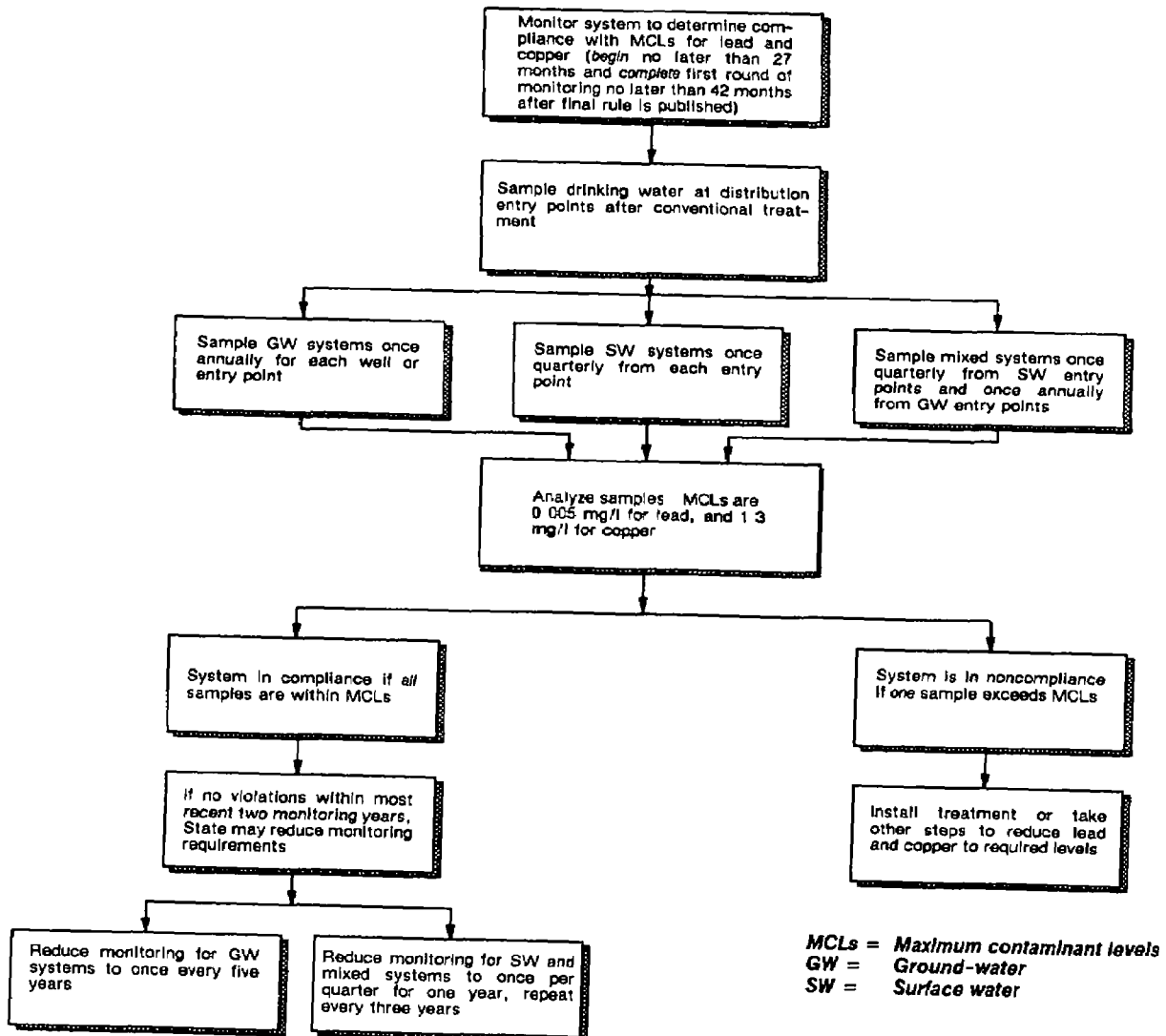
If the "no-action" levels are not met, the proposed regulation requires that public water suppliers install or improve their corrosion control treatment for lead and copper. If the average level for lead exceeds 0.010 mg/l, or more than 5% of the lead samples exceed 0.020 mg/l, water suppliers will be required to implement a public education program to inform its customers of the health risks associated with lead in drinking water.

The average annual cost of monitoring for "no-action" levels is about \$55.50 for a system serving fewer than 500 people.\*

\*Costs were derived from data on page VI-45 of previously cited source

Exhibit 1

# MCLs Requirements for Water Systems Serving Fewer than 500 People



## TREATMENT REQUIREMENTS FOR SYSTEMS THAT EXCEED "NO-ACTION" LEVELS

If any of the "no-action" levels are exceeded, systems will be required to apply to the State for a treatment plan within one year after the close of the initial monitoring period. Public water systems may also propose a treatment plan to the State and request approval. The State will either specify a required corrosion control treatment plan or approve the public water system's treatment plan. The treatment plan will also contain a schedule for implementing the following steps:

- 1) Installing and operating the corrosion control treatment required by the State;
- 2) Monitoring to determine efficacy of the treatment as installed;
- 3) Adjusting the treatment as necessary to minimize lead levels;

4) If "no-action" levels continue to be exceeded after installation of treatment, demonstrating that treatment is optimal and lead levels are minimized for the system; and

5) Conducting a public education program, if necessary.

EPA recommends that systems serving fewer than 500 people consider installing treatment systems such as a soda ash feed or a limestone bed contactor to adjust pH and alkalinity if "no-action" levels are not met. See Exhibit 2 for an outline of the proposed requirements for compliance with "no-action" levels in systems serving fewer than 500 people.

EPA estimates the average annual costs of complying with the "no-action" levels treatment requirements to be \$1,700 for a system serving fewer than 500 people.\*

\*Costs were derived from data on pages VI-30, 31, 55, and 69 of previously cited source

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## **PUBLIC EDUCATION REQUIREMENT FOR SYSTEMS THAT EXCEED THE LEAD "NO-ACTION" LEVELS**

Under the proposed rule, EPA requires public water suppliers that exceed "no-action" levels for lead to conduct intensive public education programs to inform their customers of the health risks associated with lead in drinking water. Water suppliers will be required to undertake a public education program encouraging consumers to reduce their exposures to lead in drinking water if:

- 1) The lead level exceeds 0.020 mg/l (measured as the 95th percentile of samples taken); and
- 2) The lead average level exceeds 0.010 mg/l.

EPA recognizes that most of the lead and copper found in drinking water at the tap is added by plumbing after the water leaves the treatment plant. For this reason, individual actions on the part of the public are essential for reducing exposures to lead in drinking water.

Water suppliers exceeding one of the "no-action" levels for lead will be required to design a public education program to meet two performance standards, one regarding program content and a second regarding program delivery. An effective public education program for lead in drinking water will include information about:

- (1) the health reasons for concern about lead exposure, including identification of sensitive subpopulations;
- (2) sources of lead exposure, including non-drinking water sources; and
- (3) measures that can be taken to reduce lead exposure from drinking water.

*Detailed standards for required public education programs are outlined in the proposed rule*

EPA is currently conducting a community-based pilot study to develop and evaluate alternative public education approaches that effectively address the problems associated with lead in drinking water. In cooperation with the pilot community, the Agency will conduct public outreach efforts and develop information materials to assist public water suppliers and other community interests in designing and implementing effective public education programs in their community.

## **EPA INVITES PUBLIC COMMENT ON THE PROPOSED RULE**

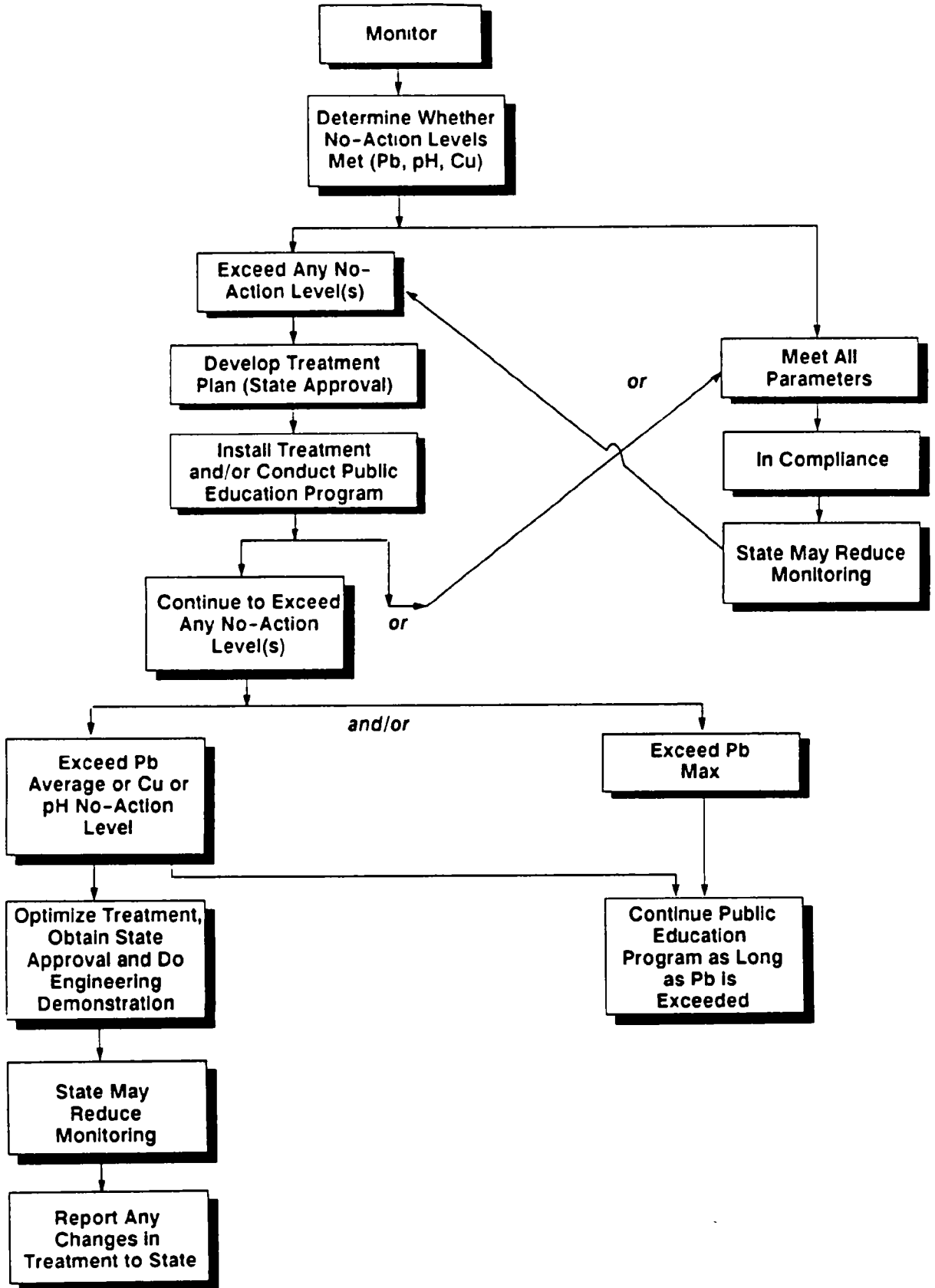
EPA will also accept public comment on a variety of alternative approaches to this proposed regulation. The major alternatives are:

- Requiring corrosion control treatment if 95 percent of lead samples are not below 0.020 mg/l, in addition to the average lead level, copper level, and pH "no-action" levels;
- Adding lead service line replacement as part of the treatment techniques requirement to reduce lead levels. Under this alternative, systems would be required to remove service lines that contribute a significant amount of lead to tap water;
- Setting up an alternative two-tiered monitoring plan to improve the accuracy of the sampling program and, in some cases, reduce the total number of samples required. Under this alternative, systems serving fewer than 500 people would take 10 samples as Stage 1 of the two-tiered process. If no samples exceed the maximum "no-action" level, the system would be excused from further sampling during that monitoring period. If more than one sample exceeds the "no-action" level, the system would be required to collect five more samples as Stage 2 of the process. If more than one sample collected from Stages 1 and 2, combined, exceeds the "no-action" level, the system would have to undertake corrosion control treatment;
- Deleting pH "no-action" levels;
- Adding an additional "no-action" level for total alkalinity of 30 mg/l to trigger corrosion control treatment; and
- Deleting MCLs for distribution water leaving the treatment plant. Removal of lead from distributed water would be added as part of the required treatment technique requirement.

Individuals wishing to comment on the proposed rule should do so in writing by October 17, 1988. Send comments to:

Lead and Copper Comment Clerk  
Office of Drinking Water (WH-550)  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460

*Figure 2*  
**Treatment Technique Requirement**



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## FOR MORE INFORMATION

Individuals with questions on how to comply with drinking water regulations for lead and copper should contact their State Environmental or Health Departments. Information may also be obtained from the EPA Safe Drinking Water Hotline. The toll-free number is (800) 426-4791 and the Washington, D.C. number is (202) 382-5533. The hotline is open from 8:30 a.m. to 4:00 p.m. EDT.