ALASKA LEGISLATURE COMMITTEE FILES 1987-1988 8672
5416 SLAB SB 487 - SB 498

988

(c) The Department of Commerce and Economic Development and the Department of Labor are responsible for the issuance of books containing appropriate citations, and each shall maintain a record of each book issued and each citation contained in it. Each department shall require and retain a receipt for every book issued to an employee of that department.

(d) The department that issues a citation under AS 08.40.340 shall deposit the original or a copy of the citation with a court having jurisdiction over the alleged offense. Upon its deposit with the court, the citation may be disposed of only by trial in the court or other official action taken by the magistrate, judge, or prosecutor. The department that issued the citation may not dispose of it or copies of it or of the record of its issuance except as required under this subsection and (e) of this section.

(e) The Department of Commerce and Economic Development and the Department of Labor shall require the return of a copy of every citation issued by the respective department under AS 08.40.340 and of all copies of every citation that has been spoiled or upon which an entry has been made and not issued to an alleged violator. The departments shall also maintain, in connection with every citation issued by the respective department, a record of the disposition of the charge by the court where the original or copy of the citation was deposited.

(f) If the form of citation issued under AS 08.40.340 includes the essential facts constituting the offense charged, and if the citation is sworn to as required under the laws of this state for a complaint charging commission of the offense alleged in the citation, then the citation when filed with a court having jurisdiction is considered to be a lawful complaint for the purpose of prosecution.

Sec. 08.40.360. CEASE AND DESIST ORDER. (a) If the

commissioner of commerce and economic development determines that a person is acting as a mechanical administrator in violation of AS 08.40.210 - 08.40.490 the commissioner may issue a cease and desist order prohibiting further action by the person as a mechanical administrator. The cease and desist order remains in effect until the person has submitted evidence acceptable to the commissioner showing that the violation has been corrected.

(b) A person affected by an order issued under (a) of this section may seek equitable relief preventing the commissioner of commerce and economic development from enforcing the order.

Sec. 08.40.370. INJUNCTIVE RELIEF. The commissioner of commerce and economic development may seek an injunction in the superior court to enjoin a person from violating AS 08.40.210 - 08.40.490.

Sec. 08.40.380. PENALTIES. (a) A person who knowingly violates AS 08.40.210 - 08.40.490, or who knowingly violates a valid rule, regulation, or order of the board or the department, is guilty of a misdemeanor, and upon conviction is punishable by a fine of not more than $300, or by imprisonment for not more than 60 days, or by both.

(b) Unless the citation has been voided or otherwise dismissed by the magistrate, judge, or prosecutor, a person who without lawful justification or excuse fails to appear in court to answer a citation issued under AS 08.40.340, regardless of the disposition of the charge for which the citation was issued, is guilty of a class B misdemeanor.

Sec. 08.40.390. EXCLUSIONS. (a) AS 08.40.210 - 08.40.490 do not apply to a utility or municipality engaged in

(1) mechanical construction and maintenance of mechanical systems and equipment for the generation and distribution of electrical current or generation and distribution of district heating when the mechanical work is performed on an integral part of a system owned

and operated by that utility or municipal light and power department and when the work is performed by employees of the utility or municipality;

(2) mechanical construction and maintenance of mechanical systems and equipment for the distribution of fuel gas when the mechanical work is performed on an integral part of the distribution system owned and operated by the utility or municipality and when the work is performed by employees of the utility or municipality.

(b) AS 08.40.210 - 08.40.490 do not apply to a person engaged in

(1) the manufacture or repair of mechanical apparatus or equipment;

(2) mechanical work, the cost of which does not exceed $5,000, involving residences or small commercial establishments in communities that

(A) have a population of under 500; or

(B) are over 50 miles by air or water transportation from the business place of a mechanical administrator licensed under AS 08.40.210 - 08.40.490;

(3) mechanical installation on a single family residence that is owned by the installer or a member of the installer's immediate family and not intended for sale at the time of making the installation;

(4) installation outside of a building of water lines or sanitary, storm, or drain sewer lines.

Sec. 08.40.400. PERSONAL SUPERVISION. A person licensed under AS 08.40.210 - 08.40.490 as a mechanical administrator who contracts to install or modify mechanical piping and systems, devices, fixtures, equipment, or other mechanical materials, shall personally inspect those materials after installation and modification unless the

installation or modification amounts to simple or highly standardized work performed in less than 24 man-hours by personnel generally under the supervision of the mechanical administrator.

Sec. 08.40.490. DEFINITIONS. In AS 08.40.210 - 08.40.490

(1) "department" means the Department of Commerce and Economic Development except where the context otherwise requires;

(2) "manufacture" means fabrication or completion of a product or mechanical apparatus exclusive of its completion or installation at a job site;

(3) "mechanical administrator" means a person engaged in the business of, or purporting to be engaged in the business of, installing or modifying, or contracting to install or modify, mechanical piping and systems, devices, fixtures, equipment, or other mechanical materials subject to the Uniform Plumbing Code, Uniform Swimming Pool, Spa, and Hot Tub Code, Uniform Solar Energy Code, and the Uniform Mechanical Code as published by the International Association of Plumbing and Mechanical Officials and the International Conference of Building Officials;

(4) "mechanical piping" includes piping fixtures, devices, and equipment;

(5) "utility" means every public, cooperative, or other corporation, company, individual, or association of individuals, their lessees, trustees, or receivers appointed by a court, that owns, operates, manages, or controls a plant or system for

(A) furnishing, by generation, transmission, or distribution, electrical service, fuel gas service, district heating, sewage disposal, or domestic water service to the public for compensation;

(B) furnishing telecommunications service to the

public for compensation.

* Sec. 11. INITIAL APPOINTMENTS TO THE BOARD. A person is eligible for an initial appointment to the Board of Mechanical Examiners, created under sec. 10 of this Act, as a professional member of the board, if at the time of the appointment the person

(1) understands plans, design specifications, and engineering terms commonly used in mechanical installations and piping;

(2) is familiar with mechanical installations and piping and with mechanical installation problems peculiar to this state; and

(3) is familiar with the requirements of the Uniform Plumbing Code, Uniform Swimming Pool, Spa, and Hot Tub Code, Uniform Solar Energy Code, and Uniform Mechanical Code that are currently in effect in the state.

* Sec. 12. Sections 1, 2, 6, 8, 10, and 11 of this Act take effect immediately under AS 01.10.070(c).

* Sec. 13. Sections 3 - 5, 7, and 9 of this Act take effect August 31, 1989.

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to mechanical administrators and mechanical contracting; and providing an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*Section 5. AS 08.18.026 is amended to read:

Sec. 08.18.026. ELECTRICAL AND MECHANICAL CONTRACTORS. (a) The department may not issue a certificate of registration as an electrical or mechanical contractor to an applicant unless the applicant is, or employs, as applicable, a person currently licensed as an electrical or mechanical administrator under AS 08.40.

(b) Each applicant for an electrical or mechanical contractor's certificate of registration may employ more than one electrical or mechanical administrator.

(c) If the [RELATIONSHIP OF THE] only electrical administrator employed by [WITH] a registered electrical contractor is terminated, or if the only mechanical administrator employed by a registered mechanical contractor is terminated, the electrical contractor's or mechanical contractor's certificate of registration, as applicable, is void 30 days after the next regularly scheduled electrical or mechanical administrator examination unless the electrical or mechanical contractor has hired a licensed electrical or mechanical administrator in the interim.

*Sec. 6. AS 08.18.071(b) is amended to read:

(b) If the applicant is a general contractor, the amount of the bond shall be $10,000; if the applicant is a mechanical contractor, the amount of the bond shall be $7,500; if the applicant is a specialty contractor the amount of the bond shall be $5,000. In lieu of the surety bond, the applicant may file with the commissioner a cash deposit or other negotiable security acceptable to the commissioner in the amount specified for bonds.

the capacity to perform, or submits a bid for a project to construct, alter, repair, move or demolish a building, highway, road, railroad, or any type of fixed structure, including excavation and site development and erection of scaffolding, and includes the terms "general contractor," "builder," mechanical contractor," "specialty contractor," and "subcontractor"; a "general contractor" is a contractor whose business operations require the use of more than three [TWO] distinct trades, specialty or mechanical contractors, or other subcontractors whose work the general contractor superintends; the terms "general contractor" and "builder" are synonymous; a "mechanical contractor" is a contractor whose operations involve the plumbing and pipe fitting, sheet metal, heating, air conditioning or ventilating trades in order to install or modify mechanical piping and systems, devices, fixtures, and equipment or other mechanical materials subject to the Uniform Plumbing Code, Uniform Swimming Pool, Spa, and Hot Tub Code, Uniform Solar Energy Code, and the Uniform Mechanical Code, as published by the International Association of Plumbing and Mechanical Officials and the International Conference of Building Officials; a "specialty contractor" is a contractor whose operations require the use of three or less trades and do not fall within the definition of "general contractor."

*Sec. 8. This act takes effect immediately.

SB

492

5-2054X
Bannister
4/30/88

Original sponsor: Health, Education and Social Services

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

CS FOR SENATE BILL NO. 492 (L&C)

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to the practice of naturopathy."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 08.45.030 is amended to read:

Sec. 08.45.030. ISSUANCE OF LICENSE. The division shall issue a license to practice naturopathy to an applicant who provides proof satisfactory to the division that the applicant has [RECEIVED]

(1) received a degree from an accredited four-year college or university;

(2) received a degree from a school of naturopathy that required four years of attendance at the school; and

(3) a license to practice naturopathy in a state that required an examination for the license, and has passed the Naturopathic Physicians Licensing Examination sponsored by the American Association of Naturopathic Physicians and administered by the state where the exam was taken.

* Sec. 2. AS 08.45.030 is amended by adding a new subsection to read:

(b) For an applicant who has completed the applicant's naturopathic studies after December 31, 1987, the division shall issue a license to practice naturopathy to the applicant if the applicant provides proof satisfactory to the division that the applicant has

(1) satisfied the requirements of (a)(1) - (3) of this section;

(2) graduated from a naturopathic school that is accredited or that is a candidate for accreditation by the Council on

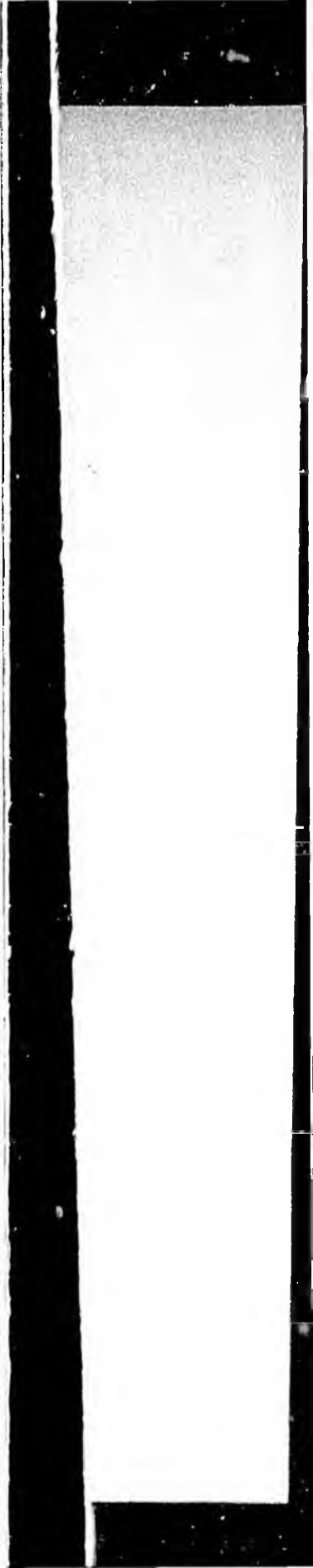
Naturopathic Medical Education or a successor organization recognized by the United State Department of Education; and

(3) been certified by the American College of Naturopathic Obstetricians as having performed 40 or more deliveries, if childbirth is to be a part of the person's practice.

* Sec. 3. AS 08.45.200(3) is amended to read:

(3) "naturopathy" means the use of hydrotherapy, dietetics, electrotherapy, sanitation, suggestion, mechanical and manual manipulation for the stimulation of physiological and psychological action to establish a normal condition of mind and body; in this paragraph, "dietetics" includes herbal and homeopathic remedies.

* Sec. 4. AS 08.45.030, as amended by secs. 1 - 2 of this Act, does not apply to a person who applies before the effective date of this Act for a license to practice naturopathy in the state.



SB

498

STATE OF ALASKA
1988 LEGISLATIVE SESSION

BILL VERSION: SB 498
PUBLISH DATE: 3/31/88

FISCAL NOTE

REQUEST:

Revision Date:
Title: An act relating to lead in public water systems and certain installations ...
Sponsor: Sen. Labor & Commerce
Requestor: Sen. Labor & Commerce

Agency Affected: DEC
BRU: Environmental Quality
Components: Water Quality Management

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL						

POSITIONS: None

FULL-TIME						
PART-TIME						
TEMPORARY						

ANALYSIS: (Attach a separate page if necessary)

Funding for the lead notice provisions of this bill (Section 3) has been included in the proposed budget for DEC.

Prepared by: Amy D. Kyle
Phone: 465-2600
Division: Commissioner's Office
Date: 4/8/88

Approved by Commissioner:
Date: 4/11/88
Agency: DEC

Distribution (by preparer):
Legislative Finance
Legislative Sponsor
Requestor
Office of Management and Budget
Impacted Agency(ies)

POSITION PAPER
SB 498

Title

An act relating to lead in public water systems and in certain plumbing installations and repairs; and providing for an effective date

Effect of the Bill

The bill would amend Department of Labor statutes to ban the use of lead solders and fluxes in installation of new water systems and repair of existing water systems. The bill would also require public water systems to notify their customers of whether their water system is susceptible to leaching of lead from solders and fluxes and the potential health impacts from consumption of lead.

Department position

The Department supports the bill. The bill would implement key provisions of the federal Safe Drinking Water Act Amendments, passed in 1986.

Use of lead solder in drinking water systems is a leading cause of elevated lead levels in drinking water.

Lead has extremely adverse effects on persons exposed to it. These effects range from acute swelling of the brain and seizures at high blood levels to symptoms such as fatigue, loss of appetite, or abdominal pain at low levels. Lead is known to damage the digestive system, reproductive system, gastro-intestinal system, and kidneys. It also interferes with the blood-forming process and exposure has been related to increased miscarriages. Lead accumulates in the human body and has no beneficial uses in the body. Young children and fetuses are at highest risk because they absorb a higher percentage of the lead to which they are exposed than adults do.

Individuals who are exposed to lead in water have been shown to have increases in blood lead levels. Lead solder in plumbing has been identified as the most significant source of lead in drinking water. Lead in raw water is rare.

In Alaska, high lead levels have been found in drinking water systems in St. Michaels, Gambell, Shishmaref, Point Hope, Point Lay, Barrow, Nuiqsut, Atquasak, Wainwright, Fairbanks, Birch Creek and Mekoryuk due to corrosive water in contact with lead

solder. The problem could be expected in most water systems using surface water and in some systems using ground water. No comprehensive testing for lead in distribution systems has been done. The North Slope Borough has imposed a ban on the use of lead solders and fluxes.

The federal Safe Drinking Water Act was amended in June, 1986 to include a new section 1417 titled "Prohibition on Use of Lead Pipes, Solder, and Flux." This section bans the use of solder and flux containing greater than 0.2% lead and pipes and pipe fittings containing more than 8.0% lead. The act requires that states with primacy in the drinking water program implement this requirement. In Alaska, the Department of Environmental Conservation has primacy for the drinking water program.

The most effective way to ban use of lead fluxes and solders is to do so in conjunction with laws and regulations that govern plumbing. Under Alaska law, this requires an amendment to Title 18, the statute pertaining to the Department of Labor. Both the Department of Environmental Conservation and the Department of Labor support this change.

Alternative tin solders are available and are preferable to lead solders in terms of strength. Material unit cost is slightly higher, but less solder is used so that overall cost is equivalent. Initial education will be needed to help industry address the change of requirements.

Dennis D. Kelso, Commissioner
Department of Environmental Conservation

POSITION PAPER
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Dennis D. Kelso, Commissioner
Department of Environmental Conservation

DEPARTMENT OF SOCIAL & HEALTH SERVICES
DIVISION OF HEALTH

TOXIC SUBSTANCES FACT SHEET

LEAD IN DRINKING WATER

State of Washington DATE: August 1987

GENERAL INFORMATION ABOUT LEAD

Everyone has some exposure to lead. Lead from automobile exhaust and industry are the major sources for contamination of air, water and soil. People who live in cities are exposed to more lead than those who live in rural areas. Lead enters the body through breathing (inhalation) or eating (ingestion).

Lead poisoning can cause a variety of symptoms such as loss of appetite, fatigue, crankiness and anemia (low blood count). Because these symptoms can resemble the flu - lead poisoning can sometimes be unrecognized. The early symptoms of lead poisoning are reversible and complete recovery is possible. However, if lead poisoning progresses - symptoms become more severe and permanent damage may occur to the blood, nervous system, kidneys, brain and sex organs. A person can be tested for lead poisoning by having a blood sample taken for a blood lead level.

Lead poisoning is especially dangerous for young children and the unborn babies of pregnant women.

In Washington State, no cases of elevated blood lead levels or lead poisoning have been linked with lead in drinking water. Cases which have occurred have been associated with: pottery contaminated with lead; certain occupations which have high lead exposure; children who eat dirt contaminated with lead from highly industrialized areas near freeways and busy streets; or children exposed to lead dust brought into the home on their parents' work clothes.

LEAD IN DRINKING WATER

Studies have been done to analyze drinking water for lead. These studies show that for public water systems the lead content of the water delivered to the homeowner is higher at the faucet in the home than the lead content where the water originates. This indicates that the lead is "picked up" in the household plumbing system. This is most likely to occur when there is water low in mineral content (soft water) or the water is acidic. These conditions can cause lead to leach from lead pipes or lead soldering materials into the drinking water.

Even though adults and children are exposed to some lead through drinking water - the major source of lead comes from food. In fact it appears that the average lead intake from drinking water is about 1/10 of that obtained from an ordinary diet.

Fairbanks Daily News Miner May 1987

VOL. LXXXV, NO. 121

College Utilities takes 'lead' aim

By SUSAN FISHER
Staff Writer

In a rare move, a private utility company is taking an aggressive posture in meeting a federal mandate that isn't required until next year on the serious subject of lead in water.

College Utilities Corporation last month t .d 14 places tested for lead in water, and six of them had higher than federally safe levels. But the lead isn't due to College Utilities' water supply, which tests substantially lower than required.

Lead-based solder appears to be the major culprit, particularly in newer structures. However, CUC's water is corrosive, a quality that helps water pick up lead and other metals within plumbing systems.

Not only did the company pay for the testing itself, but College Utilities Friday sent informational letters to all its customers, began a three-week advertising campaign [illegible] its president/general manager [illegible] officials to apprise them of the situation. CUC [illegible] offered its results to the Alaska Department of Environmental Conservation.

People can learn more about this issue during National Drinking Water Week this next week. CUC is having an open house Friday.

(See LEAD, page 2)

GEORGE GORDON
Spreading the word

(Continued from page 1)

Under the Federal Safe Drinking Water Act of 1986, new language in 1988 will require public water suppliers to inform customers of lead hazards even if the lead is not coming from the main water supply.

Water at Gordon's home, four public schools, and at professional offices and homes were sampled and tested.

The first sample at all 14 showed a higher lead content than CUC's supplied water. Six of those places exceeded the federal safe limit. Then, after a three-minute flushing, a second sample was taken. All 14 were within the federal limit, Gordon said.

Currently the federal standard on lead is .05 parts per million, but that will change next year to .02. The utility, which draws underground water through wells and treats it, tested at .002 parts per million.

Of the four schools—Woodriver and University Park elementary schools, West Valley High School and Hutchison Career Center—only Woodriver's initial sample exceeded the federal limit, Gordon said.

Lead can be a serious health hazard, particularly to children. Studies link lead to hyperactivity, decreased intelligence and learning disabilities in youngsters. High blood pressure and cardiovascular problems also are linked with lead.

The federal law prohibits public water suppliers from using lead pipes and lead-based solder, and eventually building codes will prohibit lead-based solder as well. That's the solution for new construction, but what about existing buildings?

Ideally buildings should be replumbed if there's a serious problem, Gordon said, but that's costly and not practical.

Flushing, or letting the tap run, is the easier answer.

"Before they consume water from the tap, first thing in the morning they should run the water for two or three minutes until it's cold, which will insure they're getting water directly from our distribution system," said Gordon. Water sitting for a long period in the line is more likely to have a higher lead content. Letting the water run helps purge it from the lines.

What people should not do is drink hot water from the tap, even indirectly, he said. This is water most likely to have the lead content.

College Utilities hired Northern Testing Laboratories in Fairbanks to do the testing. Mike Pollen, president of that company, said testing water corrosiveness is a common test, particularly for utilities. It's called the Langelier Index, and it tests pH, alkilinity, chemical composition, hardness, temperature and total dissolved solids. Homeowners pay about $55 for the test.

A zero means the water is neither scaling or corroding, said Pollen. Water that tests positive on the index is protective, it builds a film on the inside walls of pipes. A negative on the index indicates corrosive water. There is no protective film and corrosive water picks up virtually any metal in the pipes.

"It kind of caught us by surprise that George (Gordon) brought these results in," said Stan Justice, environmental engineer with the ADEC. "Since then I've been calling around to the other major utilities to see what kind of corrosion control program they have."

"I was pleasantly surprised that all the utilities are doing something," Justice said.

Water suppliers in the area include the military, the University of Alaska, Fairbanks Municipal Utilities System, the City of North Pole, and another private company, Valley Water Co.

The ADEC next year will enforce the lead ban and public notification requirements under the federal law. Justice credited College Utilities for its effort. "They have taken some initiative here to address this issue before the reg[illegible] actually come into play," he said.

640.07.01

BSSD will replace pipes

by CAT STEPHENSON

A recent discussion with Bob Collins, director of the Bering Straits School District, revealed the district's plans to renovate the St. Michael elementary school's water system which is currently sloughing off particles of lead into the water at levels higher than what the Department of Environmental Conservation deems safe. District officials are waiting until the summer to replace about two-thirds mile of copper water pipes which are soldered together with lead and to rebuild the wooden utilidor which houses the water and sewage pipes and electrical lines.

The lead-soldered water system was installed by the Bureau of Indian Affairs which built the school. Bob Collins moved to St. Michael in 1977 to teach at the BIA school and was appointed as its principal the following year. He recalled that the lead content was discovered during his last years at the school and that the BIA added soda ash to the water to slow the erosion process. When put in hard water the soda ash will form a hard coat on the inside of the water pipes but the water in St. Michael is soft, reducing the effectiveness of the preventative measure.

"We were told by the BIA in Nome that the soda ash theory prevented the water eroding of the lead," Collins said.

The school was transferred to the Rural Education Attendence Area's Bering Straits School District last summer. Collins said the district must wait until next summer to remedy the problem in full. The lead-soldered copper tubing goes all the way up the building walls to the water taps so they must wait for the warm weather before tearing the walls out. The copper pipes will be replaced with about 3,000 feet of new tubing which will be joined with silver solder. He could not estimate the cost for the two work crews to be sent there or the pipes, solder, and new utilidor housing.

"What we've done now is shut off the water supply to all drinking and tap water," he said. "The toilets are connected to a salt water flush system. We are carrying drinking and cooking water from holding tanks to coolers in the classrooms."

One piece of construction is underway at this time. Silver-soldering piping is being installed from the school's holding tank to the kitchen for the convenience of the cook who must prepare meals for the 75 students and staff members daily.

by Stan Justice

Lead in Alaskan Village Water Systems

St. Michael, 1975. (Photo by J.M. Antonson; courtesy of the Alaska Division of Parks, Office of History and Archeology.)

High lead concentrations have been discovered in the water systems of the four remote villages of St. Michael, Birch Creek, Gambell and Shishmaref. This paper covers preliminary findings by the state, federal, and local agencies involved, for the purpose of alerting engineers to the problems and how they may best be avoided.

The problem was discovered during a sampling program to assess water quality in rural Alaska, conducted jointly by the State Village Safe Water Program, the Alaska Department of Environmental Conservation (DEC), and the Federal Public Health Service (PHS). Under this program water samples are collected by the PHS sanitarians and mailed to the DEC lab in Douglas. The lab analyzes the samples for 11 toxic elements (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, sodium, fluoride, and nitrate) and the 13 aesthetic and operational parameters, including iron, manganese, calcium, magnesium, potassium, chloride, sulfate, carbonate alkalinity, total filterable residue, pH, turbidity, color and conductivity. The results are then distributed to the agencies involved in water programs.

ST. MICHAEL

St. Michael is a village of 206 Eskimo people on the south shore of Norton Sound, 125 miles southeast of Nome. The situation there best illustrates the problem, so this paper covers it in some detail. On July 20, 1979, Ray Van Ostran, PHS sanitarian, collected two samples in St. Michael. The raw water sample showed no lead, but the sample collected from

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Stan Justice *is an environmental engineer who worked for the Alaska Department of Environmental Conservation for the past year, directing the regional drinking water program. He has an M.S. from the University of Alaska and spent two years as a Peace Corps volunteer constructing water systems in Nepal.*

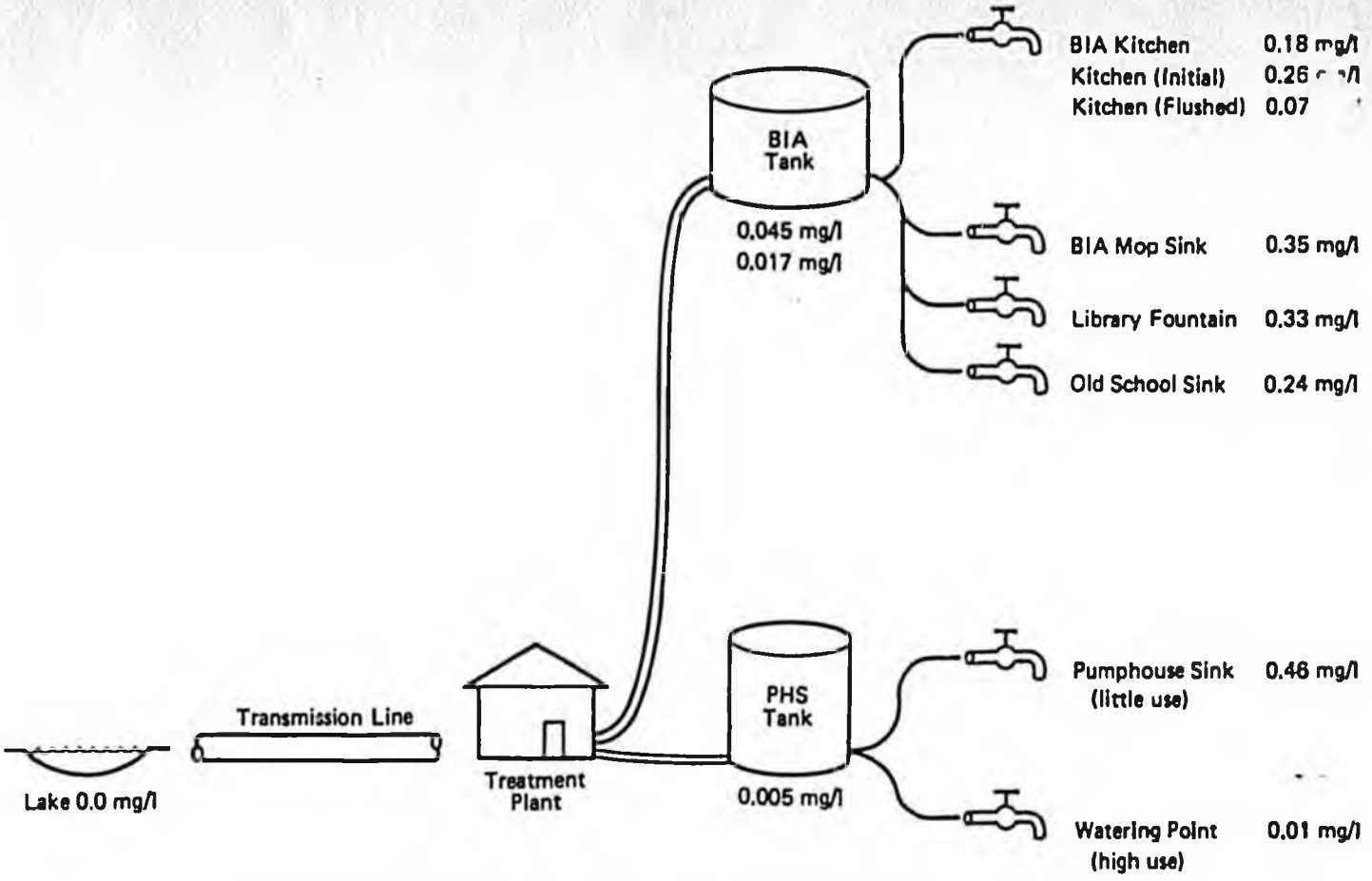

Figure 1. St. Michael water system showing locations of water samples and lead values.

the Bureau of Indian Affairs school showed 0.18 mg/l, over three times the 0.05 mg/l limit set by the Environmental Protection Agency.

The water source consists of a shallow lake located 3½ miles from town across wet tundra. Attempts have been made to locate a ground water source for the village, but to date all test wells have produced salt water. The water transmission line is four-inch diameter portable aluminum irrigation pipe. The line is assembled twice a year and gasoline-powered pumps are used to supply the water treatment plant. The treatment scheme consists of pressure sand filtration, HTH (the trade name for calcium hypochlorite) chlorination and fluoridation. The treated water is stored in the 100,000 gallon PHS wood stave tank adjacent to the plant and a 150,000 gallon steel tank at the BIA school. The PHS distribution system consists of a watering point and a sink in the pumphouse. The watering point is the primary source of water for the village. The BIA tank provides water to the school at various taps, water fountains, lavatories and the kitchen. Both distribution systems are constructed primarily of copper pipe joined by soldered joints. Water is heated by oil-fired boilers via heat exchangers and circulated by pumps.

Additional samples were collected on various dates and locations to determine the source of the lead (Fig. 1). The raw water contained no lead, so we knew the lake was not the source. Lead contents in the samples from the storage tanks were low also, which eliminated tank coatings and the treatment process as the lead source. All the high lead samples were from various points in the distribution system. The lead concentration was highest in the water taps with low use, such as the drinking fountains. We also noted a drop in lead concentration between the initial water from the kitchen tap and a sample taken after flushing the tap for five minutes. All this indicated a possible corrosion problem in the distribution system. Investigation established that the pipes had been joined with solder containing 50% lead, a standard construction technique, and inspection of some open pipes revealed a splattering of solder on the inside of the pipe.

Water Pipe Corrosion

Several indices are available for quantifying the tendency of water to corrode pipe materials, but one of the easiest to use is the Aggressive Index (AI).[1,2,3] The formula for calculating the AI is

$$AI = pH + \log (Ca \times Alk)$$

where Ca is the calcium concentration expressed as mg/l $CaCO_3$ and Alk is the alkalinity also expressed as mg/l $CaCO_3$. The scale below is used to interpret the figures:

$AI < 10$	highly aggressive
$10 < AI < 12$	moderately aggressive
$AI > 12$	not aggressive

Tests of the St. Michael raw water showed AIs from 6.9 to 8.5, well within the highly aggressive range. This indicates that the source water is derived from rain and snow melt which has not contacted earth minerals.

Corrosion in a lead-copper-water system is similar to a galvanic battery. The copper acts as the cathode, lead the anode and water the medium for transporting the charged particles. Lead in this system is a sacrificial anode, releasing lead ions into solution. This will not occur with hard, non-aggressive waters due to the layer of calcium carbonate which builds up on the pipe walls.[3]

Literature indicates that high lead historically has been a problem in soft water areas of the 'lower 48' (Boston), Scotland and northern England. In some areas water is distributed in lead pipes and even stored in lead-lined cisterns. Other instances have been documented in which copper pipes joined with lead solder have raised lead concentrations in soft water.[4,5]

Several factors contribute to the acuteness of the problem in rural Alaska.

1) Soft surface water sources are often the only ones available due to the presence of permafrost or of saline aquifers.
2) Water use is low, so contaminant concentrations build up instead of being flushed away.
3) To prevent pipe freezing the water is usually heated and pumped through circulation loops. Heat and higher water velocity contribute to corrosion.[3]

BIRCH CREEK

Birch Creek is a small Athabascan village south of Fort Yukon, where the PHS has recently completed a new water system similar to that at St. Michael. The water source is Birch Creek, which has an AI of 10.3 to 11.6, or moderately aggressive. Again, the only lead found was in the distribution system, with the river source, water tank, added chemicals and even surrounding soils showing little lead. Literature indicates that new water systems have lead values higher than do ones five years old; since the Birch Creek system was completed recently, lead values may decrease as the system ages.

OTHER VILLAGES

Gambell and Shishmaref have only recently been sampled, so little data are available. Check samples are being collected to determine the extent of the problem in those villages.

HEALTH IMPLICATIONS

Lead poisoning is a disease long recognized for its ability to cause weakness, depression, constipation, anemia and paralysis.[5,6] Young children are particularly susceptible.[7] For this reason the lead limit in drinking water has been set at 0.05 milligrams per liter by the Federal Environmental Protection Agency.[5]

Health aspects of the investigation have been conducted by the state epidemiologist, Dr. John Middaugh. He collected blood samples from the residents of Birch Creek and tested for erythrocyte protoporphyrin (EP), an enzyme which changes rapidly with increase in lead consumption. EP is used to indicate potential health problems prior to the onset of serious symptoms.[7] All samples were well within acceptable limits, with the highest value being from Dr. Middaugh himself. The blood test results are inconclusive tests of the health hazard from the water system, because many of the people have reverted to drinking river water because of the lead reports. Further blood tests will be done to determine if the high lead concentrations are affecting human health.

SOLUTIONS

The solution to the lead problem is relatively easy for future installations. In planning for new facilities, water samples are commonly collected from possible sources to determine potability and palatability. It is a simple matter to check the Aggressive Index as well. When corrosive waters can not be avoided, pipe and fitting materials can be selected to prevent contamination. For example, copper pipe with threaded joints or corrosion-resistant plastic pipe could be used.

For existing facilities it is usually not economically feasible to replace all the piping. Other possible solutions include:

1) Install a second distribution system made of corrosion-resistant materials and sized to serve only the drinking water needs.
2) Install chemical addition equipment for adding lime, sodium hydroxide, phosphates, or other corrosion inhibitors. (The problem with this is that corrosion control requires careful analytical control, control which may be difficult to obtain in remote villages.)
3) An alternate source of water could be developed to avoid extremely soft surface waters.

CONCLUSIONS

We know that lead limits are being exceeded in some village water systems. No high lead values have been noted in non-soft water areas. We are fairly certain that soft corrosive waters are attacking the lead solder at the copper sweat joints. Investigations are continuing to determine the extent of the problem and the effects on human health, and solutions are being tried to mitigate the problem.

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WATER ANALYSIS AND EVALUATION FOR COMMUNITIES OF THE NORTH SLOPE BOROUGH

NOVEMBER 1983

FOR
PACIFIC MANAGEMENT & ENGINEERING CORPORATION
ANCHORAGE, ALASKA

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EXECUTIVE SUMMARY

Lead was present above background levels in the water systems of all communities visited except Atqasuk and Anaktuvuk Pass; selected samples in Point Lay, Nuiqsut, and Barrow indicated lead contamination in excess of permissible limits established by the EPA and ADEC. With the exception of water from a relatively deep well at Anaktuvuk Pass, all communities had water supplies that were moderately to highly aggressive (corrosive). Solder samples collected from the water systems in each community indicated lead contents in excess of 50 percent. Less than one-fifth of the solder samples collected indicated lead content of less than 10 percent. The use of copper piping with soldered joints was the standard material of construction for the water systems observed during the survey.

An acute health hazard requiring emergency corrective actions is not deemed to exist; however, recommendations are provided to minimize the potential for health impact until permanent control of water quality can be achieved. Health risks that might be suggested as potentially resulting from chronic consumption of water supplies, if corrections were not made, can be readily avoided. The corrosive tendency of the water has, or will, present significant impact on the maintenance requirements for the water systems of concern.

Immediate attention is warranted for developing a timely action plan for improving the water quality provided in the villages of the North Slope Borough.

NORTH SLOPE BOROUGH LEAD STUDY SUMMARY

Date	Sample Location	Flushed or Unflushed	Lead mg/l (limit .05 mg/l)
07/07/83	Barrow - High School Drinking Fountain	Unflushed	0.98
08/07/83	Point Hope - Womens Restroom	Unflushed	0.04
08/07/83	Point Hope - Womens Restroom	Flushed	0.53
08/09/83	Nuiqsut - School Sink	Unflushed	0.62
08/09/83	Nuiqsut - School Sink	Flushed	0.17
08/09/83	Kaktovik - School Sink	Unflushed	0.005
08/09/83	Kaktovik - School Sink	Flushed	<0.005
08/15/83	Wainwright - School Office Sink	Unflushed	0.056
08/15/83	Wainwright - School Kitchen Sink	Flushed	0.310
08/15/83	Barrow - Elem. School Kitchen Sink	Unflushed	0.145
08/15/83	Barrow - Elem. School Kitchen Sink	Flushed	<0.005
08/15/83	Barrow - High School Kitchen Sink	Unflushed	0.018
08/15/83	Barrow - High School Kitchen Sink	Flushed	0.080
08/16/83	Barrow - NSB Building Mens Room	Unflushed	0.006
08/16/83	Barrow - NSB Building Mens Room	Unflushed	0.005
08/16/83	Barrow - NSB Building Mens Room	Flushed	<0.005
09/28/83	Nuiqsut - Public Safety House	Unflushed	0.008
09/28/83	Nuiqsut - Public Safety House	Flushed	0.006
09/28/83	Nuiqsut - School Fountain	Unflushed	0.340
09/28/83	Nuiqsut - School Fountain	Flushed	0.028
09/28/83	Nuiqsut - Truck Fill Point	Unflushed	0.090
09/28/83	Nuiqsut - Truck Fill Point	Flushed	0.011
09/29/83	Point Hope - Gym Drinking Fountain	Flushed	0.012
09/29/83	Point Hope - Gym Drinking Fountain	Flushed	0.006

NORTH SLOPE BOROUGH LEAD STUDY SUMMARY

Date	Sample Location	Flushed or Unflushed	Lead mg/l (limit .05 mg/l)
09/29/83	Point Hope - NSB Housing - Kitchen	Unflushed	0.013
09/29/83	Point Hope - NSB Housing - Kitchen	Flushed	0.013
09/29/83	Point Hope - Water Plant - Kitchen Sink	Unflushed	0.026
09/29/83	Point Hope - Water Plant - Kitchen Sink	Flushed	<0.005
09/30/83	Wainwright - Jack Farik's place	Unflushed	0.077
09/30/83	Wainwright - Jack Farik's place	Flushed	0.005
09/30/83	Wainwright - High School Kitchen	Flushed	0.029
09/30/83	Wainwright - School Drinking Fountain	Unflushed	0.098
09/30/83	Wainwright - Sink Downstairs	Flushed	<0.005
09/30/83	Wainwright - Water Fountain upstairs	Unflushed	0.610
10/12/83	Anaktuvuk Pass - W. Side Kitchen	Flushed	0.005
10/12/83	Anaktuvuk Pass - E. Kitchen Sink - Cold	Unflushed	<0.005
10/12/83	Anaktuvuk Pass - Well House Sink	Unflushed	<0.005
10/12/83	Anaktuvuk Pass - Well House Sink	Flushed	<0.005
10/12/83	Anaktuvuk Pass - Paul Hugo Kitchen	Unflushed	0.010
10/12/83	Anaktuvuk Pass - Paul Hugo Kitchen	Flushed	<0.006
10/13/83	Atquasuk - Tony Susocks - Water Truck Sink Via	Unflushed	0.011
10/13/83	Atquasuk - Tony Susocks - Kitchen Tap	Unflushed	0.079
10/13/83	Atquasuk - Empty Storage Tank	Unflushed	<0.005
11/10/83	Barrow - NSB Housing J.H. Hittson	Unflushed	0.006
11/10/83	Barrow - NSB Houisng J.H. Hittson	Flushed	<0.005
10/13/83	Barrow - New High School Fountain	Unflushed	0.070
10/13/83	Barrow - New High School Fountain	Flushed	0.010
10/13/83	Barrow - New High School Kitchen Tap	Unflushed	0.130
10/13/83	Barrow - New High School Kitchen Tap	Flushed	0.015

NORTH SLOPE BOROUGH LEAD STUDY SUMMARY

Date	Sample Location	Flushed or Unflushed	Lead mg/l (limit .05 mg/l)
12/09/83	Barrow - New High School Kitchen	Unflushed	0.032
12/09/83	Barrow - New High School Kitchen	Flushed	<0.005
12/09/83	Barrow - New High School Voc. Ed/Fountain	Unflushed	<0.005
12/09/83	Barrow - New High School Voc. Ed/Fountain	Flushed	<0.005
12/09/83	Barrow - New High School Running Track	Unflushed	0.014
12/09/83	Barrow - New High School Running Track	Flushed	<0.005
12/09/83	Barrow - Elem. School - O/S Gym Fountain	Unflushed	<0.005
12/09/83	Barrow - Elem. School - O/S Gym Fountain	Flushed	<0.005
12/09/83	Barrow - Elem. School - Multi purpose rm.	Unflushed	<0.005
12/09/83	Barrow - Elem. School - Multi purpose rm.	Flushed	<0.005
12/09/83	Barrow - Elem. School Kitchen 3x sink	Unflushed	<0.005
12/09/83	Barrow - Elem. School Kitchen 3x sink	Flushed	<0.005

Implementing a Lead Solder Ban

Joe Glicker and Don Stewart

One of the most significant aspects of the 1986 Safe Drinking Water Act amendments is the ban on the use of lead solder and lead pipes, which is similar to a ban enacted by the state of Oregon in 1984. Implementing such a ban requires a close coordination among the water utility, plumbing inspectors, plumbing code authorities, and health officials. Education and enforcement programs are essential to ensure that the ban is effective. Understanding the experiences in establishing the ban in Oregon and enforcing it in Portland may be useful as the lead ban is extended nationwide.

One of the most far-reaching sections of the 1986 amendments to the Safe Drinking Water Act (SDWA) is section 1417—"Prohibition on Use of Lead Pipes, Solder, and Flux." This section of the act prohibits use of solder and flux with more than 0.2 percent lead and pipe and pipe fittings with more than 8 percent lead in all water systems and residential and nonresidential potable water plumbing. This section of the act also requires the water utility to provide notice to the public about possible lead contamination of tapwater in a manner to be prescribed by the US Environmental Protection Agency (USEPA).[1]

These provisions are similar to a lead ban enacted by the state of Oregon in 1984.[2] This ban was an outgrowth of a corrosion study undertaken by the Portland Water Bureau from 1981 through 1983.[3-5] Implementing such a ban requires the cooperative efforts of many agencies, organizations, and individuals. The experiences in establishing a ban in Oregon and in enforcing it in Portland may be useful as this ban is extended nationwide.

Portland's corrosion study generated considerable coverage in the local press, as did the hearings and meetings that preceded issuance of the state rule.

Establishing a lead ban

The biggest obstacle to establishing a lead solder ban in Oregon—and the biggest reason that the ban was implemented statewide—was the fact that the plumbing code in Oregon is statewide. Local governments do not have the option under state law to adopt their own plumbing codes. Thus, when the primary conclusion of the Portland Corrosion Study was the desirability of a lead-solder ban in the area served by Portland's water supply, more than a local ordinance change was needed. It was also realized that although a local ordinance could perhaps control lead solder use within the city limits of Portland, Portland supplies water to other cities and water districts over which a local ordinance would have no effect. Compliance with a citywide only ban would likely be difficult because plumbers working in the metropolitan region would continue to use lead solder outside the city limits, and, in some locations, it would be difficult for a plumber to know whether the work was in or outside the boundaries of the city.

This led Portland's water bureau to take two actions: first, the city's Bureau of Buildings was contacted and the results of the corrosion study were explained. Together, the two agencies developed a notice that was distributed to each person who applied for a city plumbing permit. This notice explained the risks of using lead solders and rec-

TABLE 1
Results of lead-solder testing

Period	Number of Solder Tests	Number of Locations Tested	Number of Samples With Lead Solder*	Number of Locations With Lead Solder*
Oct. 1984-Mar. 1985	10	10	5	5
Apr. 1985-Sept. 1985	19	8	11	3
Oct. 1985-Mar. 1986	5	4	2	2
Apr. 1986-Sept. 1986	4	4	3	3

*Lead solder is defined as having more than 0.2 percent lead.

The Portland, Ore., water quality laboratory analyzed 38 samples during the first two years of the statewide lead solder ban. Plumbing inspectors selected sampling sites from 26 locations on the basis of the solder's appearance—50:50 lead solder becomes dull, whereas 95:5 solder remains bright.

ommended the use of 95:5 tin-antimony solder for potable water plumbing.

Second, the study was brought before the State Plumbing Code Advisory Board with a request to ban the use of lead solder in the area served by Portland's Bull Run water supply. The Plumbing Code Board was reluctant to take such a step for several reasons: they did not have the technical background to evaluate the health-based need for the action, and it would be difficult for plumbers working in the general area of the proposed ban to know whether it was or was not in force in a particular location. Furthermore, they did not know whether other areas that served other water supplies were also at risk from the solder. The advisory board noted that a section of the plumbing code gave the administrator of the State Health Division the authority to ban use of any material determined to have adverse health effects.[6] The board suggested that this approach would be more appropriate. The State Health Division was contacted with a request to make this determination.

The health division held a number of fact-finding hearings around the state that eventually led to the final rule. This rule bans the use of solder with more than 0.2 percent lead in potable water systems and lines, requires labeling of any solder sold in Oregon with more than 0.2 percent lead to indicate that it shall not be used on potable waterlines, bans the use of new lead pipe in potable water systems, and requires removal of all lead services and lead service connectors from water systems on a schedule approved by the health division. The rule does not specifically define lead pipe but allows the State Health Division to determine whether a water supplier is identifying and removing the appropriate material.

Implementing the ban in Portland

Portland's corrosion study generated considerable coverage in the local press during the two years it was being conducted, as did the hearings and meetings preceding issuance of the state rule. Despite this publicity, many plumbers, home remodelers, and plumbing engineers were unaware of the need for and requirements of the ban. An extensive educational campaign was undertaken to explain the new rule and the lead issue. All plumbing contractors working in Portland were sent notices explaining the rule. Speakers were provided to organizations of local plumbing contractors, plumbing inspectors, corrosion engineers, and interested civic groups. Articles describing the corrosion study were placed in a newsletter inserted with quarterly residential water bills. An informational flyer on lead prepared by the county health department was also mailed to each customer. One-on-one discussions with plumbers and the general public were held by the plumbing inspectors when applications for permits were made and when job sites were visited. Persons contacting the Water Bureau with water quality complaints or requests for information about the lead issue were told of the solder ban and the need to flush standing water prior to consumption.

Although this education campaign did much to inform the public about the solder ban and the reasons for it, there was still resistance to the idea. Cost increases for plumbing installations were feared by contractors and homeowners alike. Material costs for 95:5 tin-antimony solder, the primary alternative solder, are usually higher than for lead-based solders. The higher melting point and narrower melting point range for this solder were thought to be more time-consuming and would therefore result in higher labor costs. Although everyone recognized the severe consequences of exposure to lead, not everyone was convinced that solder was a serious source of this exposure. Many wanted other solutions to the problem, such as adding water treatment chemicals that would not affect or restrict the ability to use plumbing materials of their choosing.

This resistance led to the realization that in addition to education, an enforcement program was necessary if the lead solder ban was to become a reality. A cooperative program was established between the Water Bureau and the Plumbing Division of the Bureau of Buildings in Portland. If a field plumbing inspector found a solder being used that was suspected of containing lead in excess of the rule, the inspector took a sample of the solder for analysis in the Water Bureau's water quality laboratory. This provided the inspector with the certified data needed to force correction of the problem. The field inspector could then require removal of the portion of the piping system installed with the lead solder. If the whole system was found to be installed with lead solder, the whole system would have to be removed at the installer's expense. If the installer refuses to comply with the plumbing inspector's order, the installer is subject to a $1,500 fine and loss of plumbing license. This enforcement program was communicated to the plumbing contractors along with other information about the ban.

Implementation of the ban on lead services and lead service connectors was considerably easier because this area was entirely under the control of the Water Bureau. No new lead piping has been installed for many years, and there

are no lead services in Portland, so compliance with those aspects of the ban required no effort. Portland has about 10,000 galvanized pipe services that are connected to the water main with a 2-ft (0.6-m) lead pipe connector or pigtail. Old records of services, mains, and foremen's reports were searched to identify all these installations. A compliance schedule to remove these pigtails and replace the services over a 10-year period was negotiated with the State Health Division. The cost of this program is estimated to be more than $6.5 million although most of this cost would be incurred, even without the program, because the service lines being removed are old and often in need of replacement.

Results of two years of experience

During the first two years of the lead solder ban, 38 solder samples have been analyzed by the Portland water quality laboratory. Samples were collected at 26 locations in Portland where plumbing inspectors suspected use of lead-based solder. Inspectors use the difference in appearance between lead solder and tin-antimony solder to identify points at which testing is needed. The 50:50 lead solder is usually dull in appearance after application, whereas 95:5 solder remains bright. A slight indentation or gap often appears where the fitting meets the pipe with tin-antimony solder, whereas this gap is bridged with lead-based solder. Twenty-one of the samples analyzed in the laboratory proved positive for lead-based solder at 13 of the locations. In each case in which a positive solder sample was found, the plumbing installer was given verbal and written notification to remove all piping that was installed using lead-based solder. In no case has it been necessary to impose fines or revoke licenses of installers to gain compliance.

As the plumbing inspectors gained field experience in identifying lead-based and lead-free solders, and as the contractors became accustomed to the rule, the need for laboratory testing decreased. Table 1 shows the testing frequency by six-month intervals since the ban was instituted. Included in these results is one particular location where 12 solder samples were analyzed, 9 of which contained lead-based solder and 3 of which were lead-free.

In recent months, a field solder testing kit[7] has been used to differentiate between solders. This test procedure is based on formation of an insoluble lead chromate precipitate when potassium chromate is added to a solubilized solution of the solder. This solder field test costs only a dollar or two per sample. Laboratory analyses of the solder samples have confirmed the results of the field test in all of the samples that have been compared.

The response to the results of the solder-testing program is similar to the response received whenever code violations of any kind are found. The installer is reluctant to spend the money required to correct the violation, but ultimately does so because it is the law and because of the sanctions available if the installer does not comply.

The contractors' initial fears of increased job costs do not seem to have materialized. Cost increases in plumbing work seem to be negligible and the contractors have adjusted favorably to the rule. Although tin-antimony solder unit costs are slightly higher than lead solders, the more careful handling it requires results in use of less material and equivalent material costs on a per-job basis. Labor time on contracted work has not increased once the installer learned how to use the lead-free solders. Despite the initial reluctance to accept the solder changes, once implemented and in use for awhile, the new procedures have been generally accepted.

Perhaps the major problem with the rule is that the use of 95:5 solder and other lead-free solders has greatly decreased the ability of the nonprofessional to install copper water tubing. The professional installer has the ability to obtain the training needed to work with the new materials, whereas an individual usually does not. The greater skill required to use the approved solders has made copper less competitive with other pipe materials, particularly plastics, for the do-it-yourself plumber. This drawback may decrease over time as individuals become familiar with the other solders, but it may be a permanent side-effect of the ban because the amateur may never have sufficient experience to work with lead-free solders.

The other problem in implementing the rule has been the perception by some that health protection from plumbing materials is being examined from a narrow base. For example, the ban may increase the use of plastic pipe materials, and there is concern that the known carcinogen, vinyl chloride monomer, or that other pigments, lubricants, stabilizers, or plasticizers will leach from polyvinyl chloride (PVC) or other plastic pipe.[8] Also, taste- and odor-causing compounds have been reported from polyethylene pipes.[9] The health significance, if any, of such leaching has not been fully explored. Further documentation of the risks of plastic pipe, dissemination of the information on this topic, and control of the manufacture and use of plastic pipe, if necessary, are needed to address these concerns.

Conclusions

Establishing a lead-solder ban requires close coordination among the water utility, plumbing inspectors, plumbing code authorities, and health officials. Obtaining compliance with a ban requires an extensive education program for both the general public and the groups most affected by a ban.

An enforcement program of solder testing is essential to ensure that the ban is effective. Fears of increased costs and increased difficulties in doing plumbing installations have not turned into realities for the professional installer. However, the nonprofessional is turning to other plumbing materials, particularly plastics, because of the higher level of skill required to work with lead-free solders.

A comprehensive look at plumbing materials and their health effects would provide a better basis for making decisions about selecting materials and explaining their use to the public than the current piecemeal approach.

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St. Michael: How long does it take to get the lead out?

Nome Nugget 12-23-82

By PAT STEPHENSON

The lead leaching into the St. Michael elementary school water system was discovered by accident. But it is no accident that those who could have remedied the situation did not do so. And the reluctance by local officials to discuss the problem is not an auspicious act either. About two-thirds of the people contacted would not be quoted on the issue. The reason they hesitated to speak out was because they were unsure of the facts. But then the facts haven't always been available, even during research for this article. At stake here are two issues: public information and public health.

"I've been trying to tell people this for three years," said Justice, environmental engineer for the Department of Environmental Conservation (DEC) said over the phone at his Fairbanks office.

The lead content in the water running from St. Michael elementary school taps was discovered in July, 1979, during a project to assess water quality in rural Alaska. "This was a widespread project costing very little money and getting a lot done," Justice said. "It was a cooperative effort between this department (DEC) and Public Health sanitarians like Geoff Langer (sanitarian for Norton Sound Health Corporation) and the DEC lab down in Juneau." Concern over the unexpected discovery of lead comes from its adverse effect when accumulated in the human body.

To locate the source of the lead, Justice tested St. Michael's water source, a lake located three-and-a-half miles from town. Water from this lake is pumped about twice a year into a Public Health Service (PHS) treatment plant. The treated water is stored in two tanks: the 100,000 gallon PHS tank and a 150,000 gallon steel tank installed by the Bureau of Indian Affairs (BIA). The BIA tank provides water for the taps, drinking fountains, kitchen and lavatories in the school. The water travels through copper pipes soldered together. Justice found no lead content in the lake, and a minimal amount in the holding tank. But the concentration of lead flowing from the taps was above the maximum level permitted: 0.05 milligrams of lead per liter of water. The content [illegible] but was always [illegible] water was released from taps that h[illegible] been used often. Ju[illegible] theory was that the [illegible] accumulated in the pipes[illegible]

In a report he pub[illegible] in The Northern En[illegible] Justice wrote, "All th[illegible] dicated a possible cor[illegible] problem in the distri[illegible] system. Investigatio[illegible] tablished that the pipe[illegible] been joined with solde[illegible] taining 50 percent le[illegible] standard construction [illegible]nique."

This standard techni[illegible] appropriate in parts of [illegible] where water is hard [illegible] coating of calcium carb[illegible] forms on the inside [illegible] pipe. This bone-like co[illegible] as Justice described i[illegible] prevents corrosion of the [illegible] solder. "But the pr[illegible] with St. Michael water [illegible] so soft there's really no calcium to precipitate ou[illegible]

St. Michael

/thing that would to the kids' health. t to protect the

o years ago when district drew plans ict a high school hael, Justice found se to a legal battle .A over lead solder-

was some con- re in that they had (construction) our Anchorage off- DEC environmental explained. "Our e office looked at and sent them an to construct not that this project was airbanks region. I ut the school going re and I checked and plans so I contacted l district.

I kind of got into a h them getting those id convincing them uld change the spec- s on the solder.

In the end they fin- eed to use tin ali- But I did consider tion to change the aterial."

occurred in the fall . Attitudes must have l since then because t telephone interview n REAA official in ect office proved the district willing to e situation. Dur versation which occur- weeks ago REAA b manager Mike Du When we had our w returned from test of Environmen or suggestions district ceased using the elementary school's water for drinking, cooking, and dish washing. He said they hauled cooking and drinking water and carried used dishes to the high school for washing.

Replacement of the soldered joints should be underway right now, according to Dugan. Three school district maintenance men are being flown to the village to do the repair work. Dugan estimated five to six weeks time and about $20,000 of school district money will see the job done.

"Of course we have a problem with it," the business manager said. "That's less dollars to spend elsewhere. The hauling of water is an inconvenience. And resoldering can create plumping problems by remedying the problem that exists."

He added the although he knew money had been available in the past for health, life, and safety problems prior to the transfer of any BIA school, policy had changed in Washington D.C. "I guess the funds were not available for the transfer," he concluded.

But BIA administrative official in Nome, Paul Sterling, said a budget proposal to replace the water pipes never crossed his desk for BIA to either approve or disapprove. He said the condition at St. Michael never got beyond plant management.

"Our plant manager at that time (Melvin Martin) is not here for me to get statements from as to the reason why the pipes were not replaced," Sterling said Dec. 20. "But they were aware of it and we never received an administrative budget to correct the situation.

"But they did do water tests and according to this," he said referring to Stan Justice's article in The Northern Engineer, "we did do the necessary treatments to bring the level down to 0.05 mg. of lead per liter. This was in Feb. 2.

"And so then in Sept. '81 the report went in and the lead sample was up to 0.09. Solution was put into the water in March '82 bringing the lead sample down to 0.05.

"These water tests were sent to the chemical and geological lab of Alaska and they were approved as satisfactory. This is [illegible] we did for the safety of the kids," he said, adding, "But nothing was ever done about the replacement of the pipes. Then REAA took over the school before we had a chance to replace them."

from my supervisor. We're talking about lead and there's a lot of implications."

The "implication" of lead content in a public water system is lead poisoning. Dr. Tom Kosatsky who works at the Bureau of Epidemiology in Anchorage called medical knowledge of lead poisoning "if-y data." He said a short period of lead consumption even in high doses reveals no symptions. But long term exposure will allow absorption in the body. The results are learning disorders, psycological problems, anemia, and problems in the skeletal and digestive system. Children are particularly susceptible

Continued on page 11

A variety of test

St. Michael

Continued from page 18

to the effects of lead poisening and what is equally disturbing is that these symptoms are vague. They can originate from a number of sources. Assigning them to lead consumption after the fact could be difficult.

Stan Justice noted that when another doctor from the Bureau of Epidemiology, John Middaugh, traveled to Birch Creek to test blood taken from the villagers he came up with surprising results. The interior village located just south of Fort Yukon was also reported to have a high lead content in its PHS water system. But Middaugh's tests showed the lead content in the villager's blood was at an acceptable level. This was because they turned to the river for their water source when the lead was discovered. As it turned out, Middaugh's own blood, which he tested at that time, too, had the highest lead content of all. Justice laughed when he recounted the story and pointed out that gas fumes in Anchorage exude a higher lead content then some of the problem water systems in the state.

To date, St. Michael, Birch Creek, Savoonga, and Gambell have been tested and revealed high lead content within their water systems.

Middaugh said in Anchorage, Dec. 20, that he is currently assessing past water tests from St. Michael to determine if he should perform blood tests on school children.

What is the lead content in St. Michael at this time? Justice said Simon Mawson (assistant to the state sanitarian in Nome) took samples this fall and "water samples from pipelines that had just been flushed still showed levels exceeding 0.05."

He concluded, "I think we're finally arriving at a solution there, through the actions of Simon Mawson and the school district. They've become concerned and are taking rapid action to correct the problem. In the future what it says is when people build new systems in the Arctic they are going to consider the corrosive nature of the water there. And if the water is found to be corrosive, they will use tin instead of lead solder."

A sound philosophy for the future. But the fact remains that three years and five months passed before the proper and final solution to the problem at St. Michael faced correction.

The adverse effects of lead in the body results after a long and steady accumulation of the substance. The solution to any problem arrives after an accumulation of facts. In the case of lead poisoning, it is imperative that the accumulation of facts exceeds the accumulation of lead.

NOTICE SECTION
SB IN DEC
NOT H+S-
PLUMBING

BY THE LABOR AND COMMERCE COMMITTEE

SENATE BILL NO.

LATURE OF THE STATE OF ALASKA

EGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act relating to the use of lead in certain plumbing installations and repairs; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60.705 is amended by adding new subsections to read:

(b) Notwithstanding (a) of this section, the use of a pipe or pipe fitting containing more than 8.0 percent lead, or of solder or flux containing more than 0.2 percent lead in the installation or repair of a public water system or in the installation or repair of plumbing of a residential or nonresidential facility that provides water for human consumption is prohibited. This subsection does not apply to the use of leaded joints necessary to repair cast iron pipe.

(c) A public water system shall notify persons who may be affected by lead contamination of their drinking water if the contamination results from the lead content in the construction materials of the public water distribution system or the corrosivity of the water supply sufficient to cause leaching of lead. Notice shall be given whether or not the lead contamination violates (b) of this section. The department shall adopt regulations to govern the manner and form of the notice. The notice must explain

(1) the potential sources of lead in the drinking water;

(2) potential adverse health effects;

(3) reasonably available methods of mitigating known or potential lead content in drinking water;

(4) steps the system is taking to mitigate lead content in drinking water; and

(5) the necessity for seeking alternative water supplies, if any.

* Sec. 2. AS 18.60.740(1) is repealed and reenacted to read:

(1) "code" means the code adopted under AS 18.60.705(a) as amended by AS 18.60.705(b).

* Sec. 3. APPLICABILITY. AS 18.60.705(b), enacted by sec. 1 of this Act, applies to the installation or repair of a water system or plumbing begun on or after the effective date of this Act.

* Sec. 4. This Act takes effect immediately under AS 01.10.070(c).

WORK ORDER REQUEST FORM

W. O. 15-2102

KEYWORDS: utilities

hazards

ASSIGNED TO Graves

REQUEST FOR: BILL ☐ RESOLUTION ☐ RESEARCH ☐ OTHER ☐

SUBJECT

REQUESTED FOR S BY EXT.

* DELIVER TO TAKEN BY

INSTRUCTIONS, EXPLANATIONS

OBTAIN

SPECIAL DRAFTING INSTRUCTIONS ATTACHED ☐

AUTHORIZED TO CONFER WITH

RETURN

TO REQUESTER

APPROVED: Director, Legal Services

Director, Research

REVIEWED

IN DUE

TYPED - Draft DATE

Final DATE

PROOFED DELIVERED

SPECIAL INSTRUCTIONS TO TYPIST/PROOFREADER

DRAFT ☐ FINAL ☐

LA-L 10

draft

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

SENATE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act banning the use of lead in certain plumbing installations and repairs; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60 is amended by adding a new section to read:

70

Sec. 18.60.706. Ban on the Use ~~of Lead.~~ in potable water systems Notwithstanding any provision in AS 18.60.705 to the contrary, no pipe or pipe fitting containing more than 8.0 percent lead, and no flux or solder containing more than 0.2 percent lead may be used in the installation or repair of a public drinking water system or in the plumbing ~~of a~~ installation or repair of residential or nonresidential facility providing water for ~~drinking.~~ human consumption. This section does not apply to the use of leaded joints necessary to repair cast iron pipe.

* Section 2. This Act takes effect July 1, 1988.

3/11/88

A couple of suggested changes

SO

[illegible]

draft

IN THE SENATE

BY THE LABOR AND COMMERCE COMMITTEE

SENATE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

FIFTEENTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act banning the use of lead in certain plumbing installations and repairs; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. AS 18.60 is amended by adding a new section to read:

Sec. 18.60.706. Ban on the Use of Lead. Notwithstanding any provision in AS 18.60.705 to the contrary, no pipe or pipe fitting containing more than 8.0 percent lead, and no flux or solder containing more than 0.2 percent lead may be used in the installation or repair of a public drinking water system or in the installation or repair of plumbing of a residential or nonresidential facility providing water for drinking. This section does not apply to the use of leaded joints necessary to repair cast iron pipe.

* Section 2. This Act takes effect July 1, 1988.

DEPARTMENT OF ENVIRONMENTAL CONSERATION ISSUES PAPER

LEAD SOLDER IN PLUMBING

ISSUE: Use of lead solder in drinking water systems is a leading cause of elevated lead levels in drinking water.

HEALTH EFFECTS: Lead has extremely adverse effects on persons exposed to it. These effects range from acute swelling of the brain and seizures at high blood levels to symptoms such as fatigue, loss of appetite, or abdominal pain at low levels. Lead is known to damage the digestive system, reproductive system, gastro-intestinal system, and kidneys. It also interferes with the blood-forming process and exposure has been related to increased miscarriages. Lead accumulates in the body. It has no beneficial uses in the human body. Young children and fetuses are at highest risk because they absorb a higher percentage of the lead to which they are exposed than adults do.

EXPOSURE: Individuals who are exposed to lead in water have been shown to have increases in blood lead levels. Lead solder in plumbing has been identified as the most significant source of lead in drinking water. Lead in raw water is rare.

LEGAL FRAMEWORK: The Safe Drinking Water Act was amended in June, 1986 to include a new section 1417 titled "Prohibition on Use of Lead Pipes, Solder, and Flux." This section bans the use of solder and flux containing greater than 0.2% lead and pipes and pipe fittings containing more than 8.0% lead. The act requires that states with primacy in the drinking water program implement this requirement. In Alaska, the Department of Environmental Conservation has primacy for the drinking water program.

NEED FOR LEGISLATION: The most effective way to ban use of lead fluxes and solders is to do so in conjunction with laws and regulations that govern plumbing. Under Alaska law, this requires an amendment to Title 18, the statute pertaining to the Department of Labor. Both the Department of Environmental Conservation and the Department of Labor support this change.

EFFECT ON INDUSTRY: Alternative tin solders are available and are preferable to lead solders in terms of strength. Material unit cost is slightly higher but less solder is used so that overall cost is equivalent. Initial education will be needed to help industry address the change of requirements.

3/88

THE LEAD SOLDER BAN

Its Effect on the Plumbing Industry

NAPHCC EDUCATIONAL FOUNDATION
RESEARCH REPORT II

September, 1987

NAPHCC Educational Foundation
180 S. Washington Street, Suite 50, Falls Church, VA 22046 • (800) 533-7694 / (703) 237-8100

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HISTORY OF THE ISSUE

Lead is believed to have been one of the first metals known or used. The word "plumber" is derived from "plumbum," the Latin name for lead. As early as the fourth century B.C., Hippocrates noted adverse health effects on miners and metallurgists who were exposed to lead, giving lead poisoning the distinction of being the oldest recorded occupational disease.[1]

Because the Romans used lead in their water pipes and aqueducts, among other industrial uses, stories have circulated which attribute the fall of the Roman Empire to lead intoxication caued by ingestion of lead from the water supply. According to Stanley A. Thielke, "The Roman lead issue, regardless of its authenticity, has had a significant impact on current lead problems."[2] In his article "Lead and Human Health," presented at the July 1985 Copper Development Association's All-Industry Roundtable on the Banning of Lead Solder from Potable Water Plumbing Systems, Mr. Thielke discussed another article published by the Canadian Institute of Metallurgy which offers a different perspective on the Roman lead debate. According to that article, says Thielke, it is unlikely that the Romans ingested lead from water pipes because the water system ran continuously, minimizing the potential for lead leaching, and because the water was rich in calcium which would have added a protective layer between piping and water in the pipes and aqueducts. A more likely source of lead poisoning was the lead acetate, known as "sugar of lead," which the Romans added to their wines to curtail fermentation. Moreover, despite multiple sources of lead ingestion, records of Roman physicians fail to mention any episodes of mass lead intoxication which would be expected had drinking water been the source of ingested lead.

WHY IS LEAD DANGEROUS?

Lead is a well-known toxin with no known useful function in the human body. Its adverse health effects range from an acute swelling of the brain stem leading to seizures, coma, or even death at very high blood levels to fairly subtle biochemical changes in the body, manifested in symptoms such as fatigue, loss of appetite, irritability, clumsiness, or abdominal pain at lower levels. Lead is known to damage the nervous system, the male and female reproductive systems, the gastro-intestinal system and the kidneys and to interfere with the blood-forming process. Lead in the environment is a product of the industrialization of our society, and it can enter the body from a number of sources—from industrial and automobile pollution in the air, from household dust and soil, by ingestion of lead-based paint as well as ingestion of lead-tainted food and/or water.[3] Because lead accumulates in the body and in the bloodstream and is only slowly removed, even low-level ingestion of lead becomes a health hazard over time.

Young children and unborn babies are at highest risk of damage from exposure to excessive amounts of lead because children absorb more of the lead they ingest than do adults—50% for children compared to an absorption rate of 8-10% for adults—leaving a lower safety margin between quantity of lead ingested and excreted. Also, their developing bodies handle lead differently, leaving them more vulnerable to the toxic effects of lead.

In defining "elevated blood lead level" and "lead toxicity," the Centers for Disease Control warn that the definitions do not imply that a *safe* level of blood lead has been established. The definitions are guidelines only. **Elevated blood lead level** is a confirmed concentration of lead in whole blood of 25 micrograms of lead per deciliter (μg/dl) or greater and indicates an excessive absorption of lead. **Lead toxicity** (or "lead poisoning") is an elevated blood lead level of 35 μg/dl or greater.[4] The dangers of lead can be measured in both human and economic costs and are very real. Current definitions are being re-considered and, based on recent data, blood lead levels considered dangerous probably will be considerably lower.

On April 23, 1987, *The New England Journal of Medicine* published an article reporting on a recent study of the effects of lead. **Results of that study indicate that the fetus may be adversely affected at blood lead concentrations well below 25 μg/dl, the level currently defined by the Centers for Disease Control as the highest acceptable level for young children. Infants with lead levels currently considered acceptable performed poorly on the Mental Development Index during the first two years of life compared with infants whose lead levels were under 10 μ/dl. The study suggests that lead is particularly dangerous in the prenatal stage because elevated blood lead levels occurring after birth in this group of children were not associated with poor performance.**[5]

In an editorial comment on this study in the same issue of *The New England Journal*, Nicholas D. Ashford, Ph.D. J.D. of the Massachusetts Institute of Technology, writes that the article on prenatal exposure to lead "**...confirm(s) the suspicion that very low levels of toxins are capable of causing serious health effects**" and "**...should quiet the insistence that governmental efforts to control these hazards are excessive and irrational responses...**" Dr. Ashford states that "The study...suggests that it may be wise for the EPA to review the standards for lead exposure, both from ambient air *and drinking water* in the general population," and he calls for "...a governmental response to the new realities."[6]

SAFETY OF THE WATER SUPPLY

In recent years attention has focused again on the water supply as a potential source of lead contamination, and the plumbing industry is central to this issue. It is interesting, therefore, to note that the *Proceedings of the First Annual Convention of the Association of Master Plumbers*, held in New York in 1883, contains an address by Joseph P. Gallagher of St. Louis titled "Is Lead as a Conduit for Water Detrimental to Health?"

In his address, Mr. Gallagher dated concern at that time about the safety of lead pipes as a conduit for water to the year 1842 when the plumbing business was new in this country and drainage systems and traps were used rarely in connection with fixtures. New diseases began to develop and "...as the water supply was a new thing, and lead pipes were exclusively used as a conduit, it was taken for granted by many of the physicians that the use of water conducted through lead pipes and used for culinary and drinking purposes was the cause of these mysterious maladies. Time, however, soon developed that bad drainage, or...no drainage at all, was the culprit..."[7]

Gallagher continued, saying "...we are prepared to state right here and now that we do not believe that water passing through tin pipe, or any other metallic pipe, even if it were possible to use silver or gold, would be a particle more pure than water passing through a lead pipe. We would not, however, recommend the use of water that had laid dead in any kind of pipe for any length of time... We would advise the emptying and cleansing of the pipes by letting water run long enough to wash out all dead substances before using the water for culinary or drinking purposes."[8]

Explaining that organic matter in water coats the surface of lead pipes with an insoluble film which prevents leaching of lead from the pipes, and claiming lack of evidence that any detriment to health had resulted from use of lead pipes, Gallagher stated unqualified confidence in lead pipe as "...the safest and best conduit for water that has as yet been *discovered*."[9]

Illustrating by his address early concern about the safety of drinking water, Gallagher no doubt believed, based on "...thirty-five years of practical and experimental experience as a master plumber"[10] in the safety of lead pipes while recognizing that stagnant waters might pose a hazard. This point of view is not so different from that expressed by some segments of the industry today.

The lead/drinking water issue, dormant for nearly a century, was resurrected in the 1970's when dietary sources of lead, particularly lead-based paints, gained national attention. The Childhood Lead-Based Paint Poisoning Prevention Program began in 1973 and focused the public's attention on potential hazards of lead, especially to young children. In that year,

the EPA published guidelines for safe drinking water. Of the 3,900,000 children screened by the Centers for Disease Control in 1973, 6.1% were found to have toxic blood lead levels. In FY1981, a smaller sampling found that 4.1% of children tested had lead levels defined as toxic.[11]

HOW DOES LEAD GET INTO THE WATER SUPPLY?

In an effort to reduce environmental sources of lead contributing to lead toxicity, the water supply systems came under scrutiny. Lead, which rarely occurs naturally in drinking water sources, was found at unsafe levels (measured in parts per billion—ppb) in drinking water where studies were conducted in Canada, Great Britain, Long Island, New York, and Virginia. These and "...numerous other studies on record clearly show that individuals exposed to elevated water lead concentrations have pronounced increases in blood lead concentrations."[12]

"Plumbosolvency" is the ability of water to leach lead from piping and solder with lead content. The temperature of water, its pH and alkalinity, the time of contact between the water and plumbing (period of stagnation), and the age and condition of the plumbing all affect plumbosolvency. Corrosive waters (waters that are soft, acidic, with a pH of less than 7.0) at temperature exceeding 20C which have long stagnation periods and which pass through piping with newly soldered joints are the most plumbosolvent and therefore are most likely to have a high lead content.

In his article titled "Effect on Water Quality from Lead and Nonlead Solders in Piping," Peter Lassovszky addressed the problem of plumbosolvency and suggested the following as ways to minimize the presence of lead in drinking water:[13]

- using lead-free-materials not requiring lead solder joints and lead-free solders for joining copper pipes; replacing lead materials where feasible;
- implementing corrosion-control measures to provide overall protection to the distribution system, thereby reducing presence of other contaminants as well (water conditioning); and
- flushing faucets to avoid consumption of stagnant waters (suggested only as a temporary measure because of cost and consumer unreliability).

Concern about lead and other possible contaminants in the water supply systems has led to regulation by the Environmental Protection Agency. Currently, the EPA requires that lead content in drinking water not exceed 50 ppb but has proposed lowering the limit to 20 ppb in order to be more protective of the public health. **That limit (the MCL) is enforceable at the consumer's tap, meaning that the EPA holds the water supplier responsible for making the**

water non-aggressive to the plumbing system, an issue contested by some water purveyors.

To that end and to protect the public health, the Safe Drinking Water Act was amended on June 19, 1986, (Public Law 99-339) with new provisions addressing public health concern about lead in drinking water. These new amendements have already affected the plumbing industry and will continue to generate changes for the next several years.

THE SAFE DRINKING WATER ACT AMENDMENTS (PUBLIC LAW 99-339)

On June 19, 1986, the Safe Drinking Water Act (SDWA) Amendments were signed into law. The new amendments, now Section 1417 of the Act titled "Prohibition on Use of Lead Pipes, Solder, and Flux," include five major provisions which are:[14]

#1. *Prohibition.* Effective immediately, the use of solder or flux exceeding 0.2% lead content, or pipes and fittings exceeding 8% lead content, is prohibited in new installations and repairs of public water supply systems or in any plumbing in residential or nonresidential facilities providing water for human consumption which is connected to a public water system.* (See NOTE below.)

Public Notice Requirements. Beginning June 19, 1988, these public water supply systems are required to notify consumers who may be affected by lead contamination of their drinking water where such contamination results from either or both the lead content in construction materials of the public water distribution system or the corrosivity of the water supply sufficient to cause leaching of lead. Such notice shall clearly explain the potential sources of lead in the drinking water; potential adverse health effects; reasonably available methods of mitigating known or potential lead content in drinking water; steps the system is taking to mitigate lead content; and the necessity for seeking alternative waters supplies, if any.

#2. *State Enforcement.* All states must have a mechanism in place to enforce this prohibition and to provide public notification by June 19, 1988.

#3. *Penalties.* Failure of any state to enforce prohibition and notification requirements may result in loss of up to 5% of that state's public water system supervision program grant.

#4. *HUD and VA Compliance.* Effective June 19, 1988, the United States Department of Housing & Urban Development and the Veterans Administration may not

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(*NOTE: *Public water systems* are those serving 25 or more people or those having 15 or more pipe connections to customers. This prohibition refers specifically to *potable water systems*, not to draining, heating, fire sprinkler, ventilating, or other water systems.)

provide mortgage insurance or other assistance for new residential property if the plumbing system contains lead in excess of the limits specified (0.2% lead in solder and flux; 8% lead in pipes and pipe fittings).

#5. *Warning Labels Required.* Beginning June 19, 1988, solder which has a lead content exceeding 0.2% must display prominently a label warning that its use in making joints or fittings in any private or public potable water supply system is prohibited.

All regional EPA offices have technical information available to assist states in carrying out these new restrictions.

Appendex B (pages 11-14) of this report contains a chart which illustrates the status of enactment of the lead ban in each state; how states are complying with public notice requirements; and what alternative solders have been approved for use in each state.

The second provision of the 1986 Amendments permits the states to enforce the prohibition and notification requirements by whatever mechanism they choose, such as by amendment to state plumbing, building or sanitary codes, or by legislation or regulation. States are responsible for the labeling requirements set forth in #5 above as well.

The National Association of Plumbing-Heating-Cooling Contractors' sponsored National Standard Plumbing Code has been amended to incorporate the ban on lead-containing solders, flux, and pipes to comply with the new Public Law. Other model plumbing codes have done the same or are in the process of reviewing the amendments.

The SDWA Amendments also provide directives to the EPA regarding its role in regulation and enforcement. The following is a brief summary of these directives and their deadline dates:[15]

The EPA is to propose MCLGs (Maximum Contaminent Level Goals) for 83 known drinking water contaminants. MCLGs are non-enforceable goals set at the level at which no known or anticipated adverse health effects occur and which allow an adequate margin of safety. At the same time, the EPA is to propose MCLs to be set as close to the MCLGs as is feasible. The MCLGs and MCLs are to be promulgated simultaneously. Originally scheduled for public release in September, 1987, the MCLGs and MCLs will, according to the EPA, be promulgated in November, 1987. The date is tentative.

By January 1, 1988, and every three years following, EPA must publish a list of drinking water contaminants that may require regulation.

By December 19, 1987, EPA must establish criteria from which States can determine which surface water systems must install filtration.

By June 19, 1989, a treatment regulation is to be promulgated which will require all public water systems to use disinfection. Variances will be available under EPA criteria.

By December 19, 1987, regulations for water systems to monitor contaminants will be promulgated.

Public notification regulations providing for different types and frequencies of notice depending on potential health risk were due by September 19, 1987 and will be published in the Federal Register in October, 1987. The regulations will be issued by June, 1988.

INDUSTRY REACTIONS TO THE LEAD SOLDER BAN

In anticipation of the lead solder ban, the Copper Development Association convened an all-industry meeting on July 23, 1985, to consider the present and future effects of such a ban on the copper plumbing market. Forty-five representatives from 32 organizations assembled to discuss how the lead ban had affected business to date as well as implications of the ban for the future. The purpose of the meeting was to determine how action and planning might minimize future effects on the copper plumbing market. The consensus conclusions of the meeting, as summarized by the moderator, were as follows:[18]

1) the banning of lead solders in potable water systems will spread;

2) alternative tin solders are available, are widely used, and are stronger than lead solders;

3) while there is no significant public alarm or loss of sales to date, those possibilities exist unless the industry undertakes an effective communications program...to minimize problems and confusion caused by the lead bans...to promote alternative tin solders in a highly positive way, accelerate training of plumbers unfamiliar with alternative solders, and to continue to highlight user treatment as another solution in those localities with water supplies that could cause lead pick-up.

The Copper Development Association advocates water supply treatment at the local level for waters which are aggressive in order to protect all components of conventional plumbing systems including water heaters, boilers and air conditioning systems. If water treatment is not opted for, then lead-free solders can be used. Some communities such as Seattle, Washington, have recognized the water supplier's obligation, stated by the EPA, to provide water that is non-aggressive with respect to plumbing systems. Treating public water supplies with lime or soda ash to control pH and alkalinity can insure against lead pick-up in the system.

More recently, in May of 1987, the Lead Industries Association issued a press release related to a challenge by

the American Council on Science and Health, a consumer group, of a November 1986 EPA report on the extent of lead in drinking water. The EPA report under fire is titled "Reducing Lead in Drinking Water: A Benefit Analysis," and it was written by Ms. Ronnie Levin, an economic analyst. Stating that the EPA had quietly retracted the widely publicized report which warned that between 38 and 42 million Americans have lead contaminated water, ACSH charged that "a critical reanalysis of EPA's data indicates there is *no* lead epidemic currently brewing... Indeed, it appears that the EPA has made a significant error in extrapolating controversial and obsolete data."[17]

The EPA, according to ACSH, "...in apparent retraction, stated the report had yielded misleading information and much misunderstanding and was no longer available..."[18]

Commenting for the EPA on July 16, 1987, Dr. Joseph Cotruvo, Director of the Criteria and Standards Division, Office of Drinking Water, said that *the report in question has not been "withdrawn" at all, but it is currently being completed* since it was released in December 1986 as a "draft final report."

The MCL and MCLG for lead in drinking water are still under debate within the government, and the EPA will repropose the MCLG and issue the MCL and monitoring requirements in the fall of 1987 as directed in the statute (Safe Drinking Water Act). New guidelines will follow based upon those figures.

In the meantime, although technically the new Federal Law does not go into effect until June 19, 1988, plumbing contractors would be wise, cautioned Cotruvo, to cease using lead-based materials in their installation and repair of potable water systems today, if they haven't already done so. Legal liability is not clearly defined, but a lawsuit brought against the installer of lead-based plumbing materials by an injured party could claim that the plumbing contractor "ought to have known" or that he knowingly used materials that are injurious to health. For contractors to be on the safe side, Dr. Cotruvo suggests that they adhere to the new law now. He stated that we should expect a number of legal actions to be triggered by the lead-in-drinking-water issue and advised plumbers to avoid risk by using lead-free materials.

The EPA has set up a HOTLINE to answer questions pertaining to the Safe Drinking Water Act and Amendments. The number is **(800) 426-4791.** The HOTLINE is in operation from 8:30 a.m.-4:30 p.m. (EST) from Monday-Friday.

ALTERNATIVE SOLDERS AVAILABLE

Lead-free solders are readily available and have been used in many plumbing applications for decades. Because of their greater strength and ability to withstand higher temperature and pressure, they have long been specified in high-rise installations and for high-temperature services. These solders, including 95-5 tin-antimony, 96-4 tin-silver, and 95-5 tin-silver, have a higher melting temperature than the more familiar 50-50 tin-lead. Because of their composition, they tend to be more fluid and less sluggish. They can be applied with the same fluxes, heating equipment and joining techniques as the lead solders, but application may require somewhat greater skill on the part of the mechanic. The lead-free solders cost more but are stronger, safer for potable water supply systems, and generally yield more joints per pound because of their lighter weight, lower density, and greater amount of solder per roll.

In addition, new solders have been and are being developed specifically for potable water applications. Manufacturers of these new solders claim handling characteristics similar to 50-50 tin-lead solders.

The Copper Development Association points out that solder selection normally is based on ease of use, service conditions, and cost and suggests that brazing may be the best alternative for large diameter tubes where capillary spaces may be excessive. According to Andy Kireta, "Joint geometry and tolerances experienced in the field become more important when using alternative solders, and a better understanding of the solder characteristics should be made available to the user.. Proper education on the correct theory and technique of soldering copper joints will enable the user to do a good job when using either lead-based solder or the available alternative solders." "It is a common misconception," contends Kireta, "that when the type of solder being used changes, a major change in application techniques is required. There is normally only one variable in soldering techniques, the amount of heat applied to the joint."[iv]

Appendix A, Tables I and II, on page 10 of this report, contains information about the available alternative solders, both common and proprietary, their compositions and working characteristics. In some cases, the manufacturer of a particular solder is indicated and should be contacted for more information about its product.

APPENDIX A
TABLE I
COMPOSITION AND PROPERTIES OF COMMON SOLDERS

Composition by %	*Chemical Symbol	**Working Range (Pasty Range)	National Standard
50 - 50	Sn - Pb	356° - 421°	ASTM B32-87
95 - 5	Sn - Sb	452° - 464°	ASTM B32-87
97 - 3	Sn - Cu	446° - 482°	None
85 - 15	Sn - Pb	356° - 408°	None
85 - 15	Sn - Sb	550° - 610°	None
96 - 4	Sn - Ag	430° - 430°	ASTM B32-87
94 - 6	Sn - Ag	430° - 535°	ASTM B32-87
95 - 5	Sn - Ag	430° - 473°	ASTM B32-87

*Chemical Symbols: Sn(Tin), Pb(Lead), Cu(Copper), Sb(Antimony), Ag(Silver), Zn(Zinc), Ni(Nickel)

**Working Range: The approximate temperature range between a solid and liquid state during which solder is melted and may be effectively worked.

NOTE 1: The average length per roll of 50-50 solder is 21-22 ft.
The average length per roll of the alternative solders is 26-27 ft.

NOTE 2: Composition % designates the major chemical components and not all that are listed in ASTM B32-87.

(PORTIONS OF INFORMATION FOR TABLE I SUPPLIED BY COPPER DEVELOPMENT ASSOCIATION AND SOLDER MANUFACTURERS)

APPENDIX A
TABLE II
COMPOSITION AND PROPERTIES OF PROPRIETARY SOLDERS

Manufacturer/ Product	*Chemical Composition	**Working Range (Pasty Range)
Bow—Waterpure	Sn - Cu	420° - 445°
Canfield—Watersafe	Sn - Cu - Ag	418° - 440°
Engelhard—Silvabrite 100	95.5 Sn - 4 Cu - .5 Ag	440° - 500°
Federated-Fry—Fryflow 50	Sn - Cu - Ag - Sb - Zn	403° - 446°
Federate-Fry—Fryflow 50E	Sn - Cu - Ag - Zn	367° - 622°
J.W. Harris—Stay-Safe 50	94.5 Sn - .5 Ag - 3 Sb - 1.5 Zn - .5 Cu	420° - 440°
J.W. Harris—Bridgit	Sn - Cu - Ag - Sb - Ni	460° - 660°
Oatey—Safeflo	Sn - Sb - Ag - Zn	425° - 455°
Taracorp Industries—Tara-Safe	96 Sn - 4 Zn	392° - 422°
Taracorp Industries—Taramet Sterling	95 Sn - 4.5 Cu - .5 Ag	410° - 460°

*Chemical Symbols: Sn(Tin), Pb(Lead), Cu(Copper), Sb(Antimony), Ag(Silver), Zn(Zinc), Ni(Nickel)

**Working Range: The approximate temperature range between a solid and liquid state during which solder is melted and may be effectively worked.

NOTE 1: The average length per roll of 50-50 solder is 21-22 ft.
The average length per roll of the alternative solders is 26-27 ft.

NOTE 2: % of chemical composition shown where information available

NOTE 3: Current information indicates that no national standards are available for the proprietary solders listed in Table II

(PORTIONS OF INFORMATION FOR TABLE II SUPPLIED BY COPPER DEVELOPMENT ASSOCIATION AND SOLDER MANUFACTURERS. MELTING RANGES HAVE BEEN SUPPLIED BY INDIVIDUAL MANUFACTURERS.)

APPENDIX B

STATE-BY-STATE STATUS OF LEAD BAN (ENACTMENT, NOTIFICATION, AND ALTERNATIVE SOLDERS)

STATE	Has your state banned use of solder containing more than 0.2% lead for use in installation of potable water systems?	If so, what further action is being taken by your state to inform/educate and enforce the lead solder ban?	What alternative solders are currently approved for use in potable water installations in your state?
ALABAMA	NO	No state plumbing code, many counties have no code. Dept. Environmental Management establishes standards for drinking water, but has no legal authority to ban lead solder or regulate plumbing materials. Plan to draft legislation for 1988 to ban sale or use of lead solder/flux in state. Petitioned Southern Building Congress to amend plumbing code	
ALASKA	NO; change to code anticipated during next legislative session January-May, 1988.	Environmental Conservation Dept. will do public announcements, notification; enforcement will be under purview of Dept. of Labor.	According to code; no state approval process or list of approved solders.
ARIZONA	YES; state law amended 1987.	Implementation strategy being developed.	None at this time; anticipate approval of any solder meeting lead-free requirement.
ARKANSAS	NO; change in state plumbing code anticipated within year.	Public education campaign planned; enforcement by plumbing inspectors.	Code requires approval by state plumbing programs; any certified material will be accepted.
CALIFORNIA	YES; state plumbing code revised; Section 5-802d bans use of lead solders effective 2/1/87.	State Building Standard Commission issued revision to every state agency, consulting engineers, all subscribers to Title 24; enforcement by local building departments and agencies.	No list of approved solders; approved on case-by-case basis; any solder meeting definition in Uniform Plumbing Code is acceptable
COLORADO	No; will be incorporated into state plumbing code by 6/88.	Public announcement planned via state Health Dept. press release.	No state approval process; as code allows.
CONNECTICUT	YES	Mailings regarding the ban have been sent to trades people and building officials.	No list of approved solders; all other solders meeting lead ban are approved.
DELAWARE	YES, effective 2/1/84.	Information distributed to plumbing trade.	95-5 tin-antimony, Stay Safe 50, silver solders; others pending.
DISTRICT OF COLUMIA	NO, will be achieved by amendment to Code before 6/88.	Enforcement will be joint effort of Dept. of Consumer/Regulatory Affairs, Dept. Public Works, and Dept. Health & Human Services, extensive testing during past 11 mos. for lead in drinking water at request of citizens.	
FLORIDA	NO, State Rule 10D-9 will be adopted as a revision, incorporating ban late 1987.	Mailing of EPA brochure "Lead in Your Drinking Water" sent to districts and counties; will offer workshops for public information; state currently conducting test of water samples from schools to determine lead content of water.	95-5 tin-antimony
GEORGIA	YES, by amendment to state plumbing code 8/87.	Must be adopted by localities (which may have own code or no code) in order to be enforced; enforcement on local level and more or less voluntary, Dept. of Community Affairs has no funding for notification/education, Dept. Natural Resources may do notification, testing.	According to codes which list standards.
HAWAII	NO, not officially, authorizing legislation passed early 1987, in process of writing regulation.	Plans to work through county building departments which have approval processes of their own, no educational programs but will be working with water suppliers who will notify their customers.	No list of approved materials; use materials approved by EPA, American Waterworks Assn., other national agencies and associations
IDAHO	NO, not officially; rules will be promulgated by early 1988, will be effected by code change.	Bureau of Water Quality will provide information and notices. Plumbing Bureau has notified concerned persons of impending code change and ban.	According to code, responsibility of Plumbing Bureau.
ILLINOIS	YES	State-wide seminars offered; news articles, letter to all licensed plumbers, inspections to verify compliance.	Any lead-free solder.
INDIANA	YES; by legislation effective 3/1/87.	Workshops offered to public water works operators and interested parties on health effects of lead, lowering lead content, currently developing guidance public notification to water works utilities and thereby to customers.	Tin-antimony, tin-silver, approval is by plumbing code body.
IOWA	NO; not officially; state plumbing code has been amended, necessary design standards and rule revisions currently being developed and implemented.	None to date; anticipate issuing news releases.	State does not test or approve solders, whatever is approved by appropriate state or federal agency is allowed.

STATE-BY-STATE STATUS OF LEAD BAN (ENACTMENT, NOTIFICATION, AND ALTERNATIVE SOLDERS)

STATE	Has your state banned use of solder containing more than 0.2% lead for use in installation of potable water systems?	If so, what further action is being taken by your state to inform/educate and enforce the lead solder ban?	What alternative solders are currently approved for use in potable water installations in your state?
KANSAS	NO, bill introduced in 1987 legislative session did not pass, will be considered in 1988 session. If it passes, will become state law 7/1/88.	None at this time.	Not applicable, this is a local issue.
KENTUCKY	NO, expect approval by end of 1987, regulation has been instituted, subject to public hearing.	Upon approval, public notice will be provided in the Administrative Register which is sent to all concerned persons.	All new materials are subject to approval by plumbing codes committee. 3 currently approved.
LOUISIANA	NO, not officially, will amend Chapter 14 of state sanitary code in 1988.	State Plumbing Board will include information concerning lead ban in state licensing exam, let' campaign to plumbers; state PHCC will advise members, no state requirements that plumbing systems be inspected, workshops on SDWA attended by water purveyors.	No approval requirements.
MAINE	YES, effective 8/18/87, by Dept Rule; code has been amended.	Training programs conducted for plumbing inspectors, information on solder testing kits disseminated to plumbing inspectors; meetings with plumbing industry groups; public hearing held when code amended, enforcement will be on local level by plumbing inspectors.	Will accept any solder with less than 0.2% lead which is accepted by nationally recognized testing agency.
MARYLAND	YES, effective 6/16/86.	Training seminars for plumbers as part of lead abatement program; pamphlets distributed to county health departments, libraries, enforcement by state plumbing board and local boards with checks for presence of lead in solder on jobs sites.	Not into approval process, will wait for 1988 Federal requirements.
MASSACHUSETTS	YES, effective 1/1/86.	All inspectors have kits to test for lead; seminar held to distribute kits.	Must be tested by state, given 1-year provisional approval, extensions on 3-yr. basis.
MICHIGAN	NO, not officially, amendment to Construction Code Act will prohibit, action expected by end of 1987.	Mass mailing to plumbing contractors planned, seminars and meetings for utility people; joint health advisory issued two years ago recommending end to use of lead-based solders, will enforce during inspection but not with specific tests.	Under state plumbing code, Stay-Safe and 95-5 tin-antimony officially recognized.
MINNESOTA	YES.	Educational/information activities, on site inspections.	95-5 silver solder.
MISSISSIPPI	NO, not officially, though Health Dept. considers the ban to be in effect, no state plumbing code.	Health Dept. has no way to enforce, has sent pamphlets to public water supply systems, may draft letter to send to suppliers asking them to notify customers, however, state has no mechanism to make ban official and no way to enforce lead ban.	All solders with less than 0.2% lead.
MISSOURI	NO, efforts to pass legislation have failed thus far.	None at present time except for some limited sampling studies to determine if a problem exists.	Those accepted under Federal Plumbing Code.
MONTANA	NO, now in process of writing rules.	None at this time.	Solders containing less than 0.2% lead will be approved.
NEBRASKA	NO, legislation introduced last session but not acted upon, held over for 1988 session.	None.	Not yet considered, uses EPA list of approved materials as general guide.
NEVADA	NO, hearing process required with State Board of Health, anticipated by end of 1987.	State and county health agencies currently advising public water systems and public in general concerning potential for lead contamination in drinking water.	Stay-Safe 50 (J.W. Harris).
NEW HAMPSHIRE	YES, 1987 State Code amended 6/1/87.	Amendments to and new requirements in 1987 State Code presented and discussed in continuing education seminar program required for all licensed plumbers prior to renewal of licenses. Study effort underway to introduce legislation to fund testing kit program for local inspectors to guarantee enforcement.	Only no-lead solders meeting ASTM B32 standard. The following list of approved manufacturers was provided: Canfield, Bow, Engelhard Silvabrite and Silvabrite "S," Stay Brite and Stay Brite #8 (Harris), New England Smelting Works, Inc., Taracorp Wire Dutchboy Solder 1# SPS, Willard Lead Products Co., Hercules Chemical Co., Federated-Fry Metals Silverflow (SF-1) and Spitfire 472 (Victor Equip. Co.), Hirsch Metals, Buffalo Lead & Solder, Inc.

STATE-BY-STATE STATUS OF LEAD BAN (ENACTMENT, NOTIFICATION, AND ALTERNATIVE SOLDERS)

STATE	Has your state banned use of solder containing more than 0.2% lead for use in installation of potable water systems?	If so, what further action is being taken by your state to inform/educate and enforce the lead solder ban?	What alternative solders are currently approved for use in potable water installations in your state?
NEW JERSEY	YES, effective 2/2/87; by amendment to Uniform Construction Code, Plumbing Subcode.	State Dept. of Community Affairs issued information bulletin to all local code offical in state concerning amendment.	Any lead-free solder/flux acceptable, no list of approved alternatives.
NEW MEXICO	YES	Data being collected on lead levels; public notice requirements are being reviewed.	
NEW YORK	YES, by legislation effective 1/86, also by amendment to state plumbing code.	Legislation also passed requiring warning labels on lead solders; enforcement will be by Dept. of State.	Any solder containing less than 0.2% lead.
NORTH CAROLINA	YES, prohibited by plumbing code under state building code as of 12/86.	State Health Director issued press release recommending revision, planned notifications to all public drinking water systems.	No resistance expected to use of available lead-free solders.
NORTH DAKOTA	NO; formal request to state plumbing board to address ban not yet acted upon.		
OHIO	NO, not yet. Ohio plumbing code being revised, revision will be effective approximately 9/87 and will incorporate lead ban.	Ohio EPA does not plan to do anything to ban lead solders until Federal regulations are final.	According to Ohio Plumbing Code.
OKLAHOMA	YES, State Health Dept. Plumbing Division has notified all licensed plumbers and plumbing inspectors that use of all materials banned by SDWA will be illegal in all areas of state not governed by locally adopted plumbing code, recommendation made to jurisdictions with local codes to comply with state mandate.	Educational and informational action taken by plumbing field investigators on a continual basis by presentations to governmental entities and individuals; enforcement during job site inspections.	Any solder which conforms to ASTM B-32, use of new solders such as Canfield, Silvabrite, Stay-Safe recommended but use may be restricted by local jurisdictions.
OREGON	YES, effective 9/4/84, adopted OAR 333-61-087 which prohibits use of lead solders unless specific water system granted exemption by Health Division.	Free code classes throughout state given by plumbing section of State Building Codes Division, classes attended by contractors, journeyman plumbers, apprentices, plumbing inspectors, etc., monthly informational pamphlet, the "Code Scoop," serves to inform and educate users of Oregon State Plumbing Code.	Recognizes nationally-recognized listing agencies such as ASTM B-32 or FSQQ-S571e for tin alloy solder, manufacturers may submit test data from recognized testing lab to State Plbg. Bd. for evaluation and acceptance of specific product, Plbg Bd. recommendations kept on file at Dept. of Commerce in Bldg. Codes Division.
PENNSYLVANIA	NO, drafting legislation which will ban use and sale of most leaded materials, target 6/88 or sooner.	Developing strategy to implement and enforce lead ban legislation which will include public education programs.	No list of approved solders and fluxes, will rely on third party, e.g. EPA or National Sanitation Foundation.
RHODE ISLAND	YES	None	Regulated by R.I. Building Commission.
SOUTH CAROLINA	NO, not officially, must still revise the Primary State Drinking Water Regulations in order to make the ban official.	No state plumbing code (although one soon to be adopted which incorporates lead ban), many counties without plumbing code. Dept. Health has written letters to consulting engineers, will send general press release plus one to public water utilities, notification to building code inspectors is possible.	No approval system of their own, will use EPA's.
SOUTH DAKOTA	YES, effective 9/1/87.	Press releases will be issued to trade newsletters.	All solders containing less than 0.2% lead.
TENNESSEE	NO, no state plumbing code, no cost-effective method of state enforcement of lead ban, local codes depts. being encouraged to adopt ban.	SDWA public lead notifications by public water suppliers will place increased pressure on local codes depts. to adopt lead ban, effort to warn codes depts. of upcoming notification.	Function of local codes departments.

STATE-BY-STATE STATUS OF LEAD BAN (ENACTMENT, NOTIFICATION, AND ALTERNATIVE SOLDERS)

STATE	Has your state banned use of solder containing more than 0.2% lead for use in installation of potable water systems?	If so, what further action is being taken by your state to inform/educate and enforce the lead solder ban?	What alternative solders are currently approved for use in potable water installations in your state?
TEXAS	NO, current rules do not give authority to enforce ban; rules revision underway; anticipated early 1988; will be waiver for lead joints necessary for repair of cast iron pipes	Public water systems will be required to adopt program regulations to prohibit undesirable plumbing practices, including use of lead solders/pipes, and to make provisions for enforcement of regulations; Department of Health will distribute EPA pamphlet, "Lead in Drinking Water" and will provide technical assistance to systems or individuals requesting it; any additional effort will depend on lead levels detected and availability of materials and funds; Dept. will retain primary enforcement authority. Non-compliance will be considered a violation with penalties of $10-200 per violation. (Each item of non-compliance will be a separate violation and each day of violation a separate offense.)	Tin-antimony; tin-silver; subject to local plumbing regulations
UTAH	NO, not officially, will be done by Uniform Plumbing Code Amendment prior to 7/88	State Health Dept. will work out draft press release for water systems; enforcement will be by local building inspectors and plumbing inspectors. Health Dept. will write suggested press release.	Will allow whatever Uniform Plumbing Code allows
VERMONT	NO, not yet, legislation introduced last term not passed; will be carried over to next session	One bill pending to make ban apply to all homes, and one bill to ban lead solder in homes connected to public water supply systems; attempt underway to get Plumbing Board to adopt prohibition in plumbing code. Health Department and Plumbers Examining Board in position to provide notification.	
VIRGINIA	YES, 1984 Uniform Statewide Building Code prohibits use of solder or flux exceeding 0.2% lead, effective 4/1/86		Solders conforming to ASTM B-32 except those containing more than 0.2% lead
WASHINGTON	YES; by modification to Uniform Plumbing Code, effective early 1987	Negotiating with EPA on notification requirements, enforcement and labeling requirements being developed, technical workshop will be held in May of 1988 for water utilities to instruct them in preparation of notifications	
WEST VIRGINIA	YES, by policy memo, regulation being developed	Model public notification form being developed with cooperation of local water companies, mailings, public meeting, and newsletters are in planning stage	Any solder which meets lead ban requirements
WISCONSIN	YES, by Emergency Rule 9/84 by Code Amendment 3/85, code change on pipes proposed	Educational seminars for plumbers, inspectors, contractors, architectural designers, other interested persons, published article in newsletter circulated to plumbers, plumbing inspectors, etc.	Has approval process, has approved Bow 100% Waterpure, 100% Watersafe by Canfield, Stay-Safe 50 by Harris, and Safe Flow by Oatey
WYOMING	NO, state does not have primacy of SDWA and does not have the authority to regulate lead solder		

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99th Congress
2d Session | COMMITTEE PRINT | S. PRT.
99-204

THE SAFE DRINKING WATER ACT

AS AMENDED BY

THE SAFE DRINKING WATER ACT AMENDMENTS OF 1986

(PUBLIC LAW 99-339, JUNE 19, 1986)

DECEMBER 1986

Lead in Plumbing
See pp 22-23.

Printed for the use of the Senate Committee
on Environment and Public Works

U.S. GOVERNMENT PRINTING OFFICE
62-066 O WASHINGTON : 1986

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

CONTENTS

NOTE

Amendments made by Public Law 99-339 are shown as follows: Language to be omitted is struck through; new language is printed in italic; language in which there is no change is printed in roman.

SHORT TITLE

SECTION 1. This Act may be cited as the ~~"Safe Drinking Water Act"~~, *"Safe Drinking Water Act Amendments of 1986"*.

PUBLIC WATER SYSTEMS

SEC. 2. (a) The Public Health Service Act is amended by inserting after title XIII the following new title:

TITLE XIV—SAFETY OF PUBLIC WATER SYSTEMS [1]

PART A—DEFINITIONS

DEFINITIONS

SEC. 1401. For purposes of this title:

(1) The term "primary drinking water regulation" means a regulation which—

(A) applies to public water systems;

(B) specifies contaminants which, in the judgment of the Administrator, may have any adverse effect on the health of persons;

(C) specifies for each such contaminant either—

(i) a maximum contaminant level, if, in the judgment of the Administrator, it is economically and technologically feasible to ascertain the level of such contaminant in water in public water systems, or

(ii) if, in the judgment of the Administrator, it is not economically or technologically feasible to so ascertain the level of such contaminant, each treatment technique known to the Administrator which leads to a reduction in the level of such contaminant sufficient to satisfy the requirements of section 1412; and

(D) contains criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels; including quality control

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[1] Includes the Safe Drinking Water Act (42 U.S.C. 300f et seq.) P.L. 93-523, Dec. 16, 1974, the Safe Drinking Water Amendments of 1977, P.L. 95-190, Nov. 16, 1977, the Safe Drinking Water Act Amendments of 1979, P.L. 96-63, Sept. 6, 1979, the Safe Drinking Water Act Amendments of 1980, P.L. 96-502, Dec. 5, 1980, and the Safe Drinking Water Act Amendments of 1986, P.L. 99-339, June 19, 1986

and testing procedures to insure compliance with such levels and to insure proper operation and maintenance of the system, and requirements as to (i) the minimum quality of water which may be taken into the system and (ii) siting for new facilities for public water systems.

(2) The term "secondary drinking water regulation" means a regulation which applies to public water systems and which specifies the maximum contaminant levels which, in the judgment of the Administrator, are requisite to protect the public welfare. Such regulations may apply to any contaminant in drinking water (A) which may adversely affect the odor or appearance of such water and consequently may cause a substantial number of the persons served by the public water system providing such water to discontinue its use, or (B) which may otherwise adversely affect the public welfare. Such regulations may vary according to geographic and other circumstances.

(3) The term "maximum contaminant level" means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

(4) The term "public water system" means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals. Such term includes (A) any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system, and (B) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

(5) The term "supplier of water" means any person who owns or operates a public water system.

(6) The term "contaminant" means any physical, chemical, biological, or radiological substance or matter in water.

(7) The term "Administrator" means the Administrator of the Environmental Protection Agency.

(8) The term "Agency" means the Environmental Protection Agency.

(9) The term "Council" means the National Drinking Water Advisory Council established under section 1446.

(10) The term "municipality" means a city, town, or other public body created by or pursuant to State law, or an ~~Indian tribal organization authorized by law~~ *Indian tribe*.

(11) The term "Federal agency" means any department, agency, or instrumentality of the United States.

(12) The term "person" means an individual, corporation, company, association, partnership, State, municipality, or Federal agency (and includes officers, employees, and agents of any corporation, company, association, State, municipality, or Federal agency).

(13) The term "State" includes, in addition to the several States, only the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Northern Mariana Islands, the Virgin Islands, American Samoa, and the Trust Territory of the Pacific Islands.

(14) The term "Indian Tribe" means any Indian tribe having a federally recognized governing body carrying out substantial governmental duties and powers over any area.

PART B—PUBLIC WATER SYSTEMS

COVERAGE

SEC. 1411. Subject to sections 1415 and 1416, national primary drinking water regulations under this part shall apply to each public water system in each State; except that such regulations shall not apply to a public water system—

(1) which consists only of distribution and storage facilities (and does not have any collection and treatment facilities);

(2) which obtains all of its water from, but is not owned or operated by, a public water system to which such regulations apply;

(3) which does not sell water to any person; and

(4) which is not a carrier which conveys passengers in interstate commerce.

NATIONAL DRINKING WATER REGULATIONS

~~SEC. 1412. (a)(1) The Administrator shall publish proposed national interim primary drinking water regulations within 90 days after the date of enactment of this title. Within 180 days after such date of enactment, he shall promulgate such regulations with such modifications as he deems appropriate. Regulations under this paragraph may be amended from time to time.~~

~~(2) National interim primary drinking water regulations promulgated under paragraph (1) shall protect health to the extent feasible, using technology, treatment techniques, and other means, which the Administrator determines are generally available (taking costs into consideration) on the date of enactment of this title.~~

~~(3) The interim primary regulations first promulgated under paragraph (1) shall take effect eighteen months after the date of their promulgation.~~

SEC. 1412. (a)(1) Effective on the enactment of the Safe Drinking Water Act Amendments of 1986, each national interim or revised primary drinking water regulation promulgated under this section before such enactment shall be deemed to be a national primary drinking water regulation under subsection (b). No such regulation shall be required to comply with the standards set forth in subsection (b)(4) unless such regulation is amended to establish a different maximum contaminant level after the enactment of such amendments.

(2) After the enactment of the Safe Drinking Water Act Amendments of 1986 each recommended maximum contaminant level published before the enactment of such amendments shall be treated as a maximum contaminant level goal.

(3) Whenever a national primary drinking water regulation is proposed under paragraph (1), (2), or (3) of subsection (b) for any contaminant, the maximum contaminant level goal for such contaminant shall be proposed simultaneously. Whenever a national primary drinking water regulation is promulgated under paragraph (1), (2), or (3) of subsection (b) for any contaminant, the maximum

contaminant level goal for such contaminant shall be published simultaneously.

(4) Paragraph (3) shall not apply to any recommended maximum contaminant level published before the enactment of the Safe Drinking Water Act Amendments of 1986.

~~(b)(1)(A) Within 10 days of the date of the report on the study conducted pursuant to subsection (c) is submitted to Congress, the Administrator shall publish in the Federal Register, and provide opportunity for comment on, the—~~

~~(i) proposals in the report for recommended maximum contaminant levels for national primary drinking water regulations; and~~

~~(ii) list in the report of contaminants the levels of which in drinking water cannot be determined but which may have an adverse effect on the health of persons.~~

~~(B) Within 90 days after the date the Administrator makes the publication required by subparagraph (A), he shall by rule establish recommended maximum contaminant levels for each contaminant which, in his judgment based on the report on the study conducted pursuant to subsection (c), may have any adverse effect on the health of persons. Each such recommended maximum contaminant level shall be set at a level at which, in the Administrator's judgment based on such report, no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety. In addition, he shall, on the basis of the report on the study conducted pursuant to subsection (c), list in the rules under this subparagraph any contaminant the level of which cannot be accurately enough measured in drinking water to establish a recommended maximum contaminant level and which may have any adverse effect on the health of persons. Based on information available to him, the Administrator may by rule change recommended levels established under this subparagraph or change such list.~~

~~(2) On the date the Administrator establishes pursuant to paragraph (1)(B) recommended maximum contaminant levels he shall publish in the Federal Register proposed revised national primary drinking water regulations (meeting the requirements of paragraph (3)). Within 180 days after the date of such proposed regulations, he shall promulgate such revised drinking water regulations with such modifications as he deems appropriate.~~

~~(3) Revised national primary drinking water regulations promulgated under paragraph (2) of this subsection shall be primary drinking water regulations which specify a maximum contaminant level or require the use of treatment techniques for each contaminant for which a recommended maximum contaminant level is established or which is listed in a rule under paragraph (1)(B). The maximum contaminant level specified in a revised national primary drinking water regulation for a contaminant shall be as close to the recommended maximum contaminant level established under paragraph (1)(B) for such contaminant as is feasible. A required treatment technique for a contaminant for which a recommended maximum contaminant level has been established under paragraph (1)(B) shall reduce such contaminant to a level which is as close to the recommended maximum contaminant level for such contaminant as is feasible. A required treatment technique for a contaminant which is listed under paragraph (1)(B) shall require treatment necessary in the Administrator's judgment to prevent known or anticipated adverse effects on the health of persons to the extent feasible. For purposes of this paragraph, the term feasible means feasible with the use of the best technology, treatment techniques, and other means, which the Administrator finds are generally available (taking cost into consideration).~~

(b)(1) In the case of those contaminants listed in the Advance Notice of Proposed Rulemaking published in volume 47, Federal Register, page 9352, and in volume 48, Federal Register, page 45502, the Administrator shall publish maximum contaminant level goals and promulgate national primary drinking water regulations—

(A) not later than 12 months after the enactment of the Safe Drinking Water Act Amendments of 1986 for not less than 9 of those listed contaminants;

(B) not later than 24 months such enactment for not less than 40 of those listed contaminants; and

(C) not later than 36 months after such enactment for the remainder of such listed contaminants.

(2)(A) If the Administrator identifies a drinking water contaminant the regulation of which, in the judgment of the Administrator, is more likely to be protective of public health (taking into account the schedule for regulation under paragraph (1)) than a contaminant referred to in paragraph (1), the Administrator may publish a maximum contaminant level goal and promulgate a national primary drinking water regulation for such identified contaminant in lieu of regulating the contaminant referred to in such paragraph. There may be no more than 7 contaminants in paragraph (1) for which substitutions may be made. Regulation of a contaminant identified under this paragraph shall be in accordance with the schedule applicable to the contaminant for which the substitution is made.

(B) If the Administrator identifies one or more contaminants for substitution under this paragraph, the Administrator shall publish in the Federal Register not later than one year after the enactment of the Safe Drinking Water Act Amendments of 1986 a list of contaminants proposed for substitution, the contaminants referred to in paragraph (1) for which substitutions are to be made, and the basis for the judgment that regulation of such proposed substitute contaminants is more likely to be protective of public health (taking into account the schedule for regulation under such paragraph). Following a period of 60 days for public comment, the Administrator shall publish in the Federal Register a final list of contaminants to be substituted and contaminants referred to in paragraph (1) for which substitutions are to be made, together with responses to significant comments.

(C) Any contaminant referred in paragraph (1) for which a substitution is made, pursuant to subparagraph (A) of this paragraph, shall be included on the priority list to be published by the Administrator not later than January 1, 1988, pursuant to paragraph (3)(A).

(D) The Administrator's decision to regulate a contaminant identified pursuant to this paragraph in lieu of a contaminant referred to in paragraph (1) shall not be subject to judicial review.

(3)(A) The Administrator shall publish maximum contaminant level goals and promulgate national primary drinking water regulations for each contaminant (other than a contaminant referred to in paragraph (1) or (2) for which a national primary drinking water regulation was promulgated) which, in the judgment of the Administrator, may have any adverse effect on the health of persons and which is known or anticipated to occur on the health of persons and

which is known or anticipated to occur in public water systems. Not later than January 1, 1988, and at 3 year intervals thereafter, the Administrator shall publish a list of contaminants which are known or anticipated to occur in public water systems and which may require regulation under this Act.

(B) For the purpose of establishing the list under subparagraph (A), the Administrator shall form an advisory working group including members from the National Toxicology Program and the Environmental Protection Agency's Offices of Drinking Water, Pesticides, Toxic Substances, Ground Water, Solid Waste and Emergency Response and any others the Adminstrator deems appropriate. The Administrator's consideration of priorities shall include, but not be limited to, substances referred to in section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, and substances registered as pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act.

(C) Not later than 24 months after the listing of contaminants under subparagraph (A), the Administrator shall publish proposed maximum contamination level goals and national primary drinking water regulations for not less than 25 contaminants from the list established under subparagraph (A).

(D) Not later than 36 months after the listing of contaminants under subparagraph (A), the Administrator shall publish a maximum contaminant goal and promulgate a national primary drinking water regulation for those contaminants for which proposed maximum contaminant level goals and proposed national primary drinking water regulations were published under subparagraph (C).

(4) Each maximum contaminant level goal established under this subsection shall be set at the level at which no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety. Each national primary drinking water regulation for a contaminant for which a maximum contaminant level goal is established under this subsection shall specify a maximum level for such contaminant which is as close to the maximum contaminant level goal as is feasible.

(5) For the purposes of this subsection, the term "feasible" means feasible with the use of the best technology, treatment techniques and other means which the Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available (taking cost into consideration). For the purpose of paragraph (4), granular activated carbon is feasible for the control of synthetic organic chemicals, and any technology, treatment technique, or other means found to be the best available for the control of synthetic organic chemicals must be at least as effective in controlling synthetic organic chemicals as granular activated carbon.

(6) Each national primary drinking water regulation which establishes a maximum contaminant level shall list the technology, treatment techniques, and other means which the Administrator finds to be feasible for purposes of meeting such maximum contaminant level, but a regulation under this paragraph shall not require that any specified technology, treatment technique, or other means be used for purposes of meeting such maximum contaminant level.

(7)(A) The Administrator is authorized to promulgate a national primary drinking water regulation that requires the use of a treatment technique in lieu of establishing a maximum contaminant level, if the Administrator makes a finding that it is not economically or technologically feasible to ascertain the level of the contaminant. In such case, the Administrator shall identify those treatment techniques which, in the Administrator's judgment, would prevent known or anticipated adverse effects on the health of persons to the extent feasible. Such regulations shall specify each treatment technique known to the Administrator which meets the requirements of this paragraph, but the Administrator may grant a variance from any specified treatment techniques in accordance with section 1415(a)(3).

(B) Any schedule referred to in this subsection for the promulgation of a national primary drinking water regulation for any contaminant shall apply in the same manner if the regulation requires a treatment technique in lieu of establishing a maximum contaminant level.

(C)(i) Not later than 18 months after the enactment of the Safe Drinking Water Act Amendments of 1986, the Administrator shall propose and promulgate national primary drinking water regulations specifying criteria under which filtration (including coagulation and sedimentation, as appropriate) is required as a treatment technique for public water systems supplied by surface water sources. In promulgating such rules, the Administrator shall consider the quality of source waters, protection afforded by watershed management, treatment practices (such as disinfection and length of water storage) and other factors relevant to protection of health.

(ii) In lieu of the provisions of section 1415 the Administrator shall specify procedures by which the State determines which public water systems within its jurisdiction shall adopt filtration under the criteria of clause (i). The State may require the public water system to provide studies or other information to assist in this determination. The procedures shall provide notice and opportunity for public hearing on this determination. If the State determines that filtration is required, the State shall prescribe a schedule for compliance by the public water system with the filtration requirement. A schedule shall require compliance within 18 months of a determination made under clause (iii).

(iii) Within 18 months from the time that the Administrator establishes the criteria and procedures under this subparagraph, a State with primary enforcement responsibility shall adopt any necessary regulations to implement this subparagraph. Within 18 months of adoption of such regulations the State shall make determinations regarding filtration for all the public water systems within its jurisdiction supplied by surface waters.

(iv) If a State does not have primary enforcement responsibility for public water systems, the Administrator shall have the same authority to make the determination in clause (ii) in such State as the State would have under that clause. Any filtration requirement or schedule under this subparagraph shall be treated as if it were a requirement of a national primary drinking water regulation.

(8) Not later than 36 months after the enactment of the Safe Drinking Water Act Amendments of 1986, the Administrator shall

propose and promulgate national primary drinking water regulations requiring disinfection as a treatment technique for all public water systems. The Administrator shall simultaneously promulgate a rule specifying criteria that will be used by the Administrator (or delegated State authorities) to grant variances from this requirement according to the provisions of sections 1415(a)(1)(B) and 1415(a)(3). In implementing section 1442(g) the Administrator or the delegated State authority shall, where appropriate, give special consideration to providing technical assistance to small public water systems in complying with the regulations promulgated under this paragraph.

(4) *(9)* Revised national *National* primary drinking water regulations shall be amended whenever changes in technology, treatment techniques, and other means permit greater protection of the health of persons, but in any event such regulations shall be reviewed at least once every 3 years.

Such review shall include an analysis of innovations or changes in technology, treatment techniques or other activities that have occurred over the previous 3-year period and that may provide for greater protection of the health of persons. The findings of such review shall be published in the Federal Register. If, after opportunity for public comment, the Administrator concludes that the technology, treatment techniques, or other means resulting from such innovations or changes are not feasible within the meaning of paragraph (5), an explanation of such conclusion shall be published in the Federal Register.

(5) *(10)* Revised national *National* primary drinking water regulations promulgated under this subsection (and amendments thereto) shall take effect eighteen months after the date of their promulgation. Regulations under subsection (a) shall be superseded by regulations under this subsection to the extent provided by the regulations under this subsection.

(6) *(11)* No national primary drinking water regulation may require the addition of any substance for preventive health care purposes unrelated to contamination of drinking water.

(c) The Administrator shall publish proposed national secondary drinking water regulations within 270 days after the date of enactment of this title. Within 90 days after publication of any such regulation, he shall promulgate such regulation with such modifications as he deems appropriate. Regulations under this subsection may be amended from time to time.

(d) Regulations under this section shall be prescribed in accordance with section 553 of title 5, United States Code (relating to rulemaking), except that the Administrator shall provide opportunity for public hearing prior to promulgation of such regulations. In proposing and promulgating regulations under this section, the Administrator shall consult with the Secretary and the National Drinking Water Advisory Council.

(e)(1) The Administrator shall enter into appropriate arrangements with the National Academy of Sciences (or with another independent scientific organization if appropriate arrangements cannot be made with such Academy) to conduct a study to determine (A) the maximum contaminant levels which should be recommended under subsection (b)(2) in order to protect the health of persons from any known or anticipated adverse effects, and (B) the existence of any

contaminants the levels of which in drinking water cannot be determined but which may have an adverse effect on the health of persons.

(2) The result of the study shall be reported to Congress no later than 2 years after the date of enactment of this title, and revisions thereof reflecting new information which has become available since the most recent previous report shall be reported to the Congress each two years thereafter. The report shall contain (A) a summary and evaluation of relevant publications and unpublished studies; (B) a statement of methodologies and assumptions for estimating the levels at which adverse health effects may occur; (C) a statement of methodologies and assumptions for estimating the margin of safety which should be incorporated in the national primary drinking water regulations; (D) proposals for recommended maximum contaminant levels for national primary drinking water regulations, based on the methodologies, assumptions, and studies referred to in clauses (A), (B), and (C) and in paragraph (4); (E) a list of contaminants the level of which in drinking water cannot be determined but which may have an adverse effect on the health of persons; (F) recommended studies and test protocols for future research on the health effects of drinking water contaminants, including a list of the major research priorities and estimated costs necessary to conduct such priority research; (G) periodic assessments and evaluations of unregulated contaminants which may require continuous monitoring or regulations.

(3) In developing its proposals for recommended maximum contaminant level under paragraph (2)(D) the National Academy of Sciences (or other organization preparing the report) shall evaluate and explain (separately and in composite) the impact of the following considerations:

(A) The existence of groups or individuals in the population which are more susceptible to adverse effects than the normal healthy adult.

(B) The exposure to contaminants in other media than drinking water (including exposures in food, in the ambient air, and in occupational settings) and the resulting body burden of contaminants.

(C) Synergistic effects resulting from exposure to or interaction by two or more contaminants.

(D) The contaminant exposure and body burden levels which alter physiological function or structure in a manner reasonably suspected of increasing the risk of illness.

(4) In making the study under this subsection, the National Academy of Sciences (or other organization) shall collect and correlate (A) morbidity and mortality data and (B) monitored data on the quality of drinking water. Any conclusions based on such correlation shall be included in the report of the study.

(5) Neither the report of the study under this subsection nor any draft of such report shall be submitted to the Office of Management and Budget or to any other Federal agency (other than the Environmental Protection Agency) prior to its submission to Congress.

(6) Of the funds authorized to be appropriated to the Administrator by this title, such amounts as may be required shall be available to carry out the study and to make the report directed by paragraph (2) of this subsection.

(e) The Administrator shall request comments from the Science Advisory Board (established under the Environmental Research, Development, and Demonstration Act of 1978) prior to proposal of a maximum contaminant level goal and national primary drinking water regulation. The Board shall respond, as it deems appropriate, within the time period applicable for promulgation of the national primary drinking water standard concerned. This subsection shall,

under no circumstances, be used to delay final promulgation of any national primary drinking water standard.

STATE PRIMARY ENFORCEMENT RESPONSIBILITY

SEC. 1413. (a) For purposes of this title, a State has primary enforcement responsibility for public water systems during any period for which the Administrator determines (pursuant to regulations prescribed under subsection (b)) that such State—

(1) Has adopted drinking water regulations which ~~(A) in the case of the period beginning on the date the national interim primary drinking water regulations are promulgated under section 1412 and ending on the date such regulations take effect are no less stringent than such regulations, and (B) in the case of the period after such effective date are no less stringent than the interim and revised national primary drinking water regulations in effect under such section;~~ *are no less stringent than the national primary drinking water regulations in effect under sections 1412(a) and 1412(b);*

(2) has adopted and is implementing adequate procedures for the enforcement of such State regulations, including conducting such monitoring and making such inspections as the Administrator may require by regulation;

(3) will keep such records and make such reports with respect to its activities under paragraphs (1) and (2) as the Administrator may require by regulation;

(4) if it permits variances or exemptions, or both, from the requirements of its drinking water regulations which meet the requirements of paragraph (1), permits such variances and exemptions under conditions and in a matter which is not less stringent than the conditions under, and the manner in, which variances and exemptions may be granted under sections 1415 and 1416; and

(5) has adopted and can implement an adequate plan for the provision of safe drinking water under emergency circumstances.

(b)(1) The Administrator shall, by regulation (proposed within 180 days of the date of the enactment of this title), prescribe the manner in which a State may apply to the Administrator for a determination that the requirements of paragraphs (1), (2), (3), and (4) of subsection (a) are satisfied with respect to the State, the manner in which the determination is made, the period for which the determination will be effective, and the manner in which the Administrator may determine that such requirements are no longer met. Such regulations shall require that before a determination of the Administrator that such requirements are met or are no longer met with respect to a State may become effective, the Administrator shall notify such State of the determination and the reasons thereof and shall provide an opportunity for public hearing on the determination. Such regulations shall be promulgated (with such modifications as the Administrator deems appropriate) within 90 days of the publication of the proposed regulations in the Federal Register. The Administrator shall promptly notify in writing the chief exectuvie officer of each State of the promulgation of regulations under this paragraph. Such notice shall contain a copy of the

regulations and shall specify a State's authority under this title when it is determined to have primary enforcement responsibility for public water systems.

(2) When an application is submitted in accordance with the Administrator's regulations under paragraph (1), the Administrator shall within 90 days of the date on which such application is submitted (A) make the determination applied for, or (B) deny the application and notify the applicant in writing of the reasons for his denial.

FAILURE BY STATE TO ASSURE ENFORCEMENT OF DRINKING WATER REGULATIONS

SEC. 1414. (a)(1)(A) Whenever the Administrator finds during a period during which a State has primary enforcement responsibility for public water systems (within the meaning of section 1413(a)) that any public water system—

(i) for which a variance under section 1415 or an exemption under section 1416 is not in effect, does not comply with any national primary drinking water regulation in effect under section 1412, or

(ii) for which a variance under section 1415 or an exemption under section 1416 is in effect, does not comply with any schedule or other requirement imposed pursuant thereto,

he shall so notify the State *and such public water system* and provide such advice and technical assistance to such State and public water system as may be appropriate to bring the system into compliance with such regulation or requirement by the earliest feasible time.

~~(B) If the Administrator finds such failure to comply extends beyond the thirtieth day after the date of the notice given pursuant to subparagraph (A), he shall give public notice of such finding and request the State to report within fifteen days from the date of such public notice as to the steps being taken to bring the system into compliance (including reasons for anticipated steps to be taken to bring the system into compliance and for any failure to take steps to bring the system into compliance). If—~~

~~(i) such failure to comply extends beyond the sixtieth day after the date of the notice given pursuant to subparagraph (A); and~~

~~(ii)(a) the State fails to submit the report requested by the Administrator within the time period prescribed by the preceding sentence; or~~

~~(β) the State submits such report within such period but the Administrator, after considering the report, determines that the State abused its discretion in carrying out primary enforcement responsibility for public water systems by both—~~

~~(I) failing to implement by such sixtieth day adequate procedures to bring the system into compliance by the earliest feasible time; and~~

~~(II) failing to assure by such day the provision through alternative means of safe drinking water by the earliest feasible time;~~

~~the Administrator may commence a civil action under subsection (b).~~

(B) If, beyond the thirtieth day after the Administrator's notification under subparagraph (A), the State has not commenced appropriate enforcement action, the Administrator shall issue an order under subsection (g) requiring the public water system to comply

with such regulation or requirement or the Administrator shall commence a civil action under subsection (b).

(2) Whenever, on the basis of information available to him, the Administrator finds during a period during which a State does not have primary enforcement responsibility for public water systems that a public water system in such State—

(A) for which a variance under section 1415(a)(2) or an exemption under section 1416(f) is not in effect, does not comply with any national primary drinking water regulation in effect under section 1412, or

(B) for which a variance under section 1415(a)(2) or an exemption under section 1416(f) is in effect, does not comply with any schedule or other requirement imposed pursuant thereto,

~~he may commence a civil action under subsection (b).~~ *the Administrator shall issue an order under subsection (g) requiring the public water system to comply with such regulation or requirement or the Administrator shall commence a civil action under subsection (b).*

(b) The Administrator may bring a civil action in the appropriate United States district court to require compliance with a national primary drinking water regulation, *with an order issued under subsection (g),* or with any schedule or other requirement imposed pursuant to a variance or exemption granted under section 1415 or 1416 if—

(1) authorized under paragraph (1) or (2) of subsection (a), or

(2) if requested by (A) the chief executive officer of the State in which is located the public water system which is not in compliance with such regulation or requirement, or (B) the agency of such State which has jurisdiction over compliance by public water systems in the State with national primary drinking water regulations or State drinking water regulations.

The court may enter, in an action brought under this subsection, such judgment as protection of public health may require, taking into consideration the time necessary to comply and the availability of alternative water supplies; and, if the court determines that there has been a ~~willful~~ violation of the regulation or schedule or other requirement with respect to which the action was brought, the court may, taking into account the seriousness of the violation, the population at risk, and other appropriate factors, impose on the violator a civil penalty of not to exceed ~~$5,000~~ *$25,000* for each day in which such violation occurs.

(c) Each owner or operator of a public water system shall give notice to the persons served by it—

(1) of any failure on the part of the public water system to—

(A) comply with an applicable maximum contaminant level or treatment technique requirement of, or a testing procedure prescribed by, a national primary drinking water regulation, or

(B) perform monitoring required by section 1445(a), and

(2) if the public water system is subject to a variance granted under section 1415(a)(1)(A) or 1415(a)(2) for an inability to meet a maximum contaminant level requirement or is subject to an exemption granted under section 1416, of—

(A) the existence of such variance or exemption, and

(B) any failure to comply with the requirements of any schedule prescribed pursuant to the variance or exemption.

The Administrator shall by regulation prescribe the form, manner, and frequency for giving notice under this subsection. ~~Notice under the first sentence of this subsection shall be given not less than once every 3 months, shall be given by publication in a newspaper of general circulation serving the area served by each such water system (as determined by the Administrator), shall be furnished to the other communications media serving such area, and shall be furnished to the communications media as soon as practicable after the discovery of the violation with respect to which the notice is required. If the water bills of a public water system are issued more often than once every 3 months such notice shall be included in at least one water bill of the system every 3 months, and if a public water system issues its water bills less often than once every 3 months, such notice shall be included in each of the water bills issued by the system. The Administrator may also require the owner or operator of a public water system to give notice to the persons served by it of contaminant levels of any unregulated contaminant required to be monitored under section 1445(a). Any person who willfully violates this subsection or regulations issued under this subsection shall be fined not more than $5,000.~~ *Within 15 months after the enactment of the Safe Drinking Water Act Amendments of 1986, the Administrator shall amend such regulations to provide for different types and frequencies of notice based on the differences between violations which are intermittent or infrequent and violations which are continuous or frequent. Such regulations shall also take into account the seriousness of any potential adverse health effects which may be involved. Notice of any violation of a maximum contaminant level or any other violation designated by the Administrator as posing a serious potential adverse health effect shall be given as soon as possible, but in no case later than 14 days after the violation. Notice of a continuous violation of a regulation other than a maximum contaminant level shall be given no less frequently than every 3 months. Notice of violations judged to be less serious shall be given no less frequently than annually. The Administrator shall specify the types of notice to be used to provide information as promptly and effectively as possible taking into account both the seriousness of any potential adverse health effects and the likelihood of reaching all affected persons. Notification of violations shall include notice by general circulation newspaper serving the area and, whenever appropriate, shall also include a press release to electronic media and individual mailings. Notice under this subsection shall provide a clear and readily understandable explanation of the violation, any potential adverse health effects, the steps that the system is taking to correct such violation, and the necessity for seeking alternative water supplies, if any, until the violation is corrected. Until such amended regulations are promulgated, the regulations in effect on the date of the enactment of the Safe Drinking Water Act Amendments of 1986 shall remain in effect. The Administrator may also require the owner or operator of a public water system to give notice to the persons served by it of contaminant levels of any unregulated contaminant required to be monitored under section 1445(a). Any person who violates this subsection or regulations issued under this subsection shall be subject to a civil penalty of not to exceed $25,000.*

(d) Whenever, on the basis of information available to him, the Administrator finds that within a reasonable time after national secondary drinking water regulations have been promulgated, one or more public water systems in a State do not comply with such secondary regulations, and that such noncompliance appears to result from a failure of such State to take reasonable action to assure that public water systems throughout such State meet such secondary regulations, he shall so notify the State.

(e) Nothing in this title shall diminish any authority of a State or political subdivision to adopt or enforce any law or regulation respecting drinking water regulations or public water systems, but no such law or regulation shall relieve any person of any requirement otherwise applicable under this title.

(f) If the Administrator makes a finding of noncompliance (described in subparagraph (A) or (B) of subsection (a)(1) with respect to a public water system in a State which has primary enforcement responsibility, the Administrator may, for the purpose of assisting that State in carrying out such responsibility and upon the petition of such State or public water system or persons served by such system, hold, after appropriate notice, public hearings for the purpose of gathering information from technical or other experts, Federal, State, or other public officials, representatives of such public water system, persons served by such system, and other interested persons on—

(1) the ways in which such system can within the earliest feasible time be brought into compliance with the regulation or requirement with respect to which such finding was made, and

(2) the means for the maximum feasible protection of the public health during any period in which such system is not in compliance with a national primary drinking water regulation or requirement applicable to a variance or exemption.

On the basis of such hearings the Administrator shall issue recommendations which shall be sent to such State and public water system and shall be made available to the public and communications media.

(g)(1) In any case in which the Administrator is authorized to bring a civil action under this section or under section 1445 with respect to any regulation, schedule, or other requirement, the Administrator also may issue an order to require compliance with such regulation, schedule, or other requirement.

(2) An order issued under this subsection shall not take effect until after notice and opportunity for public hearing and, in the case of a State having primary enforcement responsibility for public water systems in that State, until after the Administrator has provided the State with an opportunity to confer with the Administrator regarding the proposed order. A copy of any order proposed to be issued under this subsection shall be sent to the appropriate State agency of the State involved if the State has primary enforcement responsibility for public water systems in that State. Any order issued under this subsection shall state with reasonable specificity the nature of the violation. In any case in which an order under this subsection is issued to a corporation, a copy of such order shall be issued to appropriate corporate officers.

(3)(A) Any person who violates, or fails or refuses to comply with, an order under this subsection shall be liable to the United States for a civil penalty of not more than $25,000 per day of violation.

(B) Whenever any civil penalty sought by the Administrator under this paragraph does not exceed a total of $5,000, the penalty shall be assessed by the Administrator after notice and opportunity for a hearing on the record in accordance with section 554 of title 5 of the United States Code.

(C) Whenever any civil penalty sought by the Administrator under this paragraph exceeds $5,000, the penalty shall be assessed by a civil action brought by the Administrator in the appropriate United States district court (as determined under the provisions of title 28 of the United States Code).

(D) If any person fails to pay an assessment of a civil penalty after it has become a final and unappealable order, or after the appropriate court of appeals has entered final judgment in favor of the Administrator, the Attorney General shall recover the amount for which such person is liable in any appropriate district court of the United States. In any such action, the validity and appropriateness of the final order imposing the civil penalty shall not be subject to review.

VARIANCES

SEC. 1415. (a) Notwithstanding any other provision of this part, variances from national primary drinking water regulations may be granted as follows:

(1)(A) A State which has primary enforcement responsibility for public water systems may grant one or more variances from an applicable national primary drinking water regulation to one or more public water systems within its jurisdiction, which, because of characteristics of the raw water sources which are reasonably available to the systems, cannot meet the requirements respecting the maximum contaminant levels of such drinking water regulation. ~~Despite~~ *A variance may only be issued to a system after the system's* application of the best technology, treatment techniques, or other means, which the Administrator finds are ~~generally~~ available (taking costs into consideration). *The Administrator shall propose and promulgate his finding of the best available technology, treatment techniques or other means available for each contaminant for purposes of this subsection at the time he proposes and promulgates a maximum contaminant level for each such contaminant. The Administrator's finding of best available technology, treatment techniques or other means for purposes of this subsection may vary depending on the number of persons served by the system or for other physical conditions related to engineering feasibility and costs of compliance with maximum contaminant levels as considered appropriate by the Administrator.* Before a State may grant a variance under this subparagraph, the State must find that the variance will not result in an unreasonable risk to health. If a State grants a public water system a variance under this subparagraph the State shall prescribe ~~within~~

one year ~~of the date~~ *at the time* variance is granted, a schedule for—

(i) compliance (including increments of progress) by the public water system with each contaminant level requirement with respect to which the variance was granted, and

(ii) implementation by the public water system of such *additional* control measures as the State may require for each contaminant, subject to such contaminant level requirement, during the period ending on the date compliance with such requirement is required.

Before a schedule prescribed by a State pursuant to this subparagraph may take effect, the State shall provide notice and opportunity for a public hearing on the schedule. A notice given pursuant to the preceding sentence may cover the prescribing of more than one such schedule and hearing held pursuant to such notice shall include each of the schedules covered by the notice. A schedule prescribed pursuant to this subparagraph for a public water system granted a variance shall require compliance by the system with each contaminant level requirement with respect to which the variance was granted as expeditiously as practicable (as the State may reasonably determine).

(B) A State which has primary enforcement responsibility for public water systems may grant to one or more public water systems within its jurisdiction one or more variances from any provisions of a national primary drinking water regulation which requires the use of a specified treatment techniquie with respect to a contaminant if the public water system applying for the variance demonstrates to the satisfaction of the State that such treatment technique is not necessary to protect the health of persons because of the nature of the raw water source of such system. A variance granted under this subparagraph shall be conditioned on such monitoring and other requirement as the Administrator may prescribe.

(C) Before a variance proposed to be granted by a State under subparagraph (A) or (B) may take effect, such State shall provide notice and opportunity for public hearing on the proposed variance. A notice given pursuant to the preceding sentence may cover the granting of more than one variance and a hearing held pursuant to such notice shall include each of the variances covered by the notice. The State shall promptly notify the Administrator of all variances granted by it. Such notification shall contain the reason for the variance (and in the case of a variance under subparagraph (A), the basis for the finding required by that subparagraph before the granting of the variance) and documentation of the need for the variance.

(D) Each public water system's variance granted by a State under subparagraph (A) shall be conditioned by the State upon compliance by the public water system with the schedule prescribed by the State pursuant to that subparagraph. The requirements of each schedule prescribed by a State pursuant to that subparagraph shall be enforceable by the State under its laws. Any requirements of a schedule on which a variance

granted under that subparagraph is conditioned may be enforced under section 1414 as if such requirement was part of a national primary drinking water regulation.

(E) Each schedule prescribed by a State pursuant to subparagraph (A) shall be deemed approved by the Administrator unless the variance for which it was prescribed is revoked by the Administrator under such subparagraph.

(F) Not later than 18 months after the effective date of the interim national primary drinking water regulations the Administrator shall complete a comprehensive review of the variances granted under subparagraph (A) (and schedules prescribed pursuant thereto) and under subparagraph (B) by the States during the one-year period beginning on such effective date. The Administrator shall conduct such subsequent review of variances and schedules as he deems necessary to carry out the purposes of this title, but each subsequent review shall be completed within each 3-year period following the completion of the first review under this subparagraph. Before conducting any review under this subparagraph, the Administrator shall publish notice of the proposed review in the Federal Register. Such notice shall (i) provide information respecting the location of data and other information respecting the variances to be reviewed (including data and other information concerning new scientific matters bearing on such variances), and (ii) advise of the opportunity to submit comments on the variances reviewed and on the need for continuing them. Upon completion of any such review, the Administrator shall public in the Federal Register the results of his review together with findings responsive to comments submitted in connection with such review.

(G)(i) If the Administrator finds that a State has, in a substantial number of instances abused its discretion in granting variances under subparagraph (A) or (B) or that in a substantial number of cases the State has failed to prescribe schedules in accordance with subparagraph (A), the Administrator shall notify the State of his findings. In determining if a State has abused its discretion in granting variances in a substantial number of instances, the Administrator shall consider the number of persons who are affected by the variances and if the requirements applicable to the granting of the variances were complied with. A notice under this clause shall—

(I) identify each public water system with respect to which the finding was made,

(II) specify the reasons for the finding, and

(III) as appropriate, propose revocations of specific variances or propose revised schedules or other requirements for specific public water systems granted variances, or both.

(ii) The Administrator shall provide reasonable notice and public hearing on the provisions of each notice given pursuant to clause (i) of this subparagraph. After a hearing on a notice pursuant to such clause, the Administrator shall (I) rescind the finding for which the notice was given and promptly notify the State of such rescission, or (II) promulgate (with such modifica-

tions as he deems appropriate) such variance revocations and revised schedules or other requirements proposed in such notice as he deems appropriate. Not later than 180 days after the date a notice is given pursuant to clause (i) of this subparagraph, the Administrator shall complete the hearing on the notice and take the action required by the preceding sentence.

(iii) If a State is notified under clause (i) of this subparagraph of a finding of the Administrator made with respect to a variance granted a public water system within that State or to a schedule or other requirement for a variance and if, before a revocation of such variance or a revision of such schedule or other requirement promulgated by the Administrator take effect, the State takes corrective action with respect to such variance or schedule or other requirement which the Administrator determines makes his finding inapplicable to such variance or schedule or other requirement, the Administrator shall rescind the application of his finding to that variance or schedule or other requirement. No variance revocation or revised schedule or other requirement may take effect before the expiration of 90 days following the date of the notice in which the revocation or revised schedule or other requirement was proposed.

(2) If a State does not have primary enforcement responsibility for public water systems, the Administrator shall have the same authority to grant variances in such State as the State would have under paragraph (1) if it had primary enforcement responsibility.

(3) The Administrator may grant a variance from any treatment technique requirement of a national primary drinking water regulation upon a showing by any person that an alternative treatment technique not included in such requirement is at least as efficient in lowering the level of the contaminant with respect to which such requirement was prescribed. A variance under this paragraph shall be conditioned on the use of the alternative treatment technique which is the basis of the variance.

(b) Any schedule or other requirement on which a variance anted under paragraph (1)(B) or (2) of subsection (a) is condi-oned may be enforced under section 1414 as if such schedule or her requirement was part of a national primary drinking water gulation.

(c) If an application for variance under subsection (a) is made, e State receiving the application or the Administrator, as the se may be, shall act upon such application within a reasonable riod (as determined under regulations prescribed by the Administator) after the date of its submission.

(d) For purposes of this section, the term "treatment technique quirement" means a requirement in a national primary drinking ater regulation which specifies for contaminant (in accordance th section 1401(1)(C)(ii) each treatment technique known to the dministrator which leads to a reduction in the level of such conminant sufficient to satisfy the requirement of section 1412(b)(3).

EXEMPTIONS

SEC. 1416. (a) A state which has primary enforcement responsibility may exempt any public water system within the State's jurisdiction from any requirement respecting a maximum contaminant level or any treatment technique requirement, or from both, of an applicable national primary drinking water regulation upon a finding that—

(1) due to compelling factors (which may include economic factors), the public water system is unable to comply with such contaminant level or treatment technique requirement,

(2) the public water system was in operation on the effective date of such contaminant level or treatment technique requirement or for a system that was not in operation by that date, only if no reasonable alternative source of drinking water is available to such new system, and

(3) the granting of the exemption will not result in an unreasonable risk to health.

(b)(1) If a State grants a public water system an exemption under subsection (a), the State shall prescribe, ~~within one year of the date~~ *at the time* the exemption is granted, a schedule for—

(A) compliance (including increments of progress) by the public water system with each contaminant level requirement and treatment technique requirement with respect to which the exemption was granted, and

(B) implementation by the public water system of such control measures as the State may require for each contaminant, subject to such contaminant level requirement or treatment technique requirement, during the period ending on the date compliance with such requirement is required.

Before a schedule prescribed by a State pursuant to this subsection may take effect, the State shall provide notice and opportunity for a public hearing on the schedule. A notice given pursuant to the preceding sentence may cover the prescribing of more than one such schedule and a hearing held pursuant to such notice shall include each of the schedules covered by the notice.

(2)(A) A schedule prescribed pursuant to this subsection for a public water system granted an exemption under subsection (a) shall require compliance by the system with each contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable (as the State may reasonably determine) but (except as provided in subparagraph (B)—

(i) in the case of an exemption granted with respect to a contaminant level or treatment technique requirement prescribed by the ~~interim~~ national primary drinking water regulations promulgated under section 1412(a), ~~not later than January 1, 1984~~; *not later than 12 months after enactment of the Safe Drinking Water Act amendments;* and

(ii) in the case of an exemption granted with respect to a contaminant level or treatment technique requirement prescribed by ~~revised~~ national primary drinking water regulations, ~~not later than seven years after the date such requirement takes effect;~~

other than a regulation referred to in section 1412(a), 12 months after the date of the issuance of the exemption.

~~(II) Notwithstanding clauses (i) and (ii) of subparagraph (A) of this paragraph, the final date for compliance prescribed in a schedule prescribed pursuant to this subsection for an exemption granted for a public water system which (as determined by the State granting the exemption) has entered into an enforceable agreement to become a part of a regional public water system shall—~~

~~(i) in the case of a schedule prescribed for an exemption granted with respect to a contaminant level or treatment technique requirement prescribed by interim national primary drinking water regulations, be not later than January 1, 1986; and~~

~~(ii) in the case of a schedule prescribed for an exemption granted with respect to a contaminant level or treatment technique requirement prescribed by revised national primary drinking water regulations, be not later than nine years after such requirement takes effect~~

(B) The final date for compliance provided in any schedule in the case of any exemption may be extended by the State (in the case of a State which has primary enforcement responsibility) or by the Administrator (in any other case) for a period not to exceed 3 years after the date of the issuance of the exemption if the public water system establishes that—

(i) the system cannot meet the standard without capital improvements which cannot be completed within the period of such exemption;

(ii) in the case of a system which needs financial assistance for the necessary improvements, the system has entered into an agreement to obtain such financial assistance; or

(iii) the system has entered into an enforceable agreement to become a part of a regional public water system; and

the system is taking all practicable steps to meet the standard.

(C) In the case of a system which does not serve more than 500 service connections and which needs financial assistance for the necessary improvements, an exemption granted under clause (i) or (ii) of subparagraph (B) may be renewed for one or more additional 3-year periods if the system establishes that it is taking all practicable steps to meet the requirements of subparagraph (B).

(3) Each public water system's exemption granted by a State under subsection (a) shall be conditioned by the State upon compliance by the public water system with the schedule prescribed by the State pursuant to this subsection. The requirements of each schedule prescribed by a State pursuant to this subsection shall be enforceable by the State under its laws. Any requirement of a schedule on which an exemption granted under this section is conditioned may be enforced under section 1414 as if such requirement was part of a national primarying drinking water regulation.

(4) Each schedule prescribed by a State pursuant to this subsection shall be deemed approved by the Administrator unless the exemption for which it was prescribed is revoked by the Administrator under subsection (d)(2) or the schedule is revised by the Administrator under such subsection.

(c) Each State which grants an exemption under subsection (a) shall promptly notify the Administrator of the granting of such exemption. Such notification shall contain the reasons for the exemption (including the basis for the finding required by subsection

(a)(3) before the exemption may be granted) and document the need for the exemption.

(d)(1) Not later than 18 months after the effective date of the interim national primary drinking water regulations the Administrator shall complete a comprehensive review of the exemptions granted (and schedules prescribed pursuant thereto) by the States during the one-year period beginning on such effective date. The Administrator shall conduct such subsequent reivews of exemptions and schedules as he deems necessary to carry out the purposes of this title, but each subsequent review shall be completed within each 3-year period following the completion of the first review under this subparagraph. Before conducting any review under this subparagraph, the administrator shall publish notice of the proposed review in the Federal Register. Such notice shall (A) provide information respecting the location of data and other information respecting the exemptions to be reviewed (including data and other information concerning new scientific matters bearing on such exemptions), and (B) advise of the opportunity to submit comments on the exemptions reviewed and on the need for continuing them. Upon completion of any such review, the Administrator shall publish in the Federal Register the results of his review together with findings responsive to comments submitted in connection with such review.

(2)(A) If the Administrator finds that a State has, in a substantial number of instances, abused its discretion in granting exemptions under subsection (a) or failed to prescribe schedules in accordance with subsection (b), the Administrator shall notify the State of his finding. In determining if a State has abused its discretion in granting exemptions in a substantial number of instances, the Administrator shall consider the number of persons who are affected by the exemptions and if the requirements applicable to the granting of the exemptions were complied with. A notice under this paragraph shall—

(i) identify each exempt public water system with respect to which the finding was made,

(ii) specify the reasons for the findings, and

(iii) as appropriate, propose revocations of specific exemptions or propose revised schedules for specific exempt public water systems, or both

(B) The Administrator shall provide reasonable notice and public hearing on the provisions of each notice given pursuant to subparagraph (A). After a hearing on a notice pursuant to subparagraph (A), the Administrator shall (i) rescind the finding for which the notice was given and promptly notify the State of such rescission, or (ii) promulgate (with such modifications as he deems appropriate) such exemption revocations and revised schedules proposed in such notice as he deems appropriate. Not later than 180 days after the date a notice is given pursuant to subparagraph (A), the Administrator shall complete the hearing on the notice and take the action required by the preceding sentence.

(C) If a State is notified under subparagraph (A) of a finding of the Administrator made with respect to an exemption granted a public water system within that State or to a schedule prescribed pursuant to such an exemption and if before a revocation of such

xemption or a revision of such schedule promulgated by the Administrator takes effect the State takes corrective action with respect to such exemption or schedule which the Administrator determines makes his finding inapplicable to such exemption or schedule, the Administrator shall rescind the application of his finding to that exemption or schedule. No exemption revocation or revised schedule may take effect before the expiration of 90 days following the date of the notice in which the revocation or revised schedule was proposed.

(e) For purposes of this section, the term "treatment technique requirement" means a requirement in a national primary drinking water regulation which specifies for a contaminant (in accordance with section 1401(1)(C)(ii) each treatment technique known to the Administrator which leads to a reduction in the level of such contaminant sufficient to satisfy the requirements of section ~~1412(b)(8),~~ 1412(b).

(f) If a State does not have primary enforcement responsibility for public water systems, the Administrator shall have the same authority to exempt public water systems in such State from maximum contaminant level requirements and treatment technique requirements under the same conditions and in the same manner as a State would be authorized to grant exemptions under this section if it had primary enforcement responsibility.

(g) If an application for an exemption under this section is made, the State receiving the application or the Administrator, as the case may be, shall act upon such application within a reasonable period (as determined under regulations prescribed by the Administrator) after the date of its submission.

PROHIBITION ON USE OF LEAD PIPES, SOLDER, AND FLUX

SEC. 1417. (a) IN GENERAL.—*

(1) PROHIBITION.—Any pipe, solder, or flux, which is used after the enactment of the Safe Drinking Water Act Amendments of 1986, in the installation or repair of—

(A) any public water system, or

(B) any plumbing in a residential or nonresidential facility providing water for human consumption which is connected to a public water system,

shall be lead free (within the meaning of subsection (d)). This paragraph shall not apply to leaded joints necessary for the repair of cast iron pipes.

(2) PUBLIC NOTICE REQUIREMENTS.—

(A) IN GENERAL.—Each public water system shall identify and provide notice to persons that may be affected by lead contamination of their drinking water where such contamination results from either or both of the following:

(i) The lead content in the construction materials of the public water distribution system.

(ii) Corrosivity of the water supply sufficient to cause leaching of lead.

* P.L. 99-339, Section 109 (b) NOTIFICATION TO STATES.—The Administrator of the Environmental Protection Agency shall notify all States with respect to the requirements of section 1417 of the Public Health Service Act within 90 days after the enactment of this Act

The notice shall be provided in such manner and form as may be reasonably required by the Administrator. Notice under this paragraph shall be provided notwithstanding the absence of a violation of any national drinking water standard.

(B) CONTENTS OF NOTICE.—Notice under this paragraph shall provide a clear and readily understandable explanation of—

(i) the potential sources of lead in the drinking water,

(ii) potential adverse health effects.

(iii) reasonably available methods of mitigating known or potential lead content in drinking water,

(iv) any steps the system is taking to mitigate lead content in drinking water, and

(v) the necessity for seeking alternative water supplies, if any.

(b) STATE ENFORCEMENT.—

(1) ENFORCEMENT OF PROHIBITION.—The requirements of subsection (a)(1) shall be enforced in all States effective 24 months after the enactment of this section. States shall enforce such requirements through State or local plumbing codes, or such other means of enforcement as the State may determine to be appropriate.

(2) ENFORCEMENT OF PUBLIC NOTICE REQUIREMENTS.—The requirements of subsection (a)(2) shall apply in all States effective 24 months after the enactment of this section.

(c) PENALTIES.—If the Administrator determines that a State is not enforcing the requirements of subsection (a) as required pursuant to subsection (b), the Administrator may withhold up to 5 percent of Federal funds available to that State for State program grants under section 1443(a).

(d) DEFINITION OF LEAD FREE.—For purposes of this section, the term "lead free"—

(1) when used with respect to solders and flux refers to solders and flux containing not more than 0.2 percent lead, and

(2) when used with respect to pipes and pipe fittings refers to pipes and pipe fittings containing not more than 8.0 percent lead.

PART C—PROTECTION OF UNDERGROUND SOURCES OF DRINKING WATER

REGULATIONS FOR STATE PROGRAMS

SEC. 1421. (a)(1) The Administrator shall publish proposed regulations for State underground injection control programs within 180 days after the date of enactment of this title. Within 180 days after publication of such proposed regulations, he shall promulgate such regulations with such modifications as he deems appropriate. Any regulation under this subsection may be amended from time to time.

(2) Any regulation under this section shall be proposed and promulgated in accordance with section 553 of title 5, United States

Code (relating to rulemaking), except that the Administrator shall provide opportunity for public hearing prior to promulgation of such regulations. In proposing and promulgating regulations under this section, the Administrator shall consult with the Secretary, the National Drinking Water Advisory Council, and other appropriate Federal entities and with interested State entities.

(b)(1) Regulations under subsection (a) for State underground injection programs shall contain minimum requirements for effective programs to prevent underground injection which endangers drinking water sources within the meaning of subsection (d)(2). Such regulations shall require that a State program, in order to be approved under section 1422—

(A) shall prohibit, effective on the date on which the applicable underground injection control program takes effect, any underground injection in such State which is not authorized by a permit issued by the State (except that the regulations may permit a State to authorize underground injection by rule);

(B) shall require (i) in the case of a program which provides for authorization of underground injection by permit, that the applicant for the permit to inject must satisfy the State that the underground injection will not endanger drinking water sources, and (ii) in the case of a program which provides for such an authorization by rule, that no rule may be promulgated which authorizes any underground injection which endangers drinking water sources;

(C) shall include inspection, monitoring, recordkeeping, and reporting requirements; and

(D) shall apply (i) as prescribed by section 1447(b), to underground injections by Federal agencies, and (ii) to underground injections by any other person whether or not occurring on property owned or leased by the United States.

(2) Regulations of the Administrator under this section for State underground injection control programs may not prescribe requirements which interfere with or impede—

(A) the underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production *or natural gas storage operations*, or

(B) any underground injection for the secondary or tertiary recovery of oil or natural gas,

unless such requirements are essential to assure that underground sources of drinking water will not be endangered by such injection.

(3)(A) The regulations for the Administrator under this section shall permit or provide for consideration of varying geologic, hydrological, or historical conditions in different States and in different areas within a State.

(B)(i) In prescribing regulations under this section the Administrator shall, to the extent feasible, avoid promulgation of requirements which would unnecessarily disrupt State underground injection control programs which are in effect and being enforced in a substantial number of States.

(ii) For the purpose of this subparagraph, a regulation prescribed by the Administrator under this section shall be deemed to disrupt a State underground injection control program only if it would be

infeasible to comply with both such regulation and the State underground injection control programs.

(iii) For the purpose of this subparagraph, a regulation prescribed by the Administrator under this section shall be deemed unnecessary only if, without such regulation, underground sources of drinking water will not be endangered by any underground injection.

(C) Nothing in this section shall be construed to alter or affect the duty to assure that underground sources of drinking water will not be endangered by any underground injection.

(c)(1) The Administrator may, upon application of the Governor of a State which authorizes underground injection by means of permits, authorize such State to issue (without regard to subsection (b)(1)(B)(i)) temporary permits for underground injection which may be effective until the expiration of four years after the date of enactment of this title, if—

(A) the Administrator finds that the State has demonstrated that it is unable and could not reasonably have been able to process all permit applications within the time available;

(B) the Administrator determines the adverse effect on the environment of such temporary permits is not unwarranted;

(C) such temporary permits will be issued only with respect to injection wells in operation on the date on which such State's permit program approved under this part first takes effect and for which there was inadequate time to process its permit application; and

(D) the Administrator determines the temporary permits require the use of adequate safeguards established by rules adopted by him.

(2) The Administrator may, upon application of the Governor of a State which authorizes underground injection by means of permits, authorize such State to issue (without regard to subsection (b)(1)(B)(i)), but after reasonable notice and hearing, one or more temporary permits each of which is applicable to a particular injection well and to the underground injection of a particular fluid and which may be effective until the expiration of four years after the date of enactment of this title, if the State finds, on the record of such hearing—

(A) that technology (or other means) to permit safe injection of the fluid in accordance with the applicable underground injection control program is not generally available (taking costs into consideration);

(B) that injection of the fluid would be less harmful to health than the use of other available means of disposing of waste or producing the desired product; and

(C) that available technology or other means have been employed (and will be employed) to reduce the volume and toxicity of the fluid and to minimize the potentially adverse effect of the injection on the public health.

(d) For purposes of this part:

(1) The term "underground injection" means the subsurface emplacement of fluids by well injection. Such term does not include the underground injection of natural gas for purposes of storage.

(2) Underground injection endangers drinking water sources if such injection may result in the presence in underground water which supplies or can reasonably be expected to supply any public water system of any contaminant, and if the presence of such contaminant may result in such system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.

STATE PRIMARY ENFORCEMENT RESPONSIBILITY

SEC. 1422. (a) Within 180 days after the date of enactment of this title, the Administrator shall list in the Federal Register each State for which in his judgment a State underground injection control program may be necessary to assure that underground injection will not endanger drinking water sources. Such list may be amended from time to time.

(b)(1)(A) Each State listed under subsection (a) shall within 270 days after the date of promulgation of any regulation under section 1421 (or, if later, within 270 days after such State is first listed under subsection (a)) submit to the Administrator an application which contains a showing satisfactory to the Administrator that the State—

(i) has adopted after reasonable notice and public hearings, and will implement, an underground injection control program which meets the requirements of regulations in effect under section 1421; and

(ii) will keep such records and make such reports with respect to its activities under its underground injection control program as the Administrator may require by regulation.

The Administrator may, for good cause, extend the date for submission of an application by any State under this subparagraph for a period not to exceed an additional 270 days.

(B) Within 270 days of any amendment of a regulation under section 1421 revising or adding any requirement respecting State underground injection control programs, each State listed under subsection (a) shall submit (in such form and manner as the Administrator may require) a notice to the Administrator containing a showing satisfactory to him that the State underground injection control program meets the revised or added requirement.

(2) Within ninety days after the State's application under paragraph (1)(A) or notice under paragraph (1)(B) and after reasonable opportunity for presentation of views, the Administrator shall by rule either approve, disapprove, or approve in part and disapprove in part, the State's underground injection control program.

(3) If the Administrator approves the State's program under paragraph (2), the State shall have primary enforcement responsibility for underground water sources until such time as the Administrator determines, by rule, that such State no longer meets the requirements of clause (i) or (ii) of paragraph (1)(A) of this subsection.

(4) Before promulgating any rule under paragraph (2) or (3) of this subsection, the Administrator shall provide opportunity for public hearing respecting such rule.

(c) If the Administrator disapproves a State's program (or part thereof) under subsection (b)(2), if the Administrator determines under subsection (b)(3) that a State no longer meets the requirements of clause (i) or (ii) of subsection (b)(1)(A), or if a State fails to submit an application or notice before the date of expiration of the period specified in subsection (b)(1), the Administrator shall by regulation within 90 days after the date of such disapproval, determination, or expiration (as the case may be) prescribe (and may from time to time by regulation revise) a program applicable to such State meeting the requirements of section 1421(b). Such program may not include requirements which interfere with or impede—

(1) the underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production *or natural gas storage operations*, or

(2) an underground injection for the secondary or tertiary recovery of oil or natural gas,

unless such requirements are essential to assure that underground sources of drinking water will not be endangered by such injection. Such program shall apply in such State to the extent that a program adopted by such State which the Administrator determines meets such requirements is not in effect. Before promulgating any regulation under this section, the Administrator shall provide opportunity for public hearing respecting such regulation.

(d) For purposes of this title, the term "applicable underground injection control program" with respect to a State means the program (or most recent amendment thereof) (1) which has been adopted by the State and which has been approved under subsection (b), or (2) which has been prescribed by the Administrator under subsection (c)

(e) An Indian Tribe may assume primary enforcement responsibility for underground injection control under this section consistent with such regulations as the Administrator has prescribed pursuant to Part C and section 1451 of this Act. The area over which such Indian Tribe exercises governmental jurisdiction need not have been listed under subsection (a) of this section, and such Tribe need not submit an application to assume primary enforcement responsibility within the 270-day deadline noted in subsection (b)(1)(A) of this section. Until an Indian Tribe assumes primary enforcement responsibility, the currently applicable underground injection control program shall continue to apply. If an applicable underground injection control program does not exist for an Indian Tribe, the Administrator shall prescribe such a program pursuant to subsection (c) of this section, and consistent with section 1421(b), within 270 days after the enactment of the Safe Drinking Water Act Amendments of 1986, unless an Indian Tribe first obtains approval to assume primary enforcement responsibility for underground injection control."

FAILURE OF STATE TO ASSURE ENFORCEMENT OF PROGRAM

SEC. 1423. (a)(1) Whenever the Administrator finds during a period during which a State has primary enforcement responsibility for underground water sources (within the meaning of section 1422(b)(3)) or section 1422(b)(3)) that any person who is subject to a requirement of an applicable underground injection control pro-

ram in such State is violating such requirement he shall so notify he State and the person violating such requirement. If the Administrator finds such failure to comply extends beyond the thirtieth day after the date of such notice, he shall give public notice of such finding and request the State to report within 15 days after the date of such public notice as to the steps being taken to bring such person into compliance with such requirement including reasons for anticipated steps to be taken to bring such person into compliance with such requirement and for any failure to take steps to bring such person into compliance with such requirement). If—

(A) such failure to comply extends beyond the sixtieth day after the date of the notice given pursuant to the first sentence of this paragraph; and

(B)(i) the State fails to submit the report requested by the Administrator within the time period prescribed by the preceding sentence; or

(ii) the State submits such report within such period but the Administrator after considering the report, determines that by failing to take necessary steps to bring such person into compliance by such sixtieth day the State abused its discretion in carrying out primary enforcement responsibility for underground water source;

he Administrator may commence a civil action under subsection (b)(1). *If beyond the thirtieth day after the Administrator's notification the State has not commenced appropriate enforcement action, the Administrator shall issue an order under subsection (c) requiring the person to comply with such requirement or the Administrator shall commence a civil action under subsection (b).*

(2) Whenever the Adminstrator finds during a period during which a State does not have primary enforcement responsibility for underground water sources that any person subject to any requirement of any applicable underground injection control program in such States is violating such requirement, he may commence a civil action under subsection (b)(1). *the Administrator shall issue an order under subsection (c) requiring the person to comply with such requirement or the Administrator shall commence a civil action under subsection (b).*

(b)(1) When authorized by subsection (a), the Administrator may bring a civil action under this paragraph in the appropriate United States district court to require compliance with any requirement of an applicable underground injection control program. The court may enter such judgement as protection of public health may require, including, in the case of an action brought against a person who violates an applicable requirement of an underground injection control program and who is located in a State which has primary enforcement responsibility for underground water sources, the imposition of a civil penalty of not to exceed $5,000 for each day such person violates such requirement after the expiration of 30 days after receiving notice under subsection (a)(1).

(2) Any person who violates any requirement of an applicable underground injection control program to which he is subject during any period for which the State does not have primary enforcement responsibility for underground water sources (A) shall be subject to a civil penalty of not more than $5,000 for each day for such violation, or (B) if such violation is willful, such person may, in lieu of the civil penalty authorized by clause (2), be fined not more than $10,000 for each day of such violation.

(b) CIVIL AND CRIMINAL ACTIONS.—Civil actions referred to in paragraphs (1) and (2) of subsection (a) shall be brought in the appropriate United States district court. Such court shall have jurisdiction to require compliance with any requirement of an applicable

underground injection program or with an order issued under subsection (c). The court may enter such judgment as protection of public health may require. Any person who violates any requirement of an applicable underground injection control program or an order requiring compliance under subsection (c)--

(1) shall be subject to a civil penalty of not more than $25,000 for each day of such violation, and

(2) if such violation is willful, such person may, in addition to or in lieu of the civil penalty authorized by paragraph (1), be imprisoned for not more than 3 years, or fined in accordance with title 18 of the United States Code, or both.

(c) ADMINISTRATIVE ORDERS.—(1) In any case in which the Administrator is authorized to bring a civil action under this section with respect to any regulation or other requirement of this part other than those relating to—

(A) the underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production, or

(B) any underground injection for the secondary or tertiary recovery of oil or natural gas,

the Administrator may also issue an order under this subsection either assessing a civil penalty of not more than $10,000 for each day of violation for any past or current violation, up to a maximum administrative penalty of $125,000, or requiring compliance with such regulation or other requirement, or both.

(2) In any case in which the Administrator is authorized to bring a civil action under this section with respect to any regulation, or other requirement of this part relating to—

(A) the underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production, or

(B) any underground injection for the secondary or tertiary recovery of oil or natural gas,

the Administrator may also issue an order under this subsection either assessing a civil penalty of not more than $5,000 for each day of violation for any past or current violation, up to a maximum administrative penalty of $125,000, or requiring compliance with such regulation or other requirement, or both.

(3)(A) An order under this subsection shall be issued by the Administrator after opportunity (provided in accordance with this subparagraph) for a hearing. Before issuing the order, the Administrator shall give to the person to whom it is directed written notice of the Administrator's proposal to issue such order and the opportunity to request, within 30 days of the date the notice is received by such person, a hearing on the order. Such hearing shall not be subject to section 554 or 556 of title 5, United States Code, but shall provide a reasonable opportunity to be heard and to present evidence.

(B) The Administrator shall provide public notice of, and reasonable opportunity to comment on, any proposed order.

(C) Any citizen who comments on any proposed order under subparagraph (B) shall be given notice of any hearing under this subsection and of any order. In any hearing held under subparagraph

(A), such citizen shall have a reasonable opportunity to be heard and to present evidence.

(D) Any order issued under this subsection shall become effective 30 days following its issuance unless an appeal is taken pursuant to paragraph (6).

(4)(A) Any order issued under this subsection shall state with reasonable specificity the nature of the violation and may specify a reasonable time for compliance.

(B) In assessing any civil penalty under this subsection, the Administrator shall take into account appropriate factors, including (i) the seriousness of the violation; (ii) the economic benefit (if any) resulting from the violation; (iii) any history of such violations; (iv) any good-faith efforts to comply with the applicable requirements; (v) the economic impact of the penalty on the violator; and (vi) such other matters as justice may require.

(5) Any violation with respect to which the Administrator has commenced and is diligently prosecuting an action, or has issued an order under this subsection assessing a penalty, shall not be subject to an action under subsection (b) of this section or section 1424(c) or 1449, except that the foregoing limitation on civil actions under section 1449 of this Act shall not apply with respect to any violation for which—

(A) a civil action under section 1449(a)(1) has been filed prior to commencement of an action under this subsection, or

(B) a notice of violation under section 1449(b)(1) has been given before commencement of an action under this subsection and an action under section 1449(a)(1) of this Act is filed before 120 days after such notice is given.

(6) Any person against whom an order is issued or who commented on a proposed order pursuant to paragraph (3) may file an appeal of such order with the United States District Court for the District of Columbia or the district in which the violation is alleged to have occurred. Such an appeal may only be filed within the 30-day period beginning on the date the order is issued. Appellant shall simultaneously send a copy of the appeal by certified mail to the Administrator and to the Attorney General. The Administrator shall promptly file in such court a certified copy of the record on which such order was imposed. The district court shall not set aside or remand such order unless there is not substantial evidence on the record, taken as a whole, to support the finding of a violation or, unless the Administrator's assessment of penalty or requirement for compliance constitutes an abuse of discretion. The district court shall not impose additional civil penalties for the same violation unless the Administrator's assessment of a penalty constitutes an abuse of discretion. Notwithstanding section 1448(a)(2), any order issued under paragraph (3) shall be subject to judicial review exclusively under this paragraph.

(7) If any person fails to pay an assessment of a civil penalty—

(A) after the order becomes effective under paragraph (3), or

(B) after a court, in an action brought under paragraph (6), has entered a final judgment in favor of the Administrator,

the Administrator may request the Attorney General to bring a civil action in an appropriate district court to recover the amount assessed (plus costs, attorneys' fees, and interest at currently prevailing rates from the date the order is effective or the date of such final judgment, as the case may be). In such an action, the validity, amount, and appropriateness of such penalty shall not be subject to review.

(8) The Administrator may, in connection with administrative proceedings under this subsection, issue subpoenas compelling the attendance and testimony of witnesses and subpoenas duces tecum, and may request the Attorney General to bring an action to enforce any subpoena under this section. The district courts shall have jurisdiction to enforce such subpoenas and impose sanction.

(e) *(d)* Nothing in this title shall diminish any authority of a State or political subdivision to adopt or enforce any law or regulation respecting underground injection but no such law or regulation shall relieve any person of any requirement otherwise applicable under this title.

INTERIM REGULATION OF UNDERGROUND INJECTIONS

SEC. 1424. (a)(1) Any person may petition the Administrator to have an area of a State (or States) designated as an area in which no new underground injection well may be operated during the period beginning on the date of the designation and ending on the date on which the applicable underground injection control program covering such area takes effect unless a permit for the operation of such well has been issued by the Administrator under subsection (b). The Administrator may so designate an area within a State if he finds that the area has one aquifer which is the sole or principal drinking water source for the area and which, if contaminated, would create a significant hazard to public health.

(2) Upon receipt of a petition under paragraph (1) of this subsection, the Administrator shall publish it in the Federal Register and shall provide an opportunity to interested persons to submit written data, views, or arguments thereon. Not later than the 30th day following the date of the publication of a petition under this paragraph in the Federal Register, the Administrator shall either make the designation for which the petition is submitted or deny the petition.

(b)(1) During the period beginning on the date an area is designated under subsection (a) and ending on the date the applicable underground injection control program covering such area takes effect, no new underground injection well may be operated in such area unless the Administrator has issued a permit for such operation.

(2) Any person may petition the Administrator for the issuance of a permit for the operation of such a well in such an area. A petition submitted under this paragraph shall be submitted in such manner and contain such information as the Administrator may require by regulation. Upon receipt of such a petition, the Administrator shall publish it in the Federal Register. The Administrator shall give notice of any proceeding on a petition and shall provide opportunity for agency hearing. The Administrator shall act upon such petition on the record of any hearing held pursuant to the preceding sentence respecting such petition. Within 120 days of the publication in the Federal Register of a petition submitted under