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Oregon Drinking Water Quality Standards

including the 1986 amendments to the
Safe Drinking Water Act

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This summary provides a broad overview of the existing and upcoming water quality standards with which public drinking water systems must comply over the next 10 years. This summary is not a substitute for the actual statutes, rules, codes or ordinances which govern drinking water supply.

Amendments to the 1986 Safe Drinking Water Act (SDWA) called for the Environmental Protection Agency (EPA) to set maximum contaminant level goals (MCLGs)[1], maximum contaminant levels (MCLs)[2], and monitoring requirements for 83 specific contaminants. As an alternative to setting MCLs and monitoring requirements, EPA can specify a required treatment technique for water systems. The amendments also require surface water systems to install filtration, and surface and groundwater systems to disinfect. In addition, the amendments require EPA to set 25 new MCLs every three years for additional contaminants in drinking water that may have an adverse effect on public health and which are known or anticipated to occur in public water systems.

These regulations require that systems treat and/or control contaminants to the maximum contaminant levels. Treatment and control is expensive and will increase the need for systems to make capital improvements.

The Oregon Health Division (OHD) is responsible for administering both state and federal drinking water laws under ORS Chapter 448, the Oregon Drinking Water Quality Act. The federal schedule for implementing the rules is presented on page 2.

The following is a summary of each of the federal rules. Each rule is implemented in Oregon on a schedule depending on system size. Federal rules that are described but not yet final are subject to change. Information presented on these is from the most current drafts.

A list of EPA's health advisories is also included. The health advisories are not enforceable standards but help owners and operators determine when there may be a potential health risk posed by a particular contaminant whether or not there is a regulatory standard that has been established for the chemical of concern.

For additional information call either the Oregon Health Division (503) 731-4381 or the EPA Drinking Water Hotline (800) 426-4791.

Types of Public Water Systems

Oregon public water systems are regulated under OAR Chapter 333, Public Water Systems. A *public water system* provides piped water for human consumption to more than three service connections; or supplies water to a public or commercial establishment which operates a total of at least 60 days per year and which is used by 10 or more individuals per day; or is a facility licensed by the Health Division. There are about 3,500 public water systems currently identified in Oregon.

A *community water system* is a public water system which provides piped water to 15 or more service connections used by year-round residents or serves 25 or more year-round residents. Typical community water systems are cities, water districts, water associations, mobile home parks and rural subdivisions. There are 887 community water systems serving 2.35 million people in Oregon.

A *nontransient noncommunity water system* is a public water system which is not a residential water system but which regularly serves at least 25 of the same persons over six months per year. Typical nontransient noncommunity water systems are factories and schools. There are 325 nontransient noncommunity water systems currently identified serving 69,000 people in Oregon.

A *noncommunity water system* is a public water system that serves a transient population of at least 25 people per day for at least 60 days per year. This category includes parks, campgrounds, restaurants, motels, highway rest areas and stores. There are 1,480 noncommunity water systems currently identified in Oregon.

The Oregon statute regulates public water systems which are too small to fall under federal regulations. A *state-regulated water system* provides piped water to more than three but fewer than 15 service connections or more than 9 but fewer than 25 year-round residents. Small mobile home parks, subdivisions and rural residential systems are typical state-regulated systems. There are 871 state-regulated systems currently identified serving 16,000 people in Oregon. Monitoring requirements are the same as those for noncommunity systems.

Public Notification

Purpose:

This rule requires owners/operators to notify their customers when a particular standard has been exceeded. This will inform consumers when there is a problem with the system that requires protective actions by users, construction of improvements or finding other solutions to the problem.

Application:

All public water systems.

Schedule:

Final rule published in *Federal Register* on October 28, 1987. State rule became effective November 13, 1989.

Each Public Notice must contain:

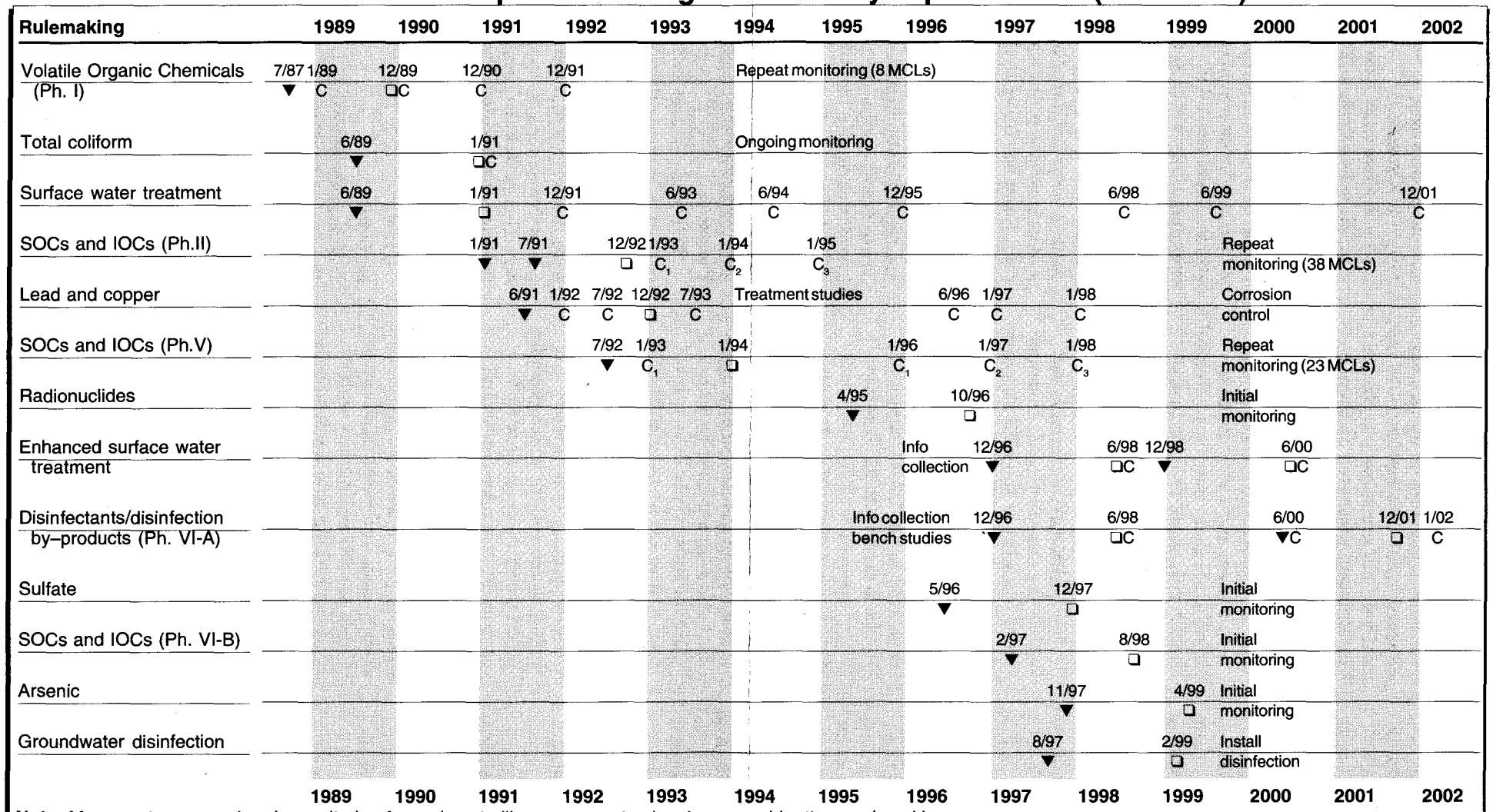
- A clear and understandable explanation of the violation;
- Information about potential adverse health effects, including specific mandatory language;

[1]MCLGs: Non-enforceable health-based goals. MCLGs must be set at a level at which no known or anticipated adverse effect on human health occurs and allows for an adequate margin of safety, regardless of cost.

[2]MCLs: Enforceable standards which must be set as close to the MCLGs as feasible, with the use of best available technology and other means that are available, taking cost and feasibility into consideration.

State of Oregon

Schedule of Anticipated Drinking Water Quality Improvements (1989-2002)



Note: Many systems are already monitoring for and controlling some contaminants covered by these rulemakings

C = date when regulated systems must monitor and start controlling problem contaminants (see dates in text)

C1 = date when all large systems must monitor and start controlling problem contaminants; population greater than 300

C2 = date when all medium systems must monitor and start controlling problem contaminants; population 100-299

C3 = date when all small systems must monitor and start controlling problem contaminants; population less than 100

▼ = U.S. EPA finalizes rulemaking

❑ = Oregon Health Division adopts final state rule

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- Identification of the population at risk;
- A description of the steps being taken to correct the problem;
- Preventive measures to be taken until the violation is corrected.

Each Public Notice must:

- Be clear and conspicuous;
- Not contain unduly technical language;
- Not contain unduly small print;
- Include the phone number of the owner, operator or designee of the public water system; and
- Be multilingual, where appropriate.

Ways to Issue a Public Notice:

- Through the local electronic media;
- In the local daily newspaper;
- By direct mail;
- In customers' water bills;
- By hand delivery; or
- By continuous posting in a conspicuous place.

Systems serving areas that do not have a daily or weekly newspaper must provide notice by hand delivery or posting.

Public water systems must provide copies of the public notification to the state.

The owner/operator of the public water system is legally responsible for ensuring that all public notice requirements are met.

Classification of Violations:

Acute violations for contaminants which pose an immediate threat to human health such as nitrate require immediate public notice.

Tier 1 violations are directly related to potential adverse health effects and include:

- Failure to comply with an MCL;
- Failure to comply with a treatment technique that has been established in lieu of an MCL; and
- Failure to comply with a schedule prescribed by the Division.

Tier 2 violations do not pose a direct threat to public health; however, they are significant enough to warrant public notice. They include:

- Failure to comply with monitoring requirements;
- Failure to use or comply with specified test procedures;
- Issuance of variance or an exemption.

Timing and Frequency of Public Notice:

Within 72 hours (Acute violations):

- Notice by all community systems via the electronic media;
- Notices by noncommunity systems via hand delivery or posting.

Within 14 days:

- Newspaper notices by all systems for all Tier 1 violations; or
- Notices by noncommunity systems by posting or hand delivery.

Within 45 days:

Notices by all community water systems by direct mail, in water bills, or by hand delivery for all Tier 1 violations.

Within 3 months:

- Newspaper notices for all Tier 2 violations; or
- Notices by noncommunity systems by posting or hand delivery for Tier 2 violations.

Repeated every 3 months:

All notices given by all systems by direct mail or hand delivery for both Tier 1 and Tier 2 violations.

Continuous Notice:

All notices given by posting, for as long as the violation exists.

I. Volatile Organic Chemicals (Phase I)

Schedule:

Final federal rule published July 8, 1987. Final state rule effective November 13, 1989. See Table 1.

Purpose:

Set standards for eight VOCs.

Require monitoring for unregulated VOC contaminants.

Application:

All community and nontransient noncommunity systems.

Sources:

Solvents; gasoline; no natural sources.

Health effects:

Cancer and non-cancer effects.

Treatment:

Packed tower aeration. Granular activated carbon.

Monitoring:

Samples collected from each source after treatment. Initial monitoring during 1988, 1989, 1990 and 1991. Resampling frequency from quarterly to every five years depending on sample results and vulnerability of water source. Resampling test dates have been adjusted to fit sampling requirements for Phase II (See Section V).

Table 1: VOCs (Phase I)

Regulated contaminants:

Name	*MCL(mg/l)*
Benzene	0.005
Vinyl chloride	0.002
Carbon tetrachloride	0.005
1,2 Dichloroethane	0.005
Trichloroethylene	0.005
1,1 Dichloroethylene	0.007
1,1,1 Trichloroethane	0.200
para-Dichlorobenzene	0.075

Monitoring frequency:

Source	*VOCs++ detected*	*Source vulnerable*	*No. of connections*	*Resampling frequency*
Surface	No	No	NA	State discretion
	No	Yes	>500	3 yrs
	No	Yes	≤500	3 yrs
	Yes	NA	NA	Quarterly+++
Ground	No	No	NA	5 yrs
	No	Yes	>500	3 yrs
	No	Yes	≤500	5 yrs
	Yes	NA	NA	Quarterly+++

++ "Detected" means >0.0005 mg/l

+++ Ground or surface water systems detecting VOCs at levels consistently less than the MCL for three consecutive years may be allowed to reduce repeat monitoring to once a year at the Division's discretion.

II. Total Coliform

Schedule:

Final rule published in *Federal Register* on June 29, 1989. State rule effective January 1, 1991.

Application:

All public water systems.

Purpose:

Control coliform bacteria. Coliforms are common in the environment, are generally not harmful themselves and are used as *indicators* of water quality. The presence of these bacteria in the drinking water, however, generally is a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease.

Monitoring:

Population served	Samples per month
up to 1,000	1 sample
1,001 to 2,500	2 samples
2,501 to 83,000	1 per 800 pop.
83,001 to 111,000	1 per 900 pop.
111,001 to 160,000	1 per 1000 pop.
160,001 to 250,000	1 per 1,200 pop.
250,001 to 410,000	1 per 1,500 pop.
over 410,000	1 per 2,000 pop.

A set of repeat samples must be collected in response to each positive routine sample.

All positive total coliform samples must be further tested for fecal coliform or *Escherichia coli*.

Compliance:

All coliform results are reported as *coliforms present* (positive) or *coliforms absent* (negative).

Small- and medium-sized systems (fewer than 40 samples/mo.) are allowed one positive sample per reporting period including routine and repeat samples. Large systems are allowed up to five percent positive samples.

Confirmed presence of fecal coliform or *E. coli* constitutes an acute health risk violation and requires immediate public notice.

Treatment:

Best available treatment includes disinfection, proper well construction, wellhead protection, cross connection control and distribution pressure maintenance.

III. Surface Water Treatment

Purpose:

Control *Giardia lamblia*, viruses, heterotrophic plate count bacteria (HPC) and *Legionella*; control turbidity.

Application:

All public water systems using surface water sources (about 400).

Schedule:

Final rule published in the *Federal Register*, June 29, 1989. State rule adopted on January 1, 1991.

Compliance:

- All public water systems which use either surface water or groundwater under the direct influence of surface water will be required to filter or meet stringent criteria to remain unfiltered.
- Removal and/or inactivation of *Giardia lamblia* and enteric viruses at 99.9%,and 99.99% respectively. Must be achieved by disinfection alone or by a combination of filtration and disinfection.
- All systems must be operated by qualified operators as determined by the state.

Compliance dates:

1/91 Unfiltered supplies begin testing

12/91 Unfiltered surface water supplies must meet requirements to remain unfiltered

6/93 Filtration or alternate source must be in place. Filtered systems must meet filtration requirements. Community systems with groundwater sources that may be under direct influence of surface water begin testing to determine degree of influence.

6/94 State determines which community groundwater sources are surface water influenced

12/95 Surface influenced community systems install filtration or alternative supply

6/98 Noncommunity systems with groundwater sources that may be under direct influence of surface water begin testing to determine degree of influence.

6/99 State determines which noncommunity groundwater sources are surface influenced

12/2001 Surface influenced noncommunity systems install filtration or alternate source

Requirements to remain unfiltered:

- Fecal coliform limit prior to disinfection must be less than or equal to 20/100 ml in at least 90 percent of the samples taken or the total coliform concentration must be less than or equal to 100/100 ml in at least 90 percent of the samples. Samples must be collected from raw water on a weekly basis.
- Turbidity level prior to disinfection must not exceed 5 nephelometric turbidity units.
- A system must achieve at least 99.9% and 99.99% inactivation of *Giardia* cysts and viruses respectively. Daily measurements of pH, temperature, and chlorine residual at the first customer site are required to compute the CT values. The disinfection system must also have either redundant components, or an automatic shut-off of water to the distribution system whenever there is less than 0.2 mg/l of residual disinfectant concentration in the water.
- System must develop a watershed control program including written agreements with landowners.
- No occurrence of outbreaks of waterborne disease with the current source and treatment methods.
- System must be in compliance with the total coliform rule as well as the total trihalomethane (TTHM) standards.

Filtration requirements:

Water systems must install one of the following technologies:

- Conventional rapid sand;
- Direct filtration (with coagulation);
- Slow sand filtration;

Table 2: SOCs and IOCs (Phase II)

Contaminant	Health Effect(s)	Source(s)	Treatment*	MCL
Inorganics (IOCs)				
Asbestos	Benign tumors	Geological, asbestos-cement pipe, fire retardant	2,3,8	7 million fibers/liter
Barium	Circulatory system	Geological	5,6,7	2 mg/l
Cadmium	Kidney	Geological, mining, and smelting	2,5,6,7	0.005 mg/l
Chromium	Liver, kidney effects	Geological, metal plating	2,5,6,7	0.1 mg/l
Mercury	Kidney	Used to make paint, paper, vinyl chloride, geological	2,4,6,7	0.002 mg/l
Nitrate (as N)	Methemoglobinemia ("blue baby" syndrome)	Fertilizer, sewage, animal waste	5,7	10 mg/l
Nitrite (as N)	Same as nitrate	Same as nitrate	5,7	1 mg/l
Total nitrate/nitrite (as N)				10 mg/l
Selenium	Neurological effects	Mining, geological	1,2,5,6,7	0.05 mg/l
VOCs				
cis-1,2-Dichloroethylene	Nervous system, liver, kidney	Extraction solvent, dyes, perfumes, lacquers, pharmaceuticals	4,9	0.07 mg/l
1,2-Dichloropropane	Liver toxin, lung and kidney effects	Pesticide, solvent	4,9	0.005 mg/l
Ethylbenzene	Liver, kidney effects	Manufacture of styrene	4,9	0.7 mg/l
Monochlorobenzene	Respiratory, nervous system, liver, kidney	Solvent, pesticide	4,9	0.1 mg/l
trans-1,2-Dichloroethylene	Liver, nervous and circulatory systems	Solvent, chemical production	4,9	0.1 mg/l
Styrene	Probable cancer	Production of plastics	4,9	0.1 mg/l
Tetrachloroethylene	Probable cancer	General and dry cleaning solvent	4,9	0.005 mg/l
Toluene	Liver, kidney, nervous and circulatory damage	Solvent and in the manufacture of gasoline	4,9	1 mg/l
Xylenes	Liver, kidney and nervous system damage	Degreaser of metals; solvent for pesticides and in the manufacture of gasoline	4,9	10 mg/l
o-Dichlorobenzene	Liver, kidney and blood cell damage	Solvent used in the production of pesticides and dyes	4,9	0.6 mg/l
Pesticides/herbicides/PCBs (SOCs)				
2,4-D	Liver, kidney and nervous system	Herbicide	4	0.07 mg/l
Ethylene dibromide (EDB)	Probable cancer	Pesticide	4,9	0.00005 mg/l
Heptachlor	Probable cancer	Pesticide	4	0.0004 mg/l
Heptachlor epoxide	Probable cancer	Pesticide	4	0.0002 mg/l
Lindane	Liver, kidney and nervous system damage	Pesticide	4	0.0002 mg/l
Methoxychlor	Liver, kidney and nervous system damage	Pesticide	4	0.04 mg/l
Polychlorinated biphenyls (PCBs)	Probable cancer	Used in electrical tranformers and other industrial equipment	4	0.0005 mg/l
Pentachlorophenol	Liver, kidney and reproductive damage	Used as a wood preservative, herbicide, disinfectant and defoliant	4	0.001 mg/l
Toxaphene	Probable cancer	Pesticide	4	0.003 mg/l
2,4,5-TP (Silvex)	Liver, kidney and nervous system damage	Herbicide	4	0.05 mg/l
Alachlor	Probable cancer	Pesticide	4	0.002 mg/l
Aldicarb	Nervous system damage	Pesticide	4	**(0.003 mg/l)
Aldicarb sulfoxide	Nervous system damage	Pesticide	4	**(0.004 mg/l)
Aldicarb sulfone	Nervous system damage	Pesticide	4	**(0.002 mg/l)
Altrazine	Liver and kidney damage	Herbicide	4	0.003 mg/l
Carbofuran	Nervous and reproductive system damage	Pesticide	4	0.04 mg/l
Chlordane	Probable cancer	Pesticide	4	0.002 mg/l
Dibromochloropropane (DBCP)	Probable cancer	Pesticide	4,9	0.0002 mg/l
Water treatment chemicals				
Acrylamide	Probable cancer	Polymers used for water treatment	10	Treatment technique
Epichlorohydrin	Probable cancer	Polymers used for water treatment	10	Treatment technique

*** Key to available technology for removing contaminants**

1. Activated alumina
2. Coagulation/Filtration
3. Direct and Diatomite filtration
4. Granular activated carbon
5. Ion exchange
6. Lime softening
7. Reverse osmosis
8. Corrosion control
9. Packed tower aeration
10. Polymer addition practices

** Final MCLs for these contaminants have not been set.

- Diatomaceous earth filtration;
- Alternate technology (cartridge or membrane filters).

Water systems must meet specific turbidity performance standards particular to above technologies.

IV. Enhanced Surface Water Treatment Rule

Purpose:

The Enhanced Surface Water Treatment Rule (ESWTR) may require water systems using surface water sources to monitor raw water for *Giardia*, *Cryptosporidium*, total coliforms, fecal coliforms or *E. Coli* and enteroviruses and provide levels of treatment based on the raw water quality measurements. These may exceed 99.9% (3-log) removal for *Giardia* and 99.99% virus removal as needed.

Schedule:

Large systems may be required under the Information Collection Rule (ICR) to collect the above described data prior to adoption of the ESWTR. This data will be used to design the rule.

The ESWTR will have two stages: interim and final. The final rule will be developed using experience gained under the interim. The interim would be established in December 1996 with the state rule due June 1998. The final ESWTR is due December 1998, with state rule due June 2000.

Monitoring:

Summer 1995 Final information collection rule

Fall 1995 Community water systems with surface sources serving more than 100,000 persons monitor source and filtered water for *Giardia*, *Cryptosporidium*, total coliforms, fecal coliforms/*E. coli*, viruses.

Fall 1995 Community water systems with surface sources serving 10,000-100,000 persons monitor bimonthly for *Giardia*, *Cryptosporidium*, total coliforms, fecal coliforms/*E. coli*, viruses.

12/96 Interim Enhanced Surface Water Treatment rule

6/98 Systems serving more than 10,000 persons meet interim ESWTR.

12/98 Final Enhanced Surface Water Treatment rule.

12/2000 All surface water systems meet final ESWTR.

V. Synthetic Organic and Inorganic Chemicals (Phase II)

Schedule:

Final federal rule published January 30, 1991 and July 1, 1991. Final state rule was adopted December 7, 1992.

Purpose:

Set 27 new MCLs and treatment techniques and 11 revised MCLs as follows:

- 17 pesticide standards.
- 8 inorganic standards (deleted existing MCL for silver).
- 10 new volatile organic standards.
- 2 requirements for water treatment chemicals (polymers).
- 1 standard for PCBs.

EPA is in the process of reproposing MCLs for 3 aldicarb compounds. Final MCLs are expected December 31, 1995.

Also set monitoring requirements for 30 unregulated contaminants to be regulated later under Phase V and secondary contaminant levels for silver and aluminum.

Application:

All standards apply to community and nontransient noncommunity systems. Nitrate/nitrite standards also apply to transient noncommunity systems.

Sources, health effects and best available technology:

Summarized in Table 2.

Monitoring:

Systems must complete initial monitoring during 1993, 1994 or 1995 (1/3 of systems each year). Repeat monitoring based on initial results and vulnerability assessment of water source. Samples are collected from each source after treatment. Quarterly testing is required for the first year; however, for systems serving 3,300 or fewer persons which test by Oct. 1, 1993, that will be the only test required. Systems serving more than 3,300 persons may request a waiver which, if granted, will reduce monitoring requirements. High costs for initial monitoring are due to the large number of analytical methods needed to test all contaminants and the initial quarterly monitoring.

VI. Lead and Copper Rule

Schedule:

Final federal rule adopted June 7, 1991. Final state rule was adopted December 7, 1992. See Table 3. EPA published technical corrections to the rule on June 30, 1994.

Purpose:

Set treatment technique requirements for lead and copper including:

- Corrosion control treatment.
- Source water treatment.
- Public education.
- Lead service line replacement.

No MCLs set for lead or copper. Action levels set at 0.015 mg/l for lead and 1.3 mg/l for copper.

Application:

All community and nontransient noncommunity water systems.

Health effects:

Lead:

- In children, altered physical and mental development; interference with growth; deficits in IQ, attention span and hearing;

Table 3: Lead and Copper Monitoring

Population served	Sample sites initial	Sample sites reduced
>100,000	100	50
10,001-100,000	60	30
3,301-10,000	40	20
501-3,300	20	10
101-500	10	5
≤100	5	5

Starting dates for sampling

January 1992	Large systems (>50,000)
July 1992	Medium systems (3,301-50,000)
July 1993	Small systems (<3,300)

Corrosion control installation dates

6/96 Large systems (>50,000)
1/97 Medium systems (3,301-50,000)
1/98 Small systems (<3,300)

interference with red blood cell production.
- In women, shorter gestation period; in men and women, increased blood pressure.

Copper: stomach and intestinal distress.

Sources:

Lead: corrosion of lead solder, brass plumbing fixtures and lead piping in customer plumbing.

Copper: primarily corrosion of copper piping used in plumbing systems.

Monitoring:

All systems must conduct customer tap sampling (see Table 3). One liter "standing water samples" are collected from high risk homes (those with lead solder, lead pipes or lead service lines).

Large systems (greater than 50,000 population) must optimize corrosion regardless of lead/copper levels. Other systems must install corrosion treatment only if action levels are exceeded by the 90th percentile value. Systems exceeding lead action level must monitor source water for lead, identify and remove lead service lines and conduct public education. Systems practicing corrosion control must monitor for water quality parameters (pH, temperature, alkalinity, etc.). Systems meeting action levels or optimizing corrosion control may reduce monitoring.

VII. Synthetic Organic and Inorganic Chemicals (Phase V)

Schedule:

Final federal rule adopted in July 17, 1992. Final state rule adopted January 14, 1994.

Purpose:

Set standards for five inorganic and 18 synthetic organic chemicals.

Health effects, sources, treatment:

Summarized in Table 4.

Application:

All community and nontransient noncommunity water systems.

Monitoring:

Systems serving more than 150 service connections began initial monitoring between January 1 and December 31, 1993. Systems with

Table 4: SOCs and IOCs (Phase V)

Contaminant	Health Effect(s)	Source(s)	Treatment*	MCL (mg/l)
IOCs				
Antimony	Alters blood cells of cholesterol and glucose	Geologically, used in ceramics, fireworks, glass, batteries, and explosives	2,7	0.006
Beryllium	Bone and lung damage, induction of cancer	Mining, processing plants, and improper waste disposal	2,5,6,7	0.004
Cyanide	Damage of the spleen, brain, and liver	Used in electroplating, steel processing, plastics, fertilizer	5,7,9	0.2
Nickel	Heart and liver damage	Used in electroplating, stainless steel and alloy products	5,6,7	0.1
Thallium	Damage of kidney, liver, brain, and intestines	Geologic, used in manufacture of electronics, pharmaceuticals, glass and alloys	5	0.002
Pesticides/herbicides/VOCs				
Benzo(a)pyrene	Cancer	Leaching from coal tar lining, and coatings in water storage tanks and pipes	4	0.0002
Dalapon	Kidney and liver damage	Herbicides	4	0.2
Dichloromethane	Cancer	Used as a solvent	11	0.005
Di(2-ethylhexyl)adipate	Liver and testes damage	Used as a plasticizer	4	0.5
Di(2-ethylhexyl)phthalate	Cancer	Used as a plasticizer	4	0.006
Dinoseb	Thyroid and reproductive damage	Pesticide	4	0.007
Diquat	Liver, kidney, and gastrointestinal tract	Herbicide	4	0.02
Endothall	Liver, kidney, gastrointestinal and reproductive damage	Herbicide	4	0.1
Endrin	Liver, kidney, and heart	Pesticide (no longer in use)	4	0.002
Glyphosate	Liver, and kidney	Herbicide	12	0.7
Hexachlorobenzene	Cancer	Produced in the manufacture of some solvents and pesticides	4	0.001
Hexachlorocyclopentadiene	Kidney and stomach damage	Produced in the manufacture of flame retardents and pesticides	4,11	0.05
Oxamyl (Vydate)	Kidney damage	Pesticide	4	0.2
Picloram	Kidney and liver damage	Pesticide	4	0.5
Simazine	Cancer	Herbicide	4	0.004
1,2,4-Trichlorobenzene	Cancer	Herbicide	4,11	0.07
1,1,2-Trichloroethane	Liver and kidney damage	Produced in the manufacture of 1,1,2-trichloromethane	4,11	0.005
2,3,7,8-TCDD (Dioxin)	Cancer	Production of some pesticides	4	$5x10^{-8}$

*** Available technology key**

1. Activated carbon
2. Coagulation/filtration
3. Direct and diatomite filtration
4. Granular activated carbon
5. Ion exchange
6. Lime softening
7. Reverse osmosis
8. Corrosion control
9. Chlorine oxidation
10. Ultraviolet Light
11. Packed tower aeration
12. Oxidation

fewer than 150 service connections must begin monitoring between January 1, 1996, and December 31, 1998.

VIII. Radionuclides (Phase III)

Schedule:

Proposed federal rule published July 18, 1991. Final federal rule expected in April 1995. Final state rule to be adopted October 1996. Congressional action may delay these dates.

Purpose:

Set six standards including radon and uranium. Revised existing standards for other radionuclides.

Application:

All community and nontransient noncommunity water systems.

Sources, Treatment:

Radon gas can be present in groundwater from the natural decay of radium. Most other radioactive contaminants are present naturally in the environment. Most beta and photon emitters are man-made contaminants. Treatment methods are shown in Table 5.

Health Effects:

Primarily cancer (see Table 5). Inhaling radon gas increases the risk of lung cancer.

Monitoring:

Systems may begin initial monitoring in 1996, 1997 and 1998 (1/3 of systems each year. Repeat monitoring every 3, 6 or 9 years, depending on initial results and water source vulnerability.

Table 5: Radionuclides

Contaminant	Health Effect(s)	Treatment*	MCL
Radium 226	Bone cancer	1,2,5	20 pCi/l
Radium 228	Bone cancer	1,2,5	20 pCi/l
Uranium	Kidney damage, bone cancer	1,4,7	20 µg/l
Radon	Probable lung cancer	6	200 pCi/l
Gross alpha	Cancers	2,3,7	15 pCi/l
Beta and Photon	Cancers	2,3,7	4 mrem/yr

*** Available technology key**

1-Lime softening
2-Reverse osmosis
3-Ion exchange
4-Anion exchange
5-Cation exchange
6-Aeration
7-Coagulation/flocculation

IX. Groundwater Disinfection Rule

Schedule:

Proposed federal rule expected August 1995. Final federal rule expected in August 1997. Final state rule to be adopted February 1999. Coordinated with the Disinfection By-products rule (Section X).

Purpose:

Require public water systems using groundwater sources to disinfect the water to control viruses unless the source is deemed *not vulnerable* to viral contamination.

Application:

All public water systems using groundwater sources (not influenced by surface water).

Health Effects:

Viruses can cause disease outbreaks and can travel in groundwater.

Sources:

Source of viruses is human fecal material or sewage (subsurface sewage disposal, lagoons, etc.)

Monitoring and Treatment:

This rule is under renewed development by an EPA workgroup. Key issues include how to assess vulnerability of wells to virus contamination, the nature of virus transport in groundwater, the effectiveness of different disinfection treatments for viruses of concern, and methods to monitor water for viruses. It is expected that vulnerable community systems would install disinfection by 2000–2001, and non-community systems by 2002–2003.

X. Disinfectants and Disinfection By-products (Phase VI-A)

Schedule:

Large systems will be required (under the Information Collection Rule [ICR]) to monitor for water quality parameters in raw and distribution system water and for disinfection by-products in the distribution system. Data generated will be used to finalize a federal rule by December 1996. Water systems will be expected to comply with stage one MCLs between June 1998 and January 2002. Based on experience with stage one, stage 2 MCLs will be adopted by June 2000.

Purpose:

Set standards for both disinfectant residuals and compounds which are by-products of the use of disinfectants (DBPs). This rule is being closely coordinated with rules for groundwater disinfection and enhanced surface water treatment.

Disinfectants are needed to control waterborne disease but all disinfectants react with naturally occurring compounds in water (called *precursors*) to produce DBPs which may have health risks. Some disinfectants may need to have dosages limited to prevent health effects. Rule must *balance* risks to assure control of waterborne disease while limiting exposure to disinfection by-products and disinfectant residuals.

Because of the lack of adequate scientific information on disinfectant by-products and their health effects, the rule will be implemented in two stages. The stages will establish MCLs for total trihalomethanes (TTHM) and total haloacetic acids (HAA5). See Table 6. The current standard for TTHM is 100 µg/l. Maximum residual disinfectant level goals for three types of residuals will be set. In addition, treatment technique limits for total organic carbon (TOC) are set to control as yet unidentified disinfection by-products. Surface water systems with conventional filtration treatment would be required to optimize coagulation prior to disinfection if TOC levels are greater than 2 mg/l. Stage two will establish additional MCLs in the future based on stage one data generated by water systems.

Table 6: Disinfectants and disinfection by-products

Disinfectants (max. levels)	Stage one	Stage two
Chlorine (free)	4 mg/l	4 mg/l
Chloramines (total chlorine)	4 mg/l	4 mg/l
Chlorine dioxide	0.8 mg/l	0.8 mg/l
Disinfection by-products (MCLs)		
Total trihalomethanes (TTHM)	80 µg/l	40 µg/l
Total haloacetic acids (HAA5)	60 µg/l	30 µg/l
Chlorite (systems with chlorine dioxide disinfection)	1.0 mg/l	1.0 mg/l
Bromate (systems with ozone disinfection)	10 µg/l	10 µg/l

Application:

All community and nontransient noncommunity water systems that use a chemical disinfectant.

Treatment:

All systems using chemical disinfection and conventional filtration meet MCLs for TTHM and HAA5 and enhance coagulation if TOC is 2 mg/l or higher. Enhanced coagulation means removing specified levels of TOC by coagulation and sedimentation prior to disinfection.

Other water systems must meet MCLs for TTHM and HAA5. These include systems with slow sand filtration, cartridge filters and groundwater systems that disinfect.

Systems using ozone must meet bromate MCL. Systems using chlorine dioxide must meet chlorite MCL.

Health Effects:

Trihalomethanes are associated with increased cancer risk. Other DBPs now under study are possible cancer risks. Additional DBPs and health effects may be identified.

Monitoring:

Summer 1995 Final information collection rule.

Fall 1995 – Fall 1996 All water systems that serve more than 100,000 persons monitor sources and treated water monthly for pH, alkalinity, turbidity, temperature, calcium, hardness, total organic carbon, UV_{254}, bromide and ammonia. Also monitor the distribution system quarterly at four locations for TTHM, HAA5, haloacetonitriles (HAN), chloropicrin, haloketones, chloral hydrate and total organic halide (TOX). Bench studies to investigate DBP precursor removal.

12/96 Final stage one DBP rule

6/98 Surface water systems serving more than 10,000 persons meet stage one DBP MCLs. Initiate regulatory negotiation for stage two DBP requirements

6/2000 Surface water systems serving fewer than 10,000 persons meet stage one DBP MCLs. Final stage two federal rule.

1/2002 Groundwater systems serving fewer than 10,000 persons meet stage one DBP MCLs.

2002 – 2004 All water systems meet stage two DBP MCLs.

XI. Synthetic and Inorganic Chemicals (Phase VI-B)

Schedule:

Proposed federal rule expected February 1995. Final federal rule expected February 1997. Final state rule to be adopted August 1998.

Purpose:

Set standards for 19 inorganic and synthetic organic chemicals. See Table 7 for listing of contaminants. Includes 19 of first 25 set under SDWA mandate of 25 new MCLs every 2 years.

Application:

All community and nontransient noncommunity water systems.

Monitoring:

To be determined.

XII: Sulfate

Schedule:

Proposed federal rule November 1994. Final federal rule due May 1996, with state adoption by December 1997.

Purpose:

Set MCL for sulfate, probably 500 mg/l. Sulfate originally proposed as part of Phase V rule but was deferred to consider alternative regulations due to high cost and low risk.

Application:

All public water systems

Health Effects:

Sulfate levels above 500 mg/l can have a laxative effect on infants and un-acclimated adults. Adults acclimate to high sulfate levels fairly rapidly. An MCL of 500 mg/l would affect a large number of small water systems.

Monitoring:

To be determined.

XII. Arsenic

Schedule:

Proposed federal rule expected in November 1995 with the final rule in November 1997. State rule adoption by April 1999.

Purpose:

Set revised MCL for arsenic. Current MCL is 0.050 mg/l. May be reduced to as low as 0.002 to 0.005 mg/l based on cancer risk. A low MCL would affect a large number of water systems. More study is likely before a new MCL is proposed.

Application:

Community and nontransient noncommunity water systems.

Table 7: SOCS and IOCS (Phase VI-B)

Contaminant	Possible MCLs
1,1,1,2 Tetrachloroethane	0.07 mg/l
1,2,3 Trichloropropane	0.0008 mg/l
1,3 Dichloropropene	0.0006 mg/l
2,4/2,6-Dinitrotoluene	0.003 mg/l
Acifluorfen	0.002 mg/l
Acrylonitrile	0.003 mg/l
Boron	0.6 – 1 mg/l
Bromomenthane	0.01 mg/l
Cyanazine	0.001 mg/l
Dicamba	0.2 mg/l
Ethylenethiourea	0.025 mg/l
Hexachlorobutadiene	0.001 mg/l
Manganese	0.2 mg/l
Methomyl	0.2 mg/l
Metolachlor	0.1 mg/l
Metribuzin	0.2 mg/l
Molybdenum	0.04 mg/l
Trifluralin	0.005 mg/l
Zinc	2 mg/l

Health Effects:

Non-cancerous effects—mainly thickening of skin. Possible skin cancer and some evidence of internal organ cancer risk.

Treatment:

Reverse osmosis, activated alumina, and electrodialysis. Treatment to below 0.002 mg/l may not be currently possible.

Monitoring:

To be determined.

XIII. Health Advisories

Health Advisories are guidance documents issued by the EPA to assist federal, state, and local officials in responding to drinking water contamination. The Health Advisories contain information on health risks and treatment technologies, and specify levels of chemical concentrations in water that are acceptable for drinking. In preparing Health Advisories, EPA reviews available human data and experimental animal studies in evaluating potential human health effects. The Health Advisories are updated as new information becomes available. As of June 1993 the list of EPA Health Advisories included the contaminants in Table 8.

XIV. Drinking Water Priority List

EPA is required to publish a priority list of contaminants in drinking water every three years. These contaminants are candidates for future regulation. The Safe Drinking Water Act requires EPA to set 25 new MCLs every three years.

The drinking water priority list was revised in 1991 and the listed contaminants are shown in Table 9. A new list was due in January 1994, but was not ready.

XV. Unregulated Contaminants

Purpose:

Develop occurrence data to assist in selecting new contaminants for setting drinking water standards. Unregulated contaminants have no established MCLs.

Application:

Community and nontransient noncommunity water systems.

Schedule:

The list of current unregulated contaminants is shown in Table 10. This list will change as new federal regulations become effective. New contaminants will be added, existing contaminants will become regulated with established MCLs and monitoring frequencies, or will drop from the list.

Monitoring:

Monitoring is by source every five years. Systems which serve fewer than 150 connections may simply notify the Division in writing that they are available for sampling.

XVI Secondary Contaminants

Purpose:

No MCLs are set for secondary contaminants, however, guideline levels are listed that are associated with aesthetic effects such as staining of plumbing fixtures or tastes and odors.

Application:

All public water systems.

Schedule:

Secondary standards can be set within any regulation. A current listing of secondary standards is given in Table 11.

Monitoring:

No monitoring is required in the rules. Secondary contaminants and levels are offered for guidance only.

Table 8: Health Advisories

Organics

Aciflurofen
Acrylamide
Alachlor
Aldicarb
Aldicarb sulfone
Aldicarb sulfoxide
Ametryn
Ammonium sulfamate
Atrazine
Baygon
Bentazon
Benzene
bis - (1-Chloroisopropyl) ether
Bromacil
Bromochloromethane
Bromoethane
Butylate
Carbaryl
Carbofuran
Carbon tetrachloride
Carboxin
Chloramben
Chlordane
Chloromethane
Chlorothalonil
Chlorotoluene o-
Chlorotoluene p-
Cyanazine
2,4-D
DCPA (Dacthal)
Dalapon
Diazinon
Dibromochloropropane (DBCP)
Dicamba
Dichlorobenzene o-
Dichlorobenzene m-
Dichlorobenzene p-
Dichlorodifluoromethane
Dichloroethane (1,2-)
Dichlorethylene (1,1-)
Dichloroethylene (cis-1,2-)
Dichloroethylene (trans-1,2-)
Dichloromethane
Dichloropropane (1,2-)
Dichloropropene (1,3-)
Dieldrin
Diisopropyl methylphosphonate
Dimethrin
Dimethyl methylphosphonate
1,3-Dinitrobenzene
Dinitrotoluene (2,4-)
Dinitrotoluene (2,6-)
Dinoseb
Dioxane p-
Diphenamid
Diphenylamine
Disulfoton
Dithiane (1,4-)
Diuron
Endothall
Endrin
Epichlorohydrin
Ethylbenzene
Ethylene dibromide (EDB)
Ethylene glycol
ETU
Fenamiphos
Fluometuron
Fluorotrichloromethane
Fonofos
Glyphosate
Heptachlor
Heptachlor epoxide
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Hexane (n-)
Hexazinone
HMX
Isophorone
Lindane
Maleic hydrazinde
MCPA
Methomyl
Methoxychlor
Methyl parathion
Metolachlor
Metribuzin
Monochlorobenzene
Naphthalene
Nitrocellulose (non-toxic)
Nitroguanidine
Oxamyl (Vydate)
Paraquat
Pentachlorophenol
Picloram
Prometon
Pronamide
Propachlor
Propazine
Propham
RDX
Simazine
Styrene
2,4,5-T
2,3,7,8 TCDD (Dioxin)
Tebuthiuron
Terbacil
Terbufos
Tetrachloroethane (1,1,1,2-)
Tetrachloroethylene
Toluene
Toxaphene
2,4,5-TP
Trichlorobenzene (1,2,4 -)
Trichlorobenzene (1,3,5-)
Trichloroethane (1,1,1-)
Trichloroethane (1,1,2-)
Trichloroethylene
Trichloropropane (1,2,3-)
Trifluralin
Trinitroglycerol
Trinitrotoluene
Vinyl chloride
Xylenes

Inorganics

Anitmony
Barium
Cadmium
Chromium (total)
Cyanide
Mercury (inorganic)
Molybdemun
Nickel
Nitrate (as N)
Nitrite (as N)
Nitrate + Nitrite (both as N)
Thallium
White phosphorous
Zinc
Zinc chloride (measured as Zinc)

Table 9: Drinking Water Priority List

Inorganics (total = 14)
Aluminum
Boron
Chloramines
Chlorate
Chlorine
Chlorine dioxide
Chlorite
Cyanogen chloride
Hypochlorite ion
Manganese
Molybdenum
Strontium
Vanadium
Zinc

Pesticides (total = 19)
Asulam
Bentazon
Bromacil
Cyanazine
Cyromazine
DCPA (and its acid metabolites)
Dicamba
Ethylenethiourea
Fomesafen
Lactofen / Acifluorfen
Metalaxyl
Methomyl
Metolachlor
Metribuzin
Parathion degradation product (4-Nitrophenol)
Prometon
2,4,5-T
Thiodicarb
Trifluralin

Synthetic organic chemicals (total = 43)
Acrylonitrite
Bromobenzene
Bromochloroacetonitrile
Bromodichloromethane
Bromoform
Bromomethane
Chlorination / Chloramination by-products (Misc.), e.g., Haloacetic acids, Haloketones, Chloral hydrate, MX-2 [3-chloro-4-(dichloromethyl)-5-hydroxy-2-(5H)-furanone], N-Organochloramines
Chloroethane
Chloroform
Chloromethane
Chloropicrin
o-Chlorotoluene
p-Chlorotoluene
Dibromoacetonitrile
Dibromoacetomethane
Dibromomethane
Dichloroacetonitrile
1,1-Dichloroethane
2,2-Dichloropropane
1,3-Dichloropropane
1,1-Dichloropropene
1,3-Dichloropropene
2,4-Dinotrophenol
2,4-Dinitrotoluene
2,6-Dinitrotoluene
1,2-Diphenylhydrazine
Fluorotrichloromethane
Hexachlorobutadiene
Hexachloroethane
Isophorone
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl-t-butyl ether
Naphthalene
Nitrobenzene
Ozone by-products, e.g., aldehydes, epoxides, peroxides, nitrosamines, bromate, Iodate
1,1,1,2-Tetrachloroethane
1,1,2,2,-Tetrachloroethane
Tetrahydrofuran
Trichloroacetonitrile
1,2,3-Trichloropropane

Microorganisms (total = 1)
Cryptosporidium

Table 10: Unregulated Contaminants

3-Hydroxycarbofuran	Metribuzin	Bromodichloromethane
Aldicarb	Propachlor	Bromoform
Aldicarb Sulfoxide	1,1-Dichloroethane	Bromomethane
Aldicarb Sulfone	1,1-Dichloropropene	Chloroethane
Aldrin	1,1,1,2-Tetrachloroethane	Chloroform
Butachlor	1,1,2,2,-Tetrachloroethane	Chloromethane
Carbaryl	1,2,3,-Trichloropropane	Dibromochloromethane
Dicamba	1,3-Dichloropropane	Dibromomethane
Dieldrin	1,3-Dichloropropene	M-Dichlorobenzene
Methomyl	2,2-Dichloropropane	*o*-Chlorotoluene
Metolachlor	Bromobenzene	*p*-Chlorotoluene

Table 11: Secondary Standards

Aluminum	.05-0.2 mg/l
Chloride	250 mg/l
Color	15 color units
Copper	1.0 mg/l
Corrosivity	Non-corrosive
Fluoride*	2.0 mg/l
Foaming agents	0.5 mg/l
Hardness	250 mg/l
Iron	0.3 mg/l
Manganese	0.05mg/l
Odor	3 threshold odor numbers
pH	6.5-8.5
Silver	.1 mg/l
Sulfate	250 mg/l
Total dissolved solids (TDS)	500 mg/l
Zinc	5 mg/l

* Note: Fluoride also has an MCL of 4 mg/l.

The Future—A Regulatory Forecast

Considerable progress in improving Oregon public drinking water supplies continues to be made. Four key areas of effort are critical to insure continued progress in the next two to five years:

1. Reform and reauthorization of the federal Safe Drinking Water Act,
2. Reform of safe drinking water regulations and prioritization of their implementation,
3. Funding assistance for safe drinking water construction projects, and
4. Funding of the regulatory and research programs.

These areas all need to be fully addressed, in the order listed above. Each is described and discussed below.

Safe Drinking Water Act Reform

During the report period, a major effort was made on the national level to reauthorize and reform the Safe Drinking Water Act (SDWA). The Oregon drinking water team played a key role in this process participating through its representation in the Association of State Drinking Water Administrators and serving as a direct information resource for the Oregon congressional delegation. Senator Hatfield and his staff took a very strong interest in SDWA reform and the Program and Oregon water suppliers had many opportunities to provide information and input. Senator Hatfield's efforts resulted in the Senate's passage of S. 2019 - "The Safe Drinking Water Act Amendments of 1994."

Late in the session, the House of Representatives passed its own version of amendments to the SDWA (HR 3392), however, a final compromise SDWA bill was not passed before adjournment. While the SDWA remains unchanged, the debate and discussion of the Senate and House bills raised a number of possible solutions to major issues of concern to health professionals and water suppliers, including:

- Deletion of the requirement for 25 new standards every three years;
- Selection of new contaminants for regulation based on their occurrence in drinking water supplies and on sound information regarding the risk they present to health;
- Consideration of health risk reduction benefits and costs when setting maximum contaminant levels for contaminants;
- Directly involving the public health community, such as the Centers for Disease Control and Prevention, in the drinking water standard setting process;
- Allowing states more flexibility in tailoring contaminant monitoring requirements to the local water supply situation.

Efforts to complete SDWA reauthorization and reform are expected to resume in the next Congress. The

goal of SDWA reform is to develop a law that focuses on achieving the largest health benefits first, based on sound scientific foundations of health risk reduction benefits and costs.

Regulatory Reform

After reform of the Safe Drinking Water Act, reform and revision of EPA regulations is the next priority of work. The current regulatory framework contains highly prescriptive and complex rules. As a result, they often are very difficult to implement for the small and very small systems that are typical of Oregon. A result is a large number of technical violations of rules that have more to do with compliance process than actual exposure of the public to drinking water contaminants. This causes increased public perceptions that drinking water is unsafe, even when contaminants are not present.

Regulatory reform must occur in the context of the statutory reform discussed above, and should focus on making drinking water rules more implementable, especially for small water systems. Rules should maximize implementation flexibility for the state programs without creating undue burdens on them. The rules should reflect implementation priorities according to magnitude of health risks. For example, Program experience has suggested the following priorities for implementation of drinking water standards in Oregon:

First - Microbiological contaminants presenting a known risk of disease (*Giardia, Cryptosporidium*, coliform bacteria, viruses). Risk reduction efforts include:

- Filtration treatment installation for unfiltered surface water sources,
- Optimizing the operation of existing filtration treatment plants,
- Identifying groundwater sources directly influenced by nearby surface water bodies,
- Disinfection of groundwater sources at risk of viral contamination.

Second - Chemical contaminants presenting short-term or acute health risks (lead, nitrate), especially to susceptible populations such as children. Risk reduction efforts include:

- Installing corrosion control treatment to reduce the amount of lead and copper that leaches into water at the customer tap from household plumbing and fixtures,
- Installing treatment or replacing or protecting sources to reduce nitrate levels in water systems, especially in agricultural areas.

Third - Chemical contaminants that present potential chronic health risks from long-term low level exposure, usually based on projection of animal study data (synthetic organics, inorganics). Risk reduction efforts include:

- Statewide monitoring efforts,
- Coordination of water supply monitoring results with DEQ site contamination and cleanup programs,
- Wellhead and watershed programs to protect public water sources from contamination,
- Installation of treatment systems or source replacement at contaminated water systems.

Funding of Water System Improvements

After statutory and regulatory reform is completed, financing assistance is needed to fund water system construction improvements, especially in small systems. They frequently lack access to financial markets and costs for water system improvements are generally higher per capita than for larger systems. *Safety on Tap* (OHD, 1991) estimated that Oregon water systems would require $1.4 billion for infrastructure improvements during the 1990s, of which about $240M would be needed to meet regulatory requirements.

At the national level, proposals for a State Revolving Fund (SRF) were a part of the Safe Drinking Water Act reauthorization debate, with total funding authorized at $6.6 billion over five years. EPA is now conducting a national community water system needs survey to determine individual state allocations. SRF funds would be distributed and administered by existing state financial assistance programs. In Oregon, the Economic Development Department is well positioned to take on this work through the Water and Wastewater Financing Program and other existing community infrastructure programs.

Funding of Regulatory and Research Programs

After the above three steps are completed, research and regulatory development programs at the federal level, and rule implementation programs at the state and local levels must be adequately funded to carry out the work under the reformed statutory and regulatory framework. There must be a balance between the scope of work for the regulatory effort and resources committed for the effort. At present, health effects and regulatory development research work is seriously underfunded and is in fact declining at the federal level. State regulatory programs, including Oregon's, are now funded at about one-half that needed to fully carry out the existing implementation effort, in spite of recent modest increases in funding from EPA and state funds. Failure to fund research and regulatory programs adequately threatens to jeopardize the entire safe drinking water effort. ■

You've Got Our Number!

Implementation of the new drinking water standards is generating an ever increasing number of questions from system operators and managers. Both county and state Drinking Water Program staffs are attempting to deal with these questions while continuing to implement the rules, make site visits and conduct training. This page lists current names and phone numbers for both contract county and state technical staff.

Contract counties are now responsible for all community water systems serving fewer than 3,300 people with groundwater sources as well as all nontransient noncommunity and transient noncommunity systems. Operators and managers of these systems should contact their county health department for assistance on all drinking water issues.

State staff are responsible for all community systems serving over 3,300 people and all smaller community systems that use surface water sources. In counties without drinking water program contracts, state staff are responsible for all water systems. State staff also serve as a technical resource to the counties as needed.

Contract County Programs

The Drinking Water Program contracts with the following counties to perform much of the program work at the local level.

Baker/Malheur	Ray Huff/Susan Fuller	473-5186
Benton	Bob Wilson/Ron Smith	757-6841
Clackamas	Jim Buckley/Steve Dahl	655-8384
Columbia	Mark Edington	397-1501
Crook	Greg Hinshaw	447-8155
Curry	Mike Meszaros	247-7011 x 254
Douglas	Dave Bussen/Gerry Meyer	440-3571
Hood River	Scott Fitch/Jay Martin	386-1115
Jackson	Gary Stevens/J. Manwaring	776-7316
Jefferson	Mary Jane Cervenka	475-4456
Josephine	Bill Olson/Bruce Cunningham	474-5431
Klamath	Bob Baggett	883-1122
Lane	Stan Petrasek	687-3951
	Harry Youngquist	687-3636
Lincoln	Amy Chapman	265-4179
Linn	George Waun/Valerie Aliski	967-3821
Malheur/Baker	Ray Huff/Susan Fuller	473-5186
Marion	Joe Fowler/Rick Sherman	588-5346
Multnomah	Ken Yee	248-3400
Polk	Gene Clemens/J. Callicrate	623-9237
Sherman/Wasco	Glenn Pierce/John Valaznik	296-4636
Tillamook	Caryn Backman/John Roe	842-3902
Wasco/Sherman	Glenn Pierce/John Valaznik	296-4636
Washington	Bill Ross/Gerhard Matheis	648-8722
Yamhill	Nancy Nunley/Flory Lotspeich	434-7525

Technical Assistance Resources

American Water Works Association,
Pacific Northwest Section
J.L. Grycko, Secretary-Treasurer 246-5845

Oregon Association of Water Utilities
Dan DeMoss, Program Manager 873-8353

State Program

Technical staff members are frequently in the field assisting water systems. Each day, however, one staff member serves as *phone duty person* in the Portland office and is available to answer questions. Please make use of this person unless you feel you must speak with a specific staff member.

When you call one of our Portland office general numbers below, you will initially speak with a support staff person. If the technical staff member you wish to speak with is not available, you will be given the option of leaving a voice mail message or speaking with the phone duty person. If the duty person is on the phone, the support person will take your name and number and the phone duty person will call you back as soon as possible.

Another option is to contact a staff person's voice mail directly. To do this, call our auto-attendant number (731-4821), and when directed by the recording, dial the person's extension listed below.

Portland office fax: 731-4077

Voice mail ..... 731-4821 + ext.

Drinking Water administration: 731-4010
Dave Leland, Program Manager ..... ext. 757
Dennis Nelson, Groundwater Coord. (In Eugene: 687-3804) . ext. 763
Dave Phelps, Funding information ..... ext. 759

Monitoring data and compliance: 731-4381
Mary Alvey, Unit Manager ..... ext. 748
Patrick Meyer ..... ext. 753
Robin Peterson ..... ext. 758
Mike Patterson ..... ext. 746
Diane Rumage ..... ext. 743

Operator certification: 731-4899
Joe Bogart ..... ext. 760
Georgine Proctor ..... ext. 761

Field staff: 731-4317
Chris Hughes, Unit Manager ..... ext. 750
Tom Charbonneau ..... ext. 749
Scott Curry ..... ext. 739
Mike Grimm ..... ext. 765
Kurt Putnam ..... ext. 740
Bonnie Waybright ..... ext. 752
Michael Whiteley ..... ext. 742
Kari Salis ..... ext. 764

Field staff, Pendleton: 276-8006
Gary Burnett

Field staff, Corvallis: 757-4281
John Potts

Lab certification, Public Health Laboratory, Portland: 229-5505
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