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James G. Martin, Governor
William W. Cobey, Jr., Secretary

Richard K. Rowe
Director

November 6, 1992

MEMORANDUM

TO: Water System Officials
FROM: W. E. Venrick, Chief *W. E. Venrick*
Public Water Supply Section
SUBJECT: Phase II Rule and Phase V Rule

The Safe Drinking Water Act (SDWA) amendments passed by Congress in 1986 require the Environmental Protection Agency (EPA) to set drinking water standards for 83 contaminants listed in the Act and 25 additional contaminants every three years. EPA has designated a Standardized Monitoring Framework to synchronize monitoring across several existing and upcoming rules with related contaminants coordinated within compliance periods of three years each.

Standardized monitoring which was established by the Phase II Rule will begin on **January 1, 1993**.

Enclosed you will find the fact sheets for the Phase II Rule and the Phase V Rule. These fact sheets summarize the requirements of the rules. If you would like a copy of the actual regulations, you may obtain it by calling the toll-free Safe Drinking Water Hotline at telephone number 1-800-426-4791.

In general, the Phase II monitoring will be implemented in steps with those systems serving more than 500 in population being required to monitor in 1993. Systems serving more than 100 in population and less than 501 shall monitor in 1994; systems serving fewer than 101 population shall monitor during 1995. The non-transient non-community system shall monitor at approximately one-third of the total number of systems each year between 1993 and 1995 depending on the service area characteristics of the systems. The exceptions are the inorganic chemicals which will continue on the previous schedule and nitrates which will be annually for well systems and quarterly for surface water systems. Samples shall be collected at each entry point to the distribution system unless otherwise indicated.

These rules allow for the issuance of various waivers of the sampling requirements; however, we anticipate that only a very few systems will qualify for the waivers. A copy of the waiver considerations is enclosed for your information.

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MEMORANDUM: Water System Officials

Page 2

November 6, 1992

For your information, Congress recently amended the Safe Drinking Water Act effective October 6, 1992, with the following language (Public Law 102-389):

With respect to monitoring requirements for organic chemicals, pesticides, PCBs, or unregulated contaminants promulgated in January 1991 (known as the Phase II rule), the Administrator or a primacy State may modify such requirements to provide that any drinking water system serving a population of less than 3,300 persons shall not be required to conduct additional quarterly monitoring for a specific contaminant or contaminants prior to October 1, 1993, if monitoring for any one quarter conducted after the date of enactment of this subsection and prior to October 1, 1993 for any such contaminant or contaminants fails to detect the presence of such contaminant or contaminants in the water supplied by the drinking water system.

EPA has not provided further guidance concerning the above amendment at the time of this correspondence.

To assist you in understanding the new monitoring, a table showing the sampling requirements is also enclosed. This information is provided to help you understand the new regulations and the impact on your system. We will send additional information to the appropriate systems when it is time to conduct the analyses. If you have additional questions after studying the enclosed material, please call your regional office at the number indicated below:

Regional Office	Telephone Number
Asheville (Black Mountain)	(704) 669-3361
Mooreville	(704) 663-1699
Winston-Salem	(919) 761-2390
Raleigh	(919) 571-4700
Fayetteville	(919) 486-1191
Washington	(919) 946-6481
Wilmington	(919) 395-3900

WEV:JCM:spm

Enclosures: Phase II Fact Sheet
Phase V Fact Sheet
Waiver Considerations
Monitoring Requirements Table

cc: Regional Engineers
Certified Laboratories
Public Water Supply Section Staff

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type of waiver cannot be granted.

- **Unregulated contaminant monitoring - Phase II** also contains one-time monitoring requirements for 30 other contaminants during the initial period which begins on January 1, 1993. Systems must take one year of quarterly samples for organic contaminants, and one sample for inorganic contaminants. No MCLs have been set for these contaminants, and no further monitoring is required if these chemicals are detected. Systems only need to report the results of this monitoring to the state. Systems with less than 150 service connections may request a waiver from the State.

Treatment Options

- **Permanent treatment options** - For each regulated contaminant, EPA has identified a treatment technology which is considered the best available for achieving the MCL. If a system cannot reliably and consistently meet an MCL, the system and State will work together to decide which of these **Best Available Technologies (BATs)** the system must install. BATs for Phase II chemicals are listed in Table 4.
- **Deferred treatment options** - Systems which cannot comply with an MCL have two options for deferring installation of treatment:
 - **Variations** allow such a system to continue operating but only under a according to a compliance schedule which sets a timeframe for installing treatment to bring the supply into compliance. A system is eligible for a variance only if it is already using BAT. Other factors, including health concerns and the reasonable availability of other sources of water, must also be considered before the state may grant a variance.
 - **Exemptions from MCLs** are available under some conditions including economic difficulties, regardless of whether or not BAT is being used. As with variances though, a compliance schedule must be met, and other factors, including health concerns and the reasonable availability of other sources of water, must also be considered. For systems having no more than 500 service connections, exemptions may be extended for two-year periods if the system demonstrates an effort to take steps necessary for achieving compliance.
- **Short-Term Treatment Options** - As a condition of granting a variance or exemption, States may require a system to provide its consumers with either bottled water, point-of-use (POU) devices or point-of-entry (POE) devices as temporary means to avoid health problems related to exceedance of an MCL.
- **Non-treatment options** - include regionalization, or joining with another nearby system, development of a new source, or blending present supplies with water from other supplies.

Assistance Programs

Several EPA programs exist to assist systems that find installation is necessary. The Technology and Training Support Initiative is supervising projects to identify, develop, and make available alternative drinking water technologies which are relatively inexpensive and simple to operate.

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Table 4. Phase II BATs

Organics
Volatile Organics: EDB, DBCP
 Granular Activated Carbon
 Packed Tower Aeration
Pesticides and PCBs
 Granular Activated Carbon

Inorganics
Conventional Technologies
 Coagulation/ Filtration¹
 Lime Softening¹
Additional Technologies
 Electrodialysis Reversal
 Ion Exchange
 Reverse Osmosis

Asbestos
 Corrosion Control
 Diatomite Filtration
 Direct Filtration

Optional for Mercury
 Granular Activated Carbon

Optional for Selenium
 Activated Alumina

¹ Not BAT for variance purposes for systems with <500 service connections.

For More Information

Call the Safe Drinking Water
 Hotline at 1-800-426-4791

nants or contaminant groups at either the MCL, 50 percent of the MCL, or at the analytical method detection limit.

- **Monitoring waivers** - Sampling frequencies may also be reduced or eliminated if the system obtains a waiver based on: 1) previous sampling results, and/or 2) an assessment of the system's vulnerability to each specific contaminant. There are two types of waivers based on vulnerability assessments:

Use waiver: A system may be eligible for a waiver if it can show that a contaminant has not been used, manufactured and/or stored within a certain area around the system's water source. If use cannot be determined, a use waiver cannot be granted.

Susceptibility waiver: Even if a system is not eligible for a use waiver, it may be eligible for a waiver based on its susceptibility in terms of source protection, wellhead protection program reports, previous sample results, environmental transport and fate of the contaminant, and

Table 3 | Compliance Monitoring Requirements

Contaminant	Base Requirement		Trigger that Increases Sampling	Waivers for Base Requirements
	Ground water	Surface water		
Asbestos	1 Sample every 9 years		> MCL	YES Based on VA ¹
Nitrate	Annual	Quarterly	≥ 50% MCL	NO
	After 1 year < 50% of MCL, SWS may reduce to an annual sample			
Nitrite	1 Sample: If < 50% of MCL, state discretion		≥ 50% MCL	NO
5 Inorganics	1 Sample every 3 years	Annual sample	> MCL	YES Based on analytical results of 3 rounds
18 VOCs	4 Quarterly samples every 3 years Annual after 1 year of no detects		> 0.0005 mg/L	YES Based on VA ¹
17 Pesticides and PCBs	4 Quarterly samples every 3 years		Method Detection Limit (MDL)	YES Based on VA ¹
	After 1 round of no detects: systems >3300 reduce to 2 samples per year every 3 years; systems ≤ 3300 reduce to 1 sample every 3 years			
Unregulated - 6 IOCs - 24 SOCs	1 Sample 4 Consecutive quarterly samples		N.A.	YES Based on VA ¹

¹ VA = Vulnerability Assessment

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The Phase II Rule

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"Phase II will roughly double the present number of drinking water standards."

The Phase II Rule was published in the *Federal Register* on January 30, 1991 and July 1, 1991. It will become effective in 1992 with monitoring requirements to begin on January 1, 1993. This rule sets drinking water standards for 38 inorganic and organic chemicals. All community and non-transient non-community water systems are required to monitor for and, if necessary, treat their supply to remove these chemicals. Transient water systems are required to comply with the nitrate and nitrite regulations in Phase II.

Phase II will roughly double the present number of drinking water standards. While many of these chemicals may occur in drinking water due to human activity, others are naturally occurring. Some chemicals are only rarely found in water supplies but are very widely used and are being regulated because of the likelihood that they may contaminate supplies.

Drinking Water Standards

Maximum Contaminant Levels (MCLs): Public Water Systems are required to make sure that the water they supply meets the MCL for each Phase II chemical. These are enforceable standards. MCLs for Phase II chemicals are listed in Table 1.

Contaminant	MCL (mg/L)	Contaminant	MCL (mg/L)
Inorganics			
Asbestos	7 MFL	Pesticides and PCBs	
Barium	2	Alachlor (Lasso)	0.002
Cadmium	0.005	Aldicarb (Temik)	0.003
Chromium	0.1	Aldicarb sulfoxide	0.004
Mercury	0.002	Aldicarb sulfone	0.002
Nitrate	10	Atrazine (Atrax, Chiazin)	0.003
Nitrite	1	Carbofuran (Furadan 4F)	0.04
Total Nitrate/Nitrite	10	Chlordane	0.002
Selenium	0.05	Dibromochloropropane (DBCP, Nemalume)	0.0002
Volatile Organics			
o-Dichlorobenzene	0.8	2,4-D (Formula 40, Weedar 84)	0.07
cis-1,2-Dichloroethylene	0.07	Ethylene dibromide (EDB, Bromotome)	0.0005
trans-1,2-Dichloroethylene	0.1	Heptachlor (H-34, Heptox)	0.0004
1,2-Dichloropropane	0.005	Heptachlor epoxide	0.0002
Ethylbenzene	0.7	Lindane	0.0002
Monochlorobenzene	0.1	Methoxychlor (DMOT, Merlate)	0.04
Styrene	0.1	Polychlorinated biphenyls (PCBs, Aroclor)	0.0005
Tetrachloroethylene	0.005	Pentachlorophenol	0.001
Toluene	1	Toxaphene	0.003
Xylenes	10	2,4,5-TP (Silvex)	0.05
Treatment Techniques			
		Acrylamide	0.05% dosed at 1 mg/L
		Epichlorohydrin	0.01% dosed at 20 mg/L

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Treatment Techniques: When there are no analytical methods available for monitoring a contaminant's presence in water, systems are required to use a treatment technique for removing this chemical. Two Phase II chemicals are controlled in this way, simply by limiting their use in other treatment processes.

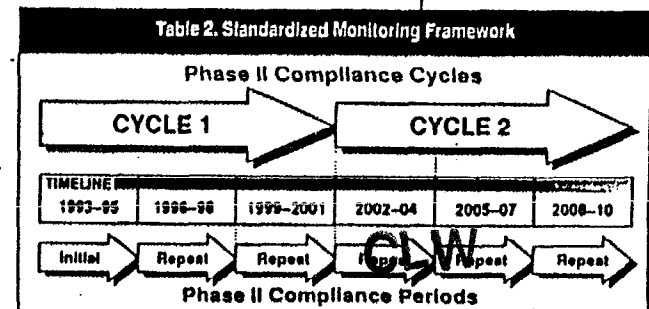
Maximum Contaminant Level Goals (MCLGs): For each chemical, EPA has set a non-enforceable health goal which water systems should try to achieve. Water containing a chemical in an amount equal to or below its MCLG is not expected to cause any health problems, even over a lifetime of drinking this water.

Monitoring Requirements

A major feature introduced in Phase II is its plan for synchronizing compliance monitoring across several existing and upcoming rules. Under this Standardized Monitoring Framework, the various monitoring frequencies for most source-related contaminants will be coordinated within compliance periods of three years each. Some monitoring and related system activities, such as vulnerability assessments, will occur at intervals which may span across up to three of these three-year periods, forming a nine-year compliance cycle. The first compliance cycle and the initial compliance period both begin on January 1, 1993. Table 2 gives dates for these Framework intervals over the next several decades. Monitoring requirements are given in Table 3.

Other features of Phase II monitoring requirements include:

- Sampling location** - Ground water systems must sample at entry points to the distribution system which are representative of each well after any application of treatment. Surface water systems must sample at points within the distribution system which are representative of each source or at entry points to the distribution system after any application of treatment. Samples must be analyzed by a state-certified lab.
- Initial sampling frequency** - All systems must sample at a base (or minimum) frequency which is specific for a contaminant or contaminant group. The state may grant monitoring waivers (as discussed below) and may allow a system to substitute suitable previous monitoring data for this initial monitoring. In the initial compliance period, the actual year in which a system samples will be determined by the state.
- Repeat sampling frequency** - In general, if a system does not detect contaminants in initial samples, then repeat sampling frequencies will be lower than initial frequencies. Repeat monitoring requirements are generally the same for all systems regardless of system size or water source.
- Trigger to increase monitoring** - If contaminants are detected in any sample, the system must begin quarterly sampling until the state determines that subsequent results are "reliably and consistently" below the MCL. At least two to four samples must be taken before this determination may be made. Detection is defined separately for various contami-



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A previous drinking water regulation (Phase II, January 1991) required that certain public water supplies monitor for specified unregulated contaminants by December 1995, including a number of Phase V contaminants. The final Phase V rule takes advantage of this requirement and uses the 1993-1995 initial monitoring date for all contaminants for water systems with 150 or more service connections. Smaller systems are required to monitor during the 1996-1998 monitoring period. States determine when, within the 3-year monitoring period, each water system is to monitor. Monitoring requirements are given below in Table 2.

Table 2. COMPLIANCE MONITORING REQUIREMENTS¹

Contaminant	Base Requirement		Trigger that Increases Monitoring	Waiver ²
	Ground Water	Surface Water		
4 Inorganic	1 Sample per 3 Yr	Annual Sample	>MCL	<u>YES</u> Based on Analytical Results of 3 Rounds
	1 Sample/9 Years After 3 Samples <MCL			
Cyanide	1 Sample per 3 Yr	Annual Sample	>MCL	<u>YES</u> Based on vulnerability assessment
	1 Sample/9 Years After 3 Samples <MCL			
3 Volatile Organics	Quarterly/yr; Annual After One Year of No Detect; Every 3 Years After 3 Rounds		≥0.0005 mg/l	<u>YES</u> Based on vulnerability assessment
15 Pesticides/ Synthetic Organics	4 Quarterly Samples Every 3 yrs; After 1 Round of No Detect: Systems >3,300 Reduce to 2 Samples/Yr Every 3 Yrs, Systems ≤3,300 reduce to 1 sample Every 3 Yrs		Detection (as specified in the rule)	<u>YES</u> Based on vulnerability assessment

- ¹ The compliance monitoring requirements apply to community water systems and non-transient non-community water systems.
- ² Two types of waivers are available: waivers by rule and vulnerability waivers. Waivers by rule are based on prior monitoring results. They reduce but do not eliminate monitoring. Vulnerability waivers eliminate monitoring but must be renewed, usually every three years.

RELATED FEDERAL WATER QUALITY PROGRAMS

Many of the contaminants regulated under the SDWA are subject to regulation under other Federal environmental statutes. For example, MCLs established under the SDWA are often used as human health criteria established under the Clean Water Act. Pesticides (including 9 Phase V contaminants) are regulated under the Federal Insecticide, Fungicide, and Rodenticide Act. In addition, voluntary programs have been established by the U.S. Department of Agriculture and other Federal agencies (in cooperation with EPA) to reduce risks of contamination of surface water and ground water from pesticides and other substances.

FOR MORE INFORMATION

Call the Safe Drinking Water Hotline at: 1-800-426-4791

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Phase V Rule

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The Safe Drinking Water Act (SDWA) amendments passed by Congress in 1986 require EPA to set drinking water standards for 83 contaminants listed in the Act, and an additional 25 contaminants every three years. To date, the Agency has promulgated National Primary Drinking Water Standards for eight volatile organic chemicals (VOCs), fluoride, coliform and other microbiological contaminants, 38 synthetic organic chemicals (SOCs) and inorganic chemicals (IOCs), and lead and copper. Regulations for Phase V, radionuclides (proposed July 1991), and a revised standard for arsenic (expected November 1992) count toward completion of the required 83.

The Phase V Rule sets drinking water standards for 23 contaminants that may be found in drinking water. The regulation includes Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), requirements for monitoring, reporting, public notification, and Best Available Technologies (BATs) for water treatment. In general, a low occurrence of these contaminants is expected in drinking water, and it is estimated that 256 systems will exceed an MCL, with most systems exceeding the MCL for antimony. Cost estimates include a monitoring cost of \$5 million, state implementation cost of \$10 million, and annual treatment cost of \$31 million, for a total of \$46 million. These regulations become effective 18 months after the promulgation date.

Table 1. MCLGs AND MCLs FOR INORGANIC AND ORGANIC CONTAMINANTS

Contaminant	MCLG (mg/l)	MCL (mg/l)
IOCs		
Antimony	0.006	0.006
Beryllium	0.004	0.004
Cyanide	0.2	0.2
Nickel	0.1	0.1
Sulfate	deferred	deferred
Thallium	0.0005	0.002
VOCs		
Dichloromethane	zero	0.005
1,2,4-Trichlorobenzene	0.07	0.07
1,1,2-Trichloroethane	0.003	0.005
Pesticides		
Dalapon	0.2	0.2
Dinoseb	0.007	0.007
Diquat	0.02	0.02
Endothall	0.1	0.1
Endrin	0.002	0.002
Glyphosate	0.7	0.7
Oxamyl (Vydate)	0.2	0.2
Picloram	0.5	0.5
Simazine	0.004	0.004
Other Organic Contaminants		
Benzo(a)pyrene	zero	0.0002
Di(2-ethylhexyl)adipate	0.4	0.4
Di(2-ethylhexyl)phthalate	zero	0.006
Hexachlorobenzene	zero	0.001
Hexachlorocyclopentadiene	0.05	0.05
2,3,7,8-TCDD (Dioxin)	zero	3×10^{-4}

DRINKING WATER STANDARDS

Maximum Contaminant Levels (MCLs): Public Water Systems are required to make sure that the water they supply does not exceed the MCL for each Phase V chemical. These are enforceable standards which are considered feasible and safe.

Maximum Contaminant Levels Goals (MCLGs): For each chemical, EPA has set a non-enforceable health goal which water systems should try to achieve. Water containing a chemical in an amount equal to or below its MCLG is not expected to cause any health problems, even over a lifetime of drinking this water. Final MCLs and MCLGs for Phase V chemicals are listed in Table 1.

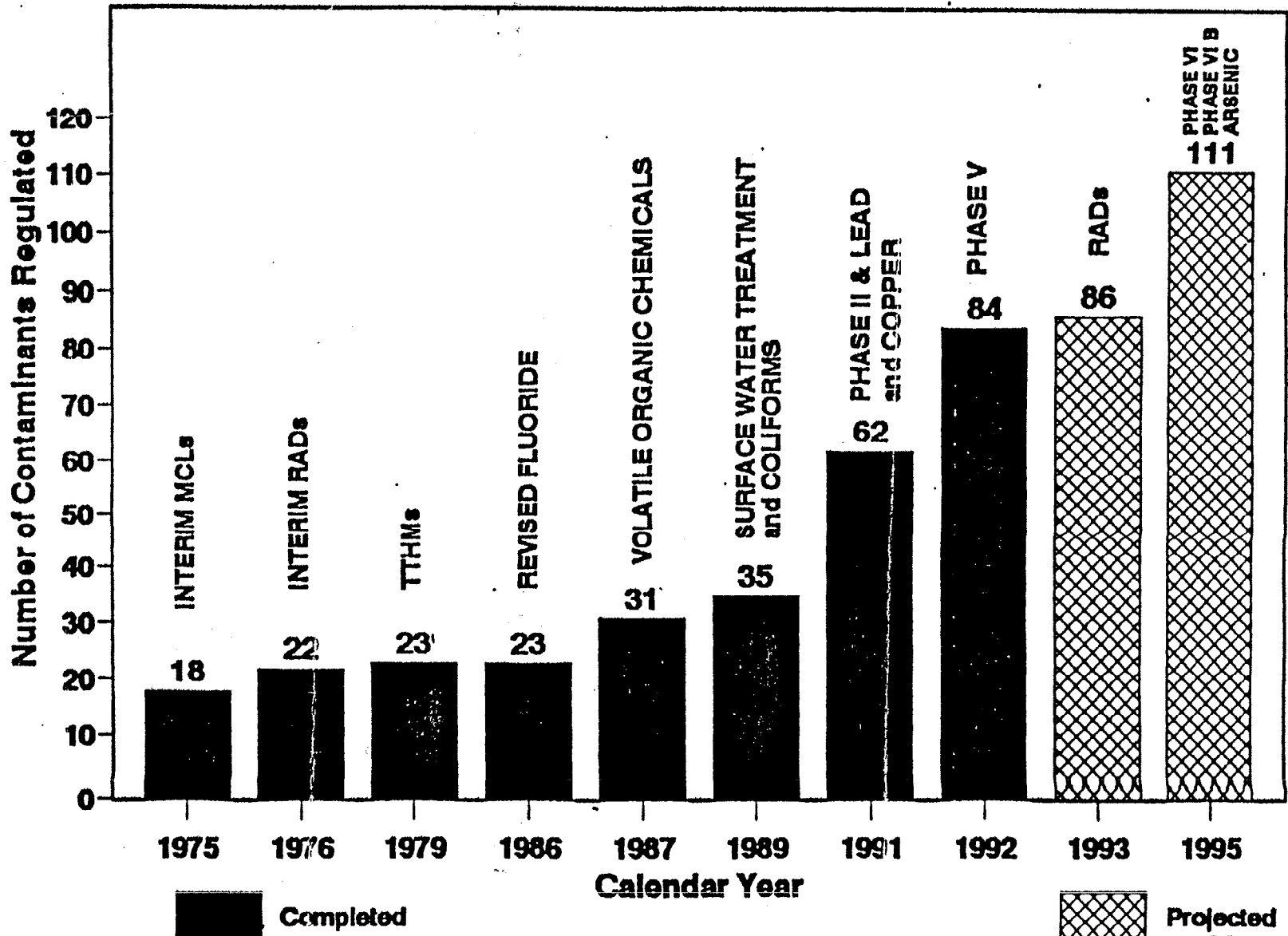
APPLICABILITY OF MCLs

MCLs established under the Safe Drinking Water Act are Federally enforceable standards for finished water provided by Public Water Supply Systems. In addition, these standards are often used as reference points for the protection and remediation of water resources under several EPA programs as well as programs implemented by other federal agencies and states.

MONITORING REQUIREMENTS

Phase V makes use of the standard monitoring framework, which will reduce the complexity of the monitoring requirements, coordinate the requirements among various regulations, and synchronize the monitoring schedules by establishing "three year" monitoring periods for drinking water contaminants. 192

DRINKING WATER REGULATIONS - PAST AND FUTURE



The timing on sufficient has not yet been determined. GLW

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Monitoring Requirements Table*

Contaminant	Base Requirements		Trigger That Increases Monitoring	Increased Monitoring	Trigger That Returns to Base†		Waiver
	Groundwater	Surface Water			Groundwater	Surface Water	
Asbestos	1 sample every 9 years	1 sample every 9 years	>MCL	Quarterly	Min. of 2 samples <MCL	Min. of 4 samples <MCL	Yes – based on vulnerability assessment
Nitrate	Annual sample	Quarterly sample; after 1 yr. <50% of MCL, annual sample	≥50% of MCL	Quarterly	Min. of 4 samples <MCL	Min. of 4 samples <MCL	No
Nitrite	1 initial sample—if <50% of MCL, further monitoring at state discretion		≥50% of MCL	Quarterly	Min. of 4 samples <MCL	Min. of 4 samples <MCL	No
Other Inorganics**	1 sample every 3 yrs. 1 sample every 9 yrs. after 3 samples <MCL	Annual sample	>MCL	Quarterly	Min. of 2 samples <MCL	Min. of 4 samples <MCL	Yes – based on results of 3 rounds
VOCs	Quarterly for 1 year. Annual after 1 yr. of no detection Every 3 yrs. after 3 rounds		≥0.0005 mg/L	Quarterly	Min. of 2 samples <MCL	Min. of 4 samples <MCL	Yes – based on vulnerability assessment
Pesticides and PCBs	4 quarterly sample every 3 yrs. Systems >3,300 reduce to 2/yr. every 3 yrs. after 1 round of no detection Systems ≤3,300 reduce to 1 sample every 3 yrs. after 1 round of no detection		Detection	Quarterly	Reduce to annual if min. of 2 samples <MCL Reduce to base after 3 yrs.	Reduce to annual if min. of 4 samples <MCL Reduce to base after 3 yrs.	Yes – based on vulnerability assessment
Unregulated Organics	4 quarterly samples						Yes CLW

* Sample sites are at the entry point to the distribution system.

** Includes unregulated inorganics.

† States determine systems are "reliably and consistently less than MCL" within minimums to return to base monitoring.

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Waiver Considerations

Asbestos Monitoring - 141.23(b)(3)(4)

A waiver of distribution system monitoring for asbestos will be allowed only if the system owner can demonstrate that piping material does not contain asbestos. This shall be demonstrated through a statement by a registered professional engineer licensed to practice in the state, that the system was installed in accordance with plans and specifications approved by the Public Water Supply Section which did not reflect the installation of pipe containing asbestos. Those systems which cannot be verified as being constructed without asbestos piping, will be reviewed through the materials survey required under §141.42(d). Those systems confirmed by this survey as not having asbestos cement pipe will be eligible for a waiver from monitoring if the absence of asbestos pipe is reaffirmed in writing by the responsible person in charge.

Regarding source water sampling; a written statement by a professional geologist or certification by the U.S. Geological Survey that asbestos is absent in the geological formations from which the groundwater is extracted shall be grounds for considering the source non-vulnerable and shall make the water system eligible for a waiver from monitoring for asbestos.

Surface water sources shall be considered non-vulnerable if all discharges upstream of the water plant intake are not susceptible to asbestos contamination on the basis of the characteristics of the operation producing the discharge and will be eligible for a waiver of the asbestos monitoring if written documentation is submitted to the State by the appropriate regulatory authority or officers of the affected industry.

Inorganic Chemical, Nitrate and Nitrite Monitoring - 141.23(c)(2)-(d) & (e)

There will be no waivers of inorganic chemical, nitrate or nitrite sampling.

Regulated V.O.C. Monitoring - 141.61(a)

There will be no waivers of the regulated volatile organic chemical sampling. However, where analysis results of sampling is in evidence after January 1, 1988 and there are no detects, grandfathering will be allowed to satisfy base sampling requirements.

Unregulated V.O.C.s and IOCs - 141.40(n)

There will be no waivers of unregulated organic chemical sampling 141.40(n)(11). A community water system or non-transient non-community water system serving fewer than 150 service connections shall be required to take one sample during the sampling period.

There will be no waivers of unregulated inorganic chemical sampling 141.40(n)(12). A community water system or non-transient non-community water system serving fewer than 150 service connections shall be required to take one sample during the compliance period.

Pesticides and PCBs - 141.61(c)

Waivers may be granted for monitoring of the seventeen pesticides and PCB's after evaluation of the factors involved as stated in 141.24(h)(6). If a waiver request is to be successful the water utility owner must have a signed statement from all the landowners (including publicly owned property and rights-of-way) located within the watershed or zone of influence that they have not used the pesticide in question for the number of years required to allow the pesticide to breakdown into harmless elements. Further, no waiver will be granted if there are major highways crossing the watershed or zone of influence unless factor (iv) is satisfied. The zone of influence for a well shall be established by a written statement

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