

Summary of Phase II Regulations

***National Primary Drinking Water
Regulations for 38 Inorganic and
Synthetic Organic Chemicals***

April 1991

**Office of Drinking Water
U.S. Environmental Protection Agency
Washington, DC**

Preface

Note to the Reader:

The U.S. Environmental Protection Agency (EPA) promulgated National Primary Drinking Water Regulations for 38 inorganic and synthetic organic chemicals on January 30, 1991 (Phase II Rule). The following packet of materials was developed in response to this rulemaking effort and is intended for use by EPA regional officials, state and water system personnel. The packet is organized into two sections. The first section consists of a general fact sheet which summarizes the Phase II regulatory requirements. The second section (or appendices) of the package consists of a series of eight fact sheets and flow charts which describe the compliance monitoring requirements for the various groups of contaminants regulated under Phase II. The entire package of materials has been designed such that individual sections can be used by themselves or together.

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Phase II Fact Sheet

National Primary Drinking Water Regulations for 38 Inorganic and Synthetic Organic Chemicals

April 1991

Summary

The January 30, 1991 rulemakings:

- Promulgate Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs) or treatment technique requirements for 33 contaminants; and,
- Repropose MCLGs and MCLs for aldicarb, aldicarb sulfoxide, aldicarb sulfone, pentachlorophenol, and barium.

When both rulemakings are final:

- The addition of the 38 contaminants regulated under Phase II will nearly double the number of regulated contaminants from the 38 contaminants currently regulated to 64 when both rulemakings become effective in 1992. Of the 38 Phase II contaminants, 27 are newly regulated. The remaining 11 contaminants were previously regulated and were revised. Phase II will establish:
 - 12 new pesticide MCLs for a total of 18;
 - Two new inorganic MCLs and the deletion of one MCL for a total of 11;
 - 10 new volatile organics MCLs for a total of 18;
 - Treatment technique requirements for two contaminants; and
 - One additional MCL for PCBs.

These rules also include additional provisions for:

- Analytical methods and laboratory performance requirements;
- Best Available Technologies (BATs) for compliance with the MCLs and for the purpose of issuing variances;
- Secondary standards for silver (0.1 mg/L) and aluminum (0.05 to 0.2 mg/L) to address aesthetic considerations;
- Mandatory health effects language to be used by systems when notifying the public of violations; and
- State reporting, recordkeeping and primacy requirements.

Implementation Dates

January 1991	Standards for 33 contaminants promulgated Standards for 5 contaminants repropose
July 1991	Standards for 5 contaminants promulgated
July 1992	Standards for 33 contaminants effective State adoption
January 1993	Standards for 5 contaminants effective Monitoring for 38 contaminants begins

Regulatory Impact

- These regulations will reduce the exposure of three million consumers to the regulated contaminants and result in an estimated reduction of 75 cancer cases per year.
- Pesticides are expected to result in most violations, costs and benefits.
- Total costs to all public water systems will be approximately \$88 million per year.
- State implementation costs will be \$21 million initially and \$17 million in future years.
- Additional monitoring will be required for 200,000 systems.
 - 80,000 community and nontransient noncommunity systems must monitor for all contaminants.
 - 120,000 transient noncommunity systems must monitor for nitrate and nitrite.
 - Monitoring requirements will be standardized to 3/6/9 year cycles.
 - Monitoring costs will generally be less than \$10 per household per year.
 - It will cost \$24 million per year for systems to monitor.
 - Monitoring for the 30 unregulated contaminants (contaminants that will be regulated in future rulemakings) will cost systems an additional \$39 million.
- Approximately 3300 or three percent of all public water systems will be required to provide treatment or find an alternate source of water.
 - Treatment will cost \$10 to \$800 per household depending upon system size, degree of contamination, and other factors.
 - It will cost systems \$64 million to provide treatment.
 - Exemptions will be allowed for small systems based on costs.

Phase II National Primary Drinking Water Regulations

Contaminants	Drinking Water Health Effects	EPA Standards (mg/L) ¹			Sources	Analytic Method	BAT
		Final MCLG	Final MCL	Current MCL			
Inorganics							
Asbestos	benign tumors	7 MFL ²	7 MFL ²	-	natural mineral deposits, also in Asbestos/Cement (A/C) pipe	TEM	C/F, DF DMF, CC
Barium ³	circulatory system	2	2	1	natural mineral deposits; oil/gas drilling operations; paint & other industrial uses	GFAA, ICP, DAAA	IE; LS, RO, ED
Cadmium	kidney	0.005	0.005	0.01	natural mineral deposits; metal finishing, corrosion product in plumbing	GFAA, ICP	C/F; LS; RO, IE
Chromium	liver/kidney, skin, and digestive system	0.1	0.1	0.05	natural mineral deposits; metal finishing, textile, tanning and leather industries	GFAA; ICP	C/F; LS RO; IE
Mercury	kidney, nervous system	0.002	0.002	0.002	industrial/chemical manufacturing; fungicide; natural mineral deposits	MCV; ACV	GAC; LS; C/F, RO
Nitrate	methemoglobinemia "blue-baby syndrome"	10	10	10	fertilizers, feedlots, sewage; naturally in soil, mineral deposits	MCR; AHR; ACR, ISE, IC	IE, RO, EDR
Nitrite	methemoglobinemia "blue-baby syndrome"	1	1	-	unstable, rapidly converted to nitrate; prohibited in working metal fluids	ACR, MCR; IC, SP	IE, RO
Total Nitrate/Nitrite	-----	10	10	-	-----	-----	-----
Selenium	nervous system	0.05	0.05	0.01	natural mineral deposits, by-product of copper mining/smeltering	GHAA; GFAA	EDR, C/F AA, LS, RO

¹ Final MCLGs and MCLs become effective July 1992. At that time, the current MCLs cease to be effective.

² MFL = million fibers per liter, with fiber length > 10 microns.

³ Levels for barium, aldicarb, aldicarb sulfone, aldicarb sulfoxide and pentachlorophenol are proposed. Final levels will be established by July 1991.

Phase II National Primary Drinking Water Regulations

Contaminants	Drinking Water Health Effects	EPA Standards (mg/L) ¹			Sources	Analytic Method	BAT
		Final MCLG	Final MCL	Current MCL			
Volatile Organics							
o-Dichlorobenzene	nervous system, lung, liver, kidney	0.6	0.6	-	industrial solvent, chemical manufacturing	All VOCs: 502.1	All VOCs: GAC/PTA
cis-1,2-Dichloroethylene	nervous system, liver, circulatory	0.07	0.07	-	industrial extraction solvent	502.2 503.1 524.1 524.2	
trans-1,2-Dichloroethylene	nervous system, liver, circulatory	0.1	0.1	-	industrial extraction solvent		
1,2-Dichloropropane	probable cancer, liver, lungs, kidney	0	0.005	-	soil fumigant; industrial solvent		
Ethylbenzene	kidney, liver, nervous system	0.7	0.7	-	present in gasoline & insecticides; chemical manufacturing		
Monochlorobenzene	kidney, liver, nervous system	0.1	0.1	-	pesticide manufacturing; metal cleaner, industrial solvent		
Styrene	liver, nervous system	0.1	0.1	-	plastic manufacturing; resins used in water treatment equipment		
Tetrachloroethylene	probable cancer	0	0.005	-	dry cleaning/industrial solvent		
Toluene	kidney, nervous system, lung	1	1	-	chemical manufacturing, gasoline additive, industrial solvent		
Xylenes	liver, kidney, nervous system	10	10	-	paint/ink solvent; gasoline refining by-product; component of detergents		

¹ Final MCLGs and MCLs become effective July 1992. At that time, the current MCLs cease to be effective.

Phase II National Primary Drinking Water Regulations

Contaminants	Drinking Water Health Effects	EPA Standards (mg/L) ¹			Sources	Analytic Method	BAT
		Final MCLG	Final MCL	Current MCL			
Pesticides and PCBs							
Alachlor (Lasso)	probable cancer	0	0.002	-	herbicide on corn and soybeans; under review for cancellation	505, 507 525	GAC
Aldicarb ² (Temik)	nervous system	0.001	0.003	-	insecticide on cotton, potatoes; restricted in many areas due to gw contamination	531.1	GAC
Aldicarb sulfone ²	nervous system	0.002	0.003	-	degraded from aldicarb by plants	531.1	GAC
Aldicarb sulfoxide ²	nervous system	0.001	0.003	-	degraded from aldicarb by plants	531.1	GAC
Atrazine (Atrane, Crisazine)	reproductive and cardiac	0.003	0.003	-	widely used herbicide on corn and on non-crop land	505, 507 525	GAC
Carbofuran (Furadan 4F)	nervous system and reproductive	0.04	0.04	-	soil fumigant/insecticide on corn/cotton, restricted in some areas	531.1	GAC
Chlordane	probable cancer	0	0.002	-	soil insecticide for termite control on corn, potatoes; most uses cancelled in 1980	505, 508, 525	GAC
Dibromochloropropane (DBCP, Nemafume)	probable cancer	0	0.0002	-	soil fumigant on soybeans, cotton, cancelled in 1977	504	GAC/PTA
2,4-D (Formula 40, Weedar 64)	liver, kidney, nervous system	0.07	0.07	0.1	herbicide for wheat, corn, rangelands	515.1	GAC
Ethylene dibromide (EDB, Bromofume)	probable cancer	0	0.00005	-	gasoline additive; soil fumigant; solvent, cancelled in 1984; limited uses continue	504	GAC/PTA
Heptachlor (H-34, Heptox)	probable cancer	0	0.0004	-	insecticide on corn; cancelled in 1983 for all but termite control	505, 508, 525	GAC
Heptachlor epoxide	probable cancer	0	0.0002	-	soil & water organisms convert heptachlor to the epoxide	505, 508, 525	GAC

¹ Final MCLGs and MCLs become effective July 1992. At that time, the current MCLs cease to be effective.

² Levels for benomyl, aldicarb, aldicarb sulfone, aldicarb sulfoxide and pentachlorophenol are proposed. Final levels will be established by July 1, 1991.

Phase II National Primary Drinking Water Regulations

Contaminants	Drinking Water Health Effects	EPA Standards (mg/L) ¹			Sources	Analytic Method	BAT
		Final MCLG	Final MCL	Current MCL			
Pesticides and PCBs (cont'd)							
Lindane	nervous system, liver, kidney	0.0002	0.0002	0.004	insecticide for seed, lumber, livestock; pest control, most uses restricted in 1983	505, 508, 525	GAC
Methoxychlor (DMDT, Marlate)	nervous system, liver, kidney,	0.04	0.04	0.1	insecticide on alfalfa, livestock	505, 508, 525	GAC
Polychlorinated biphenyls (PCBs, Aroclor)	probable cancer	0	0.0005	-	electrical transformers, plasticizers, banned in 1979	505, 508 (screen), 508A	GAC
Pentachlorophenol ²	probable cancer, liver, kidney	0	0.001	-	wood preservative & herbicide, non-wood uses banned in 1987	525	GAC
Toxaphene	probable cancer	0	0.003	0.005	insecticide/herbicide for cotton, soybeans, cancelled in 1982	505	GAC
2,4,5-TP (Silvex)	nervous system, liver, kidney	0.05	0.05	0.01	herbicide on rangelands, sugarcane, golf courses; cancelled in 1983.	515.1	GAC
Treatment Techniques							
Acrylamide	probable cancer, nervous system	0	0.005% dosed at 1 mg/L	-	flocculents in sewage/ wastewater treatment	none	limit use
Epichlorohydrin	probable cancer, liver, kidney, lungs	0	0.01% dosed at 20 mg/L	-	epoxy resins & coatings, flocculents used in treatment	none	limit use

Analytical Methods Key:

TEM = Transmission Electron Microscopy
 GFAA = Graphite Furnace Atomic Absorption
 DAAA = Direct Aspiration Atomic Absorption
 ICP = Inductively Coupled Plasma
 MCV = Manual Cold Vapor
 ACV = Automated Cold Vapor
 GHAA = Gaseous Hydride Atomic Absorption
 MCD = Manual Cadmium Reduction
 ACR = Automated Cadmium Reduction
 AHR = Automated Hydrazine Reduction
 ISE = Ion Selective Electrode
 IC = Ion Chromatography
 SP = Spectrophotometric

Best Available Technology Key:

AA = Activated Alumina
 C/F = Coagulation/Filtration
 DF = Direct Filtration
 DMF = Diatomite Filtration
 EDR = Electrodialysis Reversal
 CC = Corrosion Control
 GAC = Granular Activated Charcoal
 IE = Ion Exchange
 LS = Lime Softening
 RO = Reverse Osmosis
 PTA = Packed Tower Aeration

¹ Final MCLGs and MCLs become effective July 1992. At that time, the current MCLs cease to be effective.

² Levels for barium, aldicarb, aldicarb sulfone, aldicarb sulfoxide and pentachlorophenol are proposed. Final levels will be established by July 1991.

Compliance Monitoring Requirements

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

¹ VA = Vulnerability Assessment

Regulatory Development

- Proposed MCLGs, proposed MCLs and treatment techniques - May 22, 1989 (54 FR 22062)
- Final MCLGs, MCLs, and treatment technique requirements for 33 contaminants - January 30, 1991 (56 FR 3526)
- Proposed MCLGs and MCLs for five contaminants - January 30, 1991 (56 FR 3600)

For More Information

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EPA Region 2

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Appendices

- **Standardized Monitoring Framework**
- **Asbestos**
- **Nitrate**
- **Nitrite**
- **Inorganics**
- **Volatile Organic Chemicals**
- **Pesticides**
- **Unregulated Contaminants**

Fact Sheet on Standardized Monitoring Framework

EPA Phase II Monitoring Series (1 of 8)

April 1991

This fact sheet summarizes the U.S. Environmental Protection Agency's (EPA) Standardized Monitoring Framework as promulgated under the Agency's Phase II Rule on January 30, 1991.

Purpose

The primary objective of the Standardized Monitoring Framework is to reduce the variability and complexity of drinking water monitoring requirements. The objective is achieved through the standardization of monitoring requirements and the synchronization of monitoring schedules across "rules" or by contaminant group.

Applicability

The Standardized Monitoring Framework currently applies to the 38 contaminants contained in EPA's Phase II Rule. However, the Framework was designed to apply to all source-related contaminants, including volatile organic chemicals, pesticides, inorganic chemicals, and radionuclides. Subsequent rulings by EPA for such contaminants will, in general, contain monitoring requirements that "fit" or fall within the Standardized Monitoring Framework. In general, the Standardized Monitoring Framework applies to all community water systems and all nontransient noncommunity water systems. For some contaminants (i.e., nitrate and nitrite), the Standardized Monitoring Framework also applies to transient noncommunity water systems.

The Framework

For the purpose of standardizing monitoring requirements across rules or by contaminant group, EPA has established a *nine-year* (based on a calendar year) *compliance "cycle,"* with the first cycle beginning on January 1, 1993. The nine-year compliance cycle contains three *three-year compliance "periods."* The first three-year compliance period extends from 1993 to 1995, the second period from 1996 to 1998, and the third from 1999 to 2001. The second nine-year compliance cycle begins in 2002 and extends through 2010.

The Standardized Monitoring Framework encompasses both sampling and vulnerability assessments. The Framework provides states with the flexibility to determine at which point in a compliance period systems must conduct sampling activities. For example, states may wish to prioritize sampling based on system size, vulnerability, lab capacity, and community/nontransient noncommunity criteria. Once a system is scheduled to sample within a particular three-year compliance period (e.g., the second year in the compliance period), the system must then sample in the same year in subsequent compliance periods (e.g., the second year).

Initial sampling for contaminants under EPA's Phase II Rule begins in the three-year compliance period starting January 1, 1993. Repeat sampling for applicable systems is to take place during the compliance periods 1996 to 1998 and 1999 to

Standardized Monitoring Framework

Compliance Cycle 1

- Period 1
(1993, 1994, 1995)
- Period 2
(1996, 1997, 1998)
- Period 3
(1999, 2000, 2001)

Compliance Cycle 2

- Period 1
(2002, 2003, 2004)

↓ to 2010

2001. For subsequent rulings by the Agency, the initial sampling period for contaminants will be during the first full three-year compliance period following the effective date of the ruling (i.e., 18 months after the date of promulgation). For example, if Phase V is promulgated in March 1992, the effective date of the ruling would be September 1993 (the middle of a compliance period). The initial round of sampling for Phase V contaminants would then take place during the 1996 to 1998 compliance period.

Specific Standardized Monitoring Requirements

(To learn how these requirements are applied to the 38 contaminants in the Phase II Rule, consult Fact Sheets 2 through 8 of EPA's Monitoring Series):

- All systems must sample at a base (or minimum) sampling frequency which is specified by EPA for each contaminant or group of contaminants unless a waiver has been granted by the state (see waiver section below).
- Initial base sampling requirements are the same for all systems regardless of system size or water source. (This requirement does not apply to the inorganic contaminants contained in the Phase II Rule.)
- Repeat base sampling requirements are generally the same for all systems regardless of system size and water source. (Exceptions to this rule exist for pesticides.) Generally, repeat base sampling requirements are reduced after the successful conduct of initial sampling.
- All systems which "detect" a contaminant must conduct quarterly sampling until the state determines that the analytical results are "reliably and consistently" below the maximum contaminant level (MCL). Detection is defined separately for each contaminant or group of contaminants at either the MCL or at the analytical method detection limit (MDL). Groundwater systems must take a minimum of two quarterly samples and surface water systems must take a minimum of four quarterly samples before the state can determine that the analytical results are "reliably and consistently" below the MCL.
- "Reliably and consistently" below the MCL means that though a system detects contaminants in its water supply, it has sufficient knowledge of the source or extent of the contamination to predict that the MCL would not be exceeded. Wide variations in the analytical results near the MCL would not meet the "reliably and consistently" test.

Grandfathering of Data

- Sampling data collected three years prior to the beginning of an initial three-year compliance period may be used to satisfy a system's initial sampling requirements. Such "grandfathering of data" would enable an eligible system to sample at repeat frequencies which are generally lower than initial frequencies.
- Vulnerability assessments may not be grandfathered.

Waivers

- Waivers to sampling requirements are available to all systems and are based upon a vulnerability assessment and/or the consideration of prior analytical results.
- Waiver determinations are to be made by the state and are to be made on a contaminant-by-contaminant basis.

- Vulnerability assessments may be conducted by the state, a system, or a third-party organization. States are to approve all assessments.
- Systems which do not receive waivers must sample at required base frequencies.
- There are two basic types of waivers:
 - 1) **Waiver by Rule:** Systems meet EPA-specified criteria.
 - 2) **Waiver by Vulnerability Assessment** (two-step process):

Step 1—Use Waiver: A determination is made whether a given contaminant was used, manufactured, and/or stored in a system area. If the answer to the inquiry is yes or unknown, the system is "susceptible" to contamination and a "use waiver" can not be granted.

Step 2—Susceptibility Waiver: If a "use waiver" can not be granted, a system may conduct a thorough vulnerability assessment of the water source to determine the system's "susceptibility" to contamination. Susceptibility is to be based on: a) prior analytical and/or vulnerability assessment results, b) environmental persistence and transport of the contaminant, c) how well the source is protected, d) wellhead protection program reports, and e) elevated nitrate levels.

Systems with no known "susceptibility" to contamination (based upon an assessment of the above factors), may be granted a "susceptibility waiver." If "susceptibility" can not be determined, a system is not eligible for a waiver and must sample at the regulatory minimum or base sampling frequency.

Fact Sheet on Asbestos

EPA Phase II Monitoring Series (2 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for asbestos as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Systems Affected

All community water systems (CWS) and nontransient noncommunity water systems (NTWS) must comply with the Phase II monitoring requirements for asbestos.

Sampling Points

- 1) Sampling must be conducted at each entry point to the distribution system which is representative of the well or source water after treatment.
- 2) Systems that are vulnerable to asbestos contamination, either solely due to corrosion of asbestos-cement pipe or due to both corrosion of asbestos-cement pipe and the source water, shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

Initial Base Sampling

Between 1993 and 1995, all systems must take one sample unless a waiver has been granted by the state (see below for summary of waiver requirements). The state will designate the year in which each system samples within this compliance period.

Grandfathering

States may allow previous sampling data to satisfy the initial base sampling requirements, provided the sampling data was collected after January 1, 1990.

Repeat Base Sampling

If results of the initial sample do not exceed the MCL for asbestos, then the system would not be required to take repeat samples until the start of the next nine-year compliance cycle (2002 to 2005).

Trigger for Increased/Decreased Sampling

The maximum contaminant level (MCL) for asbestos is the trigger for increased/decreased sampling (see sidebar for the MCL).

Regulated Contaminant

Contaminant

Asbestos

MCL

7 Million Fibers/Liter
(MFL)—(greater than
10 microns)

Increased Sampling (If MCL is exceeded)

- 1) Any system exceeding the MCL for asbestos must take quarterly samples (in the quarter immediately following the violation) until a baseline is established (minimum of two quarters for *groundwater systems* and four quarters for *surface water systems*).
- 2) If the state determines that the baseline is "reliably and consistently" below the MCL, the sampling frequency may be reduced to the base requirements

Compliance Determination

- 1) If a system samples more frequently than annual (i.e., quarterly), the system would be in violation if the annual average at any sampling point exceeds the MCL.
- 2) If a system samples on an annual or less frequent basis, the system would be in violation if one sample (or the average of the initial and confirmation samples) at any point exceeds the MCL.

Confirmation Samples

States may require a confirmation sample for any sample that exceeds the MCL. These confirmation samples must be taken from the same sampling point and as soon as possible (within no greater than a two week time period) after the initial sample. If a confirmation sample is used, the compliance determination is based on the average of the results of both the confirmation and initial samples.

Public Notice

A system in violation of the National Primary Drinking Water Regulation (i.e., MCL, monitoring and reporting requirements, etc.) for asbestos must give public notice. The public notice must include the specific mandatory health effects language contained in the Phase II Rule.

Compositing

Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.

- 1) For systems serving greater than ($>$) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

States may grant a waiver if, on the basis of a vulnerability assessment, the system determines it is not vulnerable to asbestos contamination. The state may grant a waiver based on consideration of the following factors:

- 1) Potential asbestos contamination of the water source, and
- 2) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

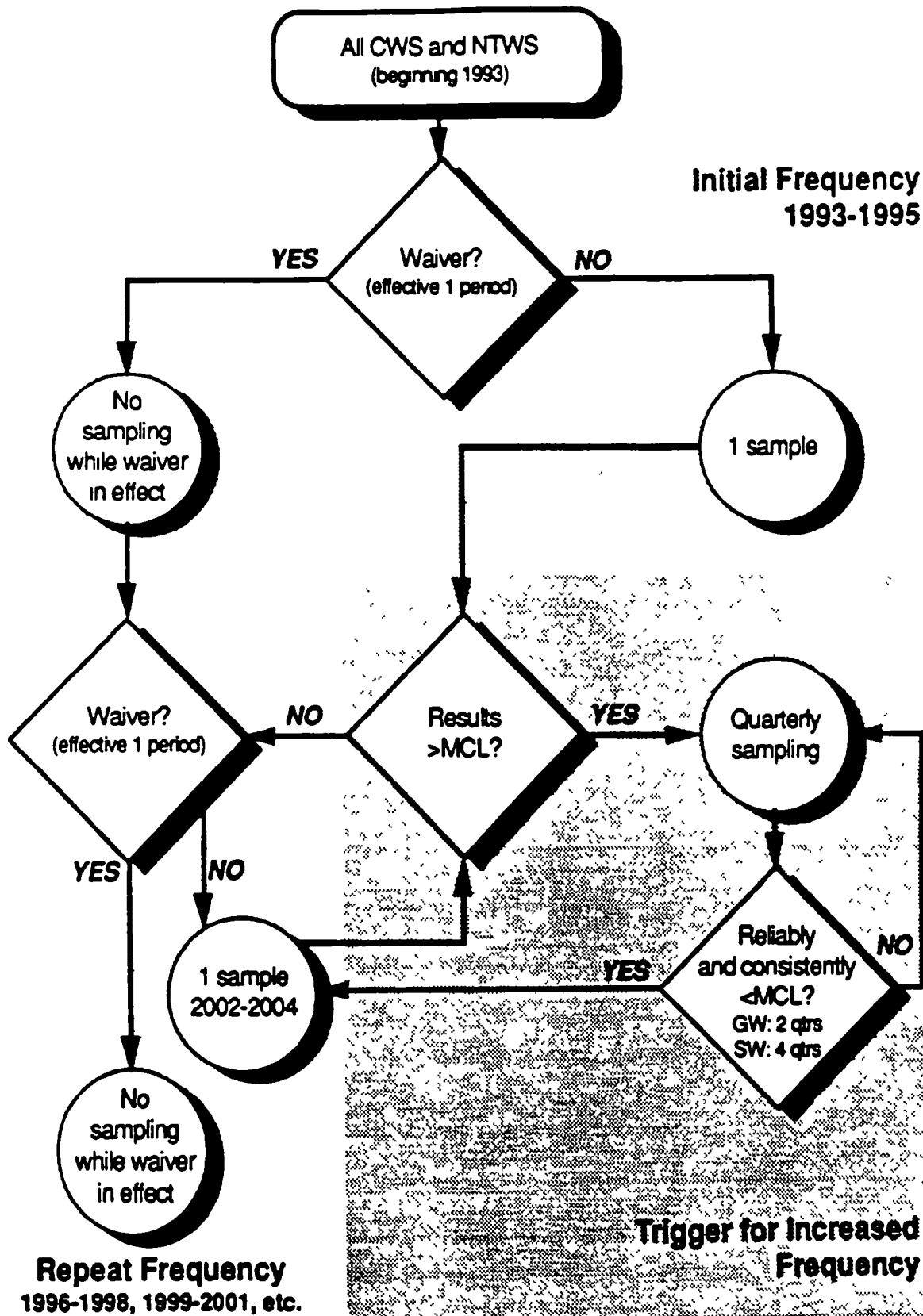
If the state grants a waiver, base sampling requirements are eliminated. Waivers are effective for one three-year compliance period. However, waivers only need to be renewed in the first compliance period of each nine-year compliance cycle. If waivers are not renewed, systems must sample according to base requirements.

Standardized Monitoring Framework: Asbestos (CWS and NTWS)

	CALENDAR YEAR		BASE REQUIREMENTS	WAIVERS (ALL SYSTEMS)
	1991			
	1992			
First 9 - year Compliance Cycle	1993	Initial Monitoring Round	1 sample at each sampling point	Waivers Based on Vulnerability Assessment (No Samples Required)
	1994			
	1995			
	1996	Repeat Monitoring	No Requirements	Not Applicable
	1997			
	1998			
	1999	Repeat Monitoring	No Requirements	Not Applicable
	2000			
	2001			
Begins Second 9 - year Cycle	2002	Repeat Monitoring Round	1 sample at each sampling point	Waivers Based on Vulnerability Assessment
	2003			
	2004			

NOTE: States will designate the year during each compliance period in which each system must monitor.

Asbestos Monitoring Flow Chart



Fact Sheet on Nitrate

EPA Phase II Monitoring Series (3 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for nitrate as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Systems Affected

All community water systems (CWS), transient and nontransient noncommunity water systems (TWS and NTWS) must comply with the Phase II monitoring requirements for nitrate.

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment.

Initial Base Sampling

Sampling for nitrate is to be conducted by all water systems beginning January 1, 1993. The frequency of initial sampling is as follows:

CWS and NTWS: *Groundwater systems* must sample annually while *surface water systems* must sample quarterly.

TWS: Such systems regardless of the water source must sample annually.

Grandfathering

Not allowed.

Trigger for Increased/Decreased Sampling

Any sample greater than (\geq) 50 percent of the MCL triggers the need for increased sampling. Analytical results less than ($<$) 50 percent of the MCL for a minimum of one round of sampling can trigger decreased sampling requirements. *The trigger is not applicable to transient noncommunity water systems.* (See side bar for MCL and trigger level for nitrate.)

Repeat Base Sampling ($<$ 50% MCL)

CWS and NTWS: *Groundwater systems* must continue sampling on an annual basis as during the initial sampling phase. States may reduce the sampling frequency to annual for *surface water systems* provided the analytical results from four consecutive quarters is less

Regulated Contaminants

Contaminants

Nitrate

Total Nitrate/Nitrite

MCL (for both)

10 mg/L (as Nitrogen)

Trigger (for both)

5 mg/L (as Nitrogen)

than (<) 50 percent of the MCL. Repeat samples must be taken during the quarter(s) which yielded the highest analytical results during the initial compliance period.

TWS: Same as initial sampling requirements.

Increased Sampling (\geq 50% MCL or \geq MCL)

CWS and NTWS: Systems collecting any sample(s) greater than (\geq) 50 percent of the MCL must increase or continue sampling on a quarterly basis, regardless of the water source. States have the discretion to decrease the sampling frequency to annual for **ground-water systems** provided the results of four consecutive quarterly samples are "reliably and consistently" below the MCL. States may reduce the sampling frequency to annual for **surface water systems** provided the analytical results from four consecutive quarters is less than (<) 50 percent of the MCL.

TWS: Same as initial sampling requirements.

Compliance Determination

If any sample exceeds the MCL for nitrate, systems must take a confirmation sample (see below). The compliance determination is then based on the average of the results of both the confirmation and initial samples.

Confirmation Samples

Systems must take a confirmation sample within 24 hours after the results of the initial sample are found to be greater than (\geq) the MCL. Systems unable to meet the 24-hour confirmation sampling requirement must issue a public notice to consumers of the system and must then analyze a confirmation sample within two weeks of receiving the results of the initial sample.

Public Notice

Any system violating the National Primary Drinking Water Regulation (i.e., MCL, monitoring and reporting requirements, etc.) for nitrate must give public notice. The public notice must include the specific mandatory health effects language contained in the Phase II Rule. The public notice requirements also apply to systems unable to take confirmation samples within a 24-hour time period (see confirmation sample section above).

Compositing

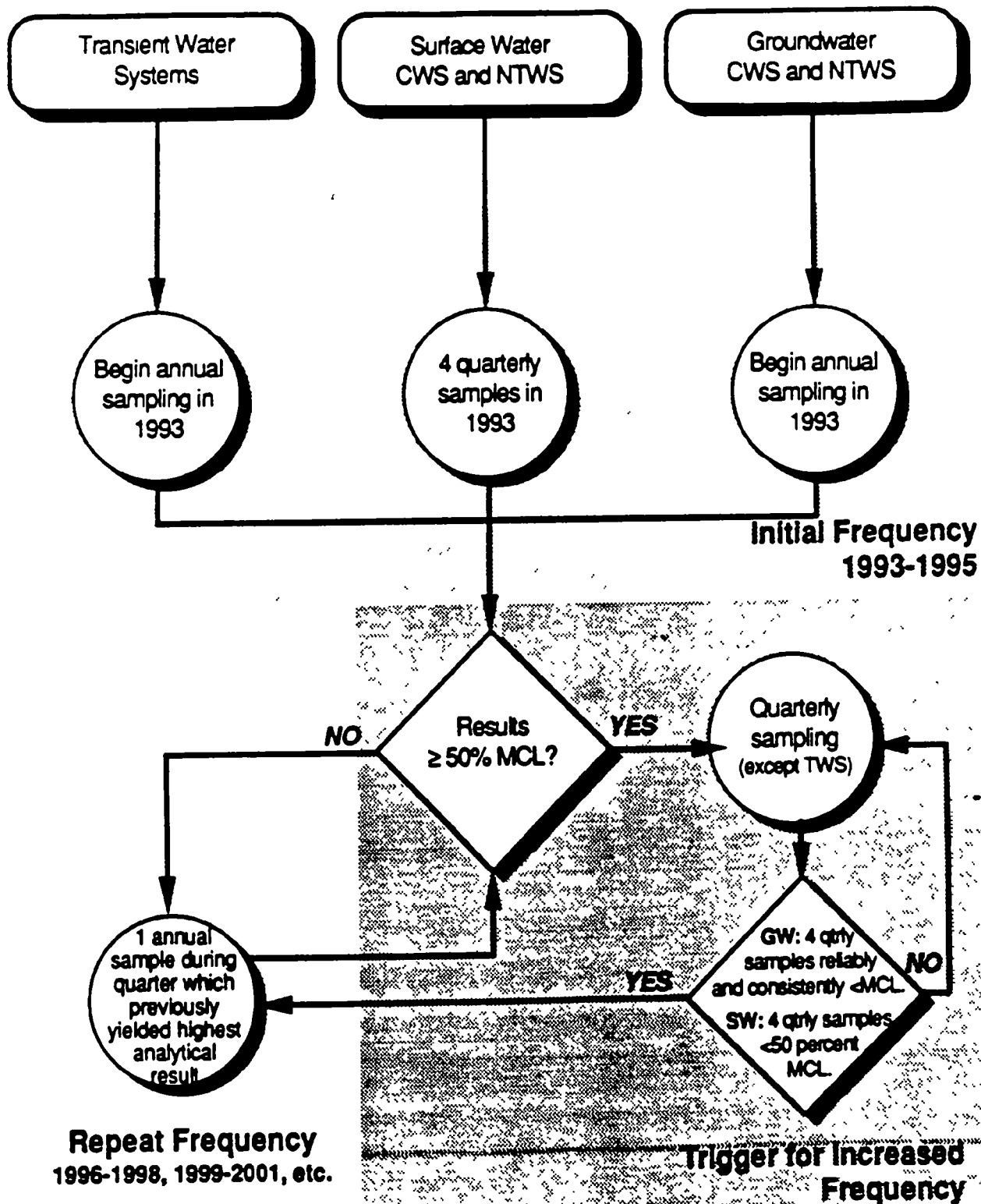
Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.

- 1) For systems serving greater than (>) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

Not allowed.

Nitrate Monitoring Flow Chart



Fact Sheet on Nitrite

EPA Phase II Monitoring Series (4 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for nitrite as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Systems Affected

All community water systems (CWS), transient and nontransient noncommunity water systems (TWS and NTWS) must comply with the Phase II monitoring requirements for nitrite.

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment.

Initial Base Sampling

Between 1993 and 1995, all systems must take one sample. The state will designate the year in which each system samples within this compliance period.

Grandfathering

Not allowed.

Trigger for Increased/Decreased Sampling

The trigger for increased/decreased sampling for nitrite is 50 percent of the MCL.

Regulated Contaminants		
Contaminant	MCL	Trigger
Nitrite	1 mg/L (as Nitrogen)	0.5 mg/L (as Nitrogen)
Total Nitrate/Nitrite	10 mg/L (as Nitrogen)	5 mg/L (as Nitrogen)

Repeat Base Sampling (< 50% MCL)

If the results of initial sampling are less than (<) 50 percent of the MCL, repeat sampling requirements may be reduced at state discretion.

Increased Sampling ($\geq 50\%$ MCL or \geq MCL)

- 1) Systems collecting any sample(s) greater than (\geq) 50 percent of the MCL must sample quarterly for at least one year.
- 2) States may decrease the sampling frequency to annual provided the results of four consecutive quarterly samples are "reliably and consistently" below the MCL.
- 3) Systems sampling annually must take subsequent samples during the quarters which previously yielded the highest analytical result(s).

Compliance Determination

If any sample exceeds the MCL for nitrite, systems must take a confirmation sample (see below). The compliance determination is then based on the average of the results of both the confirmation and initial samples.

Confirmation Samples

Systems must take a confirmation sample within 24 hours after the results of the initial sample are found to be greater than (\geq) the MCL. Systems unable to meet the 24 hour confirmation sampling requirement must issue a public notice to consumers of the system and must then analyze a confirmation sample within two weeks of receiving the results of the initial sample.

Public Notice

Any system violating the National Primary Drinking Water Regulation (i.e., MCL, monitoring and reporting requirements, etc.) for nitrite must give public notice. The public notice must include the specific mandatory health effects language contained in the Phase II Rule. The public notice requirements also apply to systems unable to take confirmation samples within a 24 hour time period (see confirmation sample section above).

Compositing

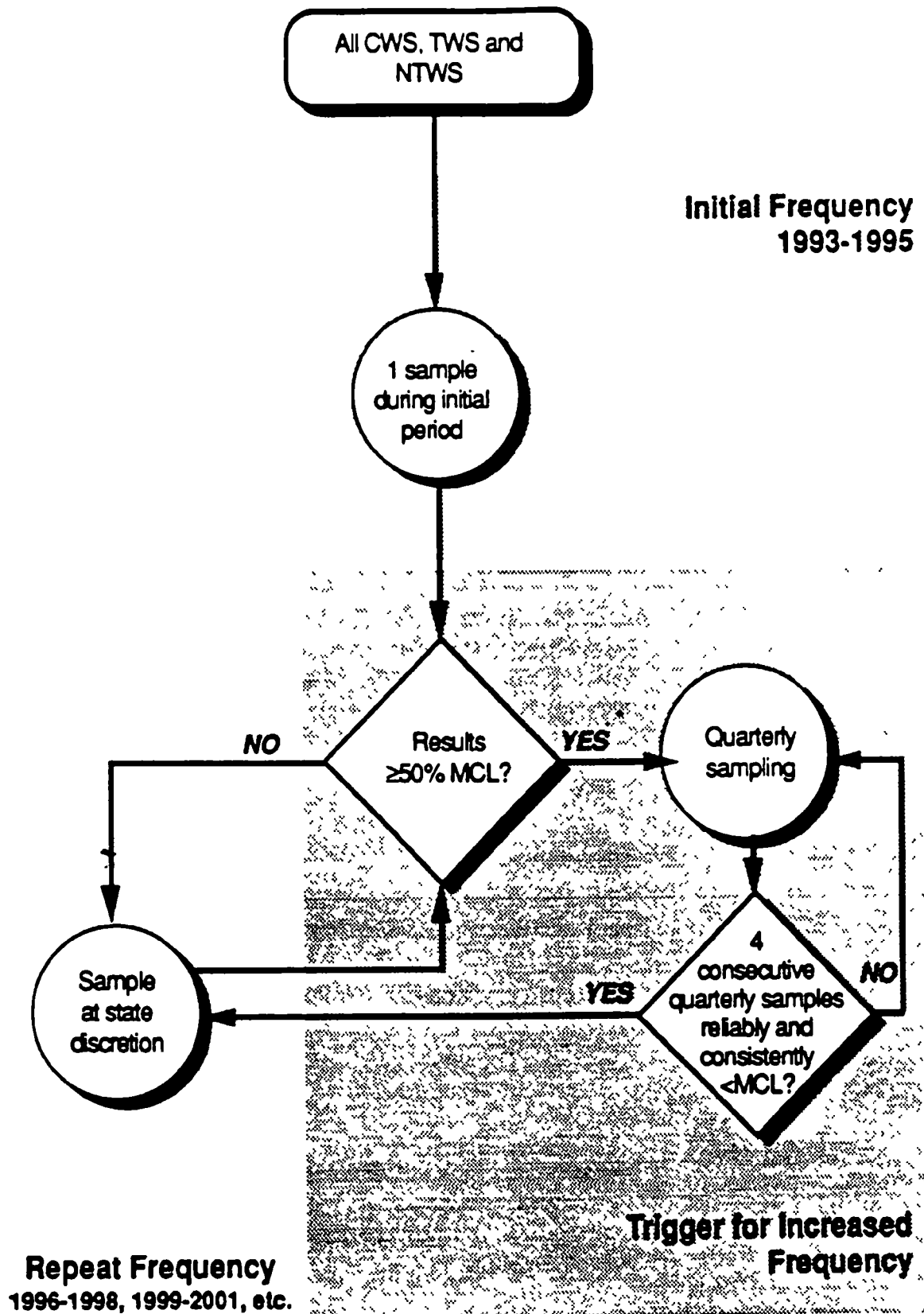
Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.

- 1) For systems serving greater than ($>$) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

Not allowed.

Nitrite Monitoring Flow Chart



Fact Sheet on Inorganics

EPA Phase II Monitoring Series (5 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for five inorganic chemicals (barium, cadmium, chromium, mercury, and selenium) as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Systems Affected

All community water systems (CWS) and nontransient noncommunity water systems (NTWS) must comply with the Phase II monitoring requirements for barium, cadmium, chromium, mercury, and selenium.

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment.

Initial Base Sampling

Groundwater systems must take one sample during the compliance period 1993 to 1995. The state will designate the year in which each system must sample within this compliance period. **Surface water systems** must sample annually beginning in 1993. Waivers from sampling may be granted by the state (see below for a summary of waiver requirements).

Grandfathering

States may allow previous sampling data to satisfy the initial base sampling requirements, provided at least one sample was taken after January 1, 1990.

Repeat Base Sampling

Repeat base sampling requirements are the same as those for the initial base phase unless a waiver has been granted by the state (i.e., one sample per three-year compliance period for **groundwater** and one sample each year for **surface water systems**).

Trigger for Increased Sampling

The maximum contaminant level (MCL) for each inorganic chemical triggers the requirement for increased sampling (see side bar text for list of contaminants and their corresponding MCLs).

Regulated Contaminants

Contaminant	MCL (mg/L)
Barium	2
Cadmium	0.005
Chromium	0.1
Mercury	0.002
Selenium	0.05

- 1) For systems serving greater than ($>$) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

Systems can apply to the state for a waiver from initial and repeat base sampling frequencies. Systems are eligible for both "*use*" and "*susceptibility*" waivers provided the system has conducted a vulnerability assessment. Systems are eligible for waivers beginning in the compliance period 1993 to 1995. Waivers are effective for one compliance period; they must be renewed in subsequent compliance periods or the system must conduct sampling that is commensurate with base requirements.

Use Waivers

When a system, on the basis of a vulnerability assessment, can demonstrate that volatile organics were not used previously in the water supply area (i.e., the contaminant was not used, manufactured, stored or disposed), the system can apply to the state for a "use" waiver. If a waiver is granted, sampling requirements are eliminated. Systems ineligible for a "use" waiver can apply for a waiver based on "susceptibility."

Susceptibility Waivers

"Susceptibility" waivers are contingent on the conduct of a thorough vulnerability assessment, which considers evaluation of prior analytical and/or vulnerability assessment results (including those of surrounding systems), environmental persistence and transport, how well the source is protected, Wellhead Protection Assessments, and proximity to sources of contamination. If a waiver is granted based on susceptibility, sampling requirements are eliminated for that compliance period.

Sampling Frequency with Waivers

Groundwater systems that have been granted a waiver are required to sample once every six years and must update the vulnerability assessment at the midpoint or three year mark of the period. *Surface water systems* with a waiver are required to sample only at the discretion of the state.

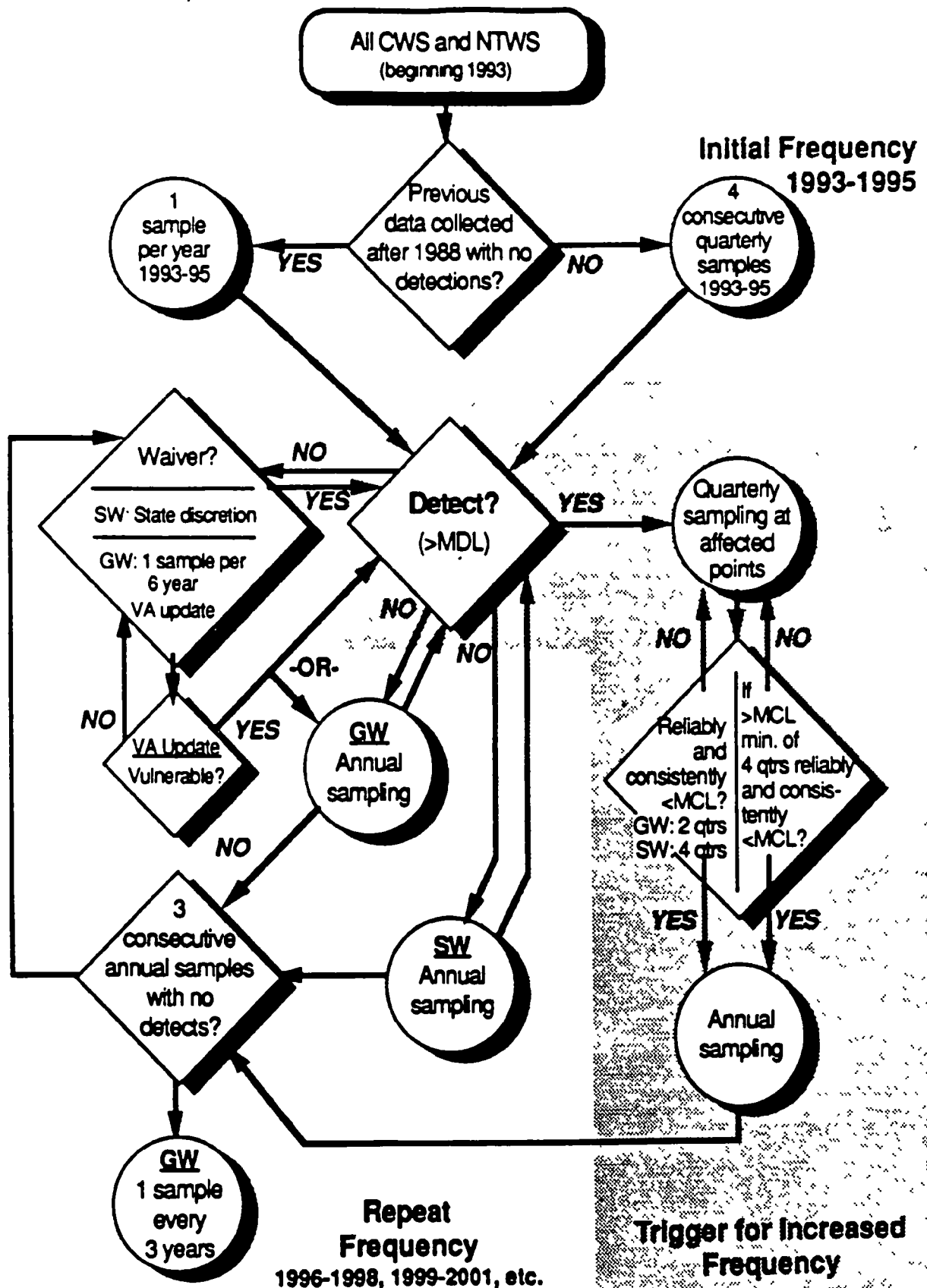
Standardized Monitoring Framework: Volatile Organic Chemicals (CWS and NTWS)

	CALENDAR YEAR		BASE REQUIREMENTS:	REDUCED MONITORING: ¹		WAIVERS ¹	
			ALL SYSTEMS	SW	GW	SW	GW
	1991						
	1992						
First 9 - year Compliance Cycle	1993	Initial Monitoring Round	4 quarterly samples at each sampling point	1 sample at each sampling point.	1 sample at each sampling point	State discretion	1 sample
	1994			"	"		
	1995			"	"		
	1996	Repeat Monitoring	4 quarterly samples at each sampling point	"	1 sample ²	State discretion	1 sample
	1997			"			
	1998			"			
	1999	Repeat Monitoring	4 quarterly samples at each sampling point	"	1 sample	State discretion	1 sample
	2000			"			
	2001			"			
	2002	Repeat Monitoring Round	4 quarterly samples at each sampling point	"	1 sample	State discretion	1 sample
Begins Second 9 - year Cycle	2003			"			
	2004			"			

- 1: Provided Initial monitoring completed by 12/31/92 and the system had no detection.
- 2: Reduction allowed after no detection in three years of annual monitoring.

NOTE:
States will designate the year during each compliance period in which each system must monitor.

Volatile Organic Chemicals Monitoring Flow Chart



Fact Sheet on Pesticides

EPA Phase II Monitoring Series (7 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for 17 pesticides and polychlorinated biphenyls (PCBs) as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Systems Affected

All community water systems (CWS) and nontransient noncommunity water systems (NTWS) must comply with the Phase II monitoring requirements for pesticides and PCBs.

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment.

Initial Base Sampling

Between 1993 and 1995, all systems must take an initial round of four consecutive quarterly samples unless a waiver has been granted by the state (see below for summary of waiver requirements). The state will designate the year in which each system samples within this compliance period.

Grandfathering

States may allow sampling data collected after January 1, 1990 to satisfy the initial base sampling requirements.

Trigger for Increased/Decreased Sampling

The method detection limit (MDL) is the trigger for increased/decreased sampling for each pesticide or PCB (see table on following page for a list of contaminants and their corresponding maximum contaminant levels (MCLs) and MDLs).

Repeat Base Sampling (no detects)

If contaminants are not detected during the initial sampling phase, systems may decrease their sampling frequency beginning in the 1996 compliance period.

- 1) Systems that serve greater than ($>$) 3300 persons may reduce their sampling frequencies to two samples in one year per compliance period.
- 2) Systems that serve less than (\leq) 3300 persons may reduce their sampling frequencies to one sample in each compliance period.

Regulated Contaminants

Contaminant	MCL ¹ (mg/L)	MDL ² (mg/L)
Alachlor	0.002	0.0002
Aldicarb	0.003*	0.0005
Aldicarb sulfonate	0.003*	0.0005
Aldicarb sulfone	0.003*	0.0008
Atrazine	0.003	0.0001
Carbofuran	0.04	0.0009
Chlordane	0.002	0.0002
Dibromochloropropane (DPCP)	0.0002	0.00002
2,4-D	0.07	0.0001
Ethylene dibromide (EDB)	0.00005	0.00001
Heptachlor	0.0004	0.00004
Heptachlor epoxide	0.0002	0.00002
Lindane	0.0002	0.00002
Methoxychlor	0.04	0.0001
Polychlorinated biphenyls (PCBs)	0.0005	0.0001
Pentachlorophenol	0.001	0.00004
Toxaphene	0.003	0.001
2,4,5-TP (Silvex)	0.05	0.0002

¹MCL=Maximum Contaminant Level

²MDL=Method Detection Limit

*MCLs for aldicarb, aldicarb sulfonate, aldicarb sulfone were repropose under the Phase II Rule, final levels will be promulgated by July 1, 1991.

Increased Sampling (if detected or MCL exceeded)

If contaminants are detected or if the MCL is exceeded in any sample, then systems must sample quarterly beginning in the next quarter. Systems are to sample quarterly until a baseline is established (minimum of two quarters for *groundwater systems* and four quarters for *surface water systems*).

- 1) If the baseline indicates a system is "reliably and consistently" below the MCL, the state may reduce the system's sampling frequency to annual. (Annual sampling must be conducted during the quarter which previously yielded the highest analytical result.)
- 2) Systems which have three consecutive annual samples with no detection can apply to the state for a waiver.

Compliance Determination

- 1) If a system samples more frequently than annual (i.e., quarterly or semi-annually), the system would be in violation if the running annual average at any sampling point exceeds the MCL.
- 2) If a system conducts sampling on an annual or less frequent basis, the system would be in violation if one sample (or the average of the initial and confirmation samples) at any point exceeds the MCL.

Confirmation Samples

States may require a confirmation sample for positive or negative results. If a confirmation sample is used, the compliance determination is based on the average of the results of both the confirmation sample and the initial sample.

Public Notice

Any system violating a National Primary Drinking Water Regulation (i.e., MCL, monitoring and reporting requirements, etc.) for one or more of the 17 pesticides and PCBs must give public notice. The public notice must include the specific mandatory health effects language contained in the Phase II Rule.

Compositing

Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.

- 1) For systems serving greater than (>) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

Systems can apply to the state for a waiver from initial and repeat base sampling frequencies. Systems are eligible for both "*use*" and "*susceptibility*" waivers provided the system has conducted a vulnerability assessment. Systems are eligible for waivers beginning in the compliance period 1993 to 1995. Waivers are effective for one compliance period; they must be renewed in subsequent compliance periods or the system must conduct sampling that is commensurate with base requirements.

Use Waivers

When a system, on the basis of a vulnerability assessment, demonstrates that the regulated pesticide/PCB has not been used in the water supply area (i.e., the contaminant was not used, manufactured, stored or disposed of in the area), the system can apply to the state for a "*use*" waiver. Systems not eligible for "*use*" waivers may still qualify for a waiver by evaluating susceptibility (see below).

Susceptibility Waivers

"Susceptibility" waivers are contingent on the conduct of a thorough vulnerability assessment. Such a vulnerability assessment must consider prior analytical and/or vulnerability assessment results (including those of surrounding systems), environmental persistence and transport, how well the source is protected, Wellhead Protection Assessments, and proximity of the supply to sources of contamination.

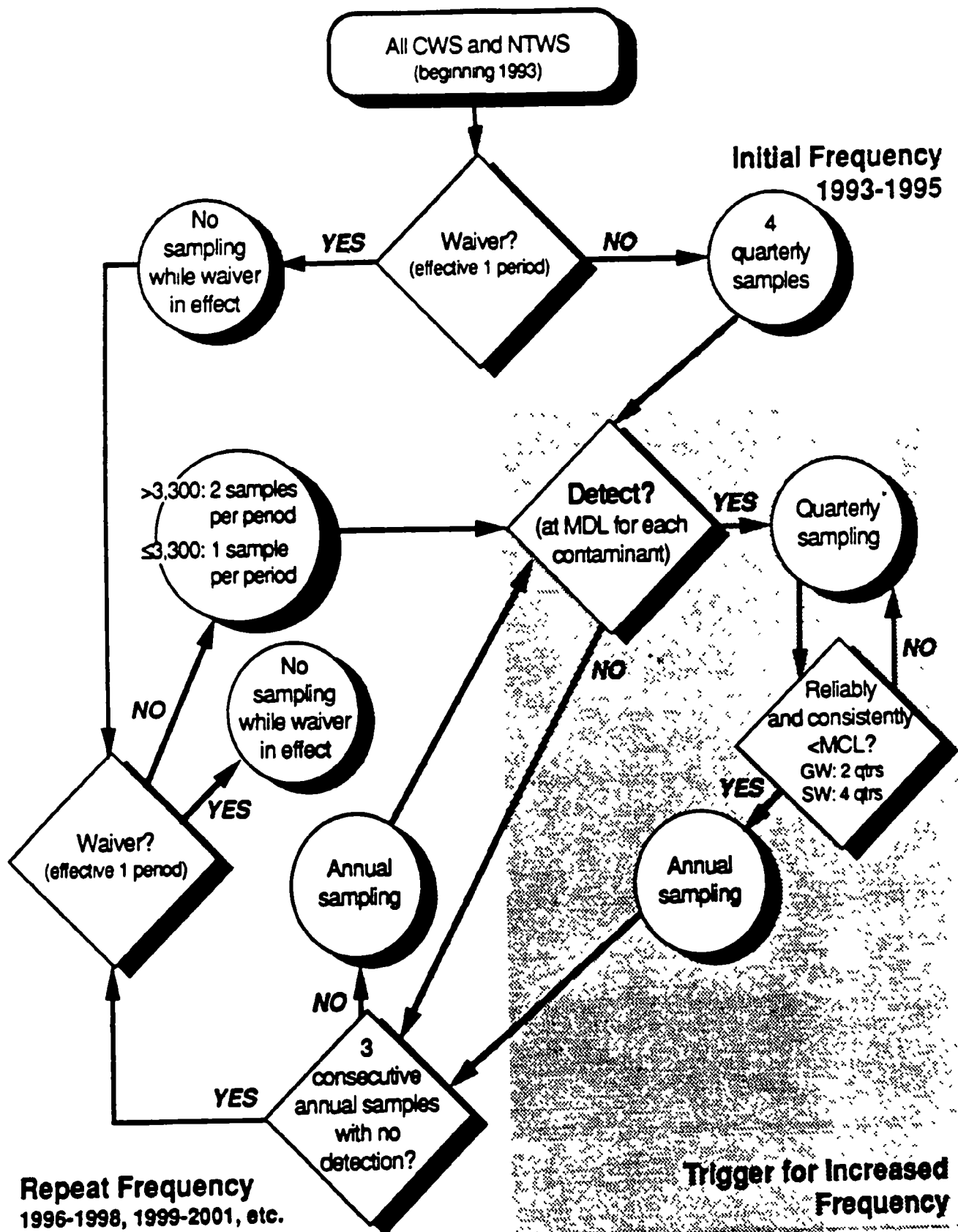
Standardized Monitoring Framework: Pesticides (CWS and NTWS)

	CALENDAR YEAR		BASE REQUIREMENTS: ALL SYSTEMS	REDUCED MONITORING: SYSTEMS WITH NO PREVIOUS DETECTION	WAIVERS *
	1991				
	1992				
First 9 - year Compliance Cycle	1993	Initial Monitoring Round	4 quarterly samples at each sampling point	Not Applicable	Waiver
	1994				
	1995				
	1996	Repeat Monitoring	4 quarterly samples at each sampling point	Systems Serving: > 3,300 - 2 samples at each sampling point ≤ 3,300 - 1 sample at each sampling point	Waiver
	1997				
	1998				
	1999	Repeat Monitoring	4 quarterly samples at each sampling point	Systems Serving: > 3,300 - 2 samples at each sampling point ≤ 3,300 - 1 sample at each sampling point	Waiver
	2000				
	2001				
Begins Second 9 - year Cycle	2002	Repeat Monitoring Round	4 quarterly samples at each sampling point	Systems Serving: > 3,300 - 2 samples at each sampling point ≤ 3,300 - 1 sample at each sampling point	Waiver
	2003				
	2004				

NOTE: States will designate the year during each compliance period in which each system must monitor.

* Based on 'use' and/or 'susceptibility' assessment (No Samples Required)

Pesticides Monitoring Flow Chart



Fact Sheet on Unregulated Contaminants

EPA Phase II Monitoring Series (8 of 8)

April 1991

This fact sheet summarizes the one-time monitoring requirements for 24 organic and 6 inorganic chemicals as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule. These requirements will take effect on July 30, 1992.

Unregulated Contaminants

Organics

Aldrin
Benzo(a)pyrene
Butachlor
Carbaryl
Dalapon
Di(2-ethylhexyl)adipate
Di(2-ethylhexyl)phthalates
Dicamba
Dieldrin
Dinoseb
Diquat
Endothall
Glyphosate
Hexachlorobenzene
Hexachlorocyclopentadiene
3-Hydroxycarbofuran
Methomyl
Metolachlor
Metribuzin
Oxamyl (vydate)
Picloram
Propachlor
Simazine
2,3,7,8-TCDD (Dioxin)

Inorganics

Antimony
Beryllium
Nickel
Sulfate
Thallium
Cyanide

Systems Affected

All community water systems (CWS) and nontransient noncommunity water systems (NTWS) must conduct monitoring for the 24 organic and six inorganic chemicals (see sidebar for lists of contaminants).

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment.

Sampling Requirements

All systems must conduct a one-time round of sampling, unless a waiver has been granted by the state (see below for summary of waiver requirements). The specific sampling requirements are:

- 1) For the 24 organic chemicals, systems must take four consecutive quarterly samples and report the results to the state.
- 2) For the six inorganic chemicals, systems must take one sample and report the results to the state.
- 3) Sampling must be completed no later than December 31, 1995.

Confirmation Samples:

The state may require a confirmation sample for positive or negative results.

Compositing

Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.









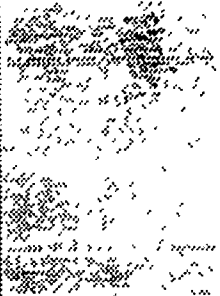
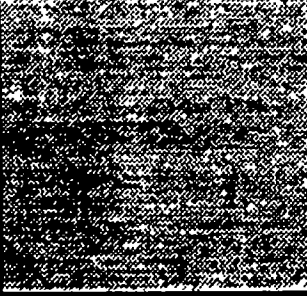

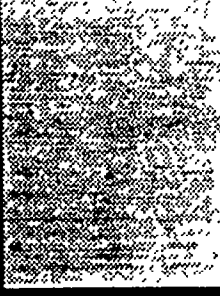
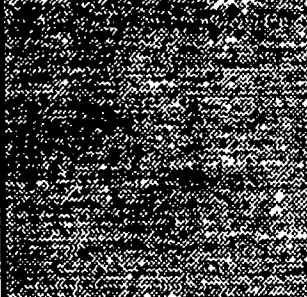

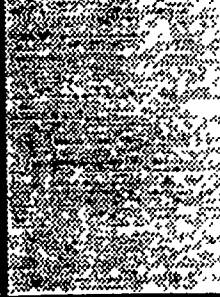
- 1) For systems serving greater than (>) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

Systems may apply to the state for a waiver from the sampling requirements. Such waivers may be granted for either the organics or inorganics, or both, as follows:

- 1) **Waiver for Organics:** When a system can rule out previous use of the chemical in the water supply area (i.e., the contaminant was not used, manufactured, stored or disposed of in the area), the system can apply to the state for a "use" waiver. If previous use is unknown, then systems may still qualify for a waiver by evaluating susceptibility. "Susceptibility" waivers are contingent on the conduct of a thorough vulnerability assessment. The state may grant a "susceptibility" waiver based on an evaluation of prior analytical and/or vulnerability assessment results (including those of surrounding systems), environmental persistence and transport, how well the source is protected, Wellhead Protection Assessments, and proximity to sources of contamination.
- 2) **Waiver for Inorganics:** The state may grant a waiver if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.
- 3) **Waiver for Very Small Systems:** Systems serving fewer than 150 service connections may obtain a waiver by sending a letter to the state indicating that the system is available for sampling. This letter must be sent to the state by January 1, 1994.

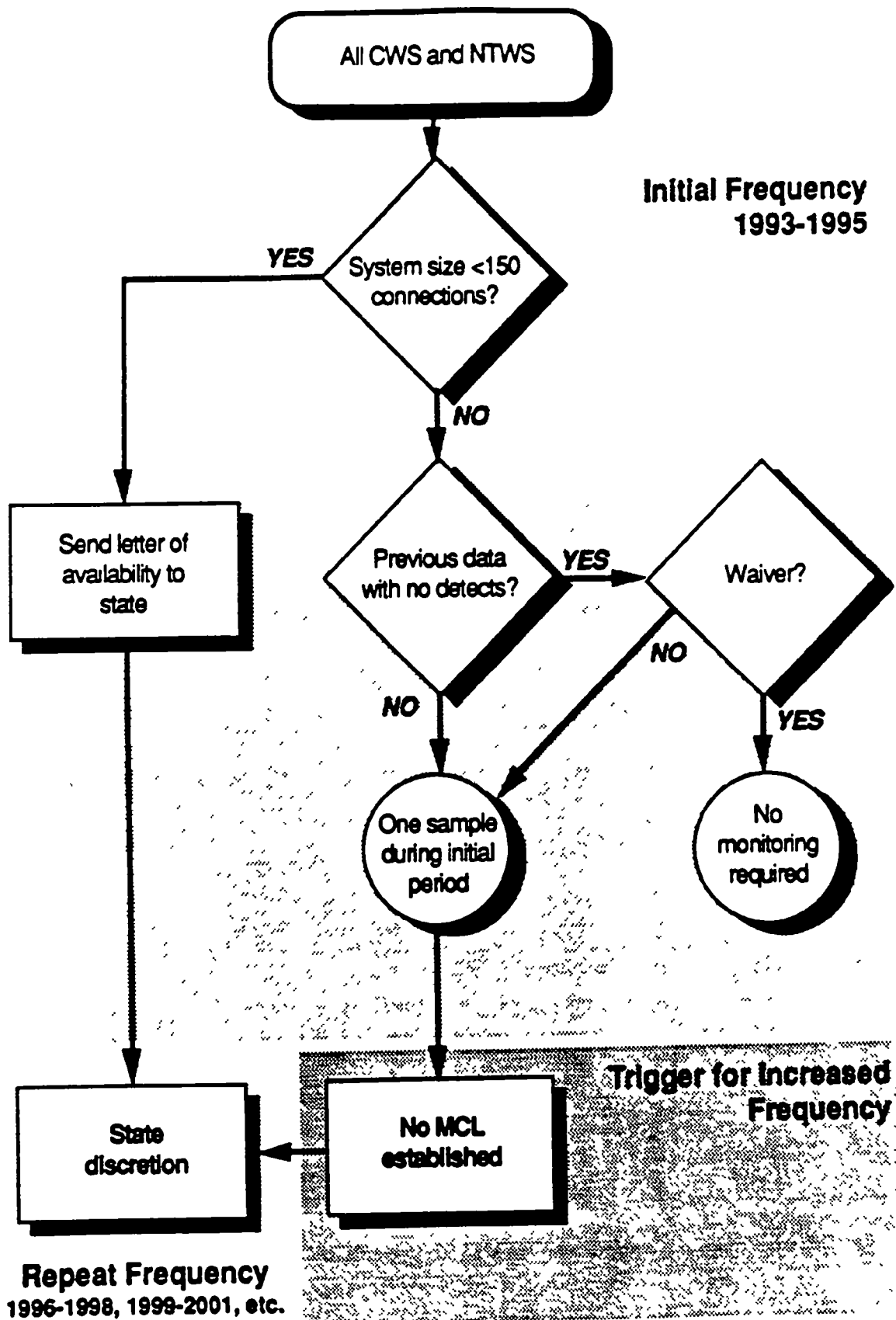
Standardized Monitoring Framework: Unregulated Contaminants (CWS and NTWS)

	CALENDAR YEAR		BASE REQUIREMENTS: ALL SYSTEMS		WAIVERS *
			Organics	Inorganics	
	1991				
	1992				
First 9 - year Compliance Cycle	1993	Initial Monitoring Round	 4 quarterly samples at each sampling point 	 1 sample at each sampling point 	 Waiver 
	1994				
	1995				
	1996	Repeat Monitoring			
	1997				
	1998				
	1999	Repeat Monitoring			
	2000				
	2001				
Begins Second 9 - year Cycle	2002	Repeat Monitoring Round			
	2003				
	2004				

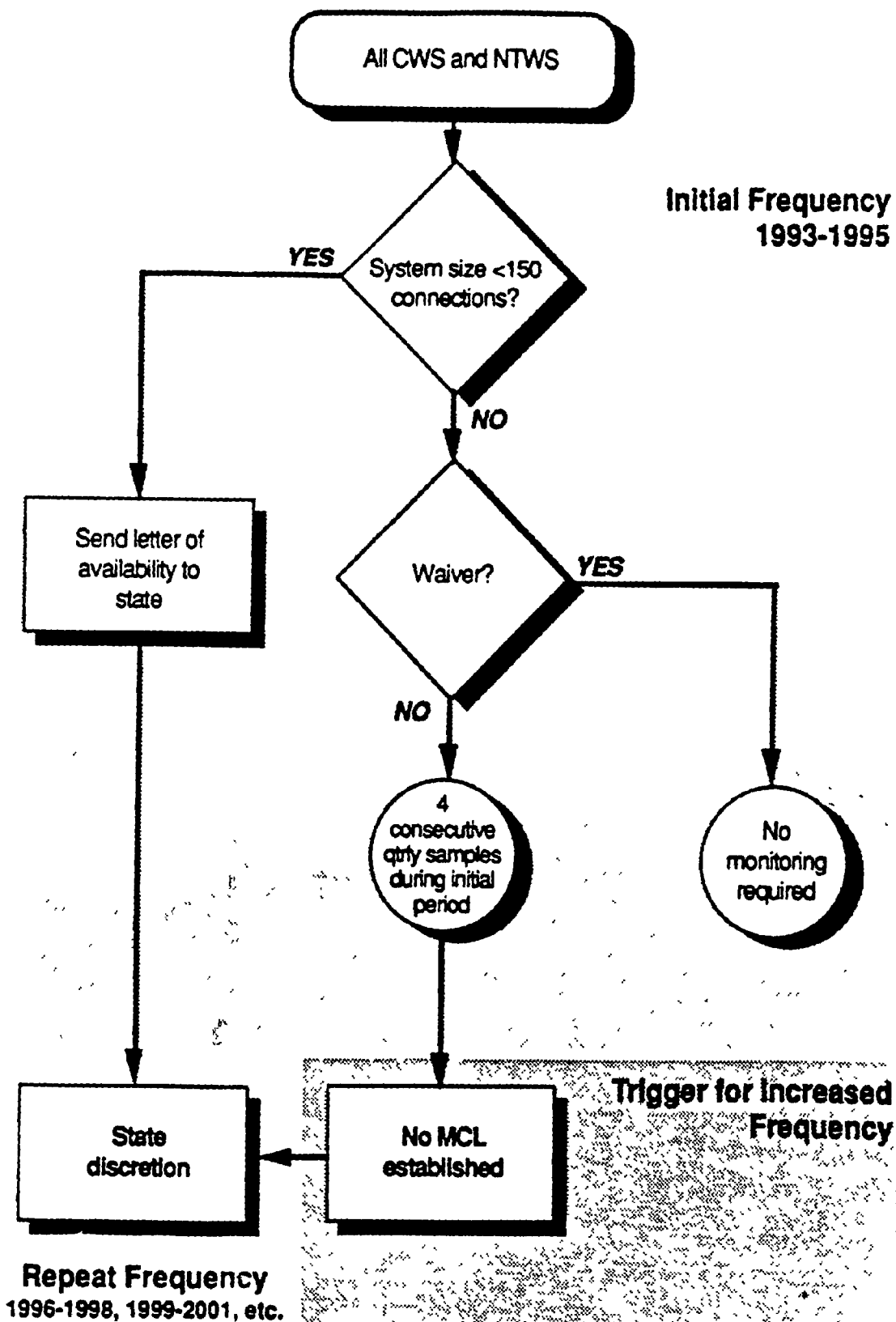
NOTE: States will designate the year during each compliance period in which each system must monitor.

* Based on 'use' and/or 'susceptibility' assessment (No Samples Required)

Unregulated Contaminant Monitoring Flow Chart — Inorganics



Unregulated Contaminant Monitoring Flow Chart — Pesticides



Increased Sampling

- 1) Any system exceeding the MCL for a given contaminant must take quarterly samples (in the quarter immediately following the violation) until a baseline is established (minimum of two quarters for *groundwater systems* and four quarters for *surface water systems*).
- 2) If the state determines that the baseline is "reliably and consistently" below the MCL, the sampling frequency may be reduced to the base requirements.

Compliance Determination

- 1) If a system samples more frequently than annual (i.e., quarterly), the system would be in violation if the running annual average at any sampling point exceeds the MCL.
- 2) If a system conducts sampling on an annual or less frequent basis, the system would be in violation if one sample (or the average of the initial and confirmation samples) at any point exceeds the MCL.

Confirmation Samples

States may require a confirmation sample for any sample that exceeds the MCL. These confirmation samples must be taken from the same sampling point and as soon as possible (within no greater than a two week time period) after the initial sample. If a confirmation sample is used, the compliance determination is based on the average of the results of both the confirmation sample and the initial sample.

Public Notice

Any system violating the National Primary Drinking Water Regulation (i.e., MCL, monitoring and reporting requirements, etc.) for one or more of the five inorganic chemicals must give public notice. The public notice must include the specific mandatory health effects language contained in the Phase II Rule.

Compositing

Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.

- 1) For systems serving greater than ($>$) 3300 persons, compositing is only allowed at sampling points within a single system.
- 2) For systems serving less than (\leq) 3300 persons, compositing among different systems is permitted.

Waivers

States may grant "waivers by rule" to systems of up to nine years (or one compliance cycle) for each of the five inorganic contaminants. In order to qualify for a waiver, a system must have three previous compliance samples (including one taken after January 1, 1990), and all previous analytical results must be below the MCL (see grandfathering section above). The waiver must be granted at the beginning of the year in which the system is scheduled to sample, otherwise the system is subject to base sampling requirements. Systems must take at least one sample during the nine-year waiver period.

The state must consider a variety of issues in making the "waiver by rule" determination, such as:

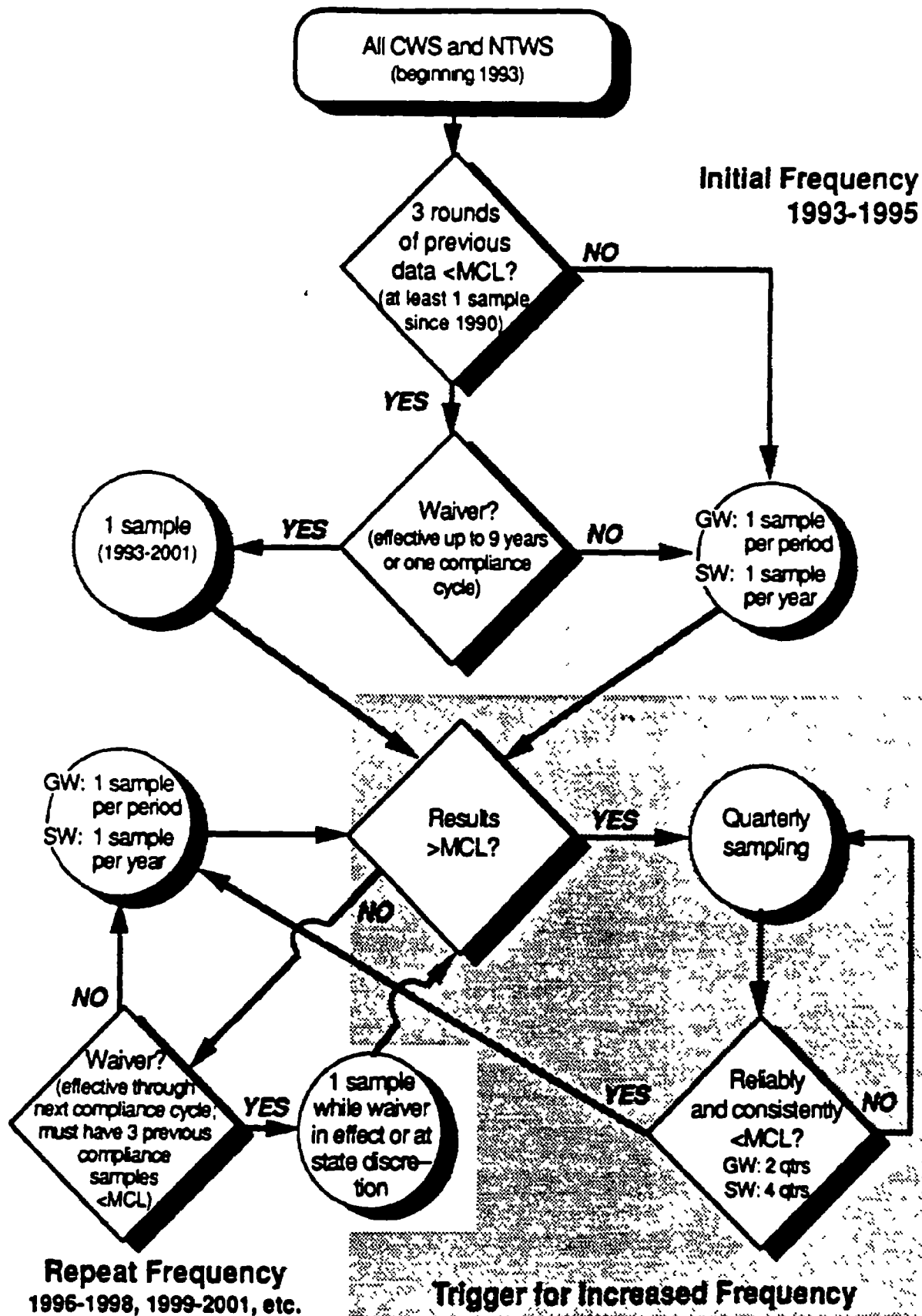
- 1) reported concentrations from all previous monitoring,
- 2) degree of variation in reported concentrations, and
- 3) other factors which may affect contaminant concentrations (i.e., groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics).

Standardized Monitoring Framework: Inorganics (CWS and NTWS)

	CALENDAR YEAR		BASE REQUIREMENTS		WAIVERS (ALL SYSTEMS)
			SW	GW	
	1991				State may waive the base monitoring requirements after 3 samples of less than the MCL are taken
	1992				
First 9 - year Compliance Cycle	1993	Initial Monitoring Round	1 sample at each sampling point	1 sample at each sampling point	1 sample at each sampling point
	1994		1 sample at each sampling point		
	1995		1 sample at each sampling point		
	1996	Repeat Monitoring	1 sample at each sampling point	1 sample at each sampling point	
	1997		1 sample at each sampling point		
	1998		1 sample at each sampling point		
	1999	Repeat Monitoring	1 sample at each sampling point	1 sample at each sampling point	
	2000		1 sample at each sampling point		
	2001		1 sample at each sampling point		
Begins Second 9 - year Cycle	2002	Repeat Monitoring Round	1 sample at each sampling point	1 sample at each sampling point	
	2003		1 sample at each sampling point		
	2004		1 sample at each sampling point		

NOTE: States will designate the year during each compliance period in which each system must monitor.

Inorganics Monitoring Flow Chart



Fact Sheet on Volatile Organic Chemicals

EPA Phase II Monitoring Series (6 of 8)

April 1991

This fact sheet summarizes the monitoring requirements for 10 new volatile organic chemicals (VOCs) as promulgated on January 30, 1991 under the U.S. Environmental Protection Agency's (EPA) Phase II Rule and will apply eventually to the 8 VOCs currently regulated. The monitoring requirements will take effect for all 18 VOCs on July 30, 1992.

Systems Affected

All community water systems (CWS) and nontransient noncommunity water systems (NTWS) must comply with the Phase II monitoring requirements for volatile organic chemicals.

Sampling Points

Sampling must be conducted at each entry point to the distribution system. Sampling points must be representative of the well or source water after treatment. If conditions warrant, the state may designate additional sampling points within the distribution system or at consumer taps which more accurately determine consumer exposure.

Initial Base Sampling

Between 1993 and 1995, all systems must take four consecutive quarterly samples for each of the new contaminants, unless (a) a waiver has been granted by the state (see waiver requirements below) or (b) the system has previous sampling data that qualifies it for reduced sampling (see grandfathering section below). The state will designate the year in which each system samples within this compliance period.

Grandfathering

States may allow sampling data collected after January 1, 1988 to satisfy the initial base sampling requirements. If the initial samples for the new organics are completed by December 31, 1992 and the system did not detect any of the organics, then the system shall take one sample annually beginning January 1, 1993.

Trigger for Increased/Decreased Sampling

The method detection limit (MDL) is the trigger for increased/decreased sampling for each of the volatile organics. (See side bar for a list of contaminants and their corresponding maximum contaminant levels (MCLs) and MDLs).

Repeat Base Sampling (no detects)

Systems would continue taking four consecutive quarterly samples during subsequent three-year compliance periods. However, if contaminants are not detected during the

Regulated Contaminants

	MCL
Eight Original VOCs (mg/L)	
Benzene	0.005
Carbon tetrachloride	0.005
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
para-Dichlorobenzene	0.075
1,1,1-Trichloroethane	0.20
Trichloroethylene	0.005
Vinyl chloride	0.002
Ten New VOCs	MCL (mg/L)
cis-1,2-Dichloroethylene	0.07
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetrachloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Xylenes (total)	10

NOTE: The method detection limit (MDL) for all 18 volatile organics is 0.0006 mg/L.

initial round of sampling, then systems could decrease their sampling frequency beginning in the 1996 compliance period as follows:

- 1) *Groundwater systems* would take one sample annually. After three years of annual sampling and no previous detection, *groundwater systems* could reduce their sampling frequency to one sample per compliance period.
- 2) *Surface water systems* must sample annually.

Increased Sampling (If detected or MCL exceeded)

If contaminants are detected at the MDL or if the MCL is exceeded, then systems must sample quarterly beginning in the next quarter.

- 1) Systems remain on quarterly sampling until a baseline is established (minimum of two quarters for *groundwater systems* and four quarters for *surface water systems*).
- 2) If the baseline indicates a system is "reliably and consistently" below the MCL, the state may reduce the system's sampling frequency to annual. (Annual sampling must be conducted during the quarter which previously yielded the highest analytical result.)
- 3) Systems which have three consecutive annual samples with no detection may apply to the state for a waiver (see waiver requirements below).
- 4) If any detection exceeds the MCL, both *groundwater* and *surface water systems* must take four consecutive quarterly samples until a reliable baseline is established.

Compliance Determination

- 1) If a system samples more frequently than annually (quarterly or semi-annually), the system is in violation if the annual average at any sampling point exceeds the MCL.
- 2) If a system samples on an annual or less frequent basis, the system would be in violation if one sample (or the average of the original and confirmation samples) at any point exceeds the MCL.

Confirmation Samples

States may require a confirmation sample for positive or negative results. If taken, the compliance determination must be based on the average of the results of both the confirmation sample and the initial sample.

Public Notice

Any system violating any National Primary Drinking Water Regulation (MCL, monitoring and reporting requirements, etc.) for one or more of the VOCs must give public notice. The public notice must include the specific mandatory health effects language for each of the new VOCs contained in the Phase II Rule.

Compositing

Composite samples are allowed at state discretion from no more than five sampling points. Compositing of samples must be completed in a certified drinking water laboratory.