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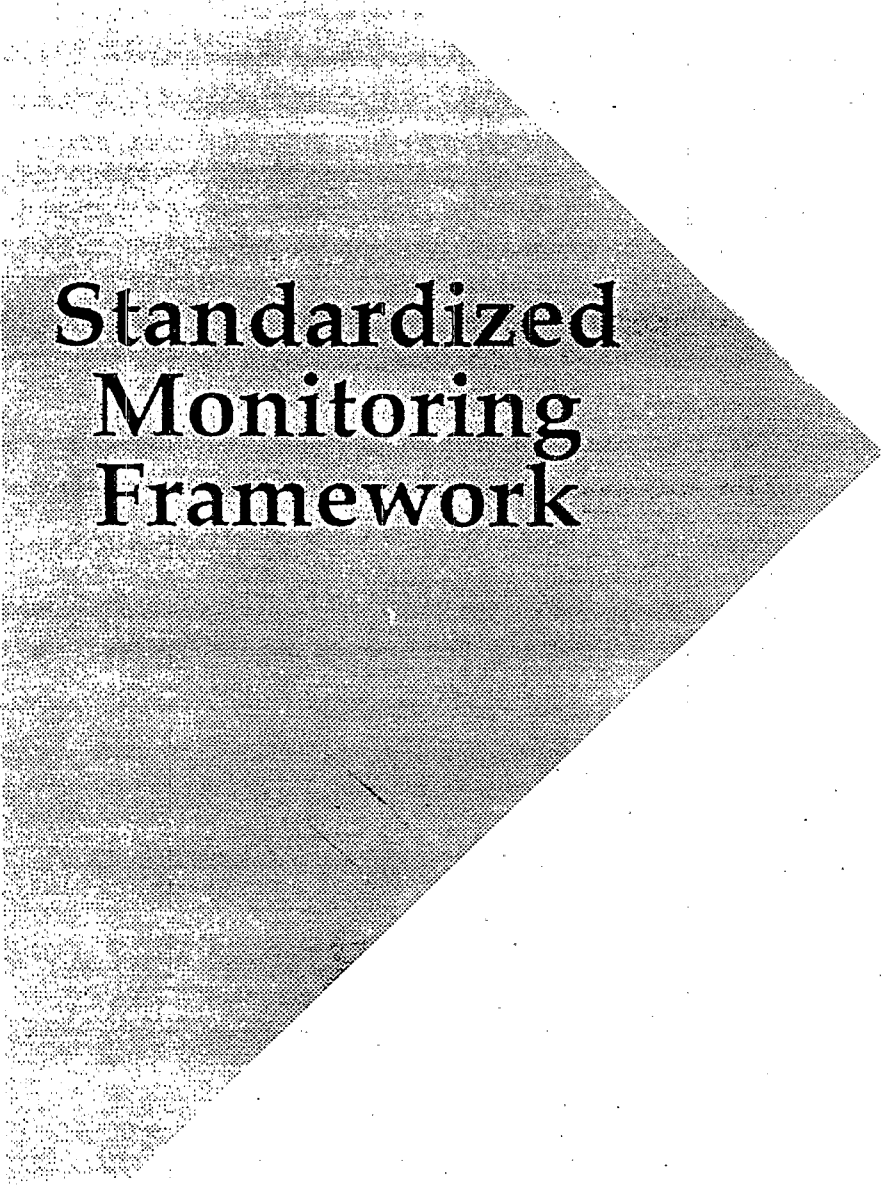


# **STANDARDIZED MONITORING FRAMEWORK**









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**U.S. EPA Office of Drinking Water**

February 1991



## STANDARDIZED MONITORING FRAMEWORK

### Background

Existing and forthcoming regulations under the Safe Drinking Water Act (SDWA) contain significant monitoring requirements for public water systems. These requirements vary by factors such as type of contaminant, system size and vulnerability status. Because a uniform schedule or framework for monitoring did not exist, EPA standardized monitoring in the recently promulgated Phase II regulation for 38 inorganic and organic contaminants. EPA's use of a standard monitoring framework will apply to future monitoring requirements for inorganics, Volatile Organic Chemicals (VOCs), pesticides, and radionuclides. Requirements for currently regulated contaminants will be integrated into the framework when the existing regulations are revised.

### Objective

The degree of variability among monitoring requirements poses both management and technical barriers for states and water systems that are ultimately responsible for implementing the regulations. Consequently, EPA desires to standardize and simplify monitoring requirements and synchronize monitoring schedules where possible. Benefits of such action include:

- Reducing the complexity of the monitoring workload from a technical and managerial perspective for both states and water systems;
- Leveling out the resource expenditure for monitoring and vulnerability assessments;
- Reducing sampling and vulnerability assessment costs.
- Increasing water system compliance with monitoring requirements.

### Applicability

- The monitoring framework applies to source related contaminants associated with chronic health effects. Contaminants associated with chronic health effects include; VOCs, pesticides, radionuclides, and inorganic chemicals (with the exception of nitrate/nitrite).



## Standard Framework, cont'd

### ➤ Standard Monitoring Requirements

- All systems must sample at the base (or minimum) sampling frequencies.
- All systems have the same initial base sampling requirement regardless of system size or water source (except for inorganics).
- Most systems have the same repeat base sampling requirement regardless of system size or water source. However, differences for specific contaminants do exist for pesticides based on system size (see Example 2).
- All systems which detect contamination must sample quarterly at each sampling point detecting contamination until the state determines that the analytical results are "reliably and dependably" below the MCL. Detection is defined as: the MCL for the inorganics; 0.0005 mg/l for the VOCs, and at the analytical Method Detection Limit (MDL) for the pesticides and PCBs. In addition to the original sample, ground water systems must take a minimum of two additional quarterly samples and surface water systems a minimum of four additional quarterly samples before the state can determine that analytical results are "reliably and dependably" below the MCL.
- "Reliably and dependably" below the MCL means that though the 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 or analytical results near the MCL would not meet the "reliably and dependably" test.
- Generally the repeat sampling requirements are reduced after initial sampling. For example, the initial sampling requirement for the VOCs is 4 quarterly samples; the repeat sampling requirement is 1 sample annually.
- Waivers are available to all systems based upon a vulnerability assessment and/or consideration of prior analytical results. Waivers either reduce the sampling frequency (e.g. inorganics and VOCs) or eliminate any sampling frequency (e.g. pesticides, asbestos, and unregulated contaminants). See Examples 1 - 5.

### ➤ Grandfathering of Data

- At a system's (or state's) discretion, sampling data collected three years prior to the beginning of the initial three-year monitoring period can be used to satisfy the initial sampling requirements. Systems using this grandfather provision would then sample at the repeat frequencies which generally are lower than the initial frequencies.
- Vulnerability assessments may not be grandfathered.



## The Standard Framework

### > 3/6/9 Monitoring Cycle

- A nine-year compliance cycle (beginning in 1993) is established for all public water systems.
- Each nine-year compliance schedule is divided into three three-year compliance periods.
- All compliance cycles and compliance periods operate on a calendar year basis (January 1 to December 31).
- The first nine-year cycle begins January 1, 1993 and ends December 31, 2001. The second nine-year cycle begins January 1, 2002 and ends December 31, 2010 and so on.
- Within the first compliance cycle, the first compliance period begins January 1, 1993 and ends December 31, 1995; the second begins January 1, 1996 and ends December 31, 1998; the third begins January 1, 1999 and ends December 31, 2001.
- The Federal requirement to phase-in monitoring by system size and community/non-transient water system classification is eliminated.
- Instead, EPA will require states to schedule approximately one-third of the systems to monitor during each year of the three-year compliance period. Each state has the flexibility to establish its own monitoring plan. For example, states may prioritize monitoring based on system size, vulnerability, lab capacity, and community/non-transient non-community criteria.
- Once a state schedules a system to monitor during a particular year of the three-year compliance period, (e.g. the system monitors in the second year of the compliance period) that system must monitor in the same year in subsequent compliance periods. (e.g., the second year).

### > When Initial Monitoring Begins

- When a regulation is promulgated during the nine-year compliance cycle, the initial round of monitoring is required in the first full three-year compliance cycle which begins 18 months after the date of promulgation (the effective date of the regulation). For example, if Phase V is promulgated in March 1992, the effective date is September 1993 (18 months after promulgation) in the middle of the first three-year period. Consequently, the initial round of monitoring would not begin until the second three-year compliance period (1996 - 1998). This means initial monitoring for Phase V contaminants would be conducted during the second three-year monitoring periods (1996 - 1998) and the repeat monitoring period would begin in 1999.



# Waivers & Vulnerability Assessments

## Waivers

EPA has established provisions whereby States may waive (either eliminate or reduce) base sampling requirements if certain conditions are met. Waivers based on vulnerability assessments are granted for three year periods. There are two basic types of waivers:

1) **Waiver by Rule:** For systems meeting established criteria. Example: inorganics where three samples less than the MCL are the criteria. All systems (regardless of size) can qualify for waivers. Systems which do not receive waivers must sample at the regulatory minimum.

2) **Waiver by Vulnerability Assessment:**

➤ A simplified two-step waiver procedure is available to all systems.

**Step # 1: "Use Waiver"** - Was the contaminant used, manufactured, stored or disposed of in the area. If not, a waiver is granted. If yes or unknown, system determines susceptibility.

Example: pesticides

**Step # 2: "Susceptibility Waiver"** - If a "use" waiver can not be granted, a thorough vulnerability assessment of the water source must be done to determine "susceptibility" to contamination.

"Susceptibility" considers:

- Prior analytical and/or vulnerability assessment results;
- Environmental persistence and transport of the contaminant;
- How well the source is protected;
- Wellhead Protection Program reports; and
- Elevated nitrate levels.

Systems with no known "susceptibility" to contamination, based upon an assessment of the above facts, may be granted a waiver by the state. If "susceptibility" can not be determined, a system is not eligible for a waiver. Systems which do not receive a waiver must monitor at the regulatory minimum (i.e. base requirement).

Example: VOCs.

- The State, the system, or a third party organization can conduct the assessment. However, the state must approve the assessment.
- Systems which do not receive waivers must sample at required base frequencies.





Standard Framework, cont'd
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## ➤ Waivers

- Base sampling requirements apply to *all* systems unless the requirements are waived (either reduced or eliminated) by the state.
- All waivers are granted by the state based upon a vulnerability assessment or evaluation of prior analytical results.
- Waivers obtained for asbestos, pesticides, and unregulated contaminants relieve the system of any sampling requirements. Waivers for inorganics or VOC's reduce the sampling frequency. Waivers are not available for nitrate and nitrite.
- Waivers based on vulnerability assessments are effective for three-years for pesticides, up to six years for VOCs, and up to nine years for the inorganics. After the waiver expires a new vulnerability assessment (generally an update of the previous assessment) is required to obtain a waiver.
- The extent of the vulnerability assessment depends on whether the system(s) in question had monitoring data available or the results of a previous assessment. The lack of data would necessitate a more extensive vulnerability assessment. Minimum criteria for vulnerability assessments are specified in each regulation.
- A waiver must be granted for each specific contaminant. Waivers are based upon an assessment of a system's vulnerability, which includes its previous monitoring results.

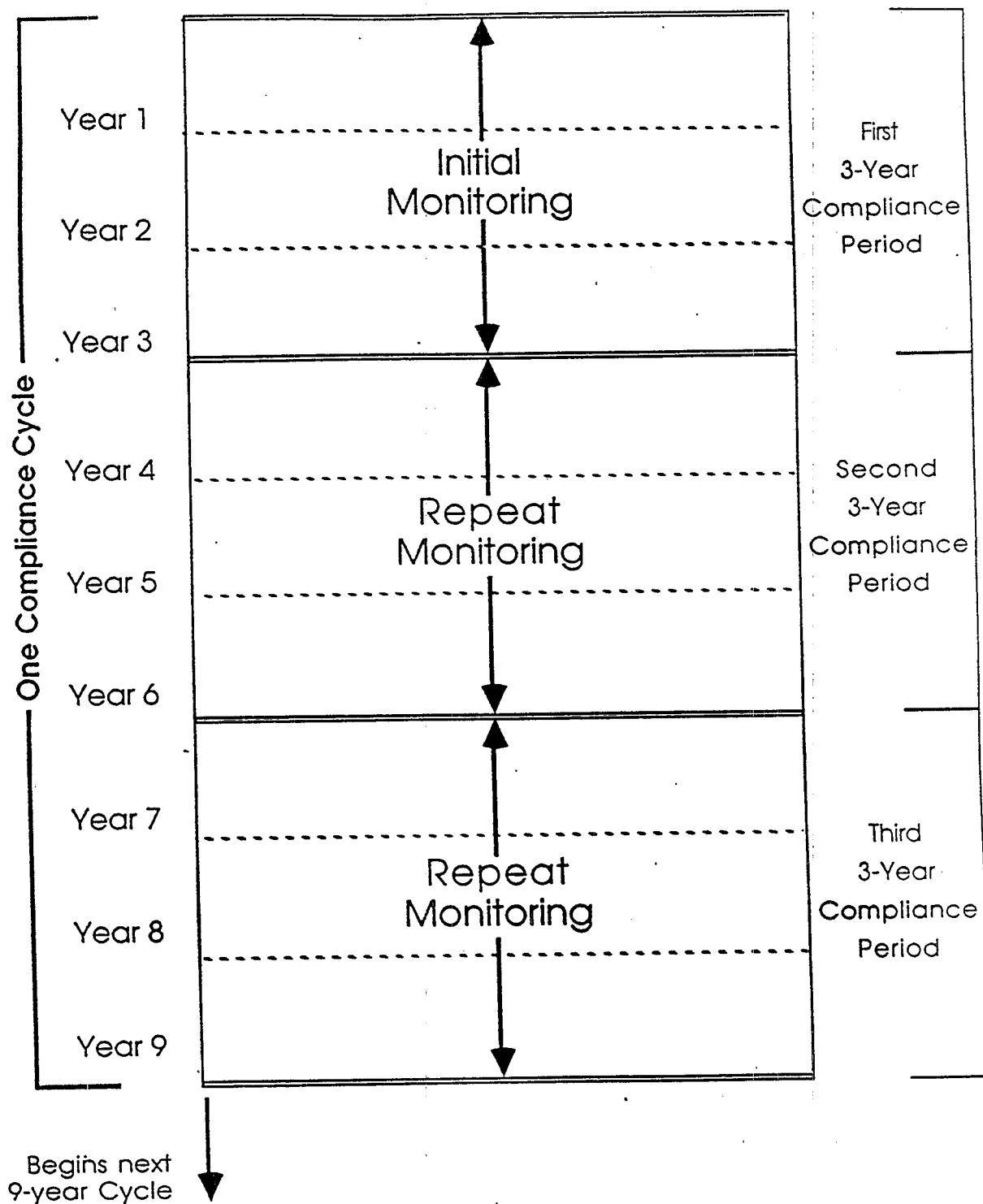


# Standardized Monitoring Framework

DATE	EVENT		COMMENTS
91			➤ Phase II promulgated - Jan. 1991
92			➤ Phase II effective - July 1992 ➤ Phase V promulgated - 1992
93 to 95	3 Year Monitoring Period	<b>First 9 Year Compliance Cycle</b> 	➤ Initial monitoring begins for Phase II - 1993
96 to 98	3 Year Monitoring Period		➤ Repeat monitoring for Phase II
99 to 2001	3 Year Monitoring Period		➤ Repeat monitoring for Phase II
2002 to 2004	3 Year Monitoring Period	<b>Second 9 Year Compliance Cycle</b> 	
2005 to 2007	3 Year Monitoring Period		
2006 to 2010	3 Year Monitoring Period		



# Nine-Year Drinking Water Monitoring Compliance Cycle





# Standardized Monitoring Framework: Pesticides

	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)



# Standardized Monitoring Framework: CWS and NTWS Asbestos

	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.



# Standardized Monitoring Framework: Volatile Organic Chemicals

	CALENDAR YEAR		BASE REQUIREMENTS:	REDUCED MONITORING: <sup>1</sup>		WAIVERS <sup>1</sup>	
			ALL SYSTEMS	ALL SYSTEMS	GW SYSTEMS	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 <sup>2</sup>	State discretion	1 sample
	1997			"			
	1998			"			
	1999	Repeat Monitoring	4 quarterly samples at each sampling point	"	1 sample	State discretion	1 sample
	2000			"			
	2001			"			
Begins Second 9 - year Cycle	2002	Repeat Monitoring Round	4 quarterly samples at each sampling point	"	1 sample	State discretion	1 sample
	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.



# 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 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.







# Standardized Monitoring Framework: Unregulated Contaminants

	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)