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FEDERAL ENVIRONMENTAL MONITORING HANDBOOK

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Prepared by

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USER'S GUIDE

Foreword:

Users of this manual should note that to the extent practicable the regulatory language pertaining to each monitoring requirement has been presented verbatim. For the sake of clarity, however, it was necessary in some cases to embellish or expand on the exact regulatory language. Braces { } are used herein to distinguish text that has been altered editorially for the reader's clarity.

Ellipses ... are used to indicate where unrelated and extraneous information was omitted within the CFR verbatim text.

The CFR references each section with the symbol §. This symbol is replaced with the phrase "40 CFR" throughout the Handbook.

In this Handbook, the terms "Administrator" and "Regional Administrator" as defined by 40 CFR 260.10 means the Regional Administrator for the Environmental Protection Agency (EPA). "Director," as defined by 40 CFR, means the Regional Administrator, the State Director, or the Tribal Director as the context requires, or an authorized representative. When there is no approved State or Tribal program, and there is an EPA administered program, "Director" means the Regional Administrator of the EPA.

Each environmental medium covered in this Handbook is addressed in a separate chapter and contains two parts: an introduction to the monitoring requirements relative to the medium, and the summary tables of the regulations.

Table of Regulations:

Introduction. The introduction to each chapter provides the reader with the statutory authority for monitoring as well as relevant information about the content of each section. Any possible exemptions to regulatory authority will be included in the introduction.

Each chapter may exhibit small variations in the presentation of information in the summary table or may have chapter-specific peculiarities. These idiosyncrasies will be identified in the Chapter specifications information box located in the introduction.

Summary Tables. The tables are structured in a 3-column format designed to organize the monitoring regulations in a concise manner. The first column provides general information on the topic to be covered in the table. This includes the title of the regulated unit, purpose of the monitoring requirements, references from the CFR, etc. Column two specifies requirements faced

by the owner or operator. Column three identifies the requirements of the Regional Administrator.

Cross References:

The Handbook uses two methods of cross referencing citations within the summary tables. Monitoring requirements referencing the CFR will identify the title of the citation parenthetically and in italicized text, directly after the citation. For example, if 40 CFR 141.62 is referenced within the text of the summary table for groundwater monitoring of sodium, the reference will appear as 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)*. Please note, however, that if the reference is to 40 CFR 141.62(c), the referenced title would remain as shown above because titles often are not provided for subsections.

References of previous or upcoming summary table information will be indicated by referencing the paragraph letter and or number in unmarked text. If the reference is to the same column, the citation will be listed followed by the words "of this section" or "above". If the reference is to another column, the citation will be listed with the title of the column heading or informational category where the reference can be found.

INTRODUCTION

PURPOSE:

Environmental monitoring is "the collection and analysis of samples or direct measurements of environmental media."[1] Monitoring point or non-point source emissions and effluent releases into any given environmental medium involves a series of actions, including but not limited to the design and operation of the monitoring system, recordkeeping, and reporting of results.

This **Federal Environmental Monitoring Handbook** has been prepared by the Department of Energy (DOE), Office of Environmental Policy and Assistance, RCRA/CERCLA Division (EH-413) to aid DOE personnel in the identification and implementation of monitoring requirements. It provides DOE personnel with an easily accessible compilation of the Federal environmental monitoring requirements which may impact DOE operations and activities. DOE personnel are reminded that this Handbook is intended to be used in concert with, and not as a substitute for, the Code of Federal Regulations (CFR), *Federal Register* (*FR*), and other applicable regulatory documents.

MANUAL ORGANIZATION:

This Handbook is organized by sections as follows:

- Air
- Surface Water
- Drinking Water
- Groundwater
- Soil
- Appendices

Each chapter consists of an introduction to the particular medium followed by regulatory summary tables that outline the monitoring requirements. The introduction also provides any background information on the statutes that specify monitoring regulations for the medium.

The appendices of this guidance manual provide supplemental information. Appendix A lists telephone numbers and operating hours of the Federally sponsored Hotlines. Appendix B is a compilation of the Federal regulations that were referenced for this handbook. Appendix C is a

[1] U.S. Department of Energy Order 5400.1

listing of the most important regulated radionuclides for air emissions. Appendix D is a listing of the Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) for drinking water.

ASSISTANCE:

EH-413 recognizes that because monitoring requirements vary widely, implementing a monitoring program which responds to all of the mandated requirements demands careful management. DOE staff who require further guidance concerning monitoring may contact the Office of Environmental Policy and Assistance (EH-41) at (202) 586-6374. In addition, there are several Federally-sponsored Hotlines with toll-free telephone numbers. Applicable Hotline numbers are listed in each chapter and are summarized in Appendix A.

MEDIUM: AIR

As stated in the introduction to this manual, air emission monitoring shall be conducted in accordance with the requirements of applicable Federal, State, and local regulations authorized by the Clean Air Act (CAA) and the Resource Conservation and Recovery Act (RCRA). Section 118 of the CAA specifically addresses the control of airborne pollution from Federal facilities. Section 3004(n) of RCRA requires EPA to develop standards that control air emissions from certain types of units located at hazardous waste generator and treatment, storage, and disposal facilities (TSDFs). Federal facilities must comply with the requirements of the CAA and RCRA in the same manner and to the same extent as non-governmental entities.

Air emission monitoring at facilities owned or operated by DOE is addressed in DOE Order 5400.1, General Environmental Protection Program.

Airborne radiation and radioactive materials discharged from DOE facilities shall comply with the requirements of 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants. Further, for those radioactive materials not regulated under the Clean Air Act, DOE has established standards to meet its responsibilities under the Atomic Energy Act. DOE must also comply with the other applicable requirements of 40 CFR Part 61 for those listed pollutants which are emitted by DOE facilities. That list of seven pollutants has been greatly expanded by EPA in the CAA amendments of 1990. One hundred and eighty-nine pollutants have been added to the list, but as of yet no monitoring standards have been promulgated for these pollutants. DOE and its contractors must track the issuance of regulations for those listed pollutants that are emitted at DOE facilities.

Appendix B to 40 CFR Part 61-Test Methods, contains the test methods to be used to demonstrate compliance with the standards presented in 40 CFR Part 61. Method 114 in Appendix B to 40 CFR Part 61 is the test method to be used to measure radionuclide emissions from stationary sources. Method 15 provides the monitoring techniques which are to be used in quantifying the radon-222 emissions from underground uranium mines, uranium mill tailings piles, and wastes that emit radon. In addition to the requirements contained in this chapter, DOE facilities may need to comply with the ambient air monitoring requirement of 40 CFR Part 53, Ambient Air Monitoring Reference and Equivalent Methods.

Relative to air monitoring requirements for hazardous waste management units under RCRA, 40 CFR Parts 264/265 Subparts AA, BB, and CC are designed to control volatile organic (VO) emissions from certain process vents; equipment leaks; and tanks, surface impoundments, and containers, respectively. In some cases, these regulations rely on and incorporate by reference test methods codified under CAA authority (e.g., Method 21 of 40 CFR Part 60, Appendix A).

For additional assistance, DOE staff and contractors who have questions concerning monitoring of air emissions may contact the Office of Environmental Policy and Assistance, Air/Water/Radiation Division (EH-412) at (202) 586-2409 or RCRA/CERCLA Division (EH-413) at (202) 586-6374.

Air Monitoring Requirements

Regulated Unit:
Any stationary source with an affected facility for which construction or modification commenced after the date of publication of an applicable standard under 40 CFR Part 60. An example of such an affected facility is a storage vessel for petroleum liquids.

Regulated Contaminant
Volatile organic compounds, nitrogen oxides, sulfur dioxide (SO_2), particulate matter, fluorides, etc.

Purpose:
Provides that all continuous monitoring systems (CMS) required under applicable subparts {of 40 CFR Part 60} shall be subject to the provisions of {40 CFR 60.13} upon promulgation of performance specifications for CMSs under Appendix B of 40 CFR Part 60 and, if the CMS is used to demonstrate compliance with emission limits on a continuous basis, Appendix F to 40 CFR Part 60, unless otherwise specified in an applicable subpart or by the Administrator.

References:
40 CFR 60.13 Monitoring requirements.

Authority:
Section 114 of the Clean Air Act.

Responsibilities of the Owner/Operator:

A. All CMSs and monitoring devices shall be installed and operational prior to conducting performance tests under 40 CFR 60.8 *(Performance Tests*). Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the device.

B. If the owner or operator of an affected facility elects to submit continuous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under 40 CFR 60.11(e)(5) *(Compliance with Standards and Maintenance Requirements)*, he or she shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, Appendix B, of 40 CFR Part 60 before the performance test required under 40 CFR 60.8 *(Performance Tests*) is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of the COMS or continuous emission monitoring system (CEMS) during any performance test required under 40 CFR 60.8 *(Performance Tests*) or within 30 days thereafter in accordance with the applicable performance specification in Appendix B of 40 CFR Part 60. The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the Administrator under Section 114 of the {Clean Air} Act.

   1. The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under 40 CFR 60.8 and as described in 40 CFR 60.11(e)(5) shall furnish the Administrator two or, upon request, more copies of a written report of the results of the COMS performance evaluation described in paragraph B of this section at least 10 days before the performance test required under 40 CFR 60.8 *(Performance Tests*) is conducted.

Responsibilities of the Administrator:

A. After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part including, but not limited to the following:

   1. Alternative monitoring requirements when installation of a CMS or monitoring device specified by this part would not provide accurate measurements due to liquid water or other interferences caused by substances with the effluent gases.

   2. Alternative monitoring requirements when the affected facility is infrequently operated.

   3. Alternative monitoring requirements to accommodate CMSs that require additional measurements to correct for stack moisture conditions.

   4. Alternative locations for installing continuous monitoring systems or monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.

   5. Alternative methods of converting pollutant concentration measurements to units of the standards.

   6. Alternative procedures for performing daily checks of zero and span drift that do not involve use of span gases or test cells.

   7. Alternatives to the ASTM test methods or sampling procedures specified by any

Air Monitoring Requirements

Regulated Unit: Any stationary source with an affected facility for which construction or modification commenced after the date of publication of an applicable standard under 40 CFR Part 60. An example of such an affected facility is a storage vessel for petroleum liquids. (cont'd.) Regulated Contaminant Volatile organic compounds, nitrogen oxides, sulfur dioxide (SO_2), particulate matter, fluorides, etc. (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): 2. Except as provided in paragraph C of this section, the owner or operator of an affected facility shall furnish the Administrator within 60 days of completion two or, upon request, more copies of a written report of the results of the performance evaluation. C. Owners and operators of all CEMSs installed in accordance with the provisions of 40 CFR 60.13 shall check the zero (or low-level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once daily in accordance with a written procedure. The zero and span shall, as a minimum, be adjusted whenever the 24-hour zero drift or 24-hour span drift exceeds two times the limits of the applicable performance specifications in Appendix B of 40 CFR Part 60. The system must allow the amount of excess zero and span drift measured at the 24-hour interval checks to be recorded and quantified, whenever specified. For CEMSs measuring opacity of emissions, the optical surfaces exposed to the effluent gases shall be cleaned prior to performing the zero and span drift adjustments except that for systems using automatic zero adjustments. The optical surfaces shall be cleaned when the cumulative automatic zero compensation exceeds 4 percent opacity.	Responsibilities of the Administrator: subpart of 40 CFR Part 60. 8. Alternative CMSs that do not meet the design or performance requirements in Performance Specification 1, Appendix B, but adequately demonstrate a definite and consistent relationship between its measurements and the measurements of opacity by a system complying with the requirements in Performance Specification 1. The Administrator may require that such demonstration be performed for each affected facility. 9. Alternative monitoring requirements when the effluent from a single affected facility or the combined effluent from two or more affected facilities are released to the atmosphere through more than one point.

Air Monitoring Requirements

Regulated Unit: Any stationary source with an affected facility for which construction or modification commenced after the date of publication of an applicable standard under 40 CFR Part 60. An example of such an affected facility is a storage vessel for petroleum liquids. (cont'd.) Regulated Contaminant Volatile organic compounds, nitrogen oxides, sulfur dioxide (SO_2), particulate matter, fluorides, etc. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): Unless otherwise approved by the Administrator, the following procedures shall be followed for continuous monitoring systems measuring opacity of emissions. Minimum procedures shall include a method for producing a simulated zero opacity condition and an upscale (span) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of the analyzer internal optical surfaces and all electronic circuitry including the lamp and photodetector assembly. D. Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under paragraph (C) of this section, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows: 1. All CMSs referenced by {paragraph C of this section} for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period. 2. All CMSs referenced by paragraph C of this section for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period. E. All CMSs or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of CMSs contained in the applicable Performance Specifications of Appendix B of 40 CFR Part 60 shall be used.	

Regulated Unit: Any stationary source with an affected facility for which construction or modification commenced after the date of publication of an applicable standard under 40 CFR Part 60. An example of such an affected facility is a storage vessel for petroleum liquids. (cont'd.) Regulated Contaminant Volatile organic compounds, nitrogen oxides, sulfur dioxide (SO_2), particulate matter, fluorides, etc. (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): F. When the effluents from a single affected facility or two or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable CMSs on each effluent or on the combined effluent. When the affected facilities are not subject to the same emission standards, separate CMSs shall be installed on each effluent. When the effluent from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable CMS on each separate effluent unless the installation of fewer systems is approved by the Administrator. When more than one CMS is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each CMS. G. Owners or operators of all CMSs for measurement of opacity shall reduce all data to 6-minute averages and for CMSs other than opacity to 1-hour averages for time periods as defined in 40 CFR 60.2. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period. For continuous monitoring systems other than opacity, 1-hour averages shall be computed from four or more data points equally spaced over each 1-hour period. Data recorded during periods of CMS breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph. An arithmetic or integrated average of all data may be used. The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O_2 or ng/J of pollutant). All excess emissions shall be converted into units of the standard using the conversion procedures specified in the applicable subparts of 40 CFR Part 60. After conversion into units of the standard, the data may be rounded to the same number of significant digits as used in the applicable subparts to specify the emission limit (e.g., rounded to the nearest 1 percent opacity).	

Regulated Unit: Any stationary source with an affected facility for which construction or modification commenced after the date of publication of an applicable standard under 40 CFR Part 60. An example of such an affected facility is a storage vessel for petroleum liquids. (cont'd.) Regulated Contaminant Volatile organic compounds, nitrogen oxides, sulfur dioxide (SO_2), particulate matter, fluorides, etc. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): H. An alternative to the relative accuracy (RA) test specified in Performance Specification 2 of Appendix B of 40 CFR Part 60 may be requested as follows: 1. An alternative to the reference method tests for determining relative accuracy is available for sources with emission rates demonstrated to be less than 50 percent of the applicable standard. A source owner or operator may petition the Administrator to waive the relative accuracy test in Section 7 of Performance Specification 2 and substitute the procedures in Section 10 if the results of a performance test conducted according to the requirements in 40 CFR 60.8 *(Performance Tests*) or other tests performed following {the same criteria} demonstrate that the emission rate of the pollutant of interest in the units of the applicable standard is less than 50 percent of the applicable standard. For sources subject to standards expressed as control efficiency levels, a source owner or operator may petition the Administrator to waive the relative accuracy test and substitute the procedures in Section 10 of Performance Specification 2 if the control device exhaust emission rate is less than 50 percent of the level needed to meet the control efficiency requirement. The alternative procedures do not apply if the CEMS is used to determine compliance continuously with the applicable standard. The petition to waive the relative accuracy test shall include a detailed description of the procedures to be applied. Included shall be the location and procedure for conducting the alternative, the concentration or response levels of the alternative relative accuracy materials, and the other equipment checks included in the alternative procedure.	

Air Monitoring Requirements

Regulated Unit:
Electric utility steam generating units for which construction is commenced after September 18, 1994

Regulated Contaminant:
Particulate matter, sulfur dioxide, oxides of nitrogen

Purpose:
Provides the regulation of emissions of particulate matter, sulfur dioxide and oxides of nitrogen from electric utility steam generating units that are capable of combusting more than 73 megawatts heat input of fossil fuel (alone or in combination with other fuel and for which construction or modification commenced after September 18, 1978.

References:
40 CFR 60.47a Emission monitoring.

Authority:
Section 114 of the Clean Air Act.

Responsibilities of the Owner\Operator:

A. The owner or operator of an affected facility shall install, calibrate, maintain, and operate a CMS, and record the output of the system, for measuring the opacity of emissions discharged to the atmosphere, except where gaseous fuel is the only fuel combusted. If opacity interference due to water droplets exists in the stack (for example, from the use of an FGD system), the opacity is monitored upstream of the interference (at the inlet to the FGD system). If opacity interference is experienced at all locations (both at the inlet and outlet of the SO_2 control system), alternative parameters indicative of the particulate matter control system's performance are monitored (subject to the approval of the Administrator).

B. The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous monitoring system, and record the output of the system, for measuring SO_2 emissions, except where natural gas is the only fuel combusted, as follows:

   1. SO_2 emissions are monitored at both the inlet and outlet of the SO_2 control device.
   2. For a facility which qualifies under the provisions of 40 CFR 60.43a(d) (*Standard for SO_2*), SO_2 emissions are only monitored as discharged to the atmosphere.
   3. An "as fired" fuel monitoring system (upstream of coal pulverizers) meeting the requirements of Method 19 (Appendix A of 40 CFR Part 60) may be used to determine potential SO_2 emissions in place of a continuous SO_2 emission monitor at the inlet to the SO_2 control device as required under paragraph (B)(1) of this section.

C. The owner or operator of an affected facility shall install, calibrate, maintain, and operate a CMS, and record the output of the system, for measuring nitrogen oxides emissions discharged to the atmosphere.

Air Monitoring Requirements

Regulated Unit: Electric utility steam generating units for which construction is commenced after September 18, 1994 (cont'd.) Regulated Contaminant: Particulate matter, sulfur dioxide, oxides of nitrogen (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): D. The owner or operator of an affected facility shall install, calibrate, maintain, and operate a CMS, and record the output of the system, for measuring the oxygen or carbon dioxide content of the flue gases at each location where SO_2 or nitrogen oxides emissions are monitored. E. The CMSs under paragraphs B, C, and D of this section are operated and data recorded during all periods of operation of the affected facility including periods of startup, shutdown, malfunction or emergency conditions, except for CMS breakdowns, repairs, calibration checks, and zero and span adjustments. F. The owner or operator shall obtain emission data for at least 18 hours in at least 22 out of 30 successive boiler operating days. If this minimum data requirement cannot be met with a CMS, the owner or operator shall supplement emission data with other monitoring systems approved by the Administrator or the reference methods and procedures as described in paragraph H of this section. G. The 1-hour averages required under paragraph 40 CFR 60.13(h) are expressed in ng/J (lb/million Btu) heat input and used to calculate the average emission rates under 40 CFR 60.46a. The 1-hour averages are calculated using the data points required under 40 CFR 60.13(b). At least two data points must be used to calculate the 1-hour averages. H. When it becomes necessary to supplement CMS data to meet the minimum data requirements in paragraph F of this section, the owner or operator shall use the reference methods and procedures as specified in this paragraph. Acceptable alternative methods and procedures are given in paragraph J of this section.	

Air Monitoring Requirements

Regulated Unit: Electric utility steam generating units for which construction is commenced after September 18, 1994 (cont'd.) Regulated Contaminant: Particulate matter, sulfur dioxide, oxides of nitrogen (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): 1. Method 6 shall be used to determine the SO_2 concentration at the same location as the SO_2 monitor. Samples shall be taken at 60-minute intervals. The sampling time and sample volume for each sample shall be at least 20 minutes and 0.020 dscm (0.71 dscf). Each sample represents a 1-hour average. 2. Method 7 shall be used to determine the NO_x concentration at the same location as the NO_x monitor. Samples shall be taken at 30-minute intervals. The arithmetic average of two consecutive samples represents a 1-hour average. 3. The emission rate correction factor, integrated bag sampling and analysis procedure of Method 3B shall be used to determine the O_2 or CO_2 concentration at the same location as the O_2 or CO_2 monitor. Samples shall be taken for at least {30} minutes in each hour. Each sample represents a 1-hour average. 4. The procedures in Method 19 shall be used to compute each 1-hour average concentration in ng/J (1b/million Btu) heat input. I. The owner or operator shall use {the following} methods and procedures to conduct monitoring system performance evaluations under 40 CFR 60.13(c) and calibration checks under 40 CFR 60.13(d). Acceptable alternative methods and procedures are given in paragraph (j) of {40 CFR 60.47}. 1. Methods 6, 7, and 3B, as applicable, shall be used to determine O_2, SO_2, and NO_x concentrations.	

Regulated Unit: Electric utility steam generating units for which construction is commenced after September 18, 1994 (cont'd.) Regulated Contaminant: Particulate matter, sulfur dioxide, oxides of nitrogen (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): 2. SO_2 or NO_x (NO), as applicable, shall be used for preparing the calibration gas mixtures (in N_2, as applicable) under Performance Specification 2 of Appendix B of {40 CFR Part 60}. 3. For affected facilities burning only fossil fuel, the span value for a CMS for measuring opacity is between 60 and 80 percent and for a CMS measuring nitrogen oxides is determined as follows: Gas = 50 ppm Liquid = 500 ppm Solid = 100 ppm Combination = 500(x +y) + 1,000z x = fraction of total heat input derived from gaseous fossil fuel y = fraction of total heat input derived from liquid fossil fuel z = fraction of total heat input derived from solid fossil fuel 4. All span values computed under paragraph B(3) of this section for burning combinations of fossil fuels are rounded to the nearest 500 ppm. 5. For affected facilities burning fossil fuel, alone or in combination with non-fossil fuel, the span value of the sulfur dioxide CMS at the inlet to the sulfur dioxide control device is 125 percent of the maximum estimated hourly potential emissions of the fuel fired, and the outlet of the sulfur dioxide control device is 50 percent of maximum estimated hourly potential emissions of the fuel fired. J. The owner or operator may use the following as alternatives to the reference methods and procedures specified in this section:	

Air Monitoring Requirements

Regulated Unit: Electric utility steam generating units for which construction is commenced after September 18, 1994 (cont'd.) Regulated Contaminant: Particulate matter, sulfur dioxide, oxides of nitrogen (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): 1. For Method 6, Method 6A or 6B (whenever Methods 6 and 3 or 3B data are used) or 6C may be used. Each Method 6B sample obtained over 24 hours represents 24 1-hour averages. If Method 6A or 6B is used under paragraph I of this section, the conditions under 40 CFR 60.46(d)(1) apply; these conditions do not apply under paragraph H of this section. 2. For Method 7, Method 7A, 7C, 7D, or 7E may be used. If Method 7C, 7D, or 7E is used, the sampling time for each run shall be 1 hour. 3. For Method 3, Method 3A or 3B may be used if the sampling time is 1 hour. 4. For Method 3B, Method 3A may be used.	

Air Monitoring Requirements

Regulated Unit:
Storage vessels with closed vent systems

Regulated Contaminant:
Volatile organic compounds

Purpose:
Provides for monitoring of storage vessels either with:

1. a design capacity greater than or equal to 151m^3 containing a volatile organic liquid that, as stored, has a maximum true vapor pressure equal to, or greater than 5.2 kPa but less than 76.6 kPa or

2. with a design capacity greater than or equal to 75 m^3 but less than 151 m^3 containing a volatile organic liquid that, as stored, has a maximum true vapor pressure equal to or greater than 27.6 kPa but less than 76.6 kPa, and is equipped with a closed vent system and control device that meets the requirements of 60.112b (a)(3)(i) and (ii) *(Standard for Volatile Organic Liquid)*.

References:
40 CFR 60.113b Testing and procedures.

Authority:
[52 FR 11429, Apr. 8, 1987, as amended at 54 FR 32973, Aug. 11, 1989]

Responsibilities of the Owner/Operator:

A. The owner or operator of each source that is equipped with a closed vent system and control device as required in 40 CFR 60.112b (a)(3) or (b)(2) (other than a flare) is exempt from 40 CFR 60.8 *(Performance Tests)* and shall meet the following requirements.

    1. Submit for approval by the Administrator as an attachment to the notification required by 40 CFR 60.7(a)(1) *(Notification and Recordkeeping)* or, if the facility is exempt from 40 CFR 60.7(a)(1), as an attachment to the notification required by 40 CFR 60.7(a)(2), an operating plan containing the information listed below.

        a. Documentation demonstrating that the control device will achieve the required control efficiency during maximum loading conditions. This documentation is to include a description of the gas stream which enters the control device, including flow and VOC content under varying liquid level conditions (dynamic and static) and manufacturer's design specifications for the control device. If the control device or the closed vent capture system receives vapors, gases, or liquids other than fuels from sources that are not designated sources under this subpart, the efficiency demonstration is to include consideration of all vapors, gases, and liquids received by the closed vent capture system and control device. If an enclosed combustion device with a minimum residence time of 0.75 seconds and a minimum temperature of 816 degrees Celsius is used to meet the 95 percent requirement, documentation that those conditions will exist is sufficient to meet {these} requirements.

Responsibilities of the Regional Administrator:
None specified.

Air Monitoring Requirements

Regulated Unit: Storage vessels with closed vent systems (cont'd.) Regulated Contaminant: Volatile organic compounds (cont'd.)	Responsibilities of the Owner\Operator (cont'd.): b. A description of the parameter or parameters to be monitored to ensure that the control device will be operated in conformance with its design and an explanation of the criteria used for selection of that parameter (or parameters). 2. Operate the closed vent system and control device and monitor the parameters of the closed vent system and control device in accordance with the operating plan submitted to the Administrator in accordance with paragraph A(1) of this section, unless the plan was modified by the Administrator during the review process. In this case, the modified plan applies.	

Air Monitoring Requirements

Regulated Unit:
Stationary sources regulated by 40 CFR Part 61

Regulated Contaminant:
Asbestos, Beryllium, Mercury, and Radionuclides

Purpose:
To provide the requirements for monitoring of any stationary sources regulated by 40 CFR Part 61.

References:

40 CFR 61.12	Compliance with standards and maintenance requirements.
40 CFR 61.14	Monitoring requirements.

Authority:
Secs. 101, 112, 114, 116, and 301 of the Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

Responsibilities of the Owner/Operator:

A. The owner or operator of each stationary source shall maintain and operate the source, including associated equipment for air pollution control, in a manner consistent with good air pollution control practice for minimizing emissions. Any unavoidable breakdown or malfunction of the monitoring system should be repaired or adjusted as soon as practicable after its occurrence.

B. When required by the applicable subpart {of 40 CFR Part 61} (and at any other time the Administrator may require), the owner or operator of a source being monitored shall conduct a performance evaluation of the monitoring system and furnish the Administrator with a copy of a written report of the results within 60 days of the evaluation. Such a performance evaluation shall be conducted according to the applicable specifications and procedures described in the applicable subpart {of 40 CFR Part 61}.

C. The owner or operator of the source {being monitored} shall furnish the Administrator with written notification of the date of the performance evaluation at least 30 days before the evaluation is to begin.

D. When the effluents from a single source, or from two or more sources subject to the same emission standards, are combined before being released to the atmosphere, the owner/operator shall install a monitoring system on each effluent or on the combined effluent.

   If two or more sources are not subject to the same emission standards, the owner or operator shall install a separate monitoring system on each effluent, unless otherwise specified.

Responsibilities of the Administrator:

A. The Administrator's determination of whether acceptable operating and maintenance procedures are being used will be based on information which may include, but is not limited to, monitoring results, review of operating and maintenance procedures, manufacturer recommendations and specifications, and inspection of the source.

B. If, in the Administrator's judgment, an alternative means of emission limitation will achieve a reduction in emissions of a pollutant from a source at least equivalent to the reduction in emissions of that pollutant from that source achieved under any design, equipment, work practice or operational standard, the Administrator will publish in the FEDERAL REGISTER a notice permitting the use of the alternative means for purposes of compliance with the standard.

   1. The notice will restrict the permission to the source(s) or category(ies) of sources on which the alternative means will achieve equivalent emission reductions.

   2. The notice {may establish that permission for the use of alternative standards will be conditional} on requirements related to the operation and maintenance of the alternative means.

C. Monitoring shall be conducted as set forth in {40 CFR 61.14 *(Monitoring requirements)* unless the Administrator:

Air Monitoring Requirements

Regulated Unit: Stationary sources regulated by 40 CFR Part 61 (cont'd.) Regulated Contaminant: Asbestos, Beryllium, Mercury, and Radionuclides (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): If the applicable standard is a mass emission standard and the effluent from one source is released to the atmosphere through more than one point, the owner or operator shall install a monitoring system at each emission point, unless the installation of fewer systems is approved by the Administrator. E. {If the owner/operator wishes to use an alternative means to limit emissions, he or she shall,} unless otherwise specified in the applicable subpart {of 40 CFR Part 61}, submit: 1. a proposed test plan or the results of testing and monitoring, 2. a description of the procedures followed in testing or monitoring, and 3. a description of pertinent conditions during testing or monitoring. F. The owner or operator of each monitoring system shall reduce the monitoring data as specified in each applicable subpart. Monitoring data recorded during periods of unavoidable monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments shall not be included in any data average. G. The owner or operator shall maintain records of monitoring data, monitoring system calibration checks, and the occurrence and duration of any period during which the monitoring system is malfunctioning or inoperative. These records shall be maintained at the source for a minimum of 2 years and made available, upon request, for inspection by the Administrator.	Responsibilities of the Administrator (cont'd.): 1. Specifies or approves the use of the specified monitoring requirements and procedures with minor changes in methodology; or 2. Approves the use of alternatives to any monitoring requirements or procedures. D. If the Administrator finds reasonable grounds to dispute the results obtained by an alternative monitoring method, the Administrator may require the monitoring requirements and procedures specified in {paragraphs A-C of this section}.

Air Monitoring Requirements

Regulated Unit:
Listed stationary sources that emit beryllium

Regulated Contaminant:
Beryllium

Purpose:
To provide the requirements for the monitoring of beryllium from extraction plants, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

References:
40 CFR 61.30 Applicability.
40 CFR 61.34 Air Sampling.

Authority:
Secs. 101, 112, 114, 116, and 301 of the Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

Responsibilities of the Owner/Operator:

A. Stationary sources subject to 40 CFR 61.32(b) *(Emission Standard)* shall locate air sampling sites in accordance with a plan approved by the Administrator. Such sites shall be located in such a manner as is calculated to detect maximum concentrations of beryllium in the ambient air.

B. All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacement of equipment needing major repair.

C. Filters shall be analyzed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data needed to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

D. Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

Responsibilities of the Administrator:

A. {The Administrator shall approve the air sampling site plan.}

B. The Administrator may at any time require changes in, or expansion of, the sampling network.

Air Monitoring Requirements

Regulated Unit:
Wastewater treatment plant sludge incineration and drying plants

Regulated Contaminant:
Mercury

Purpose:
To regulate mercury emissions from wastewater treatment plants.

References:

40 CFR 61.55	Monitoring of emissions and operations.
40 CFR 61.53	Stack Sampling.
40 CFR 61.54	Sludge Sampling.

Authority:
Secs. 101, 112, 114, 116, and 301 of the Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

Responsibilities of the Owner/Operator:

A. All the sources for which mercury emissions exceed 1,600 g per 24-hour period, demonstrated either by stack sampling according to 40 CFR 61.53 *(Stack Sampling)* or sludge sampling according to 40 CFR 61.54 *(Sludge Sampling)*, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B to 40 CFR Part 61 or the procedures specified in 40 CFR 61.53 (d) (2) and (4). The results of monitoring shall be reported and retained according to 40 CFR 61.53(d) (5) and (6) or 40 CFR 61.54 (f) and (g).

B. Unless a waiver of emission testing is obtained under 40 CFR 61.13 *(Emission tests and waiver of emission tests)*, each owner or operator of a source subject to the standard in 40 CFR 61.52(b) *(Emission standard)* shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in 40 CFR 61.53(d) or 40 CFR 61.54.

   1. Method A in Appendix B to 40 CFR Part 61 shall be used to test emissions as follows:

      a. The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial start up date preceding the effective date.

      b. The test shall be performed within 90 days of start up in the case of a new source which did not have an initial start up date preceding the effective date.

   2. Samples shall be taken over such a period or periods as are necessary to determine accurately the maximum emissions which will occur in a 24-hour period.

Responsibilities of the Administrator:

A. {The Administrator shall inspect all records of emission test results submitted by the owner/operator.}

Air Monitoring Requirements

Regulated Unit: Wastewater treatment plant sludge incineration and drying plants (cont'd.) Regulated Contaminant: Mercury (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): No changes shall be made in the operation which would potentially increase emissions above the level determined by the most recent stack test, until the new emission level has been estimated by calculation and the results reported to the Administrator. 3. All samples shall be analyzed and mercury emissions shall be determined within 30 days after the stack test. Each determination shall be reported to the Administrator by a registered letter dispatched within 15 calendar days following the date such determination is completed. 4. Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available, for inspection by the Administrator, for a minimum of 2 years.	

Air Monitoring Requirements

Regulated Unit:
Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222

Regulated Contaminant:
See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94.

Purpose:
To monitor for radionuclides other than radon 220 and 222 (e.g., tritium) from DOE facilities.

References:

40 CFR 61.93	Emission monitoring and test procedures.
40 CFR 61.94	Compliance and reporting.

Authority:
Secs. 101, 112, 114, 116, and 301 of the Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601).

Responsibilities of the Owner/Operator:

A. To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval. DOE facilities for which the maximally exposed individual lives within 3 kilometers of all sources of emissions in the facility, may use EPA's COMPLY model and associated procedures for determining dose for purposes of compliance.

{NOTE: The emission limit for emissions of radionuclides to the ambient air from DOE facilities is 10 mrem/yr.}

B. Radionuclide emission rates from point sources (stacks or vents) shall be measured in accordance with the following requirements or other procedures for which EPA has granted prior approval:

1. Effluent flow rate measurements shall be made using the following methods:

   a. Reference Method 2 of Appendix A to 40 CFR Part 60 shall be used to determine velocity and volumetric flow rates for stacks and large vents.

   b. Reference Method 2A of Appendix A to 40 CFR Part 60 shall be used to measure flow rates through pipes and small vents.

   c. The frequency of the flow rate measurements shall depend upon the variability of the effluent flow rate. For variable flow rates, continuous or frequent flow rate measurements shall be made. For relatively constant flow rates, only periodic measurements are necessary.

Responsibilities of the Administrator:
None specified.

Air Monitoring Requirements

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. Radionuclides shall be directly monitored or extracted, collected, or measured using the following methods: a. Reference Method 1 of Appendix A 40 CFR Part 60 shall be used to select monitoring or sampling sites. b. The effluent stream shall be directly monitored continuously with an in-line detector or representative samples of the effluent stream shall be withdrawn continuously from the sampling site following the guidance presented in ANSI N13.1-1969 "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities" (including the guidance presented in Appendix A of ANSI N13.1) (incorporated by reference -- see 40 CFR 61.18). The requirements for continuous sampling are applicable to batch processes when the unit is in operation. Periodic sampling (grab samples) may be used only with EPA's prior approval. Such approval may be granted in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. In such cases, grab samples shall be collected with sufficient frequency so as to provide a representative sample of the emissions. c. Radionuclides shall be collected and measured using procedures based on the principles of measurement described in Appendix B {of 40 CFR Part 61}, Method 114. Use of methods based on principles of measurement different from those described in Appendix B, Method 114 must have prior approval from the Administrator.	

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): EPA reserves the right to approve measurement procedures. d. A quality assurance program shall be conducted that meets the performance requirements described in Appendix B to 40 CFR Part 61, Method 114. *{Note: On April 24, 1995, the EPA approved, the use of an alternative monitoring method (The Shrouded Probe) for collection of gaseous and particulate emissions at DOE facilities}.* 3. When it is impractical to measure the effluent flow rate at an existing source in accordance with the requirements of paragraph {B(1) of this section} or to monitor or sample an effluent stream at an existing source in accordance with the site selection and sample extraction requirements of paragraph {B(2) of this section}, the facility owner or operator may use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures provided that: a. It can be shown that the requirements of paragraph {B(1) or (2) of this section} are impractical for the effluent stream. b. The alternative procedure will not significantly underestimate the emissions. c. The alternative procedure is fully documented. d. The owner or operator has received prior approval from EPA.	

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 4. Radionuclide emission measurements in conformance with the requirements of {paragraph B of this section} shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1 percent of the standard. All radionuclides which could contribute greater than 10 percent of the potential effective dose equivalent for a release point shall be measured. With prior EPA approval, DOE may determine these emissions through alternative procedures. For other release points which have a potential to release radionuclides into the air, periodic confirmatory measurements shall be made to verify the low emissions. C. To determine whether a release point is subject to the emission measurement requirements of {paragraph B of this section}, it is necessary to evaluate the potential for radionuclides into the air for the purposes of this section, the estimated radionuclide release rates shall be based on the discharge of the effluent stream that would result if all pollution control equipment did not exist, but the facilities' operations were otherwise normal. D. Environmental measurements of radionuclide air concentrations at critical receptor locations may be used as an alternative to air dispersion calculations in demonstrating compliance with the standard if the owner or operator meets the following criteria: 1. The air at the point of measurement shall be continuously sampled for collection of radionuclides.	

Air Monitoring Requirements

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. Those radionuclides released from the facility, which are the major contributors to the effective dose equivalent must be collected and measured as part of the environmental measurement program. 3. Radionuclide concentrations which would cause an effective dose equivalent of 10 percent of the standard shall be readily detectable and distinguishable from background. 4. Net measured radionuclide concentrations shall be compared to the concentration levels in Table 2 of 40 CFR Part 61, Appendix E, to determine compliance with the standard. In the case of multiple radionuclides being released from a facility, compliance shall be demonstrated if the value for all radionuclides is less than the concentration level in Table 2, and the sum of the fractions that result when each measured concentration value is divided by the value in Table 2 for each radionuclide is less than 1. 5. A quality assurance program shall be conducted that meets the performance requirements described in Appendix B, to 40 CFR Part 61, Method 114. 6. Use of environmental measurements to demonstrate compliance with the standard is subject to prior approval of EPA. Applications for approval shall include a detailed description of the sampling and analytical methodology and show how the above criteria will be met.	

Air Monitoring Requirements

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): E. Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any offsite point where there is a residence, school, business, or office. The owners or operators of each facility shall submit an annual report to both EPA headquarters and the appropriate regional office by June 30 which includes the results of the monitoring as recorded in DOE's Effluent Information System and the dose calculations required by 40 CFR 61.93(a) *(Emission monitoring and test procedures)* for the previous calendar year. F. In addition to the requirements of {paragraph E of this section}, an annual report shall include the following information: 1. The name and location of the facility. 2. A list of the radioactive materials used at the facility. 3. A description of the handling and processing that the radioactive materials undergo at the facility. 4. A list of the stacks or vents or other points where radioactive materials are released to the atmosphere. 5. A description of the effluent controls that are used on each stack, vent, or other release point, and an estimate of the efficiency of each control device. 6. Distances from the points of release to the nearest residence, school, business or office, and the nearest farms producing vegetables, milk, and meat.	

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 7. The values used for all other user-supplied input parameters for the computer models (e.g., meteorological data) and the source of these data. 8. A brief description of all construction and modifications which were completed in the calendar year for which the report is prepared, but for which the requirement to apply for approval to construct or modify was waived under 40 CFR 61.96 *(Applications to construct or modify)* and associated documentation developed by DOE to support the waiver. EPA reserves the right to require that DOE send to EPA all the information that normally would be required in an application to construct or modify, following receipt of the description and supporting documentation. 9. Each report shall be signed and dated by a corporate officer or public official in charge of the facility and contain the following declaration immediately above the signature line: "I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 U.S.C. 1001."	

Regulated Unit: Department of Energy (DOE) facilities that emit any radionuclides other than radon-220 and 222 (cont'd.) Regulated Contaminant: See Appendix C of this document for a list of the most important radionuclides regulated by 40 CFR 61.94 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): G. If the facility is not in compliance with the emission limits of 40 CFR 61.92 (*Standard*) in the calendar year covered by the report, then the facility must commence reporting to the Administrator on a monthly basis the information listed in paragraph {F of this section}, for the preceding month. These reports will start the month immediately following the submittal of the annual report for the year in noncompliance and will be due 30 days following the end of each month. This increased level of reporting will continue until the Administrator has determined that the monthly reports are no longer necessary. In addition to all the information required in paragraph {F of this section}, monthly reports shall also include the following information: 1. All controls or other changes in operation of the facility that will be or are being installed to bring the facility into compliance. 2. If the facility is under a judicial or administrative enforcement decree, the report will describe the facilities performance under the terms of the decree. H. In those instances where the information requested is classified, such information will be made available to EPA separate from the report and will be handled and controlled according to applicable security and classification regulations and requirements.	

Air Monitoring Requirements

Regulated Unit:
Asbestos conversion operations

Regulated Contaminant:
Asbestos

Purpose:
To provide for the monitoring of asbestos conversion operations.

References:
40 CFR 61.155 Standard for operations that convert asbestos-containing waste material into asbestos-free material.

Authority:
42 U.S.C. 7401, 7412, 7414, 7416, 7601.

Responsibilities of the Owner/Operator:

A. Each owner or operator of an operation that converts regulated asbestos containing material and asbestos-containing waste material into...asbestos-free material shall:

   1. During the initial 90 days of operation, continuously monitor and log the operating parameters identified during start-up performance tests that are intended to ensure the production of nonasbestos (asbestos-free) output material.

   2. Monitor input materials to ensure that they are consistent with the test feed materials described during start-up performance tests in paragraph B(1) of this section.

   3. Collect and analyze samples, taken as 10-day composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of all output material for the presence of asbestos. Composite samples may be for fewer than 10 days. Transmission electron microscopy shall be used to analyze the output material for the presence of asbestos. During the initial 90-day period, all output materials must be stored on-site until analysis shows the material to be asbestos-free or disposed of as asbestos-containing waste material according to 40 CFR 61.150 *(Standard for waste disposal for manufacturing, fabricating, demolition, renovation, and spraying operations)*.

B. After the initial 90 days of operation,

   1. Continuously monitor and record the operating parameters identified during start-up performance testing and any subsequent performance testing.

Responsibilities of the Regional Administrator:
None specified.

Regulated Unit: Asbestos conversion operations (cont'd.) Regulated Contaminant: Asbestos (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): Any output produced during a period of deviation from the range of operating conditions established to ensure the production of nonasbestos (asbestos-free) output materials shall be: a. Disposed of as asbestos-containing waste material according to {40 CFR} 61.150 *(Standard for Water Disposal for Manufacturing, Fabricating, Demolition, Renovation, and Spraying Operations)*, or b. Recycled as waste feed during process operation within the established range of operating conditions, or stored temporarily on-site in a leak-tight container until analyzed for asbestos content. Any product material that is not asbestos-free shall be either disposed of as asbestos-containing waste material or recycled as waste feed to the process. 2. Collect and analyze monthly composite samples (one 200-gram (7-ounce) sample collected every 8 hours of operation) of the output material. Transmission electron microscopy shall be used to analyze the output material for the presence of asbestos. 3. Discharge no visible emissions to the outside air from any part of the operation, or use the methods specified by 40 CFR 61.152 *(Air Cleaning)* to clean emissions containing particulate asbestos material before they escape to, or are vented to, the outside air. 4. Maintain records on-site and include the following information:	

Air Monitoring Requirements

Regulated Unit: Asbestos conversion operations (cont'd.) Regulated Contaminant: Asbestos (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): a. Results of start-up performance testing and all subsequent performance testing, including operating parameters, feed characteristic, and analyses of output materials. b. Results of the composite analyses required during the initial 90 days of operation under 40 CFR 61.155(c). c. Results of the monthly composite analyses required under 40 CFR 61.155(d). d. Results of continuous monitoring and logs of process operating parameters required under 40 CFR 61.155 (c) and (d). 5. The information on waste shipments received as required in 40 CFR 61.154(e). 6. For output materials where no analyses were performed to determine the presence of asbestos, record the name and location of the purchaser or disposal site to which the output materials were sold or deposited, and the date of sale or disposal. 7. Retain records required by {paragraph B(4) of this section} for at least 2 years.	

Air Monitoring Requirements

Regulated Unit:
Thermal processing units used to process solid wastes

Regulated Contaminant:
In this section, the monitoring is for fly ash and bottom ash, not a specific chemical or other pollutant.

References:
40 CFR 240.211 Records.
40 CFR 240.211-1, 2 and 3 Requirement.

Authority:
Sec. 209(a) of the Solid Waste Disposal Act of 1965 (Pub. L. 89-272); as amended by the Resource Recovery Act of 1970 (Pub. L. 91-512).

Responsibilities of the Owner/Operator:

A. The owner/operator of the thermal processing facility shall provide records and monitoring data as required by the responsible agency. (Continuously recording instrumentation should be used as much as possible.)

B. Extensive monitoring and recordkeeping should be practiced during the first 12 to 18 months of operation of a new or renovated facility, during periods of high air pollution, and during periods of upset conditions at the facility.

   During other periods of more normal operation of the facility, less extensive monitoring and record keeping may be practiced if approved by the responsible agency.

C. Operating records should be kept in a daily log and should include as a minimum:

   1. The total weight and volume (truck capacities may be used for volume determination) of solid waste received during each shift, including the number of loads received, the ownership or specific identity of delivery vehicles, the source and nature of the solid wastes accepted.

   2. Furnace and combustion chamber temperatures recorded at least every 60 minutes and as changes are made, including explanations for prolonged, abnormally high and low temperatures.

   3. Rate of operation, such as grate speed.

   4. Overfire and underfire air volumes and pressure and distribution recorded at least every 60 minutes and as changes are made.

Responsibilities of the Regional Administrator:
None specified.

Air Monitoring Requirements

Regulated Unit: Thermal processing units used to process solid wastes (cont'd.) Regulated Contaminant: In this section, the monitoring is for fly ash and bottom ash, not a specific chemical or other pollutant. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 5. Weights of bottom ash, grate siftings, and fly ash, individually or combined, recorded at intervals appropriate to normal facility operation. 6. Estimated percentages of unburned material in the bottom ash. 7. Water used on each shift for bottom ash quenching and scrubber operation. Representative samples of process waters should be collected and analyzed as recommended by the responsible agency. 8. Power produced and utilized each shift. If steam is produced, quality, production totals and consumption rates should be recorded. 9. Auxiliary fuel used each shift. 10. Gross calorific value of daily representative samples of bottom ash, grate siftings, and fly ash. (Sampling time should be varied so that all shifts are monitored on a weekly basis. 11. Emission measurements and laboratory analyses required by the responsible agency. 12. Complete records of monitoring instruments. 13. Problems encountered and methods of solution. D. An annual report should be prepared which includes at least the following information: 1. Minimum, average, and maximum daily volume and weight of waste received and processed, summarized on a monthly basis.	

Air Monitoring Requirements

Regulated Unit: Thermal processing units used to process solid wastes (cont'd.) Regulated Contaminant: In this section, the monitoring is for fly ash and bottom ash, not a specific chemical or other pollutant. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. A summary of the laboratory analyses including at least monthly averages. 3. Number and qualifications of personnel in each job category; total manhours per week; number of State certified or licensed personnel; staffing deficiencies; and serious injuries, their cause and preventive measures instituted. 4. An identification and brief discussion of major operational problems and solutions. 5. Adequacy of operation and performance with regard to environmental requirements, the general level of housekeeping and maintenance, testing and reporting proficiency, and recommendations for corrective actions. 6. A copy of all significant correspondence, reports, inspection reports, and any other communications from enforcement agencies. E. Methodology for evaluating the facility's performance should be developed. Evaluation procedures recommended by the U.S. Environmental Protection Agency should be used whenever possible.	

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations at facilities that treat, store, or dispose of hazardous waste having organic concentrations of at least 10 parts per million by weight (ppmw). Regulated Contaminant: Volatile organic air emissions. Purpose: Provides for monitoring of process vents to control organic emissions from affected operations conducted in (1) a unit that is subject to the permitting requirements of 40 CFR Part 270; (2) a unit (including a hazardous waste recycling unit) that is not exempt from permitting under the provisions of 40 CFR 262.34(a) (i.e., a HW recycling unit that is not a 90-day tank or container) and that is located at a hazardous waste management facility otherwise subject to the permitting requirements of 40 CFR Part 270; or (3) a unit that is exempt from permitting under the provisions of 40 CFR 262.34(a) (i.e., a "90-day" tank or container) and is not a recycling unit under the provisions of 40 CFR 261.6. References: 40 CFR Part 264 or 265, Subpart AA. Authority: Sec. 3004(n) of the Solid Waste Disposal Act of 1965 (Pub. L. 89-272) as amended both by the Resource Conservation and Recovery Act of 1976, and the Hazardous and Solid Waste Amendments of 1984.	Responsibilities of the Owner/Operator: A. The owner or operator of an affected facility shall monitor and inspect each control device to ensure proper operation and maintenance of the control device by implementing the following requirements: 1. Install, calibrate, maintain, and operate according to the manufacturer's specifications a flow indicator that provides a record of vent stream flow from each affected process vent to the control device at least once every hour. The flow indicator sensor shall be installed in the vent stream at the nearest feasible point to the control device inlet but before the point at which the vent streams are combined. 2. Install, calibrate, maintain, and operate according to the manufacturer's specifications a device to continuously monitor control device operation as specified below: a. For a thermal vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in degrees Celsius (deg. C) or ±0.5 deg. C, whichever is greater. The temperature sensor shall be installed at a location in the combustion chamber downstream of the combustion zone. b. For a catalytic vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature at two locations and have an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. One temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed outlet.	Responsibilities of the Administrator: The Regional Administrator may request that closed-vent system components or connections be monitored at other times in addition to annually, using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that the components or connections operate with no detectable emissions.

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): c. For a flare, a heat sensing monitoring device equipped with a continuous recorder that indicates the continuous ignition of the pilot flame. Also, a flare shall: i. be designed for and operated with no visible emissions as determined by Reference Method 22 in 40 CFR Part 60, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. The observation period is 2 hours and shall be used according to Method 22, ii. be steam-assisted or nonassisted flare and shall be designed for and operated with an actual exit velocity that is determined by dividing the volumetric flow rate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D in 40 CFR Part 60 as appropriate, by the unobstructed (free) cross-sectional area of the flare tip, of less than 18.3 m/s (60 ft/s), except as provided in paragraphs 40 CFR 264/265(d)(4)(ii) and (iii). d. For a boiler or process heater having a design heat input capacity less than 44 MW, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. The temperature sensor shall be installed at a location in the furnace downstream of the combustion zone. e. For a boiler or process heater having a design heat input capacity greater than or equal to 44 MW, a monitoring device equipped with a continuous recorder to measure a parameter(s) that indicates good combustion operating practices are being used.	

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): f. For a condenser, either: (i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the condenser, or (ii) A temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature with an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser exit (i.e., product side). g. For a carbon adsorption system that regenerates the carbon bed directly in the control device such as a fixed-bed carbon adsorber, either: (i) A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the carbon bed, or (ii) A monitoring device equipped with a continuous recorder to measure a parameter that indicates the carbon bed is regenerated on a regular. predetermined time cycle. 3. Inspect the readings from each monitoring device required above [paragraphs (1) and (2)] at least once each operating day to check control device operation and, if necessary, immediately implement the corrective measures necessary to ensure the control device operates in compliance. B. An owner or operator of an affected facility using a carbon adsorption system such as a carbon canister that does not	

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): regenerate the carbon bed directly onsite in the control device shall replace the existing carbon in the control device with fresh carbon on a regular basis by using one of the following procedures: 1. Monitor the concentration level of the organic compounds in the exhaust vent stream from the carbon adsorption system on a regular schedule, and replace the existing carbon with fresh carbon immediately when carbon breakthrough is indicated. The monitoring frequency shall be daily or at an interval no greater than 20 percent of the time required to consume the total carbon working capacity established as a requirement of 40 CFR 264.1035(b)(4)(iii)(G) or 265.1035(b)(4)(iii)(G), whichever is longer. 2. Replace the existing carbon with fresh carbon at a regular, predetermined time interval that is less than the design carbon replacement interval established as a requirement of 40 CFR 264.1035(b)(4)(iii)(G) or 265.1035(b)(4)(iii)(G). C. An alternative operational or process parameter may be monitored if it can be demonstrated that another parameter will ensure that the control device is operated in conformance with these standards and the control device's design specifications. D. An owner or operator of an affected facility seeking to comply with the provisions of this part by using a control device other than a thermal vapor incinerator, catalytic vapor incinerator, flare, boiler, process heater, condenser, or carbon adsorption system is required to develop documentation including sufficient information to describe the control device operation and identify the process parameter or parameters that indicate proper operation and maintenance of the control device. E. A closed-vent system shall meet either of the following design requirements:	

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): 1. A closed-vent system shall be designed to operate with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background as determined by the procedure in 40 CFR 264.1034(b) or 265.1034(b), and by visual inspections; or 2. A closed-vent system shall be designed to operate at a pressure below atmospheric pressure. The system shall be equipped with at least one pressure gauge or other pressure measurement device that can be read from a readily accessible location to verify that negative pressure is being maintained in the closed-vent system when the control device is operating. G. The owner or operator of an affected facility shall monitor and inspect each closed-vent system required to comply with this section to ensure proper operation and maintenance of the closed-vent system by implementing the following requirements: 1. Each closed-vent system that is designed to operate with no detectable emissions shall be inspected and monitored in accordance with the following requirements: a. An initial leak detection monitoring of the closed-vent system shall be conducted by the owner or operator of an affected facility on or before the date that the system becomes subject. The owner or operator of an affected facility shall monitor the closed-vent system components and connections using the procedures specified in 40 CFR 264.1034(b)/265.1034(b) to demonstrate that the closed-vent system operates with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background.	

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): b. After initial leak detection monitoring, the owner or operator of an affected facility shall inspect and monitor the closed-vent system as follows: i. Closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted and gasketed ducting flange) shall be visually inspected at least once per year to check for defects that could result in air pollutant emissions. The owner or operator of an affected facility shall monitor a component or connection using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that it operates with no detectable emissions following any time the component is repaired or replaced (e.g., a section of damaged hard piping is replaced with new hard piping) or the connection is unsealed (e.g., a flange is unbolted). ii. Closed-vent system components or connections other than those specified above shall be monitored annually and at other times as requested by the Regional Administrator, except as provided for in paragraph (o) of this section, using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that the components or connections operate with no detectable emissions. iii. In the event that a defect or leak is detected, the owner or operator of an affected facility shall repair the defect or leak in accordance with the above requirements. c. The owner or operator of an affected facility shall maintain a record of the inspection and	

Air Monitoring Requirements

Regulated Unit: Process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations that manage hazardous wastes at facilities which treat, store, or dispose of hazardous waste having organic concentrations of at least 10 ppmw (cont'd.). Regulated Contaminant: Volatile organic air emissions. References: 40 CFR Part 264 or 265, Subpart AA.	Responsibilities of the Owner/Operator (cont'd.): monitoring in accordance with the record keeping requirements specified in 40 CFR 264 or 265. 2. Each closed-vent system that is designed to operate at a pressure below atmospheric pressure shall be inspected and monitored in accordance with the following requirements: a. The closed-vent system shall be visually inspected by the owner or operator of an affected facility to check for defects that could result in air pollutant emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork or piping or loose connections. b. The owner or operator of an affected facility shall perform an initial inspection of the closed-vent system on or before the date that the system becomes subject to this section. Thereafter, the owner or operator of an affected facility shall perform the inspections at least once every year. c. In the event that a defect or leak is detected, the owner or operator of an affected facility shall repair the defect in accordance with the requirements of paragraph (l)(3) of this section. d. The owner or operator of an affected facility shall maintain a record of the inspection and monitoring in accordance with the record keeping requirements specified in 40 CFR 264.1035 or 265.1035.	

Air Monitoring Requirements

Regulated Unit: Equipment that contains or contacts hazardous wastes (with organic concentrations of at least 10 percent by weight) at facilities that treat, store, or dispose of hazardous wastes (except as provided in 40 CFR 264.1 or 265.1). Regulated Contaminant: Air emission leaks of organic compounds from equipment that contains or contacts hazardous wastes. Purpose: Provides for monitoring at a unit subject to the permitting requirements of 40 CFR Part 270; or at a unit (including a hazardous waste recycling unit) that is not exempt from permitting under the provisions of 40 CFR 262.34(a) (i.e., a hazardous waste recycling unit that is not a "90-day" tank or container) and that is located at a hazardous waste management facility otherwise subject to the permitting requirements of 40 CFR Part 270; or at a unit that is exempt from permitting under the provisions of 40 CFR 262.34(a). References: 40 CFR Part 264 or 265, Subpart BB. Authority: Sec. 3004(n) of the Solid Waste Disposal Act of 1965 (Pub. L. 89-272) as amended both by the Resource Conservation and Recovery Act of 1976, and the Hazardous and Solid Waste Amendments of 1984.	Responsibilities of the Owner/Operator: A. Each pump in light liquid service shall be monitored monthly to detect leaks by the methods specified in Reference Method 21 in 40 CFR 60, except as provided in 40 CFR 264.1052(d), (e), and (f) and 265.1052(d), (e), and (f). B. No later than 5 calendar days after a pressure release from a pressure relief device in gas/vapor service, the pressure relief device shall be monitored to confirm the condition of no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background as measured by the method specified in 40 CFR 264.1063(c) or 265.1063(c). C. Each valve in gas/vapor or light liquid service shall be monitored monthly to detect leaks by the methods specified in Reference Method 21 in 40 CFR 60,except as provided in 40 CFR 264.1052(d), (e), and (f) or 265.1052(d), (e), and (f), and 40 CFR 264.1061 and 264.1062 or 40 CFR 265.1061 and 265.1062. Any valve for which a leak is not detected for two successive months may be monitored the first month of every succeeding quarter, beginning with the next quarter, until a leak is detected. If a leak is detected, the valve shall be monitored monthly until a leak is not detected for two successive months. Any valve that is designated, as described in 40 CFR 264.1064(h)(1) or 265.1064(h)(1), as an unsafe-to-monitor valve is exempt if: 1. The owner or operator of the valve determines that the valve is unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying. 2. The owner or operator of the valve adheres to a written plan that requires monitoring of the valve as frequently as practicable during safe-to-monitor times. 3. The owner or operator of the valve determines that the valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface.	Responsibility of the Administrator: The Regional Administrator will specify the dates by which a semiannual report shall be submitted by owners and operators of affected facilities which will include information on the dates when the control device exceeded or operated outside of the design specifications as indicated by the control device monitoring required by 40 CFR 264.1060 or 265.1060 and not corrected within 24 hours, the duration and cause of each exceedance, and any corrective measures taken.

Air Monitoring Requirements

Regulated Unit: Equipment that contains or contacts hazardous wastes (with organic concentrations of at least 10 percent by weight) at facilities that treat, store, or dispose of hazardous wastes (cont'd.). Regulated Contaminant: Air emission leaks of organic compounds. Reference: 40 CFR Part 264 or 265, Subpart BB.	Responsibilities of the Owner/Operator (cont'd.): 4. The hazardous waste management unit within which the valve is located was in operation before June 21, 1990. 5. The owner or operator of the valve follows a written plan that requires monitoring of the valve at least once per calendar year. A log will be kept in the facility operating record and will record the identification numbers for valves that are designated as unsafe to monitor, an explanation for each valve stating why the valve is unsafe to monitor, and the plan for monitoring each valve. D. Pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service, and flanges and other connectors shall be monitored within 5 days by the method specified in Reference Method 21 in 40 CFR 60 if evidence of a potential leak is found by visual, audible, olfactory, or any other detection method; or an instrument reading of 10,000 ppm or greater is measured; or a leak is detected. Any connector that is inaccessible or is ceramic or ceramic-lined (e.g., porcelain, glass, or glass-lined) is exempt from monitoring. E. An owner or operator of an affected facility may elect to have all valves within a hazardous waste management unit comply with an alternative standard for valves in gas/vapor service or in light liquid service that allows no greater than 2 percent of the valves to leak. If the percentage of valves leaking is greater than 2 percent, the owner or operator of an affected facility shall monitor monthly in compliance with the requirements in 40CFR 264.1057 or 265.1057, but may again elect to use this alternative standard after meeting the requirements of 40 CFR 264.1057(c)(1) or 265.1057(c)(1). A schedule of monitoring and the percent of valves found leaking during each monitoring period shall be recorded in the facility operating record.	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers for which hazardous waste entering the unit has an average volatile organic (VO) concentration at the point of waste origination equal to or greater than 500 parts per million by weight (ppmw)--except as provided in 40 CFR 264/265.1, 40 CFR 264/265.1080(b), and 40 CFR 264/265.1083(c). Regulated Contaminant: Volatile organic (VO) emissions. Purpose: Provides for monitoring of air emission control devices and equipment at units subject to 40 CFR 264/265 Subpart I [except small quantity generators (SQGs)], Subpart J (except SQGs subject to 265.201 only), and Subpart K except as provided in 40 CFR 264/265.1080(b) and 40 CFR 264/265.1083(c). References: 40 CFR 264.1084(d) and 265.1084(d) Monitoring to determine "no detectable organic emissions from potential leak interfaces.	Responsibilities of the Owner/Operator: A. Procedure for determining ***no detectable organic emissions*** for the purpose of complying with this subpart: 1. The test shall be conducted in accordance with the procedures specified in Method 21 of 40 CFR part 60, appendix A. Each potential leak interface (i.e., a location where organic vapor leakage could occur) on the cover and associated closure devices shall be checked. Potential leak interfaces that are associated with covers and closure devices include, but are not limited to: The interface of the cover and its foundation mounting; the periphery of any opening on the cover and its associated closure device; and the sealing seat interface on a spring-loaded pressure relief valve. 2. The test shall be performed when the unit contains a hazardous waste having an organic concentration representative of the range of concentrations for the hazardous waste expected to be managed in the unit. During the test, the cover and closure devices shall be secured in the closed position. 3. The detection instrument shall meet the performance criteria of Method 21 of 40 CFR part 60, appendix A, except the instrument response factor criteria in section 3.1.2(a) of Method 21 shall be for the average composition of the organic constituents in the hazardous waste placed in the waste management unit, not for each individual organic constituent. 4. The detection instrument shall be calibrated before use on each day of its use by the procedures specified in Method 21 of 40 CFR part 60, Appendix A.	Responsibilities of the Administrator: As an element of a RCRA Part B permit application or a RCRA permit modification request, or as part of an interim status facility inspection, the Administrator or Director shall determine whether a facility's written plan to inspect and monitor air emission control equipment: (1) complies with the applicable requirements specified in 40 CFR 264.1084 through 264.1087, and (2) has been incorporated into the facility-wide inspection plan required under 40 CFR 264.15 (see 40 CFR 264.1088 and 40 CFR 265.1089).

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Authority: Section 3004(n) of the Solid Waste Disposal Act of 1965 (Pub. L. 89-272); as amended both by the Resource Conservation and Recovery Act of 1976 and the Hazardous and Solid Waste Amendments of 1984. Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): 5. Calibration gases shall be as follows: a. Zero air (less than 10 ppmv hydrocarbon in air), and b. A mixture of methane in air at a concentration of approximately, but less than 10,000 ppmv methane or n-hexane. 6. The background level shall be determined according to the procedures in Method 21 of 40 CFR part 60, appendix A. 7. Each potential leak interface shall be checked by traversing the instrument probe around the potential leak interface as close to the interface as possible, as described in Method 21 of 40 CFR part 60, appendix A. In the case when the configuration of the cover or closure device prevents a complete traverse of the interface, all accessible portions of the interface shall be sampled. In the case when the configuration of the closure device prevents any sampling at the interface and the device is equipped with an enclosed extension or horn (e.g., some pressure relief devices), the instrument probe inlet shall be placed at approximately the center of the exhaust area to the atmosphere. 8. The arithmetic difference between the maximum organic concentration indicated by the instrument and the background level shall be compared with the value of 500 ppmv except when monitoring a seal around a rotating shaft that passes through a cover opening, in which case the comparison shall be as specified in paragraph (d)(9) of this section. If the difference is less than 500 ppmv, then the potential leak interface is determined to operate with no detectable organic emissions.	

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.). References: 40 CFR 264.1084 and 265.1085 — Monitoring of ***tank*** air emission control equipment.	Responsibilities of the Owner/Operator (cont'd.): 9. For the seals around a rotating shaft that passes through a cover opening, the arithmetic difference between the maximum organic concentration indicated by the instrument and the background level shall be compared with the value of 10,000 ppmw. If the difference is less than 10,000 ppmw, then the potential leak interface is determined to operate with no detectable organic emissions. B. The owner or operator at an affected facility who controls air pollutant emissions from a tank by venting the tank to a control device shall inspect and monitor the air emission control equipment in accordance with the following procedures: 1. The fixed roof and its closure devices shall be visually inspected by the owner or operator at an affected facility to check for defects that could result in air pollutant emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in the roof sections or between the roof and the tank wall; broken, cracked, or otherwise damaged seals or gaskets on closure devices; and broken or missing hatches, access covers, caps, or other closure devices. 2. The closed-vent system and control device shall be inspected and monitored by the owner or operator at an affected facility in accordance with the procedures that are specified under paragraphs I.1 and I.2 below. C. The owner or operator who controls air pollutant emissions by using a pressure tank shall meet the following requirements. 1. All tank openings shall be equipped with closure devices designed to operate with no detectable organic emissions as determined using the procedure specified in this section under paragraph A above.	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): D. The owner or operator who controls air pollutant emissions from a tank by using an enclosure vented through a closed-vent system to an enclosed combustion control device shall monitor the closed-vent system and control device as specified in this section under paragraphs I.1 and I.2 below. E. Following the initial inspection and monitoring of a tank cover as required by the applicable provisions of 40 CFR 264.1084 or 265.1085, subsequent inspection and monitoring may be performed at intervals longer than 1 year under the following special conditions: 1. In the case when inspecting or monitoring the cover would expose a worker to dangerous, hazardous, or other unsafe conditions, then the owner or operator at an affected facility may designate a cover as an "unsafe to inspect and monitor cover" and comply with all of the following requirements: a. Prepare a written explanation stating the reasons why the cover is unsafe to visually inspect or to monitor, if required. b. Develop and implement a written plan and schedule to inspect and monitor the cover, as frequently as practicable during those times when a worker can safely access the cover. c. Record in a log that is kept in the facility operating record the following information: The identification numbers for the waste management units with the covers that are designated as "unsafe to inspect and monitor" " and items E.1.a and E.1.b.	

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.). References: 40 CFR 264.1085 and 265.1086 Monitoring of ***surface impoundment*** air emission control equipment.	Responsibilities of the Owner/Operator (cont'd.): 2. "In the case when a tank is buried partially or entirely underground, an owner or operator at an affected facility is required to inspect and monitor only those portions of the tank cover and those connections to the tank (e.g., fill ports, access hatches, gauge wells, etc.) that are located on or above the ground surface." F. The owner or operator who controls organic air emissions from a surface impoundment shall monitor the air emission control equipment in accordance with the following procedures: 1. The closed-vent system and control device shall be inspected and monitored by the owner or operator in accordance with the procedures specified in this section under paragraphs I.1 and I.2 below. G. Following the initial inspection and monitoring of the cover used in a surface impoundment as required by 40 CFR 264.1085 or 265.1086, subsequent inspection and monitoring may be performed at intervals longer than 1 year in the case when inspecting or monitoring the cover would expose a worker to dangerous, hazardous, or other unsafe conditions. In this case, the owner or operator at an affected facility may designate the cover as an "unsafe to inspect and monitor cover" and comply with all of the following requirements: 1. Prepare a written explanation for the cover stating the reasons why the cover is unsafe to visually inspect or to monitor, if required. 2. Develop and implement a written plan and schedule to inspect and monitor the cover, as frequently as practicable during those times when a worker can safely access the cover. 3. Record in a log that is kept in the facility operating record the identification numbers for the waste	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.). References: 40 CFR 264.1086 and 265.1087 — Monitoring of ***Container*** Level 2 and Level 3 air emission controls.	Responsibilities of the Owner/Operator (cont'd.): management units with the covers that are designated as "unsafe to inspect and monitor" as well as information required under paragraphs G.1. and G.2 above. H. The owner or operator shall control air pollutant emissions from each container subject to this section in accordance with the following requirements, as applicable to the container. 1. Container Level 2 standards. A container using Container Level 2 controls is one of the following: a. A container that operates with no detectable organic emissions as defined in §265.1081 and determined in accordance with the procedure specified in this section under paragraph A above. b. A container that has been demonstrated within the preceding 12 months to be vapor-tight by using 40 CFR part 60, Appendix A, Method 27 as follows: i. The test shall be performed in accordance with Method 27 of 40 CFR part 60, Appendix A. ii. A pressure measurement device shall be used that has a precision of ±2.5 mm water and that is capable of measuring above the pressure at which the container is to be tested for vapor tightness. iii. If the test results determined by Method 27 indicate that the container sustains a pressure change less than or equal to 750 Pascals within 5 minutes after it is pressurized to a minimum of 4,500 Pascals, then the container is determined to be vapor-tight, relief valves, and other fittings used for safety purposes are not considered to be bypass devices.	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.) Regulated Contaminant: VO emissions (cont'd.). References: 40 CFR 264.1087 and 265.1088 — Monitoring of closed-vent systems and control devices.	Responsibilities of the Owner/Operator (cont'd.): 2. An owner and operator at an affected facility using Container Level 3 air emission controls (i.e., a container that is vented directly through a closed-vent system to a control device, or that is vented inside an enclosure which is exhausted through a closed-vent system to a control device) shall inspect and monitor the closed-vent systems and control devices as specified in this section under paragraphs I.1 and I.2 below. I. This section applies to each closed-vent system and control device installed and operated by the owner or operator to control air emissions from hazardous waste tanks, surface impoundments, and containers under Subpart CC. The closed-vent system and control device shall be inspected and monitored by the owner or operator in accordance with the procedures specified in 40 CFR 265.1033(f)(2) [Section I.1 below] and 40 CFR 265.1033(k) [Section I.2 below]. The readings from each monitoring device required by 40 CFR 265.1033(f)(2) [Section I.1 below] shall be inspected at least once each operating day to check control device operation. Any necessary corrective measures shall be immediately implemented to ensure the control device is operated in compliance with the requirements of this section. 1. The owner or operator of an affected facility shall monitor and inspect each control device to ensure proper operation and maintenance of the control device by implementing the following requirements: a. Install, calibrate, maintain, and operate according to the manufacturer's specifications a flow indicator that provides a record of vent stream flow from each affected process vent to the control device at least once every hour. The flow indicator sensor shall be installed in the vent stream at the nearest feasible point to the control device inlet but before the point at which the vent streams are combined.	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): b. Install, calibrate, maintain, and operate according to the manufacturer's specifications a device to continuously monitor control device operation as specified below: i. For a thermal vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in degrees Celsius (deg. C) or ±0.5 deg. C, whichever is greater. The temperature sensor shall be installed at a location in the combustion chamber downstream of the combustion zone. ii. For a catalytic vapor incinerator, a temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature at two locations and have an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. One temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed inlet and a second temperature sensor shall be installed in the vent stream at the nearest feasible point to the catalyst bed outlet. iii. For a flare, a heat sensing monitoring device equipped with a continuous recorder that indicates the continuous ignition of the pilot flame. iv. For a boiler or process heater having a design heat input capacity less than 44 MW, a temperature monitoring device equipped with a continuous recorder. The device shall have an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. The	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): temperature sensor shall be installed at a location in the furnace downstream of the combustion zone. v. For a boiler or process heater having a design heat input capacity greater than or equal to 44 MW, a monitoring device equipped with a continuous recorder to measure a parameter(s) that indicates good combustion operating practices are being used. vi. For a condenser, either: *(1)* A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the condenser, or *(2)* A temperature monitoring device equipped with a continuous recorder. The device shall be capable of monitoring temperature with an accuracy of ±1 percent of the temperature being monitored in deg. C or ±0.5 deg. C, whichever is greater. The temperature sensor shall be installed at a location in the exhaust vent stream from the condenser exit (i.e., product side). vii. For a carbon adsorption system that regenerates the carbon bed directly in the control device such as a fixed-bed carbon adsorber, either: *(1)* A monitoring device equipped with a continuous recorder to measure the concentration level of the organic compounds in the exhaust vent stream from the carbon bed, or *(2)* A monitoring device equipped with a continuous recorder to measure a	

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): parameter that indicates the carbon bed is regenerated on a regular, predetermined time cycle. 2. The owner or operator of an affected facility shall monitor and inspect each closed-vent system required to comply with this section to ensure proper operation and maintenance of the closed-vent system by implementing the following requirements: a. Each closed-vent system that is designed to operate with no detectable emissions shall be inspected and monitored in accordance with the following requirements: i. An initial leak detection monitoring of the closed-vent system shall be conducted by the owner or operator of an affected facility on or before the date that the system becomes subject. The owner or operator of an affected facility shall monitor the closed-vent system components and connections using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that the closed-vent system operates with no detectable emissions, as indicated by an instrument reading of less than 500 ppmv above background. ii. After initial leak detection monitoring, the owner or operator of an affected facility shall inspect and monitor the closed-vent system as follows: *(1)* Closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (e.g., a welded joint between two sections of hard piping or a bolted and gasketed ducting flange) shall be visually inspected at least once per year to check for defects that could result in air	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (cont'd.): pollutant emissions. The owner or operator of an affected facility shall monitor a component or connection using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that it operates with no detectable emissions following any time the component is repaired or replaced (e.g., a section of damaged hard piping is replaced with new hard piping) or the connection is unsealed (e.g., a flange is unbolted). *(2)* Closed-vent system components or connections other than those specified above shall be monitored annually and at other times as requested by the Regional Administrator, except as provided for in paragraph I.3 of this section, using the procedures specified in 40 CFR 264.1034(b) or 265.1034(b) to demonstrate that the components or connections operate with no detectable emissions. iii. The owner or operator of an affected facility shall maintain a record of the inspection and monitoring in accordance with the recordkeeping requirements specified in 40 CFR 264 or 265. b. Each closed-vent system that is designed to operate at a pressure below atmospheric pressure shall be inspected and monitored in accordance with the following requirements: i. The closed-vent system shall be visually inspected by the owner or operator of an affected facility to check for defects that could result in air pollutant emissions. Defects include, but are not limited to, visible cracks, holes, or gaps in ductwork or	

Air Monitoring Requirements

Regulated Unit: Facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers (cont'd.). Regulated Contaminant: VO emissions (cont'd.).	Responsibilities of the Owner/Operator (con't): piping or loose connections. ii. The owner or operator of an affected facility shall perform an initial inspection of the closed-vent system on or before the date that the system becomes subject to this section. Thereafter, the owner or operator of an affected facility shall perform the inspections at least once every year. iii. The owner or operator of an affected facility shall maintain a record of the inspection and monitoring in accordance with the recordkeeping requirements specified in 40 CFR 264.1035 or 265.1035. 3. Any components of a closed-vent system that are designated (by an owner or operator) as unsafe to monitor are exempt from the requirements of paragraph I.2.a.ii.*(2)* of this section if: (a) The owner or operator of the closed-vent system determines that the components of the closed-vent system are unsafe to monitor because monitoring personnel would be exposed to an immediate danger as a consequence of complying with paragraph I.2.a.ii.*(2)* of this section; and (b) The owner or operator of the closed-vent system adheres to a written plan that requires monitoring the closed-vent system components using the procedure specified in paragraph I.2.a.ii.*(2)* of this section as frequently as practicable during safe-to-monitor times. J. The owner or operator at an affected facility shall inspect and monitor air emission control equipment, develop and implement a written plan and schedule to perform the inspections and monitoring, and incorporate this plan and schedule into the facility inspection plan required under 40 CFR 264.15 or 265.15.	

MEDIUM: SURFACE WATER

The 1987 Water Quality Act (WQA) made several revisions to the Federal Water Pollution Control Act [known more commonly as the Clean Water Act (CWA)], including; (1) provisions for grant money to states to assist in sewer construction, (2) imposition of permit limitations on discharges of pollutants, and (3) variances from the standard discharges for toxic pollutants. The WQA also established discharge limits for pollutants. A pollutant as defined by 40 CFR Part 122.2 is any:

> dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean: (a) Sewage from vessels; or (b) water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Effluent limits for municipal and industrial dischargers of pollutants are stated in the National Pollutant Discharge Elimination System (NPDES) under Sections 318, 402, and 405 of the Clean Water Act as amended. The NPDES requires a permit for any "discharge" of "pollutants" into the "waters of the United States."[2] The waters of the United States as defined by the CFR include:

> all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; all interstate waters, including interstate "wetlands," all other waters such as intrastate lakes, rivers, streams, including intermittent streams, mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce, including any such waters (1) which are or could be used by interstate or foreign travelers for recreational or

[2] 40 CFR Part 122.2.

other purposes, (2) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce, or (3) which are used or could be used for industrial purposes by industries in interstate commerce; all impoundments of waters otherwise defined as waters of the United States under this definition; tributaries of waters identified above; the territorial sea; and "wetlands" adjacent to waters (other than waters that are themselves wetlands) identified above.

A NPDES permit specifies standards for monitoring, recordkeeping, and reporting requirements for each discharge point source or outfall. These standards are set to maintain the quality of the body of water. DOE facilities are required to obtain a NPDES permit and/or a pretreatment permit if they discharge wastewaters to either a surface water body or a publicly-owned treatment system.[3]

This chapter includes the monitoring requirements for facilities that discharge pollutants into surface water (as being part of the "waters of the United States").

For additional assistance, DOE staff and contractors who have questions concerning monitoring of surface water for compliance with the NPDES requirements outlined in this chapter may contact the Office of Environmental Policy and Assistance, Air/Water/Radiation Division (EH-412) at (202) 586-2409.

[3] Environmental Policy and Assistance Program Reference Book, Clean Water Act (Excluding Section 404). DOE Office of Environmental Policy and Assistance, ORNL/M-2263, January 15, 1993.

Surface Water Monitoring Requirements

Regulated Unit:
NPDES permitted facilities

Regulated Contaminant:
Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides.

Purpose:
Provides the monitoring requirements that must be addressed in a facilities' NPDES permit application.

References:

40 CFR 122.41	Conditions applicable to all permits.
40 CFR 122.44	Establishing limitations, standards, and other permit conditions.
40 CFR 122.48	Requirements for recording and reporting of monitoring results.

Authority:
The Clean Water Act, 33 U.S.C. 1251, *et seq.*

Responsibilities of the Owner/Operator:

A. {All} samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

B. The permittee shall retain records of all monitoring information ... for a period of at least 3 years from the date of the sample, measurement, or application.

   1. {This includes} all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by {the NPDES} permit, and records of all data used to complete the application for {the NPDES} permit.

   2. Records of monitoring information required by {the NPDES} permit related to the permittee's sewage sludge use and disposal activities ... shall be retained for a period of at lease five years (or longer as required by 40 CFR Part 503 *(Standards for the use or disposal of sewage sludge)*).

C. Records of monitoring information shall include:

   1. The date, exact place, and time of sampling or measurements;

   2. The individual(s) who performed the sampling or measurements;

   3. The date(s) analyses were performed;

   4. The individual(s) who performed the analyses;

   5. The analytical techniques or methods used; and

   6. The results of such analyses.

Responsibilities of the Director:
{The Director may extend the record retention period for items listed in paragraph B(1) of Responsibilities of the Owner/Operator.}

Surface Water Monitoring Requirements

Regulated Unit: NPDES permitted facilities (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 *(Guidelines establishing test procedures for the analysis of pollutants)*. In the case of sludge use or disposal, {results must be conducted according to test procedures} approved under 40 CFR Part 136 *(Guidelines establishing test procedures for the analysis of pollutants)* unless otherwise specified in 40 CFR Part 503 *(Standards for the use or disposal of sewage sludge)*, {or} unless other test procedures have been specified in the permit. E. The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. {If a person commits a second violation under this section,} punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. F. {The permittee shall} assure compliance with permit limitations {and the permittee is required} to monitor: 1. The mass (or other measurement specified in the permit) for each pollutant limited in the permit; 2. The volume of effluent discharged from each outfall; 3. Other measurements as appropriate including: a. Pollutants in internal waste streams under 40 CFR 122.45(i) *(Calculating NPDES permit conditions);*	

Regulated Unit: NPDES permitted facilities (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): b. Pollutants in intake water for net limitations under 40 CFR 122.45(f) *(Calculating NPDES permit conditions)*; *{Note: The NPDES permit reflects the effluent limitations on discharged pollutants from a facility. "Net limitations" are the level of pollutants measured in the facility's intake water, that are not included in the level of pollutants measured in the effluent discharge. As a result, the effluent levels of pollutants are an indication of the pollutants added or formed as a result of the facility's operations or processes.}* c. {The} frequency, rate of discharge, etc., for noncontinuous discharges under 40 CFR 122.45(e) *(Calculating NPDES permit conditions)*; d. Pollutants subject to notification requirements under 40 CFR 122.42(a) *(Additional conditions applicable to ... NPDES permits)*; and e. Pollutants in sewage sludge or {domestic sewage} as (1) specified in 40 CFR Part 503 *(Standards for the use or disposal of sewage sludge)*; or (2) determined to be necessary on a case-by-case basis pursuant to Section 405(d)(4) of the Clean Water Act. 4. {The permittee must monitor} according to test procedures approved under 40 CFR Part 136 *(Guidelines establishing test procedures for the analysis of pollutants)* for the analyses of pollutants {for which such methods have been approved} under that part, and according to a test procedure specified in the permit for pollutants with no approved methods.	

Surface Water Monitoring Requirements

Regulated Unit: NPDES permitted facilities (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): G. Requirements to report monitoring results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge, but in no case less than once a year. 1. {This includes monitoring results for storm water discharges associated with industrial activity which are subject to an effluent limitation guideline}. 2. For sewage sludge use or disposal practices, requirements to monitor and report results shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the sewage sludge use or disposal practice ... as specified in 40 CFR Part 503 *(Standards for the use or disposal of sewage sludge)* (where applicable), but in no case less than once a year. H. Requirements to report monitoring results for storm water discharges associated with industrial activity {other than those subject to an effluent limitation guideline such as those addressed in paragraph G of this section} shall be established on a case-by-case basis with a frequency dependent on the nature and effect of the discharge. At a minimum, a permit for {this type of} discharge must require: 1. The discharger to conduct an annual inspection of the facility site to identify areas contributing to a storm water discharge associated with industrial activity and evaluate whether measures to reduce pollutant loadings identified in a storm water pollution prevention plan are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed.	

Regulated Unit: NPDES permitted facilities (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. The discharger to maintain for a period of three years a record summarizing the results of the inspection and a certification that the facility is in compliance with the plan and the permit, and identifying any incidents of non-compliance; 3. {A signed report and certification, as described in H(2),} in accordance with 40 CFR 122.22 *(Signatories to permit applications and reports)*; Permits for storm water discharges associated with industrial activity from inactive mining operations may require certification once every three years by a Registered Professional Engineer. {This certification would indicate that the facility is in compliance with the permit, or {provide for} alternative requirements. *{Note: Inactive mining operations have an extended certification period to allow more flexibility in addressing these mining operations. Due to the remote location, limited staffing, and natural conditions of these sites, alternative permit requirements may be considered for stormwater discharges. Discharges from such a site, where an operator cannot be identified, introduces unusual situations because of the high number of these sites on land that is Federally owned (57 FR 11402)}.* I. Permits which do not require the submittal of monitoring result reports at least annually shall require that the permittee report all instances of non-compliance not reported under 40 CFR 122.41(l) (1), (4), (5), and (6) *(Conditions applicable to all permits)* at least annually.	

Surface Water Monitoring Requirements

Regulated Unit: Publicly Owned Treatment Works (POTWs) - general monitoring Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. Purpose: Provides monitoring requirements for any POTW which has received an NPDES permit with modified secondary treatment requirements. Reference: 40 CFR 125.62 Establishment of a monitoring program. Authority: Clean Water Act as amended by the Clean Water Act of 1977, 33 U.S.C. 1251 *et seq*.	Responsibilities of the Owner/Operator: A. The applicant must: 1. Have a monitoring program designed to: a. Provide data to evaluate the impact of the modified discharge on the marine biota; b. Demonstrate compliance with applicable water quality standards; and c. Measure toxic substances in the discharge. 2. Describe the sampling techniques, schedules, and locations (including appropriate control sites), analytical techniques, quality control, and verification procedures to be used in the monitoring program. 3. Demonstrate that it has the resources necessary to implement the program upon issuance of the modified permit and to carry it out for the life of the modified permit. 4. Determine the frequency and extent of the monitoring program taking into consideration the: a. Applicant's rate of discharge; b. Quantities of toxic pollutants discharged; and c. Potentially significant impacts on receiving water quality, marine biota, and designated water uses. B. {The} water quality monitoring program shall to the extent practicable:	Responsibilities of the Administrator: The Administrator may require a revision of the proposed monitoring program before issuing a modified permit and during the term of any modified permit.

Surface Water Monitoring Requirements

Regulated Unit: POTWS - general monitoring (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 1. Provide adequate data for evaluating compliance with applicable water quality standards. 2. Measure the presence of toxic pollutants which have been identified or reasonably may be expected to be present in the discharge. C. In addition to the requirements of 40 CFR Part 122 *(EPA Administered Permit Programs: The National Pollutant Discharge Elimination System)*, to the extent practicable, monitoring of the POTW effluent shall provide quantitative and qualitative data which measure toxic substances and pesticides in the effluent and {thereby reflect} the effectiveness of the toxics control program.	

Surface Water Monitoring Requirements

Re7gulated Unit: Publicly Owned Treatment Works (POTWs) - biological monitoring Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. Purpose: Provides requirements for biological monitoring of marine biota in surface water for any POTW which has received an NPDES permit with modified secondary treatment requirements. A biological monitoring program shall provide data adequate to evaluate the impact of the modified discharge on the marine biota. Reference: 40 CFR 125.62 Establishment of a monitoring program. Authority: Clean Water Act as amended by the Clean Water Act of 1977, 33 U.S.C. 1251 *et seq.*	Responsibilities of the Owner/Operator: A. Biological monitoring shall include to the extent practicable: 1. Periodic surveys of the biological communities and populations which are most likely affected by the discharge, to enable comparisons with baseline conditions described in the application and verified by sampling at the control stations/reference sites during the periodic surveys; 2. Periodic determinations of the accumulation of toxic pollutants and pesticides in organisms and examination of adverse effects, such as disease, growth abnormalities, physiological stress or death; 3. Sampling of sediments in areas of solids deposition in the vicinity of the Zone of Initial Dilution (ZID), in other areas of expected impact, and at appropriate reference sites to support the water quality and biological surveys and to measure the accumulation of toxic pollutants and pesticides; and 4. {Periodic assessments of the conditions and productivity of fisheries} where the discharge would affect commercial or recreational fisheries. B. Small applicants are not subject to the requirements of paragraphs {A(2-4) of this section} if they discharge at depths greater than 10 meters and can demonstrate through a suspended solids deposition analysis that there will be negligible seabed accumulation in the vicinity of the modified discharge. *{NOTE: Small applicants have contributing populations of less than 50,000 people and average dry weather flows of less than 5.0 mgd.}*	Responsibilities of the Administrator: None specified.

Surface Water Monitoring Requirements

Regulated Unit: POTWs - biological monitoring (cont'd.) Regulated Contaminant: Varies, depending upon the owner/operator's permit, but is likely to include toxic substances, sewage sludge, and pesticides. (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): C. For applicants seeking a Section 301(h) modified permit based on: 1. A current discharge, biological monitoring shall be designed to demonstrate ongoing compliance with the requirements of 40 CFR 125.61(c) *(Attainment or maintenance of water quality which assures protection of public water supplies, the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife, and allows recreational activities)*, 2. An improved discharge or altered discharge other than outfall relocation, biological monitoring shall provide baseline data on the current impact of the discharge and data which demonstrate, upon completion of improvements or alterations, that the requirements of 40 CFR 125.61(c) are met; or 3. An improved or altered discharge involving outfall relocation, the biological monitoring shall: a. Include the current discharge site until such discharge ceases; and b. Provide baseline data at the relocation site to demonstrate the impact of the discharge and to provide the basis for demonstrating that requirements of 40 CFR 125.61(c) will be met.	

Surface Water Monitoring Requirements

Regulated Unit: Chemical waste landfills Regulated Contaminant: PCBs Purpose: Provides monitoring requirements for owners and operators of chemical waste landfills used for the disposal of PCBs and PCB Items. Reference: 40 CFR 761.75 Chemical waste landfills. Authority: 15 U.S.C. 2605, 2607, 2611, 2614, and 2616.	Responsibilities of the Owner/Operator: A. For all sites receiving PCBs, ... surface water from the disposal site area shall be sampled prior to commencing {waste disposal} operations under an approval {by the Regional Administrator} for use as baseline data. 1. Any surface watercourse designated by the Regional Administrator ... shall be sampled at least monthly when the landfill is being used for disposal operations. 2. Any surface watercourse designated by the Regional Administrator ... shall be sampled for a time period specified by the Regional Administrator at a frequency of not less than once every six months after final closure of the disposal area.	Responsibilities of the Administrator: None specified.

MEDIUM: DRINKING WATER

The Safe Drinking Water Act (SDWA), as amended in 1986, requires EPA to establish goal levels for contaminants that have the potential for adverse public health effects. These "maximum contaminant level goals" (MCLGs), although unenforceable, are "set at concentration levels at which no known or anticipated adverse health effects would occur." This provides a margin of safety for public health. Each MCLG is published with a National Primary Drinking Water Regulation (NPDWR) (see 40 CFR Parts 141 and 142). These regulations contain either the maximum contaminant level (MCL) which is enforceable and more stringent than the MCLG, or the required technique for treating the contaminant. A treatment technique may be set by EPA only "if it is not economically or technologically feasible to ascertain the level of a contaminant" (56 FR 3530).

The NPDWRs apply to all public water systems (PWS). A PWS is a system that provides piped water for human consumption to at least 15 service connections or regularly serves an average of at least 25 individuals daily for at least 60 days a year. A PWS includes those facilities involved with "any collection, treatment, storage, and distribution" and "any collection or pretreatment storage facilities" primarily associated with that PWS [40 CFR 141.2]. There are three types of PWSs:

Community Water Systems (CWS)	A PWS that serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.
Non-community Water Systems (NCWS)	Any PWS that is not a CWS and provides a transitory population with drinking water (e.g., gas stations, hotels). Sometimes this category is identified as a transient non-community water system (TNCWS).
Non-transient Non-community Water System (NTNCWS)	A PWS that is not a CWS but that regularly serves at least the same 25 people for six months per year (e.g., work places, factories, hospitals).

A number of DOE facilities operate water systems. Facilities that supply process water are classified as non-transient non-community water systems. In addition, within the DOE complex, there are facilities that provide potable water to the public and are therefore classified as community water systems. For example, the DOE Oak Ridge facility supplies potable water to over 27,000 residents in the nearby City of Oak Ridge.

In January 1991, EPA adopted the Standard Monitoring Framework (56 FR 3560) which standardized the way drinking water is monitored. This framework describes a monitoring approach for water systems that includes mandated monitoring frequencies for facilities and responsibilities of the State. For example, States have the authority to institute alternative monitoring frequencies or to grant waivers of monitoring requirements. Most importantly, the framework establishes monitoring compliance *cycles* of nine years that are separated into three, three-year compliance *periods*. The compliance periods run on a calendar year basis (January 1 - December 31). Owners and operators of water systems are required to begin initial (base or minimum) monitoring during the first full compliance period after the effective date of the rule. This monitoring is conducted at each sampling point (the point in the distribution system where all treatment of the water has been conducted and before the water is distributed to the public). Sampling is done at this point where there is no expectation of contamination. Systems can request a waiver from the State that would allow the base monitoring frequency to be reduced. Increased frequency of monitoring, however, is to be conducted if the system is in non-compliance or if there is contaminant detection above the appropriate levels. Once the initial monitoring for a system has been completed, the water system must be monitored at a "repeat" frequency. Typically, this repeat frequency is the same as the initial monitoring frequency, but in some cases it may be lower than that of the initial monitoring frequency. For example, if previous analytical results indicate that PCBs have not been identified in the water system, the owner or operator may be allowed to conduct repeat monitoring at a lower frequency than initial monitoring.

The first two compliance cycles were outlined in the Federal Register as "the first nine-year compliance cycle beginning January 1, 1993, and ending December 31, 2001; the second cycle beginning January 1, 2002, and ending December 31, 2010; etc." (56 FR 3560). Subsequent compliance cycles have not been published in the Federal Register but are expected to be organized in the same three three-year compliance period manner. Below is an example of how the first compliance cycle is organized.

Period	Start Date	End Date
1	January 1, 1993	December 31, 1995
2	January 1, 1996	December 31, 1998
3	January 1, 1999	December 31, 2001

EPA has made exceptions to the compliance timetable. A "phased-in" monitoring approach may be instituted when the effective dates of future finalized rules interrupt the established cycle. This was the case when the final rule for monitoring of additional Phase II Volatile Organic Contaminant (VOCs) was published in the July 17, 1992, Federal Register. Rules become effective 18 months after promulgation. The finalization of the July 17, 1992, rule would offset the monitoring periods that had been established by the Standard Monitoring Framework adopted in January 1991. A "phased-in" approach was developed to allow initial monitoring of these contaminants to coincide with the established framework. "Phased-in" monitoring allows

systems with 150 or more service connections to conduct initial monitoring during the first already established compliance period (January 1, 1993 - December 31, 1995). Systems with less than 150 service connections are allowed to conduct initial monitoring of these contaminants from January 1, 1996, to December 31, 1998. Under this approach smaller systems begin monitoring in the second compliance period providing them with sufficient time to prepare for implementation of the regulations.

States determine and enforce a monitoring schedule for each system. Based on the systems' size, vulnerability to contamination, geographic location, or other factors, States synchronize monitoring schedules so that approximately one-third of the systems conduct monitoring during each year of the three-year periods. States can then optimize enforcement and implementation of requirements by maintaining a steady flow of samples and reports that are processed.

Monitoring regulations for public water systems depend upon the source water of the system (where the system draws water) and the size of the water system. There are three types of source water:

Surface water	All water that is open to the atmosphere and subject to surface runoff.
Groundwater	Water below the land surface in a zone of saturation.
Groundwater under the influence of surface water	"Any water beneath the surface of the ground with: (1) a significant occurrence of insects or other macroorganisms, surface water algae, or large-diameter pathogens such as *Giardia lamblia*, or (2) a significant and relatively rapid shift in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlates to climatological or surface water conditions. In this case, the direct influence must be determined for individual sources in accordance with criteria established by the State" [40 CFR 141.2]. Karst formations are examples of this phenomenon.

The following are five size categories of public water systems used by EPA.[4]

Very Small	-	Population served is 25 - 500 persons.
Small	-	Population served is 501 - 3,300 persons.
Medium	-	Population served is 3,301 - 10,000 persons.
Large	-	Population served is 10,001 - 100,000 persons.

[4] United States Environmental Protection Agency, Office of Water, Technical and Economic Capacity of States And Public Water Systems To Implement Drinking Water Regulations: Report to Congress, September 1993, p. 5-6.

Very Large - Population served is greater than 100,000 persons.

Drinking Water Chapter Specifications

- Monitoring requirements for water systems with a surface water influence include requirements for systems with source water influences of surface water and/or groundwater under the influence of surface water.
- States have primary enforcement authority of the Safe Drinking Water Act and will be listed in the third column of the following regulatory table.

This chapter includes monitoring requirements for all of the above source waters. Surface water monitoring requirements that are not related to a primary drinking water regulation, such as surface water monitoring required as part of an NPDES permit, can be found in the Surface Water chapter. Groundwater monitoring requirements that are not related to a primary drinking water regulation, such as those referring to RCRA groundwater monitoring, can be found in the Groundwater Monitoring chapter.

For additional assistance, DOE staff and contractors who have questions concerning monitoring of contaminants for compliance with the primary drinking water regulations may contact the Office of Environmental Policy and Assistance, Air/Water/Radiation Division (EH-412) at (202) 586-6374.

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-community

Regulated Contaminant:
Coliform bacteria -- routine monitoring

Purpose:
A public water system must determine compliance with the MCL for total coliforms for each month in which it is required to monitor for total coliforms.

References:

40 CFR 141.21	Coliform sampling.
40 CFR 141.63	Maximum contaminant levels for microbiological contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of Owner/Operator:

A. Public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system. {This sampling must be conducted} according to a sample siting plan. These {written} plans are subject to State review and revision.

B. The monitoring frequency for total coliforms for community water systems is based on the population served by the system {as specified in the table Total Coliform Monitoring Frequency for Community Water Systems in 40 CFR 141.21 *(Coliform sampling)*}.

C. The monitoring frequency for total coliforms for non-community water systems {will occur at the following frequencies}:

1. A non-community water system using only groundwater (except groundwater under the direct influence of surface water...) and

   a. Serving 1,000 persons or fewer {during any month} must monitor each calendar quarter that the system provides water to the public.

   b. Serving more than 1,000 persons during any month must monitor at the same frequency as a like-sized community water system.

2. A non-community water system using surface water, in total or in part, must monitor at the same frequency as a like-sized community water system, ... regardless of the number of persons it serves.

Responsibilities of the State:

A. {The State will review and revise (if necessary) the public water system's written total coliform sample siting plan}.

B. {The State may reduce the monitoring frequencies specified in paragraph B of Responsibilities of the Owner/Operator}:

1. If a community water system serving 25 to 1,000 persons has no history of total coliform contamination in its current configuration and,

2. {If} a sanitary survey conducted in the past five years shows that the system is supplied solely by a protected groundwater source and is free of sanitary defects ... except that in no case may the State reduce the monitoring frequency to less than one sample per quarter.

C. The State must approve the reduced monitoring frequency {specified in paragraph B of this section}, in writing.

D. The State may reduce {the monitoring frequency specified in C(1) of the Responsibilities of the Owner/Operator} in writing, if a sanitary survey shows that the system is free of sanitary defects.

{After June 29, 1994}, the State cannot reduce the monitoring frequency for a non-community water system using only groundwater (except groundwater under the direct influence of surface water) ... and serving 1,000 persons or fewer to less than once a year.

Regulated Unit: Public water systems -- community and/or non-community (cont'd.) Regulated Contaminant: Coliform bacteria -- routine monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. A non-community water system using groundwater under the direct influence of surface water (i.e., Karst) ... must monitor at the same frequency as a like-sized community water system. {This type of} system must begin monitoring at this frequency beginning six months after the State determines that the groundwater is under the direct influence of surface water. D. The public water system {with surface water or groundwater under the influence of surface water as the water source} must collect samples at regular time intervals throughout the month. A system which uses only groundwater (except groundwater under the direct influence of surface water ...) and serves 4,900 persons or fewer, may collect all required samples on a single day if {the samples} are taken from different {sampling points}. E. A public water system that uses surface water or groundwater under the direct influence of surface water ... and does not practice filtration in compliance with {40 CFR 141} Subpart H *(Filtration and disinfection)* must collect at least one sample near the first service connection each day the turbidity level of the source water ... exceeds 1 NTU. 1. This sample must be analyzed for the presence of total coliforms.	

Regulated Unit: Public water systems -- community and/or non-community (cont'd.) Regulated Contaminant: Coliform bacteria -- routine monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. When one or more turbidity measurements in any day exceed 1 NTU, the system must collect this coliform sample within 24 hours of the first exceedance, unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. 3. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliforms in 40 CFR 141.63 *(Maximum contaminant levels (MCLs) for microbiological contaminants)*. F. {Routine monitoring} samples, such as those taken to determine whether disinfection practices are sufficient following pipe placement, replacement, or repair, shall not be used to determine compliance with the MCL for total coliforms in 40 CFR 141.63 *(Maximum contaminant levels for microbiological contaminants)*. Repeat samples taken pursuant to {repeat monitoring requirements} are not considered special purpose samples, and must be used to determine compliance with the MCL for total coliforms in 40 CFR 141.63 *(Maximum contaminant levels for microbiological contaminants)*. G. If a routine sample is total coliform-positive, the {owner or operator of the} public water system must collect a set of repeat samples within 24 hours of being notified of the positive result.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-community

Regulated Contaminant:
Coliform bacteria -- repeat monitoring

Purpose:
If a routine sample is total coliform-positive, a public water system is required to conduct repeat monitoring procedures within 24 hours of being notified of the positive result.

References:
40 CFR 141.21 Coliform sampling.

40 CFR 141.63 Maximum contaminant levels for microbiological contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. A system which collects one routine sample per month or fewer must collect no fewer than four repeat samples for each total coliform-positive sample found.

B. A system which collects more than one routine sample per month must collect no fewer than three repeat samples for each total coliform-positive sample found.

C. The system must collect at least one repeat sample from {each of the following}:

   1. A sampling tap where the original total coliform-positive sample was taken, and

   2. A tap within five service connections upstream, and

   3. A tap within five service connections downstream of the original sampling site.

D. The system must collect all repeat samples on the same day.

   {A system with a single} service connection may collect the required set of repeat samples over a four-day period or may collect a larger volume of repeat sample(s) in one or more sample containers of any size, as long as the total volume collected is at least 400 ml (300 ml for systems which collect more than one routine sample per month), {with permission from the State}.

Responsibilities of the State:

A. The State may extend the 24-hour limit {for repeat sample collection} on a case-by-case basis.

   1. The system {must have} a logistical problem in collecting the repeat samples within 24 hours that is beyond {the owner or operator's} control.

   2. The State must specify how much time the system has to collect the repeat samples.

B. The State may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site {if a total coliform-positive sample is found at the end of the distribution system, or one connection away from the end of the distribution system. See paragraph C of Responsibilities of the Owner/Operator}.

C. The State may waive the requirement {at paragraph F of Responsibilities of the Owner/Operator} if:

   1. The State, or an agent approved by the State, performs a site visit before the end of the next month the system provides water to the public.

      a. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the State to determine whether additional monitoring and/or any corrective action is needed.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-community (cont'd.) Regulated Contaminant: Coliform bacteria -- repeat monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): E. If one or more repeat samples in the set is total coliform-positive, the {owner or operator of a} public water system must collect an additional set of repeat samples in the manner specified in {paragraphs A through D of this section}. 1. The additional samples must be collected within 24 hours of being notified of the positive result, unless the State extends the limit as provided in {paragraph A of the Responsibilities of the State}. 2. The system must repeat this process until either total coliforms are not detected in one complete set of repeat samples or the system determines that the MCL for total coliforms in 40 CFR 141.63 *(Maximum containment levels (MCLs) for microbiological contaminants)* has been exceeded and notifies the State. F. If a system collecting fewer than five routine samples per month has one or more total coliform-positive samples and the State does not invalidate the sample(s), ... {the owner/operator} must collect at least five routine samples during the next month the system provides water to the public. G. After a system collects a routine sample and before it learns the results of the analysis of that sample, if it collects another routine sample(s) from within five adjacent service connections of the initial sample, and the initial sample, after analysis, is found to contain total coliforms, then the system may count the subsequent sample(s) as a repeat sample instead of as a routine sample.	Responsibilities of the State (cont'd.): b. The State cannot approve an employee of the system to perform this site visit, even if the employee is an agent approved by the State to perform sanitary surveys. c. The State cannot waive the requirement for a system to collect repeat samples in {paragraphs A through E of the Responsibilities of the Owner/Operator}. 2. The State has determined why the sample was total coliform-positive, and establishes that the system has corrected the problem or will correct the problem before the end of the next month the system serves water to the public. a. In this case, the State must document this decision to waive the following month's additional monitoring requirement in writing, have it approved and signed by the supervisor of the State official who recommends such a decision, and make this document available to the EPA and public. b. The written documentation must describe the specific cause of the total coliform-positive sample and what action the system has taken and/or will take to correct this problem.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-community (cont'd.) Regulated Contaminant: Coliform bacteria -- repeat monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): H. Results of all routine and repeat samples not invalidated by the State must be included in determining compliance with the MCL for total coliforms in 40 CFR 141.63 *(Maximum contaminant levels (MCLs) for microbiological contaminants).* I. If any routine or repeat sample is total coliform-positive, the system must analyze that total coliform-positive culture medium to determine if fecal coliforms are present, except that the system may test for Escherichia coli in lieu of fecal coliforms. If fecal coliforms or E. coli are present, the system must notify the State by the end of the {same} day when the system is notified of the test result, unless the system is notified of the result after the State office is closed, in which case the system must notify the State before the end of the next business day. J. A public water system which has failed to comply with a coliform monitoring requirement ... must report the monitoring violation to the State within ten days after the system discovers the violation, and notify the public in accordance with 40 CFR 141.32 *(Public notification)*.	Responsibilities of the State (cont'd.): c. The State cannot waive the requirement to collect five routine samples the next month the system provides water to the public solely on the grounds that all repeat samples are total coliform-negative. d. A system must still take at least one routine sample before the end of the next month it serves water to the public and use {this sample} to determine compliance with the MCL for total coliforms ..., unless the State has determined that the system has corrected the contamination problem before the system took the set of {required} repeat samples ... and all repeat samples were total coliform-negative. D. The State has the discretion to allow a public water system, on a case-by-case basis, to forgo fecal coliform or E. coli testing on a total coliform-positive sample if that system assumes that the total coliform-positive sample is fecal coliform-positive or E. coli-positive. Accordingly, the system must notify the State as specified in {paragraph J of Responsibilities of the Owner/Operator} and the provisions of 40 CFR 141.63(b) *(Maximum contaminant levels (MCLs) for microbiological contaminants)* apply.

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community; non-transient, non-community; and/or transient, non-community

Regulated Contaminant:
Inorganic chemicals -- general requirements

Purpose:
Community; non-transient, non-community; and/or transient, non-community water systems shall conduct monitoring to determine compliance with MCLs specified in 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)*.

References:

40 CFR 141.23	Inorganic chemical sampling and analytical requirements.
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Beginning in the compliance period starting January 1, 1993:

   1. Groundwater systems shall take a minimum of one sample at every {point of entry} to the distribution system which is representative of each well after treatment (hereafter called a sampling point).

   2. Surface water systems shall take a minimum of one sample at every {point of entry} to the distribution system after any application of treatment or in the distribution system at a point which is representative of each source after treatment.

   3. {Water systems} shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

B. If a system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water is representative of all sources being used).

C. Systems may apply to the State to conduct more frequent monitoring than the minimum monitoring frequencies ....

   Each public water system shall monitor at the time designated by the State during each compliance period.

D. Compliance with 40 CFR 141.11 *(Maximum contaminant levels for inorganic chemicals)* or 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)* (as appropriate) shall be determined based on the analytical result(s) obtained at each sampling point.

Responsibilities of the State:

A. The State may reduce the total number of samples which must be analyzed by allowing the use of compositing.

   1. Composite samples from a maximum of five sampling points are allowed provided that the detection limit of the method used for analysis is less than one-fifth of the MCL {for the inorganic chemical being composited}.

   2. Compositing of samples must be done in the laboratory.

   3. In systems serving {less than} 3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.

   4. If the concentration in the composite sample is greater than or equal to the detection limit of any inorganic chemical, then a follow-up sample must be analyzed within 14 days from each sampling point included in the composite.

      a. These samples must be analyzed for the contaminants which were detected in the composite sample.

      b. Detection limits for each analytical method {are identified in the table Detection Limits for Inorganic Contaminants in 40 CFR 141.23 *(Inorganic chemical sampling and analytical requirements)*}.

Regulated Unit: Public water systems -- community; non-transient, non-community; and/or transient, non-community (cont'd.) Regulated Contaminant: Inorganic chemicals -- general requirements (cont'd.)		Responsibilities of the State (cont'd.): 5. If duplicates of the original sample taken from each sampling point used in the composite are available, the {water system} may use these instead of resampling. The duplicates must be analyzed and results reported to the State within 14 days of collection. B. The State may require more frequent monitoring {for the following inorganic chemicals}: 1. Fluoride 2. Asbestos 3. Antimony 4. Barium 5. Beryllium 6. Cadmium 7. Chromium 8. Cyanide 9. Mercury 10. Nickel 11. Nitrate 12. Nitrite 13. Selenium 14. Thallium C. {The State} may require confirmation samples for positive and negative results at its discretion. D. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the State may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-transient, non-community

Regulated Contaminant:
Fluoride

Purpose:
Provides requirements for determining compliance with the MCL established for fluoride.

References:
40 CFR 141.23 Inorganic chemical sampling and analytical requirements.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Surface water systems shall take a minimum of one sample at every entry point to the distribution system after any application of treatment or in the distribution systems at a point which is representative of each source after treatment.

   1. Where the system draws water from one source, the system shall take one sample at the entry point to the distribution system.

   2. Where the system draws water from more than one source, the system must sample each source at the entry points to the distribution system.

   3. If the system draws water from more than one source and sources are combined before distribution, the system must sample at an entry point to the distribution system during periods representative of the maximum fluoride levels occurring under normal operating conditions.

B. Monitoring may be decreased from the frequencies {specified above} upon {a written application by the owner/operator to the State}. The State determines that the system is unlikely to exceed the MCL, {based on the} factors listed in {paragraph A of the Responsibilities of the State}.

   1. Such {a} determination shall be made in writing and set forth as the basis for the determination.

   2. A copy of the determination shall be provided to the Administrator.

Responsibilities of the State:

A. The State may alter the frequencies for fluoride monitoring as set out in {paragraph A of Responsibilities of the Owner/Operator} to increase or decrease such frequency considering the following factors:

   1. Reported concentrations from previously required monitoring, {and}

   2. The degree of variation in reported concentrations, and

   3. Other factors {if present} which may affect fluoride concentrations (such as changes in pumping rates in groundwater supplies or significant changes in the system's configuration, operating procedures, source of water, and changes in stream flows).

B. For systems monitoring once every 10 years {as specified in B(3) of the Responsibilities of the Owner/Operator}, the State shall review the monitoring results every 10 years to determine whether more frequent monitoring is necessary.

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminant: Fluoride (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. In no case shall monitoring be reduced {to} less than one sample every 10 years. C. Compliance with the MCL shall be determined based on each sampling point. If any sampling point is determined to be out of compliance, the system is deemed to be out of compliance. D. {In addition to the requirements above, systems monitoring for fluoride must comply with all applicable monitoring requirements specified in the general requirements for inorganic chemicals}.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-transient, non-community

Regulated Contaminant:
Asbestos

Purpose:
Community and/or non-transient, non-community water systems must conduct monitoring to determine compliance with the MCL for asbestos.

References:

40 CFR 141.23	Inorganic chemical sampling and analytical requirements.
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Each community and non-transient, non-community water system is required to monitor for asbestos during the first three-year compliance period of each nine-year compliance cycle beginning in the compliance period starting January 1, 1993.

   1. A system vulnerable to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

   2. A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the {provisions in the regulatory matrix for monitoring of inorganic chemicals -- general requirements}.

   3. A system vulnerable to asbestos contamination due both to its source water supply and corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is most likely to occur.

B. If the system believes it is not vulnerable to either asbestos contamination in its source water or due to corrosion of asbestos-cement pipe, or both, it may apply to the State for a waiver of the monitoring requirement {specified in paragraph A of this section}.

C. If the State grants {a} waiver, the system is not required to monitor {to determine compliance with the MCL for asbestos}.

Responsibilities of the State:

A. The State may grant a waiver {of the monitoring requirements provided in Responsibilities of the Owner/Operator} based on a consideration of the following factors:

   1. {The} potential asbestos contamination of the {water system's} water source, and

   2. The {water system's} use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

B. A {State-granted waiver} remains in effect until the completion of the three-year compliance period. Systems not receiving a waiver must monitor in accordance with the provisions {specified in Responsibilities of the Owner/Operator}.

C. {If a system exceeds the maximum contaminant levels} the State may decrease the quarterly monitoring requirement to the {regular} frequency {as specified in paragraph A of the Responsibilities of the Owner/Operator} provided the State has determined that the system is reliably and consistently below the maximum contaminant level.

   In no case can a State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system takes a minimum of four quarterly samples.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminant: Asbestos (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. A system which exceeds the maximum contaminant levels as determined {by the results of appropriate analytical sampling} shall monitor quarterly beginning in the next quarter after the violation occurred.	Responsibilities of the State (cont'd.): D. {The State may allow the water system to use data collected after January 1, 1990, to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993, if the data are generally consistent with the requirements specified in the section Responsibilities of the Owner/Operator}.

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-transient, non-community

Regulated Contaminants:
Antimony, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium, and Thallium

Purpose:
Community and/or non-transient, non-community water systems must monitor the above regulated contaminants to determine compliance with MCLs specified at 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)*.

References:

40 CFR 141.23	Inorganic chemical sampling and analytical requirements.
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. {Beginning January 1, 1993}:

1. Surface water (or combined surface/ground) systems shall take one sample annually at each sampling point.

2. Groundwater systems shall take one sample at each sampling point once every three years.

B. The system may apply to the State for a waiver from the monitoring frequencies specified {above}.
A condition of the waiver shall require that a system shall take a minimum of one sample while the waiver is effective. The term during which the waiver is effective shall not exceed one compliance cycle (i.e., nine years).

C. Systems which exceed the MCLs {for a contaminant} shall monitor quarterly beginning in the next quarter after the violation occurred.

D. For systems which are conducting monitoring at a frequency greater than annual, compliance with the MCLs for ... {antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium, and thallium} is determined by a running average at each sampling point.

1. If the average at any point is greater than the MCL, then the system is out of compliance.

2. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

Responsibilities of the State:

A. The State may grant a waiver {of monitoring frequencies specified in paragraph A of Responsibilities of the Owner/Operator} provided:

1. Surface water systems have monitored annually for at least three years and groundwater systems have conducted a minimum of three rounds of monitoring. (At least one sample shall have been taken since January 1, 1990).

2. Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the MCL.

3. Water systems that use a new water source are not eligible for a waiver until three rounds of monitoring from the new source have been completed.

B. In determining the appropriate reduced monitoring frequency, the State shall consider:

1. Reported concentrations from all previous monitoring,

2. The degree of variation in reported concentrations, and

3. Other factors which may affect contaminant concentrations such as changes in groundwater pumping rates, changes in the system's configuration, changes in the system's operating procedures, or changes in stream flows or characteristics.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminants: Antimony, Barium, Beryllium, Cadmium, Chromium, Cyanide, Fluoride, Mercury, Nickel, Selenium, and Thallium (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. Any sample below the method detection limit shall be calculated at zero for the purpose of determining the annual average. E. For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for {the contaminants listed as Regulated Contaminants} if the level of contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the State, the determination of compliance will be based on the average of the two samples.	Responsibilities of the State (cont'd.): C. A decision by the State to grant a waiver shall be made in writing and shall set forth the basis for the determination. 1. The determination may be initiated by the State or upon an application by the public water system. 2. The public water system shall specify the basis for its request. 3. The State shall review and, where appropriate, revise its determination of the appropriate monitoring frequency when the system submits new monitoring data or when other data relevant to the system's appropriate monitoring frequency become available. D. The State may decrease the quarterly monitoring requirement to the frequencies specified in {paragraphs A and B of Responsibilities of the Owner/Operator} provided it has determined that the system is reliably and consistently below the maximum contaminant level. E. In no case can a State make {the determination specified in paragraph D of this section} unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples.

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community; non-transient, non-community; and/or transient non-community

Regulated Contaminant:
Nitrate

Purpose:
All public water systems (community, non-transient non-community and/or transient non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrate in 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)*.

References:

40 CFR 141.23	Inorganic chemical sampling and analytical requirements.
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. {Beginning January 1, 1993,} community and non-transient, non-community water systems served by:

   1. Surface water {or combined surface/ground}, shall monitor quarterly.

   2. Groundwater, shall monitor annually.

B. For community and non-transient, non-community water systems, the repeat monitoring frequency for groundwater systems shall be quarterly for at least one year following any one sample in which the concentration is {greater than or equal to} 50 percent of the {appropriate} MCL.

C. Each transient non-community water system shall monitor annually beginning January 1, 1993.

D. After the initial round of quarterly sampling is completed, each community and non-transient non-community system which is monitoring annually shall take subsequent samples during the quarter(s) which previously resulted in the highest analytical result.

E. Where nitrate ... sampling results indicate an exceedance of the maximum contaminant level, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample.

Responsibilities of the State:

A. The State may allow:

   1. A groundwater system to reduce the sampling frequency {as specified in paragraph B of Responsibilities of the Owner/Operator} to annually after four consecutive quarterly samples are reliably and consistently less than the {appropriate} MCL.

   2. A surface water system {that is a community or non-transient, non-community system} to reduce the sampling frequency {specified in A(1) of Responsibilities of the Owner/Operator} to annually if all analytical results from four consecutive quarters are {less than} 50 percent of the MCL. {During the reduced frequency period}, the surface water system shall return to quarterly monitoring if any one sample is {greater than} 50 percent of the {appropriate} MCL.

Regulated Unit: Public water systems -- community; non-transient, non-community; and/or transient non-community (cont'd.) Regulated Contaminant: Nitrate (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 1. Systems unable to comply with the 24-hour sampling requirement must immediately notify consumers served in the area served by the public water system in accordance with 40 CFR 141.32 *(Public notification)*. 2. Systems exercising {the option specified in E(1), of this section} must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample. F. Compliance with the MCL for nitrate {is determined based on one sample if the level of this contaminant is below the MCL}. 1. {If the level of nitrate exceeds the MCL in the initial sample, a confirmation sample is required}, and 2. Compliance shall be determined based on the average of the initial and confirmation samples.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community; non-transient, non-community; and/or transient non-community

Regulated Contaminant:
Nitrite

Purpose:
All public water systems (community; non-transient, non-community; and transient, non-community systems) shall monitor to determine compliance with the maximum contaminant level for nitrite in 40 CFR 141.62 *(Maximum contaminant levels for inorganic contaminants)*.

References:

40 CFR 141.23	Inorganic chemical sampling and analytical requirements.
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. All public water systems shall take {an initial} sample at each sampling point in the {first} compliance period beginning January 1, 1993 and ending December 31, 1995.

   1. After the initial sample, systems where an analytical result for nitrite is {less than} 50 percent of the MCL shall {conduct repeat monitoring} at the frequency specified by the State.

   2. For community, non-transient, non-community, and transient non-community water systems, the repeat monitoring frequency for any water system shall be quarterly for at least one year following any one sample in which the concentration is {greater than or equal to} 50 percent of the MCL.

B. Systems which are monitoring annually shall take each subsequent sample during the quarter(s) which previously resulted in the highest analytical result.

C. Where ... nitrite sampling results indicate an exceedance of the MCL, the system shall take a confirmation sample within 24 hours of the system's receipt of notification of the analytical results of the first sample.

   1. Systems unable to comply with the 24-hour sampling requirement must immediately notify consumers served in the area served by the public water system in accordance with 40 CFR 141.32 *(Public notification)*.

   2. Systems exercising {the option specified in C(1), of this section} must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

Responsibilities of the State:

A. The State may allow a system to reduce the sampling frequency {in A(2) of Responsibilities of the Owner/Operator} to annually after determining {that the contaminant concentrations in the system are} reliably and consistently less than the {appropriate} MCLs.

B. {The State shall determine the repeat monitoring frequency for systems where the initial sample is less than 50 percent of the MCL}.

Regulated Unit: Public water systems -- community; non-transient, non-community; and/or transient non-community (cont'd.) Regulated Contaminant: Nitrite (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. Compliance with the MCL for nitrite is determined based on one sample if the {level of this contaminant is} below the MCL. 1. {If the level of nitrite exceeds the MCL in the initial sample, a confirmation sample is required}. 2. Compliance shall be determined based on the average of the initial and confirmation samples.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Chlorinated hydrocarbons and chlorphenoxyls

Purpose:
Provides monitoring requirements to determine compliance with the MCL established for chlorinated hydrocarbons and chlorphenoxyls.

References:

40 CFR 141.12	Maximum contaminant levels for organic chemicals.
40 CFR 141.24	Organic chemicals other than trihalomethanes, sampling, and analytical requirements.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. An analysis of substances for the purpose of determining compliance with 40 CFR 141.12(a) and (b) *(Maximum contaminant levels for organic chemicals)* shall be made as follows:

   1. For all community water systems utilizing surface water sources, analyses shall be completed within one year following the effective date {of July 30, 1992}.

      a. Samples analyzed shall be collected during the period of the year designated by the State as the period when contamination by pesticides is most likely to occur.

      b. These analyses shall be repeated at intervals specified by the State but in no event less frequently than at three year intervals.

   2. For community water systems utilizing only groundwater sources, analyses shall be completed by those systems specified by the State.

B. If the result of an analysis made pursuant to {paragraph A of this section} indicates that the level of any contaminant listed in 40 CFR 141.12(a) and (b) *(Maximum contaminant levels for organic chemicals)* exceeds the MCL, the supplier of water shall report to the State within 7 days and initiate three additional analyses within one month.

Responsibilities of the State:

A. The State has the authority to determine compliance or initiate enforcement action based upon analytical results and other information compiled by their sanctioned representatives and agencies.

B. {The State shall designate the monitoring frequency for a water system when the analysis conducted in accordance with paragraph A of Responsibilities of the Owner/Operator indicates that the MCL for the contaminants listed in 141.12(a) and (b) (*Maximum contaminant levels for organic chemicals*) has been exceeded}.

C. For the initial analysis required in {paragraphs A(1) and (2) of Responsibilities of the Owner/Operator},

   1. Data for surface water acquired within one year prior to the effective date of {July 30, 1992}, and

   2. Data for groundwater acquired within three years prior to the effective date of {July 30, 1992}, may be substituted at the discretion of the State.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Chlorinated hydrocarbons and chlorphenoxyls (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): C. When the average of {the} four analyses made pursuant to {paragraph B of this section} rounded to the same number of significant figures as the MCL for the substance in question exceeds the MCL, the supplier of water shall report to the State pursuant to 40 CFR 141.31 (*Reporting requirements*) and give notice to the public pursuant to 40 CFR 141.32 (*Public notification*). D. After public notification {as specified in paragraph C of this section}, monitoring shall: 1. Be at a frequency designated by the State, and 2. Continue until the MCL has not been exceeded in two successive samples or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated contaminants:
Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a)

Purpose:
Provides monitoring requirements that determine compliance with the MCLs for organic chemicals other than total trihalomethanes.

References:

40 CFR 141.24	Organic chemicals other than total trihalomethanes, sampling and analytical requirements.
40 CFR 141.61	Maximum contaminant levels for organic chemicals.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Beginning with the initial compliance period, analyses of the contaminants listed in 40 CFR 141.61(a) (1-21) for the purpose of determining compliance with the MCL shall be conducted as follows:

1. Surface (or combined surface/ground) water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point).

2. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment.

3. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of: 1) each source, 2) each treatment plant, or 3) ...the distribution system.

4. If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

5. Each community and non-transient, non-community water system shall take four consecutive quarterly samples for each contaminant listed in 40 CFR 141.61(a) (2-21) during each compliance period beginning in the initial compliance period. {The initial compliance monitoring period is scheduled for January 1, 1993 - December 31, 1995}.

Responsibilities of the State:

A. After a minimum of three years of annual sampling, the State may allow groundwater systems {to take one sample during each compliance period provided the system has had no previous detection of any contaminants listed in {paragraph A of Responsibilities of the Owner/Operator}.

B. States may also issue waivers to small {community and non-transient groundwater} systems for the initial round of monitoring for 1,2,4-trichlorobenzene.

C. A State may grant a waiver {that reduces the monitoring frequency for a water system} after evaluating {the} knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system.

D. If previous use of the contaminant is unknown or it {is known that it} has been used previously, then the following factors shall be used to determine whether a waiver is granted:

1. Previous analytical results.

2. The proximity of the system to a potential point or non-point source of contamination. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities.

3. The environmental persistence and transport of the contaminants.

Regulated Unit:
Public water systems -- community (cont'd.)

Regulated contaminants:
Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a) (cont'd.)

Responsibilities of the Owner/Operator (cont'd.):

{NOTE: 40 CFR.61(a)(1) is listed as vinyl chloride. The monitoring requirements for this organic chemical are specified in paragraphs F and G of this section.}

B. {Where grandfathering is applicable as allowed in paragraph F of Responsibilities of the State}, the owner/operator shall take one sample annually beginning with the initial compliance period {if all of the following conditions are met}:

1. If the initial monitoring for contaminants listed in 40 CFR 141.61(a) (1-8) {specified at 40 CFR 141.24(g)} has been completed by December 31, 1992, and

2. The monitoring for the contaminants listed in 40 CFR 141.61(a) (9-21) has been completed by December 31, 1992, and

3. The system did not detect any contaminant listed in 40 CFR 141.61(a) (1-21).

{NOTE: Contaminants (1-8) are Phase I volatile organic contaminants (VOC's) published in 1988 by EPA. These contaminants are governed by the grandfathered monitoring requirements found at 40 CFR 141.24(g). Contaminants (9-21) are Phase II VOC's and were unregulated prior to July 30, 1992. As unregulated contaminants they were governed by 40 CFR 141.40. However, the monitoring requirements for contaminants (9-21) were effective as of January 1, 1993 with the adoption of the Standard Monitoring Framework. "Unregulated" contaminants are those for which EPA has established a monitoring requirement but has not yet established an associated MCL, Maximum Contaminant Level Goal (MCLG), or treatment technique.

Responsibilities of the State (cont'd.):

4. The number of persons served by the public water system and the proximity of a smaller system to a larger system.

5. How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Surface water systems must consider watershed protection.

E. As a condition of the waiver {specified above}, a groundwater system must take one sample at each sampling point during the time the waiver is effective (i.e., one sample during two compliance periods or six years) and update {the water system's} vulnerability assessment considering the factors listed in {paragraph D of this section}.

1. Based on this {updated} vulnerability assessment the State must reconfirm that the system is non-vulnerable.

2. If the State does not make this reconfirmation within three years of the initial determination, then the waiver is invalidated and the system is required to sample annually as specified in {paragraph B of the Responsibilities of the Owner/Operator}.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated contaminants: Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): *EPA may regulate these contaminants in the future. Monitoring requirements established during the period of January 1, 1988 - December 31, 1992 and prior to the beginning of EPA's first compliance period of the established framework are considered "grandfathered" monitoring requirements. Water systems that have monitored for contaminants (1-21) prior to January 1, 1993 can use this grandfathered or historical data as allowed by paragraph F of Responsibilities of the State to assess if they can reduce the quarterly monitoring requirement for these contaminants}.* C. Each community and non-transient groundwater system which does not detect a contaminant {as specified in paragraph A of this section}, may apply to the State for a waiver from the requirements of {paragraphs B of this section and A of Responsibilities of the State} after completing the initial monitoring. *{NOTE: Per 40 CFR 141.24, detection is defined as greater than or equal to 0.0005 mg/l. A waiver shall be effective for no more than six years or two compliance periods.}* D. Each community and non-transient surface water system which does not detect a contaminant listed in 40 CFR 141.61(a) (1-21) may apply to the State for a waiver from the requirements of {paragraph B of this section} after completing the initial monitoring. 1. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL.	Responsibilities of the State (cont'd.): F. The State may decrease the quarterly monitoring requirement specified in paragraph {D of Responsibilities of the Owner/Operator} provided {the State} has determined that the system is reliably and consistently below the MCL. 1. In no case shall the State make this determination unless a surface water system takes a minimum of four quarterly samples. 2. If the State determines that the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. 3. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result. 4. Systems which have three consecutive annual samples with no detection of a contaminant may apply to the State for a waiver. G. The State may require a confirmation sample for positive or negative results {as determined at E of Responsibilities of the Owner/Operator}. 1. If a confirmation sample is required by the state, the result must be averaged with the first sampling result and the average ... used for the compliance determination as specified {in paragraph F of Responsibilities of the Owner/Operator}.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated contaminants: Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. Systems meeting this criterion must be determined by the State to be non-vulnerable based on a vulnerability assessment during each compliance period. 3. Each system receiving a waiver shall sample at the frequency specified by the State (if any). E. If a contaminant listed in 40 CFR 141.61(a) (2-21) is detected at a level exceeding 0.0005 mg/l in any sample, then the system must monitor quarterly at each sampling point which resulted in a detection. F. Groundwater systems which have detected one or more of the following two-carbon organic compounds: a. Trichloroethylene b. Tetrachloroethylene c. 1,2-dichloroethylene d. 1,1,1-trichloroethane e. Cis-1,2-dichloroethylene f. Trans-1,2-dichloroethylene, or g. 1,1-dichloroethylene, shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point {where} one or more of the two-carbon organic compounds was detected.	Responsibilities of the State (cont'd.): 2. States have discretion to delete results of obvious sampling errors from this calculation. H. The State may reduce the total number of samples a system must analyze by allowing the use of compositing. Composite samples from a maximum of five sampling points are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. 1. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection. 2. If the concentration in the composite sample is $\geq$ 0.0005 mg/l for any contaminant listed in 40 CFR 141.61 (a), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite. 3. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these instead of resampling. The duplicate must be analyzed and the results reported to the State within 14 days of collection. 4. Compositing may only be permitted by the State at sampling points within a single system, unless the population served by {that} system is $\geq$ 3,300 persons.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated contaminants: Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): If the results of the first analysis do not detect vinyl chloride, the State may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. G. Surface water systems are required to monitor for vinyl chloride as specified by the State. H. Systems which violate the {compliance} requirements of 40 CFR 141.61 (a) (1-21) as determined by {paragraph I of this section}, must monitor quarterly. After a minimum of four consecutive quarterly samples which show the system is in compliance as specified in {paragraph I of this section, and the determination is made} that the system is reliable and consistently below the MCL, the system may monitor at the frequency and time specified in {paragraphs C(2) and C(3) of Responsibilities of the State}. I. Compliance with 40 CFR 141.6(a)(1) through (21) shall be determined based on the analytical results obtained at each sampling point. 1. For systems which are conducting monitoring at a frequency greater than annually, compliance is determined by a running annual average of all samples taken at each sampling point. a. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. b. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.	Responsibilities of the State (cont'd.): 5. In systems serving ≥ 3,300 persons, the State may permit compositing among different systems provided the 5 sample limit is maintained. I. States may allow the use of monitoring data collected after January 1, 1988, required under Section 1445 of the {Safe Drinking Water Act} for purposes of initial monitoring compliance. 1. If the data are generally consistent with the other requirements in this section, the State may use these data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of {paragraph A(3) of Responsibilities of the Owner/Operator}. 2. Systems which use grandfathered samples and did not detect any contaminant listed in 40 CFR 141.61(a)(1) through (21) shall begin monitoring annually in accordance with {paragraph B of Responsibilities of the Owner/Operator} beginning with the initial compliance period. J. States may increase required monitoring where necessary to detect variations within the system. Each approved laboratory must determine the method detection limit (MDL), as defined in Appendix B to 40 CFR Part 136 *(Definition and procedure for the determination of the method detection limit-revision 1.11)*, at which it is capable of detecting VOCs. The acceptable MDL is 0.0005 mg/l. This concentration is the detection concentration for purposes of this section.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Organic chemicals (other than total trihalomethanes) as specified at 40 CFR 141.61(a) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL. 3. If a confirmation sample is required by the State, the determination of compliance will be based on the average of two samples. 4. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the State may allow the system to give public notice to only those that are served by the system which is out of compliance.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-transient, non-community

Regulated Contaminants:
Organic chemicals as specified in 40 CFR 141.61(c)

Purpose:
Provides monitoring requirements for determining compliance with the MCLs for organic chemicals (other than total trihalomethanes) as listed in 40 CFR 141.61(c).

References:

40 CFR 141.24	Organic chemicals other than total trihalomethanes, sampling and analytical requirements.
40 CFR 141.61	Maximum contaminant levels for organic contaminants.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Analysis of the contaminants listed in 40 CFR 141.61(c) *(Maximum contaminant levels for organic contaminants*) for the purposes of determining compliance with the MCL shall be conducted as {specified below}.

   1. Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point).

   2. Groundwater systems shall take a minimum of one sample at every entry point to the distribution system which is representative of each well after treatment (hereafter called a sampling point).

   3. Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

B. If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used).

C. Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 40 CFR 141.61(c) during each compliance period beginning with the compliance period starting January 1, 1993.

Responsibilities of the State:

A. {If a determination by the State reveals no previous use of the contaminant within the watershed or zone of influence, a waiver from the monitoring frequencies specified in paragraph C of the Responsibilities of the Owner/Operator may be granted. This evaluation shall be based on knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system}.

B. If previous use of the contaminant is unknown or it {is known that it} has been used previously, then the {State shall analyze the following factors to} determine whether a waiver {should be} granted:

   1. Previous analytical results.

   2. The proximity of the system to a potential point or non-point source of contamination.

      a. Point sources include spills and leaks of chemicals at or near a water treatment facility or at manufacturing, distribution, or storage facilities, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

      b. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, homes and gardens, and other land application uses.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminants: Organic chemicals as specified in 40 CFR 141.61(c) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 1. Systems serving more than 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of two quarterly samples in one year during each repeat compliance period. 2. Systems serving less than or equal to 3,300 persons which do not detect a contaminant in the initial compliance period may reduce the sampling frequency to a minimum of one sample during each repeat compliance period. D. Each community and non-transient water system may apply to the State for a waiver from the requirement of {paragraph C of this section}. A system must reapply for a waiver for each compliance period. E. If an organic contaminant listed in 40 CFR 141.61(c) is detected {systems must conduct the following}: 1. Each system must monitor quarterly at each sampling point which resulted in a detection. 2. If monitoring results in detection of one or more of certain related contaminants (aldicarb, aldicarb sulfone, aldicarb sulfoxide, heptachlor or heptachlor epoxide), then subsequent monitoring shall analyze for all related contaminants. *{NOTE: Per 40 CFR 141.24(h)(18), detection as used in this section is defined as greater than or equal to the contaminant concentration identified in 141.24(h)(18).}*	Responsibilities of the State (cont'd.): 3. The environmental persistence and transport of the pesticide or PCBs. 4. How well the water source is protected against contamination due to such factors as depth of the well, type of soil, and integrity of the well casing. 5. Elevated nitrate levels at the water supply source. 6. {The} use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.). C. The State may decrease the quarterly monitoring requirement specified in {paragraph E(1) of Responsibilities of the Owner/Operator provided the State} has determined that the {contaminant concentrations in the system are} reliably and consistently below the {appropriate} MCLs. 1. In no case shall the State make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface water system takes a minimum of four quarterly samples. 2. After the State determines the system is reliably and consistently below the MCL, the State may allow the system to monitor annually. 3. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminants: Organic chemicals as specified in 40 CFR 141.61(c) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): F. Systems which violate the {compliance} requirements of 40 CFR 141.61 (c) as determined by {paragraph G of this section} must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the State determines the {contaminant concentrations in the system are} reliably and consistently below the {appropriate} MCLs, ... the system shall monitor at the frequency specified in {paragraph C(2) of Responsibilities of the State}. G. Compliance with 40 CFR 141.61(c) shall be determined based on the analytical results obtained at each sampling point. 1. For systems which are conducting monitoring at a frequency greater than annually, compliance is determined by a running annual average of all samples taken at each sampling point. a. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. b. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. c. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average. 2. If monitoring is conducted annually, or less frequently, the system is out of compliance if the level of a contaminant at any sampling point is greater than the MCL.	Responsibilities of the State (cont'd.): 4. Systems which have three consecutive annual samples with no detection of a contaminant may apply to the State for a waiver as specified in {paragraph A of this section}. D. The State may require a confirmation sample for positive or negative results. 1. If a confirmation sample is required by the State, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by {paragraph G(2) of Responsibilities of the Owner/Operator}. 2. States have discretion to delete results of obvious sampling errors from this calculation. E. The State may reduce the total number of samples a system must analyze by allowing the use of compositing. 1. Composite samples from a maximum of five sampling points are allowed provided that the detection limit method used for analysis is less than on-fifth of the MCL. 2. Compositing of samples must be done in the laboratory and {the samples must be} analyzed within 14 days of sample collection.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminants: Organic chemicals as specified in 40 CFR 141.61(c) (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): If a confirmation sample is required by the State, the determination of compliance will be based on the average of two samples. 3. If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the State may allow the system to give public notice to only that portion of the system which is out of compliance. H. Each public water system shall monitor at the time designated by the State within each compliance period.	Responsibilities of the State (cont'd.): 3. If the concentration in the composite sample detects one or more contaminants listed in 40 CFR 141.61(c), then a follow-up sample must be taken and analyzed within 14 days from each sampling point included in the composite. 4. If duplicates of the original sample taken from each sampling point used in the composite are available, the system may use these duplicates instead of resampling. The duplicate must be analyzed and the results reported to the State within 14 days of collection. 5. If the population served by the system is >3,300 persons, then compositing {up to 5 samples} may be permitted by the State at sampling points within {that} single system. In systems serving ≤ 3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained. F. If monitoring data collected after January 1, 1990, are generally consistent with the requirements of {the Responsibilities of the Owner/Operator}, then the State may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993. G. The State may increase the required monitoring frequency, where necessary, to detect variations within the system (e.g., fluctuations in concentration due to seasonal use, changes in water source).

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except for the daughter products of thorium-232, uranium-235, and uranium-238

Purpose:
Provides monitoring requirements for determining compliance with the MCL for gross alpha particle activity, radium-226, radium-228, and manmade radionuclides in community water systems.

References:

40 CFR 141.16	Maximum containment levels for beta particle and proton radioactivity from manmade radionuclides in community water systems.
40 CFR 141.26	Monitoring frequency for radioactivity in community water systems.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. {The} initial sampling to determine compliance with {the MCLs for radium-226, radium-228, and gross alpha particles} shall begin within two years of {January 9, 1978}.

   1. The analysis shall be completed within three years of the effective date of these regulations.

   2. Compliance shall be based on the analysis of an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals.

B. A gross alpha particle activity measurement may be substituted for the required radium-226 and radium-228 analysis, provided that the measured gross alpha particle activity does not exceed 5 pCi/l at a confidence level of 95 percent (1.65σ where σ is the standard deviation of the net counting rate of the sample).

   1. In localities where radium-228 may be present in drinking water, it is recommended that the State require radium-226 and/or radium-228 analyses when the gross alpha particle activity exceeds 2 pCi/l.

   2. When the gross alpha particle activity exceeds 5 pCi/l the same or an equivalent sample shall be analyzed for radium-228.

   3. If the concentration of radium-226 exceeds 5 pCi/l the same or an equivalent sample shall be analyzed for radium-228.

Responsibilities of the State:

A. For the initial {required} analysis ... data acquired within a one-year period prior to the effective date of this part may be substituted at the discretion of the State.

B. At the discretion of the State, when an annual record taken in conformance with {paragraph A of this section} has established that the average annual concentration is less than half the maximum contaminant levels established by 40 CFR 141.15 *(Maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity in community water systems)*, analysis of a single sample may be substituted for the quarterly sampling procedure required by {paragraph A of Responsibilities of the Owner/Operator}.

C. More frequent monitoring shall be conducted when ordered by the State in the vicinity of mining or other operations which may contribute alpha particle radioactivity to either surface or groundwater sources of drinking water.

D. The State may allow the substitution of environmental surveillance data taken in conjunction with a nuclear facility for direct monitoring of manmade radioactivity by the supplier of water where the State determines {that such data are} applicable to a particular community water system {see paragraph G(6) of Responsibilities of the Owner/Operator}.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except for the daughter products of thorium-232, uranium-235, and uranium-238 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): C. Suppliers of water shall monitor at least once every four years following the procedure required by {paragraph A of this section}. 1. A supplier of water shall monitor in conformance with {paragraph A of this section} within one year of the introduction of a new water source for a community water system. 2. More frequent monitoring shall be conducted when ordered by the State in the event of possible contamination or when changes in the distribution system or treatment processing occur which may increase the concentration of radioactivity in finished water. 3. A community water system using two or more sources having different concentrations of radioactivity shall monitor source water, in addition to water from a free-flowing tap, when ordered by the State. D. Suppliers of water shall conduct annual monitoring of any community water system in which the radium-226 concentration exceeds 3 pCi/l, when ordered by the State. E. If the average annual MCL for gross alpha particle activity or total radium ... is exceeded, the supplier of a community water system shall give notice to the State pursuant to 40 CFR 141.31 *(Reporting requirements)* and notify the public as required by 40 CFR 141.32 *(Public notification)*. Monitoring at quarterly intervals shall be continued until the annual average concentration no longer exceeds the MCL or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.	

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except for the daughter products of thorium-232, uranium-235, and uranium-238 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): F. Monitoring requirements for manmade radioactivity in community water systems. *{NOTE: Manmade radioactivity refers to manmade beta particle and photon emitters. This includes all radionuclides that emit beta particles and/or photons listed in "Maximum Permissible Body Burdens and Maximum Permissible Concentration of Radionuclides in Air or Water for Occupational Exposure," NBS Handbook 69, except the daughter products of thorium-232, uranium-235, and uranium-238.}* 1. Within two years of the effective date of this part, systems using surface water sources and serving more than 100,000 persons and such other community water systems as are designated by the State shall be monitored for compliance with 40 CFR 141.16 *(Maximum contaminant levels for Beta particle and photon radioactivity for manmade radionuclides in community water systems)* by analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. *{NOTE: The text of 40 CFR 141.16 reads as follows:* *(a) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water shall not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year.*	

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except for the daughter products of thorium-232, uranium-235, and uranium-238 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): *(b) Except for the radionuclides listed in Table A of 40 CFR 141.16, the concentration of manmade radionuclides causing 4 mrem total body or organ dose equivalents shall be calculated on the basis of a 2 liter per day drinking water intake using the 168 hour data listed in ... the NBS Handbook 69 as amended August 1963, U.S. Department of Commerce. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 millirem/year.}* 2. Compliance with 40 CFR 141.16 *(Maximum contaminant levels for Beta particle and photon radioactivity for manmade radionuclides in community water systems)* may be assumed without further analysis if the average annual concentration of gross beta particle activity is less than 50 pCi/l and if the average annual concentrations of tritium and strontium-90 are less than those listed in Table A {of 40 CFR 141.16 *(Maximum contaminant levels for Beta particle and photon radioactivity for manmade radionuclides in community water systems)*}, provided that if both radionuclides are present, the sum of their annual dose equivalents to bone marrow shall not exceed 4 millirem/year. a. If the gross beta particle activity exceeds 50 pCi/l, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance {of the water system}.	

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except the daughter products of thorium-232, uranium-235, and uranium-238 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): b. Suppliers of water shall conduct additional monitoring, as ordered by the State, to determine the concentration of man-made radioactivity in principal watersheds designated by the State. 3. For the initial analysis required by {paragraph G(1) of this section} data acquired within one year prior to the effective date of this part {40 CFR Part 161} may be substituted at the discretion of the State. 4. After the initial analysis required by {paragraph G of this section} suppliers of water shall monitor at least every four years following the procedure given in {paragraph G of this section}. 5. Within two years of the effective date of these regulations the supplier of any community water system designated by the State as utilizing waters contaminated by effluents from nuclear facilities shall initiate quarterly monitoring for gross beta particle and iodine-131 radioactivity and annual monitoring for strontium-90 and tritium. a. Quarterly monitoring for gross beta particle activity shall be based on the analysis of monthly samples or the analysis of a composite of three monthly samples. The former is recommended. b. If the gross beta particle activity in a sample exceeds 15 pCi/l, the same or an equivalent sample shall be analyzed for strontium-89 and cesium-134.	

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Gross alpha particle activity, radium-226, radium-228, and manmade radionuclides except the daughter products of thorium-232, uranium-235, and uranium-238 (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): c. If the gross beta particle activity exceeds 50 pCi/l, an analysis of the sample must be performed to identify the major radioactive constituents present and the appropriate organ and total body doses shall be calculated to determine compliance {of the water system}. d. For iodine-131, a composite of five consecutive daily samples shall be analyzed once each quarter. As ordered by the State, more frequent monitoring shall be conducted when iodine-131 is identified in the finished water. e. Annual monitoring for strontium-90 and tritium shall be conducted by means of the analysis of a composite of four consecutive quarterly samples or analysis of four quarterly samples. The latter procedure is recommended. 6. If the average annual MCL for man-made radioactivity ... is exceeded, the operator of a community water system shall give notice to the State pursuant to 40 CFR 141.31 *(Reporting requirements)* and to the public as required by 40 CFR 141.32 *(Public notification)*. Monitoring at monthly intervals shall be continued until the concentration no longer exceeds the MCL or until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Total trihalomethanes (TTHMs) (the sum of the concentrations of bromodichloromethane, dibromochloromethane, bromoform, and chloroform)

Purpose:
Community water systems which serve a population of 10,000 or more individuals and which add a disinfectant (oxidant) to the water in any part of the drinking water treatment process shall analyze for total trihalomethanes.

References:

40 CFR 141.12	Maximum contamination levels of organic chemicals.
40 CFR 141.30	Total trihalomethanes sampling, analytical and other requirements.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. For systems serving 75,000 or more individuals, sampling and analysis shall begin not later than 1 year after {November 29, 1979}.

   For systems serving 10,000-74,999 individuals, sampling and analysis shall begin not later than 3 years after {November 29, 1979}.

B. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the State's approval, be considered one treatment plant for determining the minimum number of samples.

   All samples taken within an established frequency shall be collected within a 24-hour period.

C. Analyses for total trihalomethanes shall be performed at quarterly intervals on at least four water samples for each treatment plant used by the system for all community water systems utilizing surface water sources in whole or in part, {or} groundwater sources that have not been determined by the State to qualify for the monitoring requirements of {paragraph D of Responsibilities of the State}.

   1. At least 25 percent of the samples shall be taken at locations within the distribution system reflecting the maximum residence time of the water in the system.

Responsibilities of the State:

A. Upon the written request of a community water system, the monitoring frequency required by {paragraph C of Responsibilities of the Owner/Operator} may be reduced by the State to a minimum of one sample analyzed for TTHMs per quarter taken at a point in the distribution system reflecting the maximum residence time of the water in the system, upon a written determination by the State that the data from at least 1 year of monitoring in accordance with {paragraph C of Responsibilities of the Owner/Operator} and local conditions demonstrate that TTHM concentrations will be consistently below the MCL.

B. If at any time during ... the reduced monitoring frequency ... the results from any analysis exceed 0.10 mg/l of TTHMs, and {if} such {results} are confirmed by at least one check sample taken promptly after such results are received, or if the system makes any significant change to its source of water or treatment program, the system shall immediately begin monitoring in accordance with the requirements of {paragraph C of Responsibilities of the Owner/Operator}.

   1. Monitoring shall continue for at least 1 year before the frequency may be reduced again.

   2. At the option of the State, a system's monitoring frequency may and should be increased above the minimum in those cases where it is necessary to detect variations of TTHM levels within the distribution system.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Total trihalomethanes (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. The remaining 75 percent shall be taken at representative locations in the distribution system, taking into account number of persons served, different sources of water, and different treatment methods employed. 3. The results of all analyses per quarter shall be arithmetically averaged and reported to the State within 30 days of the system's receipt of such results. a. Results shall also be reported to EPA until such monitoring requirements have been adopted by the State. b. All samples collected shall be used in the computation of the average, unless the analytical results are invalidated for technical reasons. D. Compliance with 40 CFR 141.12(c) *(Maximum contaminant levels for organic chemicals)* shall be determined based on a running annual average of quarterly samples collected by the system as prescribed in {paragraph A(1) of this section}. 1. If the average of samples covering any 12-month period exceeds the {MCL}, the supplier of water shall report to the State pursuant to 40 CFR 141.31 *(Reporting requirements)* and notify the public pursuant to 40 CFR 141.32 *(Public notification)*. 2. Monitoring after public notification shall be at a frequency designated by the State and shall continue until a monitoring schedule as a condition to a variance, exemption, or enforcement action shall become effective.	Responsibilities of the State (cont'd.): C. At a minimum, a State-approved plan shall require the system modifying its disinfection practice to: 1. Evaluate the water system for sanitary defects and evaluate the source water for biological quality; 2. Evaluate its existing treatment practices and consider improvements that will minimize disinfectant demand and optimize finished water quality throughout the distribution system; 3. Provide baseline water quality survey data of the distribution system. 4. Conduct additional monitoring to assure continued maintenance of optimal biological quality in finished water. Additional monitoring should also be required by the State for chlorate, chlorite, and chlorine dioxide when chlorine dioxide is used. 5. Consider inclusion in the plan of provisions to maintain an active disinfectant residual throughout the distribution system at all times during and after the modification. D. Upon written request to the State, a community water system utilizing only groundwater sources may seek to have the monitoring frequency required by {paragraph C of Responsibilities of

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Total trihalomethanes (cont'd.)		Responsibilities of the State (cont'd.): the Owner/Operator} reduced to a minimum of one sample for maximum TTHM potential per year for each treatment plant used by the system taken at a point in the system {which reflects} the maximum residence time of the water in the system. 1. The system shall submit to the State the results of at least one sample analyzed for maximum TTHM potential for each treatment plant used by the system {and} taken at a point in the distribution system {which reflects} the maximum residence time of the water in the system. 2. The system's monitoring frequency may only be reduced upon a written determination by the State that, based upon the data submitted by the system, the system has a maximum TTHM potential of less than 0.10 mg/l and that, based upon an assessment of the local conditions of the system, {it is unlikely} that the system {will} approach or exceed the MCL for total TTHMs. 3. Results of all analyses shall be reported to the State within 30 days of the system's receipt of such results. a. Results shall also be reported to {the} EPA until such monitoring requirements have been adopted by the State. b. All samples collected shall be used for determining whether the system must comply with the monitoring requirements in {paragraph C of Responsibilities of the Owner/Operator}.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community Regulated Contaminant: Inorganic and organic chemicals Purpose: Provides requirements for monitoring water systems for additional organic contaminants. References: 40 CFR 141.40 Special monitoring for inorganic and organic chemicals. Authority: 42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.	Responsibilities of the Owner/Operator: A. All community and non-transient, non-community water systems shall monitor for the {organic} contaminants listed in {paragraph D of this section}. 1. {For systems serving over 10,000 people, monitoring should have begun no later than January 1, 1988}. 2. {For systems serving 3,300 to 10,000 persons, monitoring should have begun no later than January 1, 1989}. 3. {For systems serving less than 3,300 persons, monitoring should have begun no later than January 1, 1991}. B. Surface water systems shall sample at points in the distribution system {which are} representative of each water source or at entry points to the distribution system after any application of treatment. The minimum number of samples is one year of quarterly samples per water source. C. Groundwater systems shall sample at {entry points} to the distribution system {that are} representative of each well after any application of treatment. The minimum number of samples is one sample per entry point.	Responsibilities of the State: A. The State may require confirmation samples for positive or negative results. B. Monitoring for the following compounds is required at the discretion of the State: (1) 1,2,4-Trimethylbenzene; (2) 1,2,4-Trichlorobenzene; (3) 1,2,3-Trichlorobenzene; (4) n-Propylbenzene; (5) n-Butylbenzene; (6) Naphthalene; (7) Hexachlorobutadiene; (8) 1,3,5-Trimethylbenzene; (9) p-Isopropyltoluene; (10) Isopropylbenzene; (11) Tert-butylbenzene; (12) Sec-butylbenzene; (13) Fluorotrichloromethane; (14) Dichlorodifluoromethane; (15) Bromochloromethane.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminant: Inorganic and organic chemicals (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. Community water systems and non-transient, non-community water systems shall monitor for the following contaminants: 1. Chloroform 2. Bromodichloromethane 3. Chlorodibromomethane 4. Bromoform 5. Chlorobenzene 6. m-Dichlorobenzene 7. 1,1-Dichloropropene 8. 1,1-Dichloroethane 9. 1,1,2,2-Tetrachloroethane 10. 1,3-Dichloropropane 11. Chloromethane 12. Bromomethane 13. 1,2,3-Trichloropropane 14. 1,1,1,2-Tetrachloroethane 15. Chloroethane 16. 2,2-Dichloropropane 17. o-Chlorotoluene 18. p-Chlorotoluene 19. Bromobenzene 20. 1,3-Dichloropropene E. Public water systems may use monitoring data collected any time after January 1, 1983 to meet the requirements for unregulated monitoring, provided that the monitoring program was consistent with the requirements of this section. F. All community and non-transient, non-community water systems shall repeat the monitoring required in {this section} no less frequently than every five years from the dates specified {in paragraph A of this section}. G. States or public water systems may composite up to five samples when monitoring for substances {listed in paragraph D of this section or paragraph B of the Responsibilities of the State}.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community and/or non-transient, non-community

Regulated Contaminant:
Unregulated organic and inorganic contaminants ["Unregulated" contaminants are those for which EPA has established a monitoring requirement but has not yet established an associated MCL, Maximum Contaminant Level Goal (MCLG), or treatment technique. EPA may regulate these contaminants in the future.]

Purpose:
Community and/or non-transient non-community water systems are required to monitor for the listed unregulated contaminants and report all results to the State.

References:
40 CFR 141.40 Special monitoring for inorganic and organic chemicals.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. {Community and non-transient, non-community water systems shall monitor for the following unregulated contaminants}:

   1. Unregulated organic contaminants.

      a. Aldrin
      b. Butachlor
      c. Carbaryl
      d. Dicamba
      e. Dieldrin
      f. 3-Hydroxycarbofuran
      g. Methomyl
      h. Metolachlor
      i. Metribuzin
      j. Propachlor

   2. {Sulfate is the only unregulated inorganic contaminant}.

B. Monitoring of the contaminants listed in {paragraph A of this section must be completed by December 31, 1995 and} shall be conducted as follows:

   1. Each community and non-transient, non-community water system shall take four consecutive quarterly samples at each sampling point for each contaminant listed in {paragraph A(1) of this section} and report the results to the State.

   2. Each community and non-transient non-community water system shall take one sample at each sampling point for {sulfate} and report the results to the State.

Responsibilities of the State:

A. The State may grant a waiver for the requirement of {paragraph B of Responsibilities of the Owner/Operator based on the factor specified in 40 CFR 141.24(h)(6) *(Organic chemicals other than total trihalomethanes, sampling and analytical requirements).*} {The required factor is:} knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system.

B. The State may grant a waiver from the requirement of {paragraph B(2) of Responsibilities of the Owner/Operator} if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

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

D. The State may reduce the total number of samples a system must analyze by allowing the use of compositing.

   1. Composite samples from a maximum of five sampling points are allowed.

   2. Compositing of samples must be done in the laboratory and the composite sample must be analyzed within 14 days of collection.

   3. If the population served by the system is > 3,300 persons, then compositing may only be permitted by the State at sampling points within a single system.

Regulated Unit: Public water systems -- community and/or non-transient, non-community (cont'd.) Regulated Contaminant: Unregulated organic and inorganic contaminants (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): {As stated in 40 CFR 141.40 (l), monitoring for sulfate shall occur no less frequently than every five years from the dates specified in paragraph A of Responsibilities of the Owner/Operator on page 36.} 3. Each community and non-transient non-community water system may apply to the State for a waiver from the requirements of {paragraph B(1) and B(2), of this section}. C. Surface water systems shall take a minimum of one sample at points in the distribution system that are representative of each source or at each entry point to the distribution system after treatment (hereafter called a sampling point). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. D. If the system draws water from more than one source and the sources are combined before distribution, the system must sample at an entry point to the distribution system during periods of normal operating conditions (i.e., when water representative of all sources is being used). E. Instead of performing the monitoring required by this section, a community water system or non-transient non-community water system serving fewer than 150 service connections may send a letter to the State {announcing} that the system is available for sampling. 1. This letter must be sent to the State by January 1, 1994. 2. The system shall not send such samples to the State, unless requested to do so by the State.	Responsibilities of the State (cont'd.): 4. In systems serving ≤ 3,300 persons, the State may permit compositing among different systems provided the 5-sample limit is maintained.

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community Regulated Contaminant: Sodium Purpose: Provides monitoring requirements for community water systems to determine sodium concentration levels. References: 40 CFR 141.41 Special monitoring for sodium. Authority: 42 U.S.C. 300,f 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.	Responsibilities of the Owner/Operator: A. Suppliers of water for community public water systems shall collect and analyze one sample per plant at the entry point of the distribution system for the determination of sodium concentration levels. 1. Samples must be collected and analyzed annually for systems utilizing surface water sources in whole or in part and at least every three years for systems utilizing solely groundwater sources. 2. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the State's approval, be considered one treatment plant for determining the minimum number of samples. B. The supplier of water shall report to EPA and/or the State the results of the analyses for sodium within the first 10 days of the month following the month in which the sample results were received or within the first 10 days following the end of the required monitoring period as stipulated by the State, whichever of these is first. 1. If more than annual sampling is required, the supplier shall report the average sodium concentration within 10 days of the month following the month in which the analytical results of the last sample used for the annual average was received. 2. The supplier of water shall not be required to report the results to EPA where the State has adopted this regulation and results are reported to the State.	Responsibilities of the State: {The State may require the supplier of water} to collect and analyze water samples for sodium more frequently in locations where the sodium content is variable.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Sodium (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. The supplier shall report the results to EPA where the State has not adopted this regulation. C. The supplier of water shall notify appropriate local and State public health officials of the sodium levels by written notice (by direct mail) within three months. 1. A copy of each notice required to be provided by this paragraph shall be sent to EPA and/or the State within 10 days of its issuance. 2. The supplier of water is not required to notify appropriate local and State public health officials of the sodium levels where the State provides such notices in lieu of the supplier.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Characteristics of corrosivity

Purpose:
Provides monitoring requirements to determine the corrosivity characteristics of water in community water systems.

References:
40 CFR 141.42 Special monitoring for corrosivity characteristics.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. Suppliers of water for community public water systems shall collect samples from a representative entry point to the water distribution system for the purpose of analysis to determine the corrosivity characteristics of the water.

   1. For each plant using surface water sources wholly or in part, the supplier shall collect two samples per plant for analysis (or more, if required by the State), one during mid-winter and one during mid-summer.

   2. The supplier of water shall collect one sample per plant for analysis for each plant using groundwater sources (or more if required by the State).

   3. The minimum number of samples required to be taken by the system shall be based on the number of treatment plants used by the system, except that multiple wells drawing raw water from a single aquifer may, with the State's approval, be considered one treatment plant for determining the minimum number of samples.

B. Determination of the corrosivity characteristics of the water shall include measurement of pH, calcium hardness, alkalinity, temperature, total dissolved solids (total filterable residue), and calculation of the Langelier Index.

   The determination of corrosivity characteristics shall only include one round of sampling (two samples per plant for surface water and one sample per plant for groundwater sources). However, States may require more frequent monitoring as appropriate.

Responsibilities of the State:

A. States may require more frequent monitoring {than what is required in paragraphs A and B of Responsibilities of the Owner/Operator}.

B. In addition, States have the discretion to require monitoring for additional parameters which may indicate corrosivity characteristics, such as sulfates and chlorides.

C. In addition, States may require identification and reporting of other materials of construction present in distribution systems that may contribute contaminants to the drinking water, such as:

   1. Vinyl-lined asbestos cement pipe; and

   2. Coal tar-lined pipes and tanks.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Characteristics of corrosivity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): C. The supplier of water shall report to EPA and/or the State the results of the analyses for the corrosivity characteristics within the first 10 days of the month following the month in which the sample results were received. 1. If more frequent sampling is required by the State, the supplier can accumulate the data and shall report each value within 10 days of the month following the month in which the analytical results of the last sample were received. 2. The supplier of water shall not be required to report the results to EPA where the State has adopted this regulation and results are reported to the State. D. Community water supply systems shall identify whether the following construction materials are present in their distribution system and report {all results of that determination} to the State: 1. Lead from piping, solder, caulking, interior lining of distribution mains, alloys, and home plumbing; 2. Copper from piping and alloys, service lines, and home plumbing; 3. Galvanized piping, service lines, and home plumbing; 4. Ferrous piping materials such as cast iron and steel; and, 5. Asbestos cement pipe.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community systems providing filtration treatment

Regulated Contaminant:
Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity

Purpose:
Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide filtration as a treatment technique in lieu of determining the MCLs for the above regulated contaminants.

References:

40 CFR 141.70	General requirements.
40 CFR 141.74	Analytical and monitoring requirements.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. A public water system that uses a surface water source or a groundwater source under the influence of surface water and provides filtration treatment must monitor in accordance with {this section} beginning June 29, 1993, or when filtration is installed, whichever is later.

   1. Turbidity measurements as required by 40 CFR 141.73 *(Filtration)* must be performed on representative samples of the system's filtered water every four hours (or more frequently) that the system serves water to the public.

   2. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State.

B. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously.

   1. The lowest value must be recorded each day.

   2. If there is a failure in the continuous monitoring equipment, grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment.

   3. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis at {frequencies specified below. The day's samples cannot be taken at the same time. The sampling intervals are subject to State review and approval}.

Responsibilities of the State:

A. {The state may reduce the sampling frequency} for any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration {to once per day, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance of the water system. See paragraph A(1) of Responsibilities to the Owner/Operator}.

B. For systems serving 500 or fewer persons, the State may reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the State determines that less frequent monitoring is sufficient to indicate effective filtration performance.

C. The State may allow a public water system {with a surface, surface/ground, or groundwater source} to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality within the distribution system.

   Heterotrophic plate count (HPC) ... may be measured in lieu of {the} residual disinfectant concentration.

Regulated Unit: Public water systems -- community systems providing filtration treatment (cont'd.) Regulated Contaminant: Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): a. {Systems serving less than or equal to 500 persons are required to take 1 sample per day.} b. {Systems serving 501 to 1,000 persons are required to take 2 samples per day.} c. {Systems serving 1,001 to 2,500 persons are required to take 3 samples per day.} d. {Systems serving 2,501 to 3,300 persons are required to take 4 samples per day.} 4. If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l. C. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in 40 CFR 141.21 (*Coliform sampling)*.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community systems that do not provide filtration

Regulated Contaminant:
Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity

Purpose:
Each public water system with a surface water source or a ground water source under the direct influence of surface water that do not provide filtration as a treatment technique must provide monitoring for the above regulated contaminants.

References:

40 CFR 141.70	General requirements.
40 CFR 141.74	Analytical and Monitoring requirements.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. A public water system that uses a surface water source and does not provide filtration treatment must begin monitoring ... December 31, 1990, unless the State has {provided a written determination that filtration is required} pursuant to Section 1412(b)(7)(C)(iii) {of the Safe Drinking Water Act} in which case the State may specify alternative monitoring requirements, as appropriate, until filtration is in place.

B. A public water system that uses a groundwater source under the direct influence of surface water and does not provide filtration treatment must begin monitoring ... December 31, 1990, or 6 months after the State determines that the groundwater source is under the direct influence of surface water, whichever is later, unless the State has {provided a written determination that filtration is required} pursuant to Section 1412(b)(7)(C)(iii) {of the Safe Drinking Water Act}, in which case the State may specify alternative monitoring requirements, as appropriate, until filtration is in place.

C. Fecal coliform or total coliform density measurements as required by 40 CFR 141.71(a)(1) *(Criteria for avoiding filtration)* must be performed on representative source water samples immediately prior to the first or only point of disinfectant application.

    1. The system must sample for fecal or total coliforms each week the system serves water to the public at a minimum frequency {determined by the population served by the system as specified below. Multiple samples must be taken on separate days}.

Responsibilities of the State:

A. {The} State may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water ... to take disinfectant residual samples at points other than the total coliform sampling points if the State determines that such points are more representative of treated (disinfected) water quality.

B. If the State determines, based on site-specific considerations, that a system has no means for having a sample transported and analyzed for HPC by a certified laboratory under the requisite time and temperature conditions ... and that the system is providing adequate disinfection in the distribution system, the {requirements specified in paragraph G of the Responsibilities of the Owner/Operator do not apply to that system}.

Regulated Unit: Public water systems -- community systems that do not provide filtration (cont'd.) Regulated Contaminant: Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): a. {Systems serving less than or equal to 500 persons should take 1 sample per week}. b. {Systems serving 501 to 3,300 persons should take 2 samples per week}. c. {Systems serving 3,301 to 10,000 persons should take 3 samples per week}. d. {Systems serving 10,001 to 25,000 persons should take 4 samples per week}. e. {Systems serving more than 25,000 persons should take 5 samples per week}. 2. One fecal or total coliform density measurement must be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU (these samples count towards the coliform sampling requirement) unless the State determines that the system, for logistical reasons outside the system's control, cannot have the sample analyzed within 30 hours of collection. 3. Turbidity measurements as required by 40 CFR 141.71(a)(2) *(Criteria for avoiding filtration)* must be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours (or more frequently) that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol approved by the State.	

Regulated Unit: Public water systems -- community systems that do not provide filtration (cont'd.) Regulated Contaminant: Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. The total inactivation ratio for each day that the system is in operation must be determined based on the $CT_{99.9}$ values in Tables 1.1-1.6, 2.1, and 3.1 {of 40 CFR 141.74 *(Analytical and monitoring requirements)*}, as appropriate. E. The parameters necessary to determine the total inactivation ratio must be monitored as follows: 1. The temperature of the disinfected water must be measured at least once per day at each residual disinfectant concentration sampling point. 2. If the system uses chlorine, the pH of the disinfected water must be measured at least once per day at each chlorine residual disinfectant concentration sampling point. 3. The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow. 4. The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow. 5. If a system uses a disinfectant other than chlorine, the system may demonstrate to the State, through the use of a State-approved protocol for on-site disinfection challenge studies or other information satisfactory to the State, that $CT_{99.9}$ values other than those specified in Tables 2.1 and 3.1 {of 40 CFR 141.74 *(Analytical and monitoring requirements)* or} other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by 40 CFR 141.72(a)(1) *(Disinfection)*.	

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community systems that do not provide filtration (cont'd.) Regulated Contaminant: Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): F. The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be recorded each day, except that if there is a failure in the continuous monitoring equipment: 1. Grab sampling every 4 hours may be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment. 2. Systems serving 3,300 or fewer persons may take grab samples in lieu of providing continuous monitoring on an ongoing basis. G. {Monitoring frequencies for the grab samples specified in F(2) of this section are determined by the population served by the system as specified below}. Samples cannot be taken at the same time. The sampling intervals are subject to State review and approval. 1. {Systems serving a population of up to 500 persons shall take 1 sample per day}. 2. {Systems serving a population of 501 to 1,000 shall take 2 samples per day}. 3. {Systems serving a population of 1,001 to 2,500 shall take 3 samples per day}. 4. {Systems serving a population of 2,501 to 3,300 shall take 4 samples per day}.	

Regulated Unit: Public water systems -- community systems that do not provide filtration (cont'd.) Regulated Contaminant: Giardia lamblia, viruses, heterotrophic plate count bacteria (HPC), Legionella, and turbidity (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system must take a grab sample every 4 hours until the residual concentration is equal to or greater than 0.2 mg/l. H. The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in 40 CFR 141.21 *(Coliform sampling)*. Heterotrophic bacteria, measured as heterotrophic plate count (HPC) ... may be measured in lieu of residual disinfectant concentration.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Copper and lead in source water

Purpose:
All water systems exceeding the lead or copper action levels after initial tap monitoring are required to collect source water samples and submit the results to the State.

References:

40 CFR 141.80	General requirements.
40 CFR 141.88	Monitoring requirements for lead and copper in source water.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibility of the Owner/Operator:

A. Any system which exceeds the lead or copper action level at the tap shall collect one source water sample from each entry point to the distribution system within six months after the exceedance.

B. Any system which installs source water treatment pursuant to CFR 141.83(a)(3) *(Source-water treatment requirements)* shall collect an additional source-water sample from each entry point to the distribution system during two consecutive six-month monitoring periods by the deadline specified in CFR 141.83(a)(4) *(Source-water treatment requirements)*.

C. In cases where the State specifies maximum permissible source-water levels under CFR 141.83(b)(4) *(Source-water treatment requirements)* or determines that the system is not required to install source-water treatment under CFR 141.83(b)(2) *(Source-water treatment requirements)*, {a system shall monitor at the frequencies specified below}.

1. A water system using surface water (or a combination of surface and groundwater) shall collect samples once during each year, the first annual monitoring period to begin on the date on which the applicable State determination is made.

2. A system is not required to conduct source-water sampling for lead and/or copper if the system meets the action level for the specific contaminant in tap water samples during the entire source water sampling period applicable to the system.

Responsibilities of the State:
None specified.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Copper and lead in source water (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. A water system using surface water (or a combination of surface and groundwater) which demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the State ... for at least three consecutive years may reduce the monitoring frequency in {paragraph C of this section} to once during each nine-year compliance cycle. {The first compliance cycle runs from January 1, 1993, through December 31, 2001}. E. A water system that uses a new source of water is not eligible for reduced monitoring for lead and/or copper until concentrations in samples collected from the new source during three consecutive monitoring periods are below the maximum permissible lead and copper concentrations specified by the State in 40 CFR 141.83(a)(5) *(Source water treatment requirements)*.	

Drinking Water Monitoring Requirements

Regulated Unit:
Public water systems -- community

Regulated Contaminant:
Copper and lead in tap water

Purpose:
Provides monitoring requirements for determining the lead and copper action levels in a water system. An action level is the concentration of the contaminant in the water and in some cases determines the treatment requirements a water system is required to complete.

References:

40 CFR 141.80	General requirements.
40 CFR 141.86	Monitoring requirements for copper and lead in tap water.

Authority:
42 U.S.C. 300f, 300g-1, 300g-2, 300g-3, 300g-4, 300g-5, 300g-6, 300j-4, and 300j-9.

Responsibilities of the Owner/Operator:

A. The first six-month monitoring period for {water systems are as follows}:

   1. {Small systems (serving 3,300 or less) shall begin the first monitoring period on July 1, 1993.}

   2. {Medium systems (serving 3,301 to 50,000) shall begin the first monitoring period on July 1, 1992.}

   3. {Large systems (serving 50,000 or greater) shall begin the first monitoring period on January 1, 1992.}

B. All large systems shall monitor during two consecutive six-month periods.

C. All small and medium-size systems shall monitor during each six-month monitoring period until:

   1. The system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under 40 CFR 141.81 *(Applicability of corrosion control treatment steps to small, medium-size, and large water systems)*, in which case the system shall continue monitoring in accordance with {paragraph D of this section}, or

   2. The system meets the lead and copper action levels during two consecutive six-month monitoring periods, in which case the system may reduce monitoring in accordance with {paragraph F of this section}.

Responsibilities of the State:
None specified.

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Copper and lead in tap water (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. {Systems shall conduct monitoring after installation of corrosion control and source water treatment}. 1. Any large system which installs optimal corrosion control treatment {by January 1, 1997} shall monitor during two consecutive six-month monitoring periods by {January 1, 1998}. 2. Any small or medium-size system which installs optimal corrosion control treatment {within 24 months after the State designates such treatment} shall monitor during two consecutive six-month monitoring periods {within 36 months after the State designates optimal corrosion control treatment}. 3. Any system which installs source water treatment pursuant to 40 CFR 141.83(a)(3) *(Source water treatment requirements)* shall monitor during two consecutive six-month monitoring periods by {36 months after installation of source water treatment}. E. {Systems shall monitor water quality parameter values after such values for optimal corrosion control are specified by the State}. The system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the State specifies the optimal values under 40 CFR 141.82(f) *(Description of corrosion control treatment requirements*).	

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Copper and lead in tap water (cont'd.)	Responsibilities of Owner/Operator (cont'd.): F. {Systems may have monitoring frequencies reduced}. 1. A small or medium-size water system that meets the lead and copper action levels during each of the two consecutive six-month monitoring periods may reduce the number {of samples collected during standard monitoring} and reduce the frequency of sampling to once per year. 2. Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State ... during each of two consecutive six-month monitoring periods may request that the State allow the system to reduce the frequency of monitoring to once per year and to reduce the number of lead and copper samples. 3. A small- or medium-size water system that meets the lead and copper action levels during three consecutive years of monitoring may reduce the frequency of monitoring for lead and copper from annually to once every three years. Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the State under 40 CFR 141.82(f) *(Description of corrosion control treatment requirements)* during three consecutive years of monitoring may request that the State allow the system to reduce the frequency of monitoring from annually to once every three years.	

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Copper and lead in tap water (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 4. A water system that reduces the number of samples and frequency of sampling shall collect these samples from {the selected sample sites identified in a materials evaluation}. *{NOTE: Systems conduct a materials evaluation that yields a pool of adequate sampling sites from high-risk residences (those residences that are at the ends of the distribution system and either (1) had lead service connections and/or lead interior plumbing or (2) had lead solder that was less than 5 years old)}.* 5. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August, or September. 6. A small- or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance with {paragraph E of this section} and collect the number of samples specified for standard monitoring. a. Such system shall also conduct water quality parameter monitoring in accordance with 40 CFR 141.87(b), (c), or (d) (as appropriate) during the monitoring period in which it exceeded the action level. b. Any water system subject to the reduced monitoring frequency that fails to operate within the range of values for the water quality parameters specified by the State ... shall resume tap water sampling in accordance with {paragraph E of this section} and collect the number of samples specified for standard monitoring.	

Drinking Water Monitoring Requirements

Regulated Unit: Public water systems -- community (cont'd.) Regulated Contaminant: Copper and lead in tap water (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): G. The results of any monitoring conducted in addition to the minimum requirements ... shall be considered by the system and the State in making any determinations.	

MEDIUM: GROUNDWATER

Pursuant to DOE Order 5400.1 "groundwater that is or could be affected by DOE activities shall be monitored to determine and document the effects of operations on groundwater quality and quantity and to demonstrate compliance with DOE requirements and applicable Federal, State, and local laws and regulations." Each DOE facility is required by this Order to develop and design a site-specific groundwater monitoring plan as part of the Groundwater Protection Management Program. The plan includes all elements of the monitoring program (sampling, analysis, data management, recordkeeping). The groundwater monitoring program should accomplish the following:

- Obtain data for the purpose of determining baseline conditions of groundwater quality and quantity.
- Demonstrate compliance with and implementation of all applicable regulations and DOE Orders.
- Provide data to permit the early detection of groundwater pollution or contamination.
- Identify existing and potential groundwater contamination sources and maintain surveillance of these sources.
- Provide data upon which decisions can be made concerning land disposal practices and the management and protection of groundwater resources.

In addition to DOE's requirements, facilities must also comply with EPA requirements as specified in the CFR. The majority of these requirements are regulated under RCRA. All RCRA facilities (e.g., surface impoundments, landfills, waste piles, tank systems, incinerators, land treatment units, and miscellaneous units) are required to comply with the groundwater monitoring regulations of Subpart F in 40 CFR Parts 264 and 265. Additionally, some RCRA units may have groundwater monitoring requirements specific to that unit. Other statutes, such as TSCA, impose special groundwater monitoring regulations (e.g., for PCB items).

To emphasize differences in the requirements, this chapter is divided into two sections of summary tables, one addressing program-specific requirements and the other addressing unit-specific requirements.

Information pertaining to groundwater monitoring regulatory requirements is organized into the following categories:

- Regulated unit or program
- Purpose
- Authority
- References

- Responsibilities of the Owner/Operator
- Responsibilities of the Regional Administrator

In the program-specific sections, the following groundwater monitoring program elements are addressed by the summary tables:

- Compliance Monitoring Program.
- Detection Monitoring Program.
- Corrective Action Program.
- General Monitoring Program. A summary table is included for facilities with final or interim status.

The following chart indicates the prerequisites for each unit:

Regulated Unit	RCRA Program Requirements	RCRA Unit Requirements	TSCA Unit Requirements
Surface Impoundments	●		
Tank Systems	●		
Waste Piles	●		
Land Treatment Units	●		
Landfills	●		
Incinerators	●		
Miscellaneous Units*	●	●	
PCB Commercial Storers			●
Chemical Waste Landfills			●
Class I Waste Injection Wells (hazardous)		●	
Class I Waste Injection Wells (non-hazardous)		●	

*An example of a DOE unit that is regulated as a miscellaneous unit is the Waste Isolation Pilot Plant (WIPP) located in Carlsbad, New Mexico.

Class I (hazardous and non-hazardous) waste injection wells regulated by RCRA interim guidance are presented in this section. As specified at 40 CFR Part 265 Subpart R, Class I waste injection wells, during interim status, must comply with the interim status groundwater monitoring regulations of 40 CFR Part 265 Subpart F.

Current regulations for Class II and III waste injection wells contain monitoring requirements

that are project-based or related to monitoring of the well (e.g., monitoring of mechanical integrity) and do not refer to groundwater monitoring. Class V waste injection well regulations specify monitoring of inventory, etc. and not specifically groundwater. Revised regulations for both Class II and Class V wells are forthcoming from EPA.

Note: EPA has reserved, but not exercised, the right to promulgate regulations for Class IV wells (wells used for the disposal of radioactive waste). Class IV wells are only operable under CERCLA or RCRA clean-up.

Groundwater Chapter Specifications

- For consistency, groundwater will be one word throughout this chapter.
- Groundwater means the water below the land surface in a zone of saturation.

For additional assistance, DOE staff and contractors who have questions concerning groundwater monitoring may contact the Office of Environmental Policy and Assistance, Air/Water/Radiation Division (EH-412) at (202) 586-6374.

Note: Monitoring requirements for new hazardous waste land disposal facilities can be found at 40 CFR Part 267. However, these regulations were applicable only until final Part 264 regulations became effective or until February 13, 1983. Therefore, Part 267 groundwater monitoring requirements are not included in this chapter. See 40 CFR 267.3 (Duration of Part 267 standards and their relationship to permits).

Groundwater Monitoring
Unit-specific Requirements

Regulated Unit:
Miscellaneous units {Miscellaneous units are defined at 40 CFR 260.10 *(Definitions)* as "a hazardous waste management unit where hazardous waste is treated, stored, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under 40 CFR Part 146, or unit eligible for a research, development, and demonstration permit under 40 CFR 270.65 *(Research development, and demonstration permits)*."}

Purpose:
Provide the minimum groundwater monitoring requirements to owners and operators of facilities that treat, store, or dispose of hazardous waste in miscellaneous units, except as 40 CFR 264.1 *(Purpose, scope, and availability)* provides otherwise.

References:

40 CFR 264.600	Applicability.
40 CFR 264.602	Monitoring, analysis, inspection, response, reporting and corrective action.

Authority:
42 U.S.C. 6905, 6921(a), 6924, and 6925.

Responsibilities of the Owner/Operator:

A. Monitoring, testing, analytical data, inspections, response, and reporting procedures and frequencies must ensure compliance with the following as well as meet any additional requirements needed to protect human health and the environment as specified in the permit:

1. 40 CFR 264.601 *(Environmental performance standards)*,
2. 40 CFR 264.15 *(General inspection requirements)*,
3. 40 CFR 264.33 *(Testing and maintenance of equipment)*,
4. 40 CFR 264.75 *(Biennial report)*,
5. 40 CFR 264.76 *(Unmanifested waste report)*,
6. 40 CFR 264.77 *(Additional reports)*, and
7. 40 CFR 264.101 *(Corrective action for solid waste management units).*

Responsibilities of the Regional Administrator:
None specified.

Groundwater Monitoring
Unit-specific Requirements

Regulated Unit: PCB commercial storer Purpose: Provides the minimum groundwater monitoring requirements for closing facilities that store PCB waste. References: 40 CFR 761.65 Storage for disposal. Authority: 15 U.S.C. 2604, 2607, and 2625(c). (Sec. 6, Pub. L. 94-469, 90 Stat. 2020, 15 U.S.C. 2605)	Responsibilities of the Owner/Operator: A. A commercial storer of PCB waste shall have a written closure plan that identifies the steps that the owner or operator of the facility shall take to close the PCB waste storage facility. B. {The closure plan should include} a detailed description of other activities necessary during the closure period to ensure that any post-closure releases of PCBs will not present unreasonable risks to human health or the environment. This includes activities such as groundwater monitoring	Responsibilities of the Regional Administrator: None specified.

Groundwater Monitoring
Unit-specific Requirements

Regulated Unit: Chemical waste landfills Purpose: Provide owners and operators of chemical waste landfills used for the disposal of PCBs and PCB Items with groundwater monitoring requirements. Reference: 40 CFR 761.75 Chemical waste landfills. Authority: 15 U.S.C. 2604, 2607, and 2625(c). (Sec. 6, Pub. L. 94-469, 90 Stat. 2020, 15 U.S.C. 2605)	Responsibilities of the Owner/Operator: A. If underlying earth materials are homogenous, impermeable, and uniformly sloping in one direction, only three sampling points shall be necessary. These three points shall be equally spaced on a line through the center of the disposal area and extending from the area of highest water table elevation to the area of the lowest water table elevation on the property. B. All monitoring wells shall be cased. 1. The annular space between the monitor zone (zone of saturation) and the surface shall be completely backfilled with portland cement or an equivalent material and plugged with portland cement to effectively prevent percolation of surface water into the well bore. 2. The well opening at the surface shall have a removable cap to provide access and prevent entrance of rainfall or stormwater runoff. 3. The well should be pumped to remove the volume of liquid initially contained in the well before obtaining a sample for analysis.	Responsibilities of the Regional Administrator: {The Regional Administrator approves the facility operation plan that includes a detailed explanation of monitoring procedures and monitoring wells.}

Groundwater Monitoring
Unit-specific Requirements

Regulated Unit:
Class I nonhazardous waste injection wells. {Class I nonhazardous waste injection wells are defined at 40 CFR 146.5 *(Classification of injection wells)* as "industrial and municipal disposal wells which inject fluids beneath the lowermost formation containing, within one-quarter (1/4) mile of the well bore, an underground source of drinking water."}

Purpose:
Provides groundwater monitoring requirements for underground injection control programs to regulate Class I nonhazardous waste injection wells.

References:

40 CFR 146.11	Criteria and standards applicable to Class I nonhazardous wells.
40 CFR 146.13	Operating, monitoring and reporting requirements.

Authority:
Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*; RCRA, 42 U.S.C. 6901 *et seq.*

Responsibilities of the Owner/Operator:

A. Monitoring requirements shall, at a minimum, include ... the type, number and location of wells within the area of review to be used to monitor any migration of fluids into and pressure in the underground sources of drinking water, the parameters to be measured and the frequency of monitoring.

Responsibilities of the Director:

A. Based on a site-specific assessment of the potential for fluid movement from the well or injection zone and on the potential value of monitoring wells to detect such movement, the Director shall require the owner or operator to develop a monitoring program. At a minimum, the Director:

1. Shall require monitoring of the pressure buildup in the injection zone annually, including at a minimum, a shut down to the well for a time sufficient to conduct a valid observation of the pressure fall-off curve.

2. May require periodic monitoring of the groundwater quality in the first aquifer overlying the injection zone.

3. May also require the use of indirect, geophysical techniques to determine the position of the waste front, the water quality in a formation designated by the Director, or to provide-other {site-specific} data.

4. May also require periodic monitoring of the groundwater quality in the lowermost underground source of drinking water (USDW). {A USDW is an aquifer or its portion which may contain a sufficient quantity of groundwater to supply a public water system.}

5. May also require any additional monitoring necessary to determine whether fluids are moving into or between USDWs.

Groundwater Monitoring
Unit-specific Requirements

Regulated Unit:
Class I hazardous waste injection wells {Class I hazardous waste injection wells are defined at 40 CFR 146.5 *(Classification of injection wells)* as "wells used by generators of hazardous waste or owners or operators of hazardous waste management facilities to inject hazardous waste beneath the lowermost formation containing, within one quarter (1/4) mile of the well bore, an underground source of drinking water."}

Purpose:
Provides minimum groundwater monitoring requirements for Class I hazardous waste injection wells.

References:

40 CFR 146.72	Post-closure care.
40 CFR 146.68	Testing and monitoring requirements.

Authority:
Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*; RCRA, 42 U.S.C. 6901 *et* wells classified in the underground injection control program.

Responsibilities of the Owner/Operator:

A. Based on a site-specific assessment of the potential for fluid movement from the well or injection zone, and on the potential value of monitoring wells to detect such movement, the Director shall require the owner or operator to develop a monitoring program. At a minimum, the Director shall require monitoring of the pressure buildup in the injection zone annually, including at a minimum, a shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve.

B. The owner or operator of a Class I hazardous waste well shall prepare, maintain, and comply with a plan for post-closure care.

    1. {During post-closure activities} the owner or operator shall continue to conduct any groundwater monitoring required under the permit until pressure in the injection zone decays to the point that the well's cone of influence no longer intersects the base of the lowermost USDW.

Responsibilities of the Director:

A. The Director may extend the period of post-closure monitoring if he or she determines that the well may endanger a USDW.

B. When prescribing a monitoring system, the Director may also require:

    1. Continuous monitoring for pressure changes in the first aquifer overlying the confining zone. When such a well is installed, the owner or operator shall, on a quarterly basis, sample the aquifer and analyze for constituents specified by the Director.

    2. The use of indirect, geophysical techniques to determine the position of the waste front, the water quality in a formation designated by the Director, or to provide other {site-specific} data.

    3. Periodic monitoring of the groundwater quality in the first aquifer overlying the injection zone.

    4. Periodic monitoring of the groundwater quality in the lowermost USDW.

Groundwater Monitoring
Program-specific Requirements

Program:
Compliance monitoring

Regulated Units:
Hazardous waste treatment, storage, or disposal facilities, except those that are noted as exempt at 40 CFR 264.90 (*Applicability*).

Purpose:
A compliance monitoring program is required:

1. Whenever hazardous constituents are detected through the detection monitoring program at a compliance point and,

2. To insure that regulated units are in compliance with the groundwater protection standard under 40 CFR 264.92 (*Groundwater protection standard*).

References:

40 CFR 264.91	Required programs.
40 CFR 264.99	Compliance monitoring program.

Authority:
42 U.S.C. 6905, 6912(a), 6924, and 6925.

Responsibilities of the Owner/Operator:

A. An owner or operator is required to establish a compliance monitoring program that must, at a minimum, discharge the following responsibilities:

   1. The owner or operator must monitor the groundwater to determine whether regulated units are in compliance with the groundwater protection standard.

   2. The owner or operator must install a groundwater monitoring system at the compliance point as specified under 40 CFR 264.95 *(Point of compliance)*. {The point of compliance is defined at 40 CFR 264.985*(Point of compliance)* as "a vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated units."}

   3. The groundwater monitoring system must comply with 40 CFR 264.97 *(General groundwater monitoring requirements, Sections (a)(2), (b), and (c)*).

   4. The owner or operator must conduct a sampling program for each chemical parameter or hazardous constituent in accordance with 40 CFR 264.97(g) *(General groundwater monitoring requirements)*.

   5. The owner or operator must record groundwater analytical data as measured and in the form necessary for the determination of statistical significance under 40 CFR 264.97(h) *(General groundwater monitoring requirements)* for the compliance period of the facility.

Responsibilities of the Regional Administrator:

A. The Regional Administrator will specify the groundwater protection standard in the facility permit, including:

   1. A list of the hazardous constituents identified under 40 CFR 264.93 *(Hazardous constituents)*.

   2. Concentration limits under 40 CFR 264.94 *(Concentration limits)* for each of those hazardous constituents.

   3. The compliance point under 40 CFR 264.95 *(Point of compliance)*.

   4. The compliance period under 40 CFR 264.96 (*Compliance period*).

B. The Regional Administrator will specify the sampling procedures and statistical methods appropriate for the constituents and the facility, consistent with 40 CFR 264.97(g) and (h) *(General groundwater monitoring requirements)*.

   1. {The time period in which the owner/operator must make a determination of whether there is statistically significant evidence of increased contamination.} After considering the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of groundwater samples, the time will be indicated in the facility permit.

Program:	Responsibilities of the Owner/Operator (cont'd.):	Responsibilities of the Regional Administrator (cont'd.):
Compliance monitoring (cont'd.)	6. The owner or operator must determine whether there is statistically significant evidence of increased contamination for any chemical parameter or hazardous constituent specified in the facility permit ... at a frequency specified in the permit. 7. The owner or operator uses {statistical method(s) to evaluate groundwater monitoring data} as specified in the facility permit under 40 CFR 264.97(h) *(General groundwater monitoring requirements)*. The method(s) must compare data collected at the compliance point(s) to a concentration limit developed in accordance with the limits under 40 CFR 264.94 *(Concentration limits)*. 8. The owner or operator must determine whether there is statistically significant evidence of increased contamination at each monitoring well at the compliance point within a reasonable time period after completion of sampling. 9. The owner or operator must determine the groundwater flow rate and direction in the uppermost aquifer at least annually. B. The owner or operator must analyze samples from all monitoring wells at the compliance point for all constituents contained in Appendix IX of 40 CFR Part 264 at least annually to: 1. Determine whether additional hazardous constituents are present in the uppermost aquifer, and 2. Determine the concentration {of additional constituents, if present} pursuant to procedures under 40 CFR 264.98(f) *(Detection monitoring)*.	C. The Regional Administrator will specify the frequencies for collecting samples and conducting statistical tests to determine statistically significant evidence of increased contamination in accordance with 40 CFR 264.97(g) *(General groundwater monitoring requirements)*.

Program: Compliance monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): If the owner or operator finds {40 CFR Part 254} Appendix IX constituents in the groundwater that are not already identified in the facility permit as monitoring constituents, the owner or operator may resample within one month and repeat the {40 CFR} Appendix IX analysis. C. If the second analysis confirms the presence of new constituents, the owner/operator must report the concentration of these additional constituents to the Regional Administrator within seven days after the completion of the second analysis and add them to the monitoring list. If the owner/operator chooses not to resample, then he or she must report the concentrations of these additional constituents to the Regional Administrator within seven days after the completion of the initial analysis and add them to the monitoring list. D. If the owner/operator determines pursuant to paragraph A(6) that any concentration limits under 40 CFR 264.94 *(Concentration limits)* are being exceeded at any monitoring well at the point of compliance, he or she must: 1. Notify the Regional Administrator of this finding in writing within seven days. The notification must indicate what concentration limits have been exceeded. 2. Submit to the Regional Administrator an application for a permit modification to establish a corrective action program meeting the requirements of 40 CFR 264.100 *(Corrective action program)* within 180 days, or within 90 days if an engineering feasibility study has been previously submitted to the Regional Administrator under {the detection monitoring program} at 40 CFR 264.98(h)(5) *(Detection monitoring program)*.`	

Program: Compliance monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): Administrator. E. {The owner's or operator's} application for permit modification must, at a minimum, include the following information: 1. A detailed description of corrective actions that will achieve compliance with the groundwater protection standard specified in the permit. 2. A plan for a groundwater monitoring program that will demonstrate the effectiveness of the corrective action. Such a groundwater monitoring program may be based on a compliance monitoring program developed to meet the requirements of 40 CFR 264.99 *(Compliance monitoring program)*. 3. If the owner/operator determines pursuant to paragraph {A(6) of this section} that the groundwater concentration limits are being exceeded at any monitoring well at the point of compliance, he or she may demonstrate: a. {That} a source other than a regulated unit caused the contamination, or b. That the detection is an artifact caused by an error in sampling, analysis, or statistical evaluation or {by} natural variation in the groundwater. F. In making a demonstration {pursuant to E(3) of this section} the owner/operator must: 1. Within seven days, notify the Regional Administrator in writing that he or she intends to make a demonstration.	

Program: Compliance monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. Within 90 days, submit a report to the Regional Administrator which demonstrates that a source other than a regulated unit caused the standard to be exceeded or that the apparent noncompliance with the standards resulted from error in sampling, analysis, or evaluation {or by natural variation in the groundwater}. 3. Within 90 days, submit to the Regional Administrator an application for a permit modification to make any appropriate changes to the compliance monitoring program at the facility. 4. Continue to monitor in accordance with the compliance monitoring program requirements established in 40 CFR 264.99 (*Compliance monitoring program*). G. If the owner or operator determines that the compliance monitoring program no longer satisfies the requirements of this section, he or she must, within 90 days, submit an application for a permit modification to make any appropriate changes to the program.	

Groundwater Monitoring
Program-specific Requirements

Program:
Detection monitoring

Regulated Units:
Hazardous waste treatment, storage, or disposal facilities, except those that are noted as exempt at 40 CFR 264.90 (*Applicability*)

Purpose:
Owners or operators of facilities that treat, store, or dispose of hazardous waste must institute this program to determine if statistically significant evidence of contamination by any hazardous constituents from a regulated unit is present at the compliance point.

References:

40 CFR 264.91	Required programs.
40 CFR 264.98	Detection monitoring program.

Authority:
42 U.S.C. 6905, 6912(a), 6924, and 6925.

Responsibilities of the Owner/Operator:

A. An owner or operator required to establish a detection monitoring program ... must, at a minimum, discharge the following responsibilities:

1. The owner or operator must monitor for indicator parameters (e.g., specific conductance, total organic carbon, or total organic halogen), waste constituents, or reaction products that provide a reliable indication of the presence of hazardous constituents in groundwater.

2. The owner or operator must install a groundwater monitoring system at the compliance point as specified under 40 CFR 264.95 *(Point of compliance)*. The groundwater monitoring system must comply with 40 CFR 264.97(a)(2), (b), and (c) *(General groundwater monitoring requirements)*.

3. The owner or operator must conduct a groundwater monitoring program for each chemical parameter and hazardous constituent specified in the permit pursuant to paragraph {A(1) of this section} in accordance with 40 CFR 264.97(g) *(General groundwater monitoring requirements)*.

4. The owner or operator must maintain a record of groundwater analytical data as measured and in a form necessary for the determination of statistical significance under 40 CFR 264.97(h) *(General groundwater monitoring requirements)*.

5. The owner or operator must determine the groundwater flow rate and direction in the uppermost aquifer at least annually.

Responsibilities of the Regional Administrator:

A. The Regional Administrator will specify the parameters or constituents to be monitored in the facility permit, after considering the following factors:

1. The types, quantities, and concentrations of constituents in wastes managed at the regulated unit;

2. The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the waste management area;

3. The detectability of indicator parameters, waste constituents, and reaction products in groundwater; and

4. The concentrations or values and coefficients of variation of proposed monitoring parameters or constituents in the groundwater background.

B. The Regional Administrator will specify the frequencies for collecting samples and conducting statistical tests to determine whether there is statistically significant evidence of contamination for any parameter or hazardous constituent specified in the permit under paragraph {A(1) of this section}.

A sequence of at least four samples from each well (background and compliance wells) must be collected at least semi-annually during detection monitoring.

Program:	Responsibilities of the Owner/Operator (cont'd.):	Responsibilities of the Regional Administrator (cont'd.):
Detection monitoring (cont'd.)	6. The owner or operator must determine whether there is statistically significant evidence of contamination for any chemical parameter or hazardous constituent specified in the permit pursuant to {paragraph A of the Responsibilities of the Regional Administrator} at a frequency specified under {paragraph B of the Responsibilities of the Regional Administrator}. a. In determining whether statistically significant evidence of contamination exists, the owner or operator must use the method(s) specified in the permit under 40 CFR 264.97(h) *(General groundwater monitoring requirements)*. These method(s) must compare data collected at the compliance point(s) to the background groundwater quality data. b. The owner or operator must determine whether there is statistically significant evidence of contamination at each monitoring well {at} the compliance point within a reasonable period of time after completion of sampling. B. If the owner or operator determines pursuant to paragraph {A(6) of this section} that there is statistically significant evidence of contamination for chemical parameters or hazardous constituents ... at any monitoring well at the compliance point, he or she must: 1. Notify the Regional Administrator of this finding in writing within seven days. The notification must indicate what chemical parameters or hazardous constituents have shown statistically significant evidence of contamination;	C. The Regional Administrator will specify in the facility permit what period of time is reasonable {in determining whether there is statistically significant evidence of contamination}, after considering the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of groundwater samples.

Program: Detection monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. Immediately sample the groundwater in all monitoring wells and determine whether constituents in the list of Appendix IX of 40 CFR Part 264 are present, and if so, in what concentration. 3. For any Appendix IX compounds found in the analysis pursuant to paragraph {B(2) of this section}, the owner or operator may resample within one month and repeat the analysis for those compounds detected. a. If the results of the second analysis confirm the initial results, then these constituents will form the basis for compliance monitoring. b. If the owner or operator does not resample for the compounds found pursuant to paragraph {B(2) of this section} the hazardous constituents found during the initial Appendix IX analysis will form the basis for compliance monitoring. 4. Within 90 days, submit to the Regional Administrator an application for a permit modification to establish a compliance monitoring program meeting the requirements of 40 CFR 264.99 *(Compliance monitoring programs).* The application must include the following information: a. An identification of the concentration or any Appendix IX constituent detected in the groundwater at each monitoring well at the compliance point;	

Program: Detection monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): b. Any proposed changes to the groundwater monitoring system at the facility necessary to meet the requirements of {a compliance monitoring program}; c. Any proposed additions or changes to the monitoring frequency, sampling and analysis procedures or methods, or statistical methods used at the facility necessary to meet the requirements of {a compliance monitoring program}; d. For each hazardous constituent detected at the compliance point, a proposed concentration limit or a notice of intent to seek an {alternative} concentration limit. 5. Within 180 days, submit to the Regional Administrator: a. All data necessary to justify an {alternative} concentration limit sought under 40 CFR 264.94(b) *(Concentration limits)*; and b. An engineering feasibility plan for a corrective action program necessary to meet the requirement of 40 CFR 264.100 *(Corrective action plan)*, unless: (i) All hazardous constituents identified under {paragraph B(2) of this section} are listed in Table 1 of 40 CFR 264.94 *(Concentration limits)* and their concentrations do not exceed the respective values given in that Table; or	

Program: Detection monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): (ii) The owner or operator has sought an {alternative} concentration limit under 40 CFR 264.94(b) *(Concentration limits)* for every hazardous constituent identified under {paragraph B(2) of this section}. C. If the owner or operator determines, pursuant to paragraph {A(6) of this section}, that there is a statistically significant difference for chemical parameters or hazardous constituents specified pursuant to paragraph {A(1) of this section} at any monitoring well at the compliance point, he or she may demonstrate that a source other than a regulated unit caused the contamination or that the detection is an artifact caused by an error in sampling, analysis, or statistical evaluation or {by} natural variation in the groundwater. 1. The owner operator may make a demonstration ... in addition to, or in lieu of, submitting a permit modification application under paragraph {B(4) of this section}; however 2. The owner or operator is not relieved of the requirement to submit a permit modification application within the time specified in paragraph {B(4) of this section} unless the demonstration made under this paragraph successfully shows that a source other than a regulated unit caused the increase, or that the increase resulted from error in sampling, analysis, or evaluation. In making a demonstration under this paragraph, the owner or operator must:	

Program: Detection monitoring (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): a. Notify the Regional Administrator in writing within seven days of determining statistically significant evidence of contamination at the compliance point that he or she intends to make a demonstration under this paragraph; b. Within 90 days, submit a report to the Regional Administrator which demonstrates that a source other than a regulated unit caused the contamination or that the contamination resulted from {an} error in sampling, analysis or evaluation {or from natural variation in the groundwater}; c. Within 90 days, submit to the Regional Administrator an application for a permit modification to make any appropriate changes to the detection monitoring program facility; and d. Continue to monitor in accordance with the detection monitoring program established under this section. D. If the owner or operator determines that the detection monitoring program no longer satisfies the requirements of this section, he or she must, within 90 days, submit an application for a permit modification to make any appropriate changes to the program.	

Groundwater Monitoring
Program-specific Requirements

Program:
Corrective action

Regulated Units:
Hazardous waste treatment, storage, or disposal facilities, except those that are noted as exempt at 40 CFR 264.90 (*Applicability*)

Purpose:
A corrective action program must be instituted whenever:

1. The groundwater protection standard is exceeded or

2. Hazardous constituents from a regulated unit exceed concentration limits in groundwater between the compliance point and the downgradient facility property boundary.

References:

40 CFR 264.91	Required programs.
40 CFR 264.100	Corrective action program.

Authority:
42 U.S.C. 6905, 6912(a), 6924, and 6925.

Responsibilities of the Owner/Operator:

A. An owner or operator required to establish a corrective action program under this subpart must, at a minimum, discharge the following responsibilities:

   1. The owner or operator must take corrective action to ensure that regulated units are in compliance with 40 CFR 264.92 *(Groundwater protection standard).*

   2. The owner or operator must implement a corrective action program that prevents hazardous constituents from exceeding their respective concentration limits at the compliance point by removing the hazardous waste constituents or treating them in place. The permit will specify the specific measures that will be taken.

   3. The owner or operator must begin corrective action within a reasonable time period after the groundwater protection standard is exceeded.

   4. In conjunction with a corrective action program, the owner or operator must establish and implement a groundwater monitoring program to demonstrate the effectiveness of the corrective action program. Such a monitoring program may be based on the requirements for a compliance monitoring program, ... and must be as effective as that program in determining compliance with the groundwater protection standard ... and in determining the success of a corrective action program under {paragraph B of this section} where appropriate.

Responsibilities of the Regional Administrator:

A. The Regional Administrator will specify the groundwater protection standard in the facility permit, including:

   1. A list of the hazardous constituents identified under 40 CFR 264.93 *(Hazardous constituents)*;

   2. Concentration limits under 40 CFR 264.94 *(Concentration limits)* for each of those hazardous constituents;

   3. The compliance point under 40 CFR 264.95 *(Compliance point)*; and

   4. The compliance period under 40 CFR 264.96 *(Compliance period)*.

B. The Regional Administrator will specify the {reasonable time period after the groundwater protection standard has been exceeded in which corrective action must begin} in the facility permit.

   If a facility permit includes a corrective action program in addition to a compliance monitoring program, the permit will specify when the corrective action will begin, and such a requirement will operate in lieu of 40 CFR 264.99(i)(2) *(Compliance monitoring program)*.

Program: Corrective action (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): B. In addition to the other requirements of this section, the owner or operator must conduct a corrective action program to remove or treat in place any hazardous constituents under 40 CFR 264.93 *(Hazardous constituents)* that exceed concentration limits under 40 CFR 264.94 *(Concentration limits)* in groundwater: 1. Between the compliance point under 40 CFR 264.95 *(Point of compliance)* and the downgradient facility property boundary. 2. Beyond the facility boundary, where necessary to protect human health and the environment, unless the owner or operator demonstrates to the satisfaction of the Regional Administrator that, despite the owner's or operator's best efforts, the owner or operator was unable to obtain the necessary permission to undertake such action. C. The owner/operator is not relieved of all responsibility to clean up a release that has migrated beyond the facility boundary where off-site access is denied. On-site measures to address such releases will be determined on a case-by-case basis. D. Corrective action measures under this paragraph must be initiated and completed within a reasonable period of time considering the extent of contamination. Corrective action measures under this paragraph may be terminated once the concentration of hazardous constituents ... is reduced to levels below their respective concentration limits.	

Program: Corrective action (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): E. The owner or operator must continue corrective action measures during the compliance period to the extent necessary to ensure that the groundwater protection standard is not exceeded. 1. If the owner or operator is conducting corrective action at the end of the compliance period, he or she must continue that corrective action for as long as necessary to achieve compliance with the groundwater protection standard. 2. The owner or operator may terminate corrective action measures taken beyond the period equal to the active life of the waste management area (including the closure period) if he or she can demonstrate, based on data from the groundwater monitoring program under {paragraph B of this section}, that the groundwater protection standard has not been exceeded for a period of three consecutive years. F. The owner or operator must report in writing to the Regional Administrator on the effectiveness of the corrective action program. The owner or operator must submit these reports semi-annually. G. If the owner or operator determines that the corrective action program no longer satisfies the requirements of this section, he or she must, within 90 days, submit an application for a permit modification to make any appropriate changes to the program.	

Groundwater Monitoring
Program-specific Requirements

Program:
General groundwater monitoring program -- final status facilities

Regulated Units:
Hazardous waste treatment, storage, or disposal facilities, except those that are noted as exempt at 40 CFR 264.90 (*Applicability*)

Purpose:
These general requirements must be complied with for any groundwater monitoring program developed.

References:
40 CFR 264.97 General groundwater monitoring requirements.

Authority:
42 U.S.C. 6905, 6912(a), and 6925.

Responsibilities of the Owner/Operator:

A. The owner or operator must comply with the following requirements for any groundwater monitoring program developed to satisfy 40 CFR 264.98 *(Detection monitoring program)*, 40 CFR 264.99 *(Compliance monitoring program*), or 40 CFR 264.100 *(Corrective action program*):

   1. The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the upper-most aquifer that:

      a. Represent the quality of background water that has not been affected by leakage from a regulated unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the waste management area where:

         (i) Hydrogeologic conditions do not allow the owner or operator to determine what wells are hydraulically up-gradient; and

         (ii) Sampling at other wells will provide an indication of background groundwater quality that is representative or more representative than that provided by the upgradient wells.

      b. Represent the quality of groundwater passing the point of compliance.

      c. Allow for the detection of contamination when hazardous waste or hazardous constituents have migrated from the waste management area to the uppermost aquifer.

Responsibilities of the Regional Administrator:

A. {The Regional Administrator specifies in the facility permit the hazardous constituents to be monitored.} (See paragraph A(2) of Responsibilities of the Owner/Operator).

B. {The Regional Administrator must approve of {any alternative} sampling procedure proposed by the owner or operator.} (See paragraph A(7)(c)(ii) of Responsibilities of the Owner/Operator).

C. {The Regional Administrator approves of the statistical method proposed by the owner/operator to be used in evaluating groundwater monitoring data for each hazardous constituent and specifies the method in the facility permit.} (See paragraph B of the Responsibilities of the Owner/Operator).

D. If a control chart approach is used to evaluate groundwater monitoring data, {the Regional Administrator approves of the specific type of control chart and its associated parameter values if he or she finds it to be protective of human health and the environment. See paragraph C(3) of Responsibilities of the Owner/Operator.}

E. The Regional Administrator will specify in the permit when the data {from groundwater monitoring} must be submitted for review.

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. If a facility contains more than one regulated unit, separate groundwater monitoring systems are not required for each regulated unit provided that provisions for sampling the groundwater in the uppermost aquifer will enable detection and measurement at the compliance point of hazardous constituents from the regulated units that have entered the groundwater in the uppermost aquifer. 3. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring-well bore hole. a. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. b. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater. 4. The groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area. At a minimum the program must include procedures and techniques for: a. Sample collection; b. Sample preservation and shipment; c. Analytical procedures; and d. Chain of custody control.	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 5. The groundwater monitoring program must include sampling and analytical methods that are appropriate for groundwater sampling and {that} accurately measure hazardous constituents in groundwater samples. 6. The groundwater monitoring program must include a determination of the groundwater surface elevation each time groundwater is sampled. 7. In detection monitoring, or where appropriate in compliance monitoring, data on each hazardous constituent specified in the permit will be collected from background wells and wells at the compliance point(s). a. The number and kinds of samples collected to establish background shall be appropriate for the form of statistical test employed, following generally accepted statistical principles. b. The sample size shall be as large as necessary to ensure with reasonable confidence that a contaminant release to groundwater from a facility will be detected. c. The owner or operator will determine an appropriate sampling procedure and interval for each hazardous constituent listed in the facility permit which shall be specified in the facility permit upon approval by the Regional Administrator. This sampling procedure shall be:	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): (i) A sequence of at least four samples, taken at an interval that assures, to the greatest extent technically feasible, that an independent sample is obtained, by reference to the upper-most aquifer's effective porosity, hydraulic conductivity, and hydraulic gradient, and the fate and transport characteristics of the potential contaminants, or (ii) An {alternative} sampling procedure proposed by the owner or operator and approved by the Regional Administrator. B. The owner or operator will specify one of the following statistical methods to be used in evaluating groundwater monitoring data for each hazardous constituent which, upon approval by the Regional Administrator, will be specified in the unit permit. The statistical test chosen shall be conducted separately for each hazardous constituent in each well. 1. Where practical quantification limits (PQLs) are used in any of the following statistical procedures to comply with 40 CFR 264.97(i)(5) *(General groundwater monitoring requirements)*, the PQL must be proposed by the owner or operator and approved by the Regional Administrator. 2. Use of any of the following statistical methods must be protective of human health and the environment and must comply with the performance standards outlined in {paragraph C of this section}.	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): a. A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent. b. An analysis of variance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent. c. A tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit. d. A control chart approach that gives control limits for each constituent. e. Another statistical test method submitted by the owner or operator and approved by the Regional Administrator.	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): C. Any statistical method chosen under {paragraph B of this section} for specification in the unit permit shall comply with the following performance standards, as appropriate: 1. The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of chemical parameters or hazardous constituents. If the distribution of the chemical parameters or hazardous constituents is shown by the owner or operator to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed. 2. If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level {of not} less than 0.01 for each testing period. a. If a multiple comparisons procedure is used, the Type I experiment-wise error rate for each testing period shall be no less than 0.05; however, the Type I error of no less than 0.01 for individual well comparisons must be maintained. b. {The performance standard specified in C(2)(a) of this section} does not apply to tolerance intervals, prediction intervals or control charts.	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. If a control chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be proposed by the owner or operator and approved by the Regional Administrator if he or she finds it to be protective of human health and the environment. 4. If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain, shall be proposed by the owner or operator and approved by the Regional Administrator if he or she finds these parameters to be protective of human health and the environment. These parameters will be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern. 5. The statistical method shall account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. Any PQL approved by the Regional Administrator under 40 CFR 264.97(h) *(General groundwater monitoring requirements)* that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.	

Program: General groundwater monitoring program -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. Groundwater monitoring data collected in accordance with {paragraph A(7) of this section} including actual levels of constituents must be maintained in the facility operating record.	

Groundwater Monitoring
Program-specific Requirements

Program:
General groundwater monitoring program -- interim status facilities

Regulated Unit:
Any surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste during the period of interim status and until certification of final closure or, if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled.

Purpose:
A groundwater monitoring program capable of determining the facility's impact on the quality of groundwater in the uppermost aquifer underlying the facility must be carried out during the active life of the facility, and for disposal facilities, during the post-closure care period as well.

References:
40 CFR 265.90 Applicability.
40 CFR 265.91 Groundwater monitoring system.

Authority:
42 U.S.C. 6905, 6912(a), 6924, 6925, and 6935.

Responsibilities of the Owner/Operator:

A. A groundwater monitoring system must be capable of yielding groundwater samples for analysis and must consist of:

   1. Monitoring wells (at least one) installed hydraulically upgradient (i.e., in the direction of increasing static head) from the limit of the waste management area. Their number, locations, and depths must be sufficient to yield groundwater samples that are:

      a. Representative of background groundwater quality in the uppermost aquifer near the facility; and

      b. Not affected by the facility.

   2. Monitoring wells (at least three) installed hydraulically downgradient (i.e., in the direction of decreasing static head) at the limit of the waste management area. Their number, locations, and depths must ensure that they immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer.

B. The facility owner or operator may demonstrate that an {alternative} hydraulically downgradient monitoring well location {that is not a lateral expansion, new or replacement unit (as these are ineligible)} will meet the criteria outlined below. The demonstration must be in writing and kept at the facility. The demonstration must be certified by a qualified groundwater scientist and establish that:

   1. An existing physical obstacle prevents monitoring well installation at the hydraulically downgradient limit of the waste management area; and

Responsibilities of the Regional Administrator:
None specified.

Program: General groundwater monitoring program -- interim status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 2. The selected alternate downgradient location is as close to the limit of the waste management area as practical; and 3. The location ensures detection that, given the {alternative} location, is as early as possible {should} any statistically significant amounts of hazardous waste or hazardous waste constituents ... migrate from the waste management area to the uppermost aquifer. C. Separate monitoring systems for each waste management component of a facility are not required provided that provisions for sampling upgradient and downgradient water quality will detect any discharge from the waste management area. 1. In the case of a facility consisting of only one surface impoundment, landfill, or land treatment area, the waste management area is described by the waste boundary (perimeter). 2. In the case of a facility consisting of more than one surface impoundment, landfill, or land treatment area, the waste management area is described by an imaginary boundary line which circumscribes the several waste management components. 3. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. a. This casing must be screened or perforated, and packed with gravel or sand where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist.	

Program: General groundwater monitoring program -- interim status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): b. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth must be sealed with a suitable material (e.g., cement grout or bentonite slurry) to prevent contamination of samples and the groundwater.	

MEDIUM: SOIL

Soil is typically monitored as part of a facility's leak detection system (LDS). An LDS must be capable of detecting a release of hazardous waste or hazardous constituents to the environment. It is required to be designed to detect a failure of either the primary or secondary containment structure or the presence of hazardous materials or accumulated liquid in the secondary containment structure. "Such a system must employ operational controls ... or consist of an interstitial monitoring device designed to detect continuously and automatically" [40 CFR 260.10]. These systems monitor the amount of liquids being leaked into the sump underneath the unit prior to contaminant contact with soil.

The Hazardous and Solid Waste Amendments (HSWA) of 1984 revised the requirements for the land disposal practices of hazardous waste units specified in the Resource Conservation and Recovery Act (RCRA). Specifically, the amendments required the Environmental Protection Agency (EPA) to promulgate standards for new landfills, surface impoundments, waste piles, land treatment units, and underground hazardous waste tanks to use approved leak detection systems. An approved leak detection system is one which "the Administrator determines to be capable of detecting leaks of hazardous constituents at the earliest practicable time" (57 FR 3462). In the January 29, 1992, Federal Register (57 FR 3462), EPA finalized the requirements for LDSs for hazardous waste land disposal units. The 1992 Leak Detection System rule modified the proposed requirements for surface impoundments, waste piles, and landfills, and required these units, for which construction commences and each replacement unit which is reused after January 19, 1992, and each lateral expansion of these units for which construction commences after July 29, 1992, to have leak detection systems, regardless of permitted status.

The 1992 final rule did not make modifications to the proposed requirements for land treatment unit LDSs. EPA decided that the proposed requirements (see 52 FR 20128) "already require unsaturated zone monitoring - i.e., leak detection systems - at all land treatment units, both new and existing" (57 FR 3472). The 1992 rule made the proposed requirements final. Standards for the monitoring of soil and soil-pore liquid in the unsaturated zone below a land treatment unit are codified at 40 CFR 264.278 and 265.278 *(Unsaturated zone monitoring)* and are intended to ensure detection of releases of hazardous constituents or hazardous waste into the environment. This chapter outlines the soil monitoring requirements for RCRA land treatment units.

Other RCRA units required to have LDSs do not monitor the soil, but instead monitor for the amount of liquids leaked from the unit into the sump. Monitoring of the sump is an example of a preventative environmental management practice where the design of the system is intended to reduce the potential of hazardous waste releases to the environment. The requirements for this type of monitoring do not include soil sampling and analysis. As this document is media-specific, the LDS monitoring requirements for surface impoundments, waste piles, and landfills

are not included in this document. LDS monitoring requirements for final status of these units can be found at 40 CFR 264 Subpart K (sections 221, 222, 226, and 228), Subpart L (sections 251, 252, 254, and 258), and Subpart N (sections 301, 302, 303, and 310). LDS monitoring requirements for interim status of these units can be found at 40 CFR Part 265 Subpart K (sections 221, 222, and 226), Subpart L (sections 254, 255, and 258), and Subpart N (sections 301, 302, 304, and 310).

For additional assistance, DOE staff and contractors who have questions concerning monitoring of soil for compliance with the regulations referenced in this chapter may contact the Office of Environmental Policy and Assistance, RCRA/CERCLA Division (EH-413) at (202) 586-6374.

Soil Monitoring Requirements

Regulated Unit:
Land treatment -- final status facilities

Purpose:
Provides requirements for establishing a soil (unsaturated zone) monitoring program for facilities with final status that treat or dispose of hazardous waste in land treatment units (except as 40 CFR 264.1 provides otherwise). The unsaturated zone or zone of aeration is the zone between the land surface and the water table.

References:
40 CFR 264.270 Applicability.
40 CFR 264.278 Unsaturated zone monitoring.

Authority:
42 U.S.C. 6905, 6912(a), 6924, and 6925.

Responsibilities of the Owner/Operator:

A. An owner or operator ... must establish an unsaturated zone monitoring program.

   1. The owner or operator must monitor the soil and soil-pore liquid to {detect if} any hazardous constituents {are migrating} out of the treatment zone.

   2. The owner or operator must install an unsaturated zone monitoring system that includes:

      a. Soil monitoring using soil cores; and

      b. Soil-pore liquid monitoring using devices such as lysimeters.

   3. The unsaturated zone monitoring system must consist of a sufficient number of sampling points at appropriate locations and depths to yield samples that:

      a. Represent the quality of background soil-pore liquid quality and represent the chemical make-up of soil that has not been affected by leakage from the treatment zone; and

      b. Indicate the quality of soil-pore liquid and the chemical make-up of the soil below the treatment zone.

B. The owner or operator must establish a background value for each hazardous constituent to be monitored {as specified in paragraph A of this section}.

Responsibilities of the Regional Administrator:

A. The Regional Administrator will specify the hazardous constituents to be monitored {according to provisions in the Responsibilities of the Owner/Operator} in the facility permit. Hazardous constituents to be monitored are specified in Appendix VIII of 40 CFR Part 261 *(Hazardous constituents).*

B. The Regional Administrator may require monitoring for principal hazardous constituents (PHCs) in lieu of the constituents specified in {Appendix VIII of 40 CFR Part 261 *(Hazardous constituents)*}. PHCs are hazardous constituents contained in the wastes to be applied at the unit that are the most difficult to treat, considering the combined effects of degradation, transformation, and immobilization.

   1. The Regional Administrator will establish PHCs if he or she finds ... that effective degradation, transformation, or immobilization of the PHCs will assure treatment {of the other hazardous constituents in the wastes that is at least equivalent to the level of treatment of the PHCs} ... based on:

      a. Waste analysis,

      b. Treatment demonstrations, or

      c. Other data.

Soil Monitoring Requirements

Regulated Unit:	Responsibilities of the Owner/Operator (cont'd.):	Responsibilities of the Regional Administrator (cont'd.):
Land treatment -- final status facilities (cont'd.)	1. The {facility} permit will specify background values for each constituent or specify the procedures to be used to calculate the background values. a. Background soil values may be based on a one-time sampling at a background plot having characteristics similar to those of the treatment zone. b. Background soil-pore liquid values must be based on at least quarterly sampling for one year at a background plot having characteristics similar to those of the treatment zone. 2. The owner or operator must express all background values in a form necessary for the determination of statistically significant increases {under paragraph E} of this section. 3. In taking samples used in the determination of all background values, the owner or operator must use an unsaturated zone monitoring system that complies with {paragraph A(3)(a) of this section}. C. The owner or operator must conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The owner or operator must express the results of the soil and soil-pore liquid monitoring in a form necessary for the determination of statistically significant increases {according to the provisions of paragraph E of this section}.	C. The Regional Administrator will specify the frequency and timing of soil and soil-pore liquid monitoring in the facility permit after considering the: 1. Frequency, timing, rate of waste application, and 2. The soil permeability. D. The Regional Administrator will specify the {appropriate time period for determining whether a statistically significant increase has occurred below the treatment zone. This will be indicated in the facility permit}. The Regional Administrator will consider the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of soil and soil-pore liquid samples. E. The Regional Administrator will specify a statistical procedure {to be used in determining the significant increase below the treatment zone} in the facility permit that he or she finds: 1. Is appropriate for the distribution of the data used to establish background values; and 2. Provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone.

Soil Monitoring Requirements

Regulated Unit: Land treatment -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): D. The owner or operator must use consistent sampling and analysis procedures that are designed to ensure sampling results that provide a reliable indication of soil-pore liquid quality and the chemical make-up of the soil below the treatment zone. At a minimum, the owner or operator must implement procedures and techniques for: 1. Sample collection. 2. Sample preservation and shipment. 3. Analytical procedures. 4. Chain of custody control. E. The owner or operator must determine whether there is a statistically significant change {or increase} over background values for any hazardous constituent to be monitored under {paragraph A of this section} below the treatment zone each time {soil and soil-pore liquid monitoring is conducted as specified in paragraph C of this section}. In determining whether a statistically significant increase has occurred, the owner or operator must: 1. Compare the value of each constituent, as determined {during soil and soil-pore liquid monitoring immediately below the treatment zone}, to the background value for that constituent according to the statistical procedure specified in the facility permit. 2. {Make the determination of whether there has been a statistically significant increase below the treatment zone} within a reasonable time period after completion of sampling.	

Regulated Unit: Land treatment -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. {Use} a statistical procedure that provides reasonable confidence that migration from the treatment zone will be identified. F. {Once a determination has been made, the owner or operator must notify the Regional Administrator in writing within seven days.} 1. The notification must indicate what constituents have shown statistically significant increases. 2. Within 90 days {of the determination, the owner/operator must} submit to the Regional Administrator an application for a permit modification to modify the operating practices at the facility in order to maximize the success of degradation, transformation, or immobilization processes in the treatment zone. G. {The owner or operator may demonstrate that a source other than a regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. To make a demonstration, he or she must}: 1. Notify the Regional Administrator in writing within seven days of determining a statistically significant increase below the treatment zone that he or she intends to make a demonstration. 2. Within 90 days {of the determination of the significant increase}, submit a report to the Regional Administrator demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error(s) in sampling, analysis, or evaluation.	

Regulated Unit: Land treatment -- final status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): 3. Within 90 days {of the determination of the significant increase}, submit to the Regional Administrator an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility. 4. Continue to monitor in accordance with the unsaturated zone monitoring program established {in} this section. H. While the owner or operator may make a demonstration under {paragraph G of this section} in addition to, or in lieu of, submitting a permit modification application ... he or she is not relieved of the requirement to submit a permit modification application within the time specified in {paragraph F(2) of this section} unless the demonstration made ... successfully shows that a source other than a regulated unit caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation.	

Soil Monitoring Requirements

Regulated Unit: Land treatment -- interim status facilities Purpose: Provides requirements for establishing an unsaturated zone monitoring program for facilities during interim status that treat or dispose of hazardous waste in land treatment units. References: 40 CFR 265.270 Applicability. 40 CFR 265.278 Unsaturated zone monitoring. Authority: 42 U.S.C. 6905, 6912(a), 6924, and 6925.	Responsibilities of the Owner/Operator: A. The owner or operator must have in writing, and must implement, an unsaturated zone monitoring plan which is designed to: 1. Detect the vertical migration of hazardous waste and hazardous waste constituents under the active portion of the land treatment facility, and 2. Provide information on the background concentrations of the hazardous waste and hazardous waste constituents in similar but untreated soils nearby; this background monitoring must be conducted before or in conjunction with the monitoring required under paragraph {A(1) of this section}. B. The unsaturated zone monitoring plan must include, at a minimum: 1. Soil monitoring using soil cores, and 2. Soil-pore water monitoring using devices such as lysimeters. C. The owner or operator must demonstrate in his unsaturated zone monitoring plan that: 1. The depth at which soil and soil-pore water samples are to be taken is below the depth to which the waste is incorporated into the soil; 2. The number of soil and soil-pore water samples to be taken is based on the variability of: a. The hazardous waste constituents (as identified in 40 CFR 265.273(a) and (b) *(Waste analysis)*) in the waste and in the soil; and	Responsibilities of the Administrator: None specified.

Soil Monitoring Requirements

Regulated Unit: Land treatment -- interim status facilities (cont'd.)	Responsibilities of the Owner/Operator (cont'd.): b. The soil type(s). 3. The frequency and timing of soil and soil-pore water sampling is based on the frequency, time, and rate of waste application, proximity to groundwater, and soil permeability. D. The owner or operator must keep at the facility his unsaturated zone monitoring plan, and the rationale used in developing this plan. E. The owner or operator must analyze the soil and soil-pore water samples for the hazardous waste constituents that were found in the waste during the waste analysis under 40 CFR 265.273(a) and (b) *(Waste analysis)*.	

Appendix A
Federal Hotline Numbers

HOTLINE	PHONE	HOURS	SUBJECT
Emergency Planning and Community Right-to-Know Act	1-800-535-0202 (National) (703) 412-9877 (Virginia)	9:00-6:00 Eastern Monday-Friday	Title III of SARA
Resource Conservation and Recovery Act (RCRA)/Superfund	1-800-424-9346 (National) (703) 412-9810 1-800-486-3323 (TDD Machine)	9:00-6:00 Eastern Monday-Friday	RCRA regulations, underground storage tanks (UST), Superfund/CERCLA, pollution prevention, and waste minimization
Toxic Substances Control Act (TSCA)	(202) 554-1404 (202) 554-5603 (online service-modem) (202) 554-0551 (TDD Machine)	8:30-5:00 Eastern Monday-Friday	TSCA regulations
Safe Drinking Water	1-800-426-4791 (National)	8:30-5:30 Eastern Monday-Friday	Safe Drinking Water Act Amendments of 1986
Wetlands	1-800-832-7828 (National) (703) 525-0985 (Virginia)	8:30-5:00 Eastern Monday-Friday	Wetlands regulations
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	1-800-858-PEST (National)	6:30-4:30 Pacific Monday-Friday	Pesticide regulations
Pollution Prevention	(202) 260-1023 (202) 260-0178 (Fax)	8:30-5:00 Eastern Monday-Friday	Pollution prevention, waste minimization

Appendix B
Referenced Regulations

Air Chapter

40 CFR Part 60	**Standards of Performance for New Stationary Units**
40 CFR 60.13	Monitoring requirements
40 CFR 60.47a	Emission monitoring
40 CFR 60.113b	Testing and procedures
40 CFR Part 60	**National Emission Standards for Hazardous Air Pollutants**
40 CFR 61.12	Compliance with standards and maintenance requirements
40 CFR 61.14	Monitoring requirements
40 CFR 61.30	Applicability
40 CFR 61.34	Air sampling
40 CFR 61.53	Stack sampling
40 CFR 61.54	Sludge sampling
40 CFR 61.55	Monitoring of emissions and operations
40 CFR 61.93	Emission monitoring and test procedures
40 CFR 61.94	Compliance and reporting
40 CFR 61.155	Standard for operations that convert asbestos-containing waste material
40 CFR 240.211	Records
40 CFR 240.211-1,2 and 3	Requirement

Surface Water Chapter

40 CFR Part 122	**EPA Administered Permit Programs: The National Pollutant Discharge Elimination System**
40 CFR 122.41	Conditions applicable to all permits
40 CFR 122.44	Establishing limitations, standards, and other permit conditions
40 CFR 122.48	Requirements for recording and reporting of monitoring results
40 CFR Part 125	**Criteria and Standards for the National Pollutant Discharge Elimination System**
40 CFR 125.62	Establishment of a monitoring program
40 CFR Part 761	**Polychlorinated Biphenyls (PCBs): Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions**
40 CFR 761.75	Chemical waste landfills

Drinking Water Chapter

40 CFR Part 141	**National Primary Drinking Water Regulations**
40 CFR 141.12	Maximum contaminant levels for organic chemicals
40 CFR 141.16	Maximum contaminant levels for beta particle and proton radioactivity from manmade radionuclides in community water systems
40 CFR 141.21	Coliform sampling
40 CFR 141.23	Inorganic chemical sampling and analytical requirements
40 CFR 141.24	Organic chemicals other than trihalomethanes, sampling, and analytical requirements
40 CFR 141.26	Monitoring frequency for radioactivity in community water systems
40 CFR 141.30	Total trihalomethanes sampling, analytical, and other requirements
40 CFR 141.40	Special monitoring for inorganic and organic chemicals
40 CFR 141.41	Special monitoring for sodium
40 CFR 141.42	Special monitoring for corrosivity characteristics
40 CFR 141.61	Maximum contaminant levels for organic chemicals
40 CFR 141.62	Maximum contaminant levels for inorganic contaminants
40 CFR 141.63	Maximum contaminant levels for microbiological contaminants
40 CFR 141.70	General requirements
40 CFR 141.74	Analytical and monitoring requirements
40 CFR 141.80	General requirements
40 CFR 141.86	Monitoring requirements for copper and lead in tap water
40 CFR 141.88	Monitoring requirements for lead and copper in source water

Groundwater Chapter

40 CFR Part 146	**Underground Injection Control Program: Criteria and Standards**
40 CFR 146.11	Criteria and standards applicable to Class I nonhazardous wells
40 CFR 146.13	Operating, monitoring, and reporting requirements
40 CFR 146.68	Testing and monitoring requirements
40 CFR 146.72	Post-closure care
40 CFR Part 264	**Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**
40 CFR 264.91	Required programs
40 CFR 264.97	General groundwater monitoring requirements
40 CFR 264.98	Detection monitoring program
40 CFR 264.99	Compliance monitoring program
40 CFR 264.100	Corrective action program
40 CFR 264.600	Applicability
40 CFR 264.602	Monitoring, analysis, inspection, response, reporting, and corrective action
40 CFR Part 265	**Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**
40 CFR 265.90	Applicability

40 CFR 265.91	Groundwater monitoring system
40 CFR Part 761	**Polychlorinated Biphenyls (PCBs): Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions**
40 CFR 761.65	Storage for disposal
40 CFR 761.75	Chemical waste landfills

Soil Chapter

40 CFR Part 264	**Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**
40 CFR 264.270	Applicability
40 CFR 264.278	Unsaturated zone monitoring
40 CFR Part 265	**Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities**
40 CFR 265.270	Applicability
40 CFR 265.278	Unsaturated zone monitoring

Appendix C
Primary Radionuclides Regulated by 40 CFR Part 61*

Am-241
Ar-41
C-11
C-14
Co-60
Cs-137
H-3
I-125
I-129
N-13
O-15
P-32
Pb-210
Pu-239
Pu-240
S-35
Sb-125
Sr-90
Tc-99
Th-228
Th-232
U-233
U-234
U-235
U-238
Xe-133

* Summary of Air Emissions from Department of Energy Facilities for 1993.

Appendix D
Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) for Organics, Inorganics, and Radionuclides

	MCL (mg/L)	MCLG (mg/L)
ORGANICS		
1,1-Dichloroethylene	0.007	0.007
1,1,1-Trichloroethane	0.2	0.20
1,1,2-Trichloroethane	0.005	0.003
1,2-Dichloroethane	0.005	0
1,2-Dichloropropane	0.005	0
1,2,4-Trichlorobenzene	0.07	0.07
2,3,7,8-TCDD (Dioxin)	$3xl0^{-8}$	0
2,4-D	0.07	0.07
2,4,5-TP (Silvex)	0.05	0.05
Alachlor	0.002	0
Aldicarb	0.003	0.001
Aldicarb sulfone	0.003	0.001
Aldicarb sulfide	0.004	0.001
Atrazine	0.003	0.003
Benzene	0.005	0
Benzo(a)pyrene	0.0002	0
Carbofuran	0.04	0.04
Carbon Tetrachloride	0.005	0
Chlordane	0.002	0
cis-1,2-Dichloroethylene	0.07	0.07
Dalapon	0.2	0.2
Dibromochloropropane (DBCP)	0.0002	0
Dichloromethane	0.005	0
Dinoseb	0.007	0.007
Diquat	0.02	0.02
Di(2-ethylhexyl)adipate	0.4	0.4
Di(2-ethylhexyl)phthalate	0.006	0
Endothall	0.1	0.1
Endrin	0.002	0.002
Ethylbenzene	0.7	0.7
Ethylene Dibromide (EDB)	0.00005	0
Glyphosate	0.7	0.7
Heptachlor	0.0004	0
Heptachlor epoxide	0.0002	0
Hexachlorobenzene	0.001	0

Appendix D
Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) for Organics, Inorganics, and Radionuclides (cont'd.)

	MCL (mg/L)	MCLG (mg/L)
ORGANICS		
Hexachlorocylopentadiene	0.05	0.05
Lindane	0.0002	0.0002
Methoxychlor	0.04	0.04
Monochlorobenzene	0.1	0.1
o-Dichlorobenzene	0.6	0.6
Oxamyl (Vydate)	0.2	0.2
para-Dichlorobenzene	0.075	0.075
Pentachlorophenol	0.001	0
Picloram	0.5	0.5
Polychlorinated biphenyls (PCB)	0.0005	0
Simazine	0.004	0.004
Styrene	0.1	0.1
Tetrachloroethylene	0.005	0
Toluene	1	1
Toxaphene	0.003	0
trans-1,2-Dichloroethylene	0.1	0.1
Trichloroethylene	0.005	0
Trihalomethanes	0.1	0
Vinyl Chloride	0.002	none
Xylenes (total)	10	10
INORGANICS		
Antimony	0.006	0.006
Arsenic	0.05	none
Asbestos	7 million fibers/L[a]	7 million fibers/L[a]
Barium	2	2
Beryllium	0.004	0.004
Cadmium	0.005	0.005
Chromium	0.1	0.1
Cyanide	0.2	0.2
Fluoride	4	4
Lead	0.05	0
Mercury	0.002	0.002
Nickel	0.1	0.1

Appendix D
Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) for Organics, Inorganics, and Radionuclides (cont'd.)

	MCL (mg/L)	MCLG (mg/L)
INORGANICS		
Nitrate	10[b]	10[b]
Nitrite	1[b]	1[b]
Nitrate and Nitrite (combined)	10[b]	10[b]
Selenium	0.05	0.05
Thallium	0.002	0.0005

	MCL (Units)	MCLG
RADIONUCLIDES		
Radium-226 and -228 (combined)	5 pCi/L	none
Gross alpha particle activity	15 pCi/L[c]	none
Beta and photon radioactivity	4 mrem/yr[d]	none

NOTES

[a] Longer than 10 um
[b] As Nitrogen
[c] Including Radium-226 but excluding Radon and Uranium
[d] This is the calculated effective dose to the whole body or any internal organ


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