RULES AND REGULATIONS

PERTAINING TO

PUBLIC DRINKING WATER

(R46-13-DWQ)

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Department of Health
September 1977

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INTRODUCTION

These amended *Rules and Regulations Pertaining To Public Drinking Water (R46-13-DWQ)* are promulgated pursuant to the authority conferred under section 46-13-18 of the General Laws of Rhode Island, as amended, for the purpose of adopting standards compatible with the 1986 standards of the United States Environmental Protection Agency.

Pursuant to the provisions of section 42-35-3(c) of the General Laws of Rhode Island, as amended, the following were given consideration in arriving at the amended regulations: (1) alternative approaches to the regulations; (2) duplication or overlap with other state regulations; and (3) significant economic impact placed on small business as defined in Chapter 42-35 of the General Laws which would result from the regulations. No alternative approach, duplication or overlap, was identified based on available information. The health, safety and welfare of the citizens of this state overrides any economic impact which may result from these amended regulations. Consequently, these rules are adequate in the best interest of the health and safety of the public.

These regulations shall supersede all previous *Rules and Regulations Pertaining to Public Drinking Water* promulgated by the Department of Health and filed with the Secretary of State.

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Section 1.0 ***DEFINITIONS***

Wherever used in these rules and regulations the following terms shall be construed as follows:

1.1 ***"Act"*** means Chapter 46-13 of the General Laws of Rhode Island.

"Action level" is the concentration of lead or copper in water specified in section 6.80(c)which determines, in some cases, the treatment requirements contained in section 6 of these regulations that a water system is required to complete.

1.2 ***"Administrative penalty"*** - ***"Penalty"*** shall mean a monetary sum assessed by the Director pursuant to these regulations in response to a violation of, or a failure to comply with, 46-13 or any rule, regulation, license, permit or order adopted pursuant to the Director's authority thereunder.

1.3 ***"Best available technology"*** - means the best technology, treatment techniques, or other means which the EPA Administrator finds, after examination for efficacy under field conditions and not solely under laboratory conditions, are available for a specific contaminant or category of contaminants.

1.4 ***"Certified laboratory"*** means an analytical laboratory licensed by the RI Department of Health under Chapter 16.2 "Laboratories", to perform biological, microbiological, chemical or radiochemical examination of potable water or a laboratory exempt from this law as provided for in 23-16.2-3 but which shall be certified by the State Certification official in accordance with 40 CFR 1422.10b.

1.5 ***"Change of use"*** means a different or expanded activity at an existing public water system which significantly uses more or less water, or changes the duration of consumption between transient and non-transient, than previously approved through application or documented historical use.

1.6 ***"Coagulation"*** means a process using coagulant chemicals and mixing by which colloidal and suspended materials are destabilized and agglomerated into flocs.

1.7 ***"Community water system"*** - public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

1.8 ***"Compliance cycle"*** means the nine-year calendar year cycle during which public water systems must monitor. Each compliance cycle consists of three-year compliance periods. The first calendar year cycle begins January 1, 1993 and ends December 31, 2001; the second begins January 1, 2002 and ends December 31, 2010; the third begins January 1, 2011 and ends December 31, 2019.

1.9 ***"Compliance period"*** means a three-year calendar year period within a compliance cycle. Each compliance cycle has three three-year compliance periods. Within the first compliance cycle, the first compliance period runs from January 1, 1993 to December 31, 1995; the second from January 1, 1996 to December 31, 1998; the third from January 1, 1999 to December 31, 2001.

1.10 ***"Confluent growth"*** means a continuous bacterial growth covering the entire filtration area of a membrane filter, or a portion thereof, in which bacterial colonies are not discrete.

1.11 ***"Connection"*** means the water service line connecting a structure to the water distribution line. In the absence of data on the number of service connections, the population served divided by 2.5 shall be used as the default value.

a) The following are excluded from the "connection" component of the public water system definition:

A connection to a system that delivers water through constructed conveyances other than pipes is excluded from consideration as a "connection" under three (3) circumstances:

(1) Where the water is used exclusively for purposes other than residential uses (consisting of drinking, bathing, and cooking, or other similar uses);

(2) Where the Director determines that alternative water to achieve the equivalent level of public health protection provided by the applicable national primary drinking water regulations is provided for drinking and cooking;

(3) Where the Director determines that the water provided for drinking, cooking, and bathing is treated (centrally or by point of entry) by the provider, a pass-through entity, or the user to achieve the e quivalent level of protection provided by the applicable national primary drinking water regulations.

If the application of one or more of these exclusions reduces the "connections" of a system providing water for human consumption (through construction conveyances other than pipes) to fewer than fifteen (15) service connections that serve fewer than twenty-five (25) individuals, the supplier's water system is not a public water system.

However, if the supplier's remaining connections number fifteen (15) or more, or if its remaining connections [even if they number fewer than fifteen (15)] regularly serve at least twenty-five individuals, then the system is a public water system although the excluded connections are not considered part of the public water

system for as long as the exclusions apply and the system complies with any conditions governing their applicability.

b) An irrigation district in existence prior to May 18, 1994 that provides primarily agricultural service through a piped water system with only incidental residential or similar use shall not be considered to be a public water system if the system or the residential or similar users of the system comply with subsections (a)(2) and (3) of this definition.

1.12 ***"Conventional filtration treatment"*** means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in substantial particulate removal.

1.13 ***"Corrosion inhibitor"*** means a substance capable of reducing the corrosivity of water toward metal plumbing materials, especially lead and copper, by forming a protective film on the interior surface of those materials.

1.14 ***"CT"*** or ***"CTcalc"*** is the product of "residual disinfectant concentration" C in mg/1 determined before or at the first customer, and the corresponding disinfectant contact time" (T) in minutes, i.e., "C" x "T". "CT99.9" is the CT value required for 99.9 percent (3-log) inactivation of Giardia lamblia cysts. CT99.9 for a variety of disinfectants and conditions appear in Tables 1.1-1.6, 2.1, and 3.1 of Section 5.6. CTcalc/CT99.9 is the inactivation ratio. The sum of the inactivation ratios, or total inactivation ratio shown as the sum of (CTcalc) /(CT99.9) is calculated by adding together the inactivation ratio for each disinfection sequence. A total inactivation ratio equal to or greater than 1.0 is assumed to provide a 3-log inactivation of Giardia lamblia cysts.

1.15 ***"Diatomaceous earth filtration"*** means a process resulting in substantial particulate removal in which (1) a precoat cake of diatomaceous earth filter media is deposited on a support membrane (septum), and (2) while the water is filtered by passing through the cake on the septum, additional filter media known as body feed is continuously added to the feed water to maintain the permeability of the filter cake.

1.16 ***"Direct filtration"*** means a series of processes including coagulation and filtration but excluding sedimentation resulting in substantial particulate removal.

1.17 ***"Director"*** means the Director of the Rhode Island Department of Health or his duly authorized agent.

1.18 ***"Disinfectant contact time"*** ("T" in CT calculations) means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration ("C") is measured. Disinfectant contact time in pipelines must be calculated based on "plug flow" by dividing the internal volume of the pipe by the maximum hourly flow rate through that pipe. Disinfectant contact time within mixing

basins and storage reservoirs must be determined by tracer studies or an equivalent demonstration.

1.19 ***"Disinfection"*** means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

1.20 ***"Domestic or other non-distribution system plumbing problem"*** means a coliform contamination problem in a public water system with more than one service connection that is limited to the specific service connection from which the coliform-positive sample was taken.

1.21 ***"Dose equivalent"*** - The absorbed dose from ionizing radiation expressed in terms of Rads multiplied by such a factor as account for differences in biological effectiveness due to the type of radiation and its distribution in the body as specified by the International Commission on Radiological Units and Measurements (ICRU).

1.22 ***"Effective corrosion inhibitor residual"*** for the purpose of section 6, means a concentration sufficient to form a passivating film on the interior walls of a pipe.

1.23 ***"Filtration"*** means a process for removing particulate matter from water by passage through porous media.

1.24 ***"First draw sample"*** means a one-liter sample of tap water, collected in accordance with section 6.86(b) (2), that has been standing in plumbing pipes at least 6 hours and is collected without flushing the tap.

1.25 ***"Flocculation"*** means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

1.26 ***"Gross alpha particle activity"*** - The total radioactivity due to alpha particle emission as determined from measurements on a dry sample.

1.27 ***"Gross beta particle activity"*** - The total radioactivity due to beta particle emission as determined from measurements on a dry sample.

1.28 ***"Ground water under the direct influence of surface water"*** means any water beneath the surface of the ground with (1) significant occurrence of insects or other macroorganisms, algae, or large-diameter pathogens such as Giardia lamblia, or (2) significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Direct influence must be determined for individual sources in accordance with criteria established by the director. The director's determination of direct influence may be based on site-specific measurements of water quality and/or documentation of well construction characteristics and geology with field evaluation.

1.29 ***"Initial compliance period"*** means the first full three-year compliance period which begins at least 18 months after promulgation, except for dichloromethane, 1,2,4 trichlorobenzene, 1,1,2-trichloroethane, benzo[a]pyrene, dalapon, di(2-ethylhexyl)adipate, di(2-ethylhexyl)phthalate, dinoseb, diquat, endothall, endrin, glyphosate, hexachlorbenzene, hexachlorocyclopentadiene, oxamyl(Vydate), picloram, simazine, 2,3,7,8-TCDD (Dioxin), antimony, beryllium, cyanide, nickle, and thallium, initial compliance period means January 1993-December 1995 for systems with 150 or more service connections and January 1996-December 1998 for systems having fewer than 150 service connections.

1.30 ***"Large water system"***, for the purpose of section 6, means a water system that serves more than 50,000 persons.

1.31 ***"Lead service line"*** means a service line made of lead which connects the water main to the building inlet and any lead pigtail, gooseneck or other fitting which is connected to such lead line.

1.32 ***"Legionella"*** means a genus of bacteria, some species of which have caused a type of pneumonia called Legionnaires Disease.

1.33 ***"License"*** means approval as specified in Section 46-13-2.1 of the General Laws of Rhode Island, 1956 as amended.

1.34 ***"Manmade beta particle and photon emitters"*** - All radionuclides emitting beta particles and/or photons listed in Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air or Water for Occupational Exposure, NBS Handbook 69, except the daughter products of thorium-232, uranium-235, and uranium-238.

1.35 ***"Maximum contaminant level"*** means the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.

1.36 ***"Medium-size water system"*** for the purpose of section 6 only, means a water system that serves greater than 3,300 and less than or equal to 50,000 persons.

1.37 ***"Near the first service connection"*** means at one of the 20 percent of all service connections in the entire system that are nearest the water supply treatment facility, as measured by water transport time within the distribution system.

1.38 ***"Non-community water system"*** - A public water system that is not a community water system.

1.39 ***"Noncompliance"*** - ***"Nonconformance"*** - ***"Failure to comply"*** - ***"Violation"*** - each mean any act or failure to act which constitutes or results in or from:

(i) engaging in any activity prohibited by, or not in compliance with the Act or any rule, regulation, permit, approval or order adopted pursuant to the Director's authority thereunder;

(ii) engaging in any business or other activity without a necessary permit, or approval that is required by law or regulation;

(iii) the failure to perform, or the failure to perform in a timely fashion, anything required by the Act, by a rule, regulation, permit, approval or order adopted pursuant to the Director's authority.

1.40 ***"Non-transient non-community water system"*** - A non-community water system that regularly services at least twenty-five (25) of the same persons over six (6) months per year.

1.41 ***"Optimal corrosion control treatment"*** for the purpose of section 6, means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any other regulations herein (*Rules and Regulations Pertaining to Public Drinking Water*).

1.42 ***"Order"*** means the whole or a part of a final disposition by the Department, whether affirmative, negative, unjunctive, consent or declaratory in form, other than rulemaking but including notices of violation, compliance orders, permits, and approvals issued pursuant to the Director's authority.

1.43 ***"Permit"*** means an authorization, or equivalent control document issued by the Department to implement the requirements of 46-13.

1.44 ***"Person"*** - shall include an individual, partnership, association, or corporation, or any town or city or any agency thereof, or the state or any agency thereof, or any other legal entity.

1.45 ***"Picocurie (pCi)"*** - A unit of radioactivity equal to 2.22 nuclear transformations per minute.

1.46 ***"Point of disinfectant application"*** is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

1.47 ***"Point-of-entry treatment device"*** - means a treatment device applied to the drinking water entering a house or building for the purpose of reducing contaminants in the drinking water distributed throughout the house or building.

1.48 ***"Point-of-use treatment device"*** - A treatment device applied to a single tap used for the purpose of reducing contaminants in drinking water.

1.49 ***"Public water system"*** means a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen (15) service connections or regularly serves at least twenty-five (25) individuals daily at least sixty (60) days out of the year. Such term includes:

(i) any collection, treatment, storage and distribution facilities under control of the operator of such system and used primarily in connection with such system, and

(ii) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

1.50 ***"Rad"*** - A unit of absorbed dose equal to 100 ergs per gram in any medium. (100 rad = 1 gray)

1.51 ***"Rem"*** **-** The unit of dose equivalent from ionizing radiation to the total body or any internal organ or organ system. (100 rem = 1 sievert)

1.52 ***"Repeat compliance period"*** means any subsequent compliance period after the initial compliance period.

1.53 ***"Requirement"*** means any provision of the Act, or any rule, regulation, permit, approval or order adopted pursuant to the Director's authority.

1.54 ***"Residual disinfectant concentration"*** ("C" in CT calculations) means the concentration of disinfectant measured in mg/1 in a representative sample of water.

1.55 ***"Sanitary survey"*** - An on-site review of the water source, facilities, equipment, operation, and maintenance of a public water system for the purpose of evaluating the adequacy of such source, facilities, equipment, operation, and maintenance for producing and distributing safe drinking water.

1.56 ***"Sedimentation"*** means a process for removal of solids before filtration by gravity or separation.

1.57 ***"Service line sample"*** means a one-liter sample of water, collected in accordance with section 6.86(b)(3), that has been standing for at least 6 hours in a service line.

1.58 ***"Single family structure"*** for the purpose of section 6 only, means a building constructed as a single-family residence that is currently used as either a residence or a place of business.

1.59 ***"Slow sand filtration"*** means a process involving passage of raw water through a bed of sand at low velocity (generally less than 0.4 m/h or 1 gal./ft^2/h resulting in substantial particulate removal by physical and biological mechanisms.

1.60 ***"Small water system"*** for the purpose of section 6 only, means a water system that serves 3,300 persons or fewer.

1.61 ***"Surface water"*** means all water which is open to the atmosphere and subject to surface runoff.

1.62 ***"System with a single service connection"*** means a system which supplies drinking water to consumers via a single service line.

1.63 ***"Too numerous to count"*** means that the total number of bacterial colonies exceeds 200 on a 47-mm diameter membrane filter used for coliform detection.

1.64 ***"Transient non-community water system or TWS"*** means a non-community water system that does not regularly serve at least twenty-five (25) of the same persons over six (6) months per year.

1.65 ***"Water purveyor"*** - Any person who owns or operates a public water system.

1.66 ***"Waterborne disease outbreak"*** means the significant occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment, as determined by the appropriate local or State agency.

1.67 ***"Virus"*** means a virus of fecal origin which is infectious to humans by waterborne transmission.

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Section 2.0 ***COVERAGE***

2.1 These regulations apply to any public water system unless a public water system meets all of the following conditions:

a) The system consists only of distribution or storage facilities (and does not have any collection or treatment facilities);

b) The system obtains all of its water from a public water system to which these regulations apply; and

c) The system does not sell water to any person.

2.2 ***General Requirements***

a) No person shall develop, maintain, or operate a public water supply system unless said system is approved by the Director. Further, all public water supply systems must be developed, operated, and maintained in accordance with the requirements and provisions of these regulations in order for a public water supply system to maintain approval by the Director.

b) Should the Director find that a public water supply system is not developed, maintained, or operated in compliance with regulatory provisions, he/she may revoke, suspend or otherwise limit the approval previously granted.

c) The director is authorized to enter at all reasonable times in or upon any private or public property for the purpose of carrying out the provisions of these regulations or making an inspection or investigation of a condition which the director believes may be hazardous to the health of the consumers serviced by any public water supply system or in violation of the regulations or orders promulgated under Chapter 46-13.

2.3 ***Licensing Requirement***

a) ***Applicability***

Pursuant to the provisions of Section 46-13-2.1 of the General Laws of Rhode Island, as amended, no person shall operate or maintain a public water supply system unless the system is licensed by the Director under the provisions of this subsection.

Persons subject to licensure shall be assessed initial and annual renewal licensure fees in accordance with the fee schedule listed for each category of public water system in paragraph 2.3 c)2) of this subsection.

b) ***License Application***

1) To apply for a license, a public water system shall submit a completed application to the Director on forms provided for this purpose. The application shall include all information required by these regulations, as well as by the form and the accompanying instructions. Applications for a new public water system shall include a water system management plan that demonstrates the financial, managerial, and technical capacity to comply with statutory and regulatory requirements.

2) The Director may at any time after filing of the original application require further information in order to determine whether the application should be approved or denied.

3) Each application for a public water system license shall be signed by the applicant or a person duly authorized to act on behalf of the applicant.

4) No new public water system shall be licensed until: the application has been approved, the public water system has been constructed in accordance with the approved plans, and the water has been sampled and found to be in compliance with the requirements of these regulations.

c) ***License Fees***

1) Pursuant to the provisions of Section 46-13-2.1 of the General Laws of Rhode Island, as amended, the Director shall grant a license to a public water system that meets the licensure requirements set forth in these regulations and upon submission of the license fee as listed in paragraph 2.3 c)2) of these regulations made payable by check to the General Treasurer, State of Rhode Island. Said license, unless sooner suspended or revoked, shall expire on the 30th day of June following its issuance and must be renewed from year to year.

2) The annual fee for licensure shall be as follows:

Transient non-community water system....$150.

Nontransient non-community water system...$250.

Community water system..$1.10 per connection:
minimum fee = $250.
maximum fee = $25,000.

d) ***Denial of License***

1) The Director may deny an application for a license if s/he determines that the applicant has not demonstrated the ability to comply fully with the applicable requirements established by the Act and/or by these regulations.

2) An applicant whose application is denied may request a hearing in accordance with the Administrative Procedures of the Rhode Island Department of Health.

e) ***Suspension or Revocation of a License***

The Director may, for cause or for violation of these regulations, suspend or revoke any license issued under this subsection. The Director may also review the current status of any license with regard to current use of the water supply and any change of use of the public water system.

f) ***Renewal of License***

1) All licenses shall expire on the 30th day of June following its issuance except as provided in 2.3 f)5).

2) A renewal application must be filed with the Director by the 31st day of May of each year on forms provided for this purpose.

3) The appropriate licensing fee must accompany the renewal application.

4) Renewal of a license shall be based upon: satisfactory compliance with the regulations, and timely submission of a renewal application and fee.

5) In any case in which a public water system not less than 30 days prior to expiration of an existing license, has filed a renewal application and fee in proper form for renewal, such existing license shall not expire until final action on the application has been taken by the Director.

g) Licenses shall be issued only for the public water supply system and persons named on the application and shall not be transferable or assignable. Existing public water systems which have significant change of use of the water supply shall be reviewed and modified as deemed appropriate by the Director.

Section 3.0 *NEW WATER SOURCES*

3.1 No source of water shall be developed for a public water system until a site plan prepared by a professional engineer or land surveyor registered in accordance with Chapter 5-8 of General Laws of Rhode Island, 1956, as amended, has been approved by the Director.

a) Approval of plans and specifications granted an applicant shall expire within two years if construction of the approved source has not begun within that period.

b) Expired approvals may be renewed if the data provided in the application is unchanged and attested to by the applicant; and the plans conform with all construction standards and testing requirements in effect at the time of application for renewal.

3.2 In the case of a proposed gravel packed or gravel developed well, the site plan shall contain pertinent information within at least 1750 feet of the proposed well including, but not limited to, the location of existing and proposed sewage disposal systems and any other existing or proposed potential sources of pollution including but not limited to those listed in Appendix 4. Generally, the land within 400 feet of such wells shall be reserved for protection of the water quality of the well, and shall be delineated on the site plan by a topographic mapping of the 400 feet area to an appropriate scale. This distance may be modified at the discretion of the director taking into consideration such factors as the volume and type of waste material to be disposed or stored in close proximity to the land area reserved for protection of the well, the projected yield of the well, the depth below grade to impervious formation, the depth below grade to the water table, the type of soil in the area, or any other factors the director deems pertinent.

3.3 In the case of a proposed drilled (rock), driven, or dug well, the site plan shall show pertinent information within at least 1750 feet of the proposed well including, but not limited to, the location of existing and proposed sewage disposal systems and any other existing or proposed potential sources of pollution including but not limited to those listed in Appendix 4. Generally, the land within 200 feet of such wells shall be reserved for protection of the water quality of the well, and shall be delineated on the site plan by a topographic mapping of the 200 feet area to an appropriate scale. This distance may be modified at the discretion of the director taking into consideration such factors as the volume and type of waste material to be disposed or stored in close proximity to the land area reserved for protection of the well, the depth below grade to impervious formation, the depth below grade to the water table, the type of soil in the area, or any other factors the director deems pertinent.

3.4 In the case of a proposed surface water source, the site plan shall show pertinent information within the entire watershed of the proposed surface water supply, but not limited to the location of existing and proposed sewage disposal systems and any other

existing or proposed potential sources of pollution including but not limited to those listed in Appendix 4. The portion of the watershed owned or controlled by the water purveyor shall be clearly indicated. All surface water sources shall be provided with water treatment consisting, as a minimum, of coagulation, sedimentation, filtration and disinfection.

3.5 All revisions to approved plans must be submitted to the director for approval. The director may require a new application and/or site plan if the revisions are deemed significant.

3.6 Land reserved for the protection of the well as (indicated on the plan) approved by the director must remain under the direct control of the water supplier by either continued ownership or recorded easement unless written permission to modify this area is granted by the director.

3.7 It is the responsibility of the water supplier to maintain the protective well area free from potential sources of contamination as listed in Appendix 4.

3.8 Connection to another Public Water Supply - A new public water supply shall not be approved for use at any facility if another community public water supply is reasonably accessible to such facility as determined by the Director, and permission to connect can be obtained from the authority having jurisdiction.

3.9 Applications for approval of new water sources must be accompanied by an assessment of the financial viability for said water system to maintain compliance with the requirements of these regulations. The assessment shall include a discussion of operation costs including: operation, maintenance, monitoring, anticipated future improvements, debt repayment, and unforeseen emergencies or system breakdowns and a discussion of how the necessary revenues to pay for these costs will be raised.

Section 4.0 *APPROVAL OF TREATMENT WORKS, STORAGE AND PUMPING FACILITIES*

4.1 No new water treatment works or water storage or pumping facilities shall be constructed or such existing works or facilities substantially altered until design plans and specifications prepared by a professional engineer registered in accordance with Chapter 5-8 of the General Laws of Rhode Island, as amended, and a plan for operation and maintenance have been approved by the director.

a) Any chemical or substance added to a public water supply, any materials used in the manufacture of public water supply components or appurtenances, or any pipe, storage tank, valve, fixture or other materials which come in contact with water intended for use in a public water supply shall meet American National Standards Institute/NSF International standards, specifically ANSI/NSF Standard 60-1988 and ANSI/NSF Standard 61-1991 which are hereby adopted by reference.

Only products which meet the standards adopted in or pursuant to this section shall be used by a supplier of water in a public water supply. Certification that a product meets the standards adopted pursuant to this Section by an organization having a third-party certification program accredited by American National Standards Institute to test and certify products shall be prima facie evidence that a product meets the standards.

Product Type	***Standard***
Drinking Water Treatment Chemicals	60
Pipes and Related Products	61
Protective (Barrier) Materials	61
Joining and Sealing Materials	61
Process Media	61
Mechanical Devices	61
Plumbing Devices	61

4.2 All newly constructed public water systems or additions to existing systems shall be flushed, adequately disinfected, and the water examined for the presence of coliform organisms in accordance with Appendix 1. No system shall be placed in use until such examination discloses the absence of coliform organisms. Any waste water resulting from disinfection must be disposed of properly, and with proper permits.

4.3 All revisions to approved plans must be submitted to the director for approval. The director may require a new application and/or site plan if the revisions are deemed significant.

4.4 ***Use of Non-Centralized Treatment Devices***

a) Criteria and procedures for public water systems using point-of-entry devices.

1) Public water systems may use point-of-entry devices to comply with maximum contaminant levels only if they meet the requirements of this section and are approved by the director.

2) It is the responsibility of the public water system to operate and maintain the point-of-entry treatment system.

3) The public water system must develop and obtain the Director's approval for a monitoring plan before point-of-entry devices are installed for compliance. Under the plan approved by the Director, point-of-entry devices must provide health protection equivalent to central water treatment. "Equivalent" means that the water would meet all MCLS and would be of acceptable quality similar to water distributed by a well-operated central treatment plant. In addition to the VOCs, monitoring must include physical measurements and observations such as total flow treated and mechanical condition of the treatment equipment.

4) Effective technology must be properly applied under a plan approved by the Director and the microbiological safety of the water must be maintained.

i) Adequate certification of performance and field testing must be provided as required by the director.

ii) The design and application of the point-of-entry devices must consider the tendency for increase in heterotrophic bacteria concentrations in water treated with activated carbon. It may be necessary to use frequent backwashing, post-contractor disinfection, and Heterotrophic Plate Count monitoring to ensure that the microbiological safety of the water is not compromised.

5) All consumers shall be protected. Every building connected to the system must have a point-of-entry device installed, maintained, and adequately monitored. The Director must be assured that every building is subject to treatment and monitoring, and that the rights and responsibilities of the public water system customer convey with title upon sale of property.

4.5 *Use of bottled water or point of use treatment devices*

Public water systems shall not use bottled water or point-of-use devices to achieve compliance with an MCL. Bottled water or point-of-use devices may be used on a temporary basis to avoid an unreasonable risk to health, and only with prior approval of the director.

a) Where bottled water is used, the public water system is fully responsible for the provision of sufficient quantities of bottled water to every person supplied by the public water system. The water system must use an approved bottled water supply.

b) Where a point of use device is used, it must comply with the requirements of paragraph 4.4.

Section 5.0 *FILTRATION AND DISINFECTION:*

5.1 *General Requirements:*

The requirements of this section establish criteria under which filtration is required as a treatment technique for public water systems supplied by a surface water source, or a ground water source under the direct influence of surface water.

In addition, these regulations establish treatment technique requirements in lieu of maximum contaminant levels for the following contaminants: Giardia lamblia, viruses, heterotrophic plate count bacteria, Legionella and turbidity.

Each public water system with a surface water source or a ground water source under the direct influence of surface water must provide treatment of that source water that complies with these treatment technique requirements.

5.1.1 The treatment technique requirements consist of installing and properly operating water treatment processes which reliably achieve:

1) At least 99.9 percent (3-log) removal and/or inactivation of Giardia lamblia cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer, and

2) At least 99.99 percent (4-log) removal and or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

5.1.2 A public water system using a surface water source or a ground water source under the direct influence of surface water is considered to be in compliance with the requirements of section 5.1.1 if:

a) It meets the requirements for avoiding filtration in section 5.2 below and the disinfection requirements in section 5.3 **OR**

b) It meets the filtration requirements in section 5.4.and the disinfection requirements in section 5.3.

5.1.3 Each public water system using a surface water source or a ground water source under the direct influence of surface water must be operated by qualified personnel who meet the requirements of the *Rules and Regulations Pertaining to the Certification of Public Drinking Water Treatment and Transmission and Distribution Operators* promulgated pursuant to the authority set forth in Chapter 23-65 of the General Laws of Rhode Island, as amended.

5.2 ***Criteria for avoiding filtration:***

5.2.1 A public water system that uses a surface water source must meet all of the conditions of sections 5.2.5 and 5.2.6 and is subject to 5.2.7 of this section beginning December 30, 1991, unless the Director has determined in writing that filtration is required.

5.2.2 A public water system that uses a ground water source under the direct influence of surface water must meet all of the conditions of 5.2.5, 5.2.6 of this section and is subject to section 5.2.7 18 months after the Director determines that it is under the direct influence of surface water, unless the Director has determined in writing that filtration is required.

5.2.3 If the Director determines in writing before December 30, 1991 that filtration is required, the system must have installed filtration and meet the criteria for filtered systems specified in these regulations by June 29, 1993.

5.2.4 Within 18 months of the failure of a system using surface water or a ground water source under the direct influence of surface water to meet any one of the requirements of 5.2.5 or 5.2.6 of this section or after June 29, 1993, whichever is later, the system must have installed filtration and meet the criteria for filtered systems specified in section 5.4.

5.2.5 ***Source Water Quality Conditions:***

1) The fecal coliform concentration must be equal to or less that 20/100ml or the total coliform concentration must be equal to or less than 100/100 ml (measured as specified in appendix 1) in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90 percent of the samples taken for the six (6) previous months that the system served water to the public on an ongoing basis.

   If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion must be met.

2) The turbidity level cannot exceed 5 NTU (measured as specified in appendix 1) in representative samples of the source water immediately prior to the first or only point of disinfectant application.

5.2.6 ***Site Specific Conditions:***

1) ***Compliance***

a) The public water system must meet the requirements of 5.3.5(1) at least 11 of the 12 previous months that the system served water to the public on an ongoing basis.

b) The public water system must meet the requirements of 5.3.5(2) and 5.3.5(3) at all times the system serves water to the public.

c) The public water system must meet the requirements of 5.3.5(4) on an ongoing basis.

2) The public water system must maintain a watershed control program which minimizes the potential for contamination by Giardia lamblia cyst and viruses in the source water. The adequacy of a watershed control program will be determined by the Director. The adequacy of a program to limit potential contamination by Giardia lamblia cysts and viruses must include but not be limited to the following measures:

a) The comprehensiveness of the watershed review;

b) The effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and

c) The extent to which the water system has maximized land ownership and/or controlled land use within the watershed. At a minimum, the watershed control program must:

i) characterize the watershed hydrology and land ownership;

ii) identify watershed characteristics and activities which may have an adverse effect on source water quality; and

iii) monitor the occurrence of activities which may have an adverse effect on source water quality.

The public water system must demonstrate through ownership and/or written agreements with landowners within the watershed that it can control all human activities which may have an adverse impact on the microbiological quality of the source water.

The public water system must submit an annual report to the Director that identifies any special concerns about the watershed and how they are being handled; describes activities in the watershed that affect water quality; and projects what adverse activities are expected

to occur in the future and describes how the public water system expects to address them. Approved watershed protection plans or wellhead protection plans may be used to the extent that they are applicable.

3) The public water system must be subject to an annual on-site inspection to assess the watershed control program and disinfection treatment process.

A report of the on-site inspection summarizing all findings must be prepared every year. The on-site inspection must indicate to the Director's satisfaction that the watershed control program and disinfection treatment process are adequately designed and maintained. The on-site inspection will include but not be limited to:

i) A review of the effectiveness of the watershed control program;

ii) A review of the physical condition of the source intake and how well it is protected;

iii) A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

iv) An inspection of the disinfection equipment for physical deterioration;

v) A review of operating procedures;

vi) A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and

vii) identification of any improvements which are needed in the equipment, system maintenance and operation or data collection.

4) The public water system must not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system must have been modified sufficiently to prevent another such occurrence as determined by the Director.

5) The public water system must comply with the maximum contaminant level (MCL) for total coliforms in Section 16.4 c) at least 11 of the 12 previous

months that the system served water to the public on an ongoing basis, unless the Director determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water.

6) The public water system must comply with the requirements for trihalomethanes in Section 16.2.

5.2.7 ***Treatment Technique Violations:***

A. A system that fails to meet any one of the criteria in paragraphs 5.2.5 or 5.2.6 of this section or for which the Director has determined that filtration is required in writing and fails to install filtration by the date specified is in violation.

B. A system that has not installed filtration is in violation of a treatment technique requirement if:

1) the turbidity level in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU or

2) the system is identified as a source of a waterborne disease outbreak.

5.3 ***Disinfection***

5.3.1 A public water system that uses a surface water source and does not provide filtration treatment must provide the disinfection treatment specified in 5.3.5 beginning December 30, 1991 unless the Director determines that filtration is required in writing.

5.3.2 A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must provide disinfection treatment specified in paragraph 5.3.5 18 months after the Director determines that the ground water source is under the influence of surface water, unless the Director has determined that filtration is required in writing.

5.3.3 If the Director has determined that filtration is required, the system must comply with any interim disinfection requirements the Director deems necessary before filtration is installed. A system that uses a surface water source that provides filtration treatment must provide the disinfection treatment specified in 5.3.6 beginning June 29, 1993 or beginning when filtration is installed, whichever is later.

5.3.4 A system that uses a ground water source under the direct influence of surface water and provides filtration treatment must provide disinfection treatment as specified in section 5.3.6, beginning when filtration is installed. Failure to meet any requirement of this section is a treatment technique violation.

5.3.5 Disinfection requirements for public water systems that do not provide filtration:

1) The disinfection treatment must be sufficient to ensure at least 99.9 percent (3-log) inactivation of Giardia lamblia cysts and 99.99 percent (4-log) inactivation of viruses, every day the system serves water to the public, except any one day each month. Each day a system serves water to the public, the public water system must calculate the CT value(s) from the system's treatment parameters, using the procedure specified in Section 5.6.1 (3) and 5.6.1 (4) and determine whether this value is sufficient to achieve the specified inactivation rates for Giardia lamblia cysts and viruses.

   If a system uses a disinfectant other than chlorine, the system may demonstrate to the Director, through the use of a protocol approved by the Director for on-site disinfection challenge studies or other information satisfactory to the Director, that the CT 99.9 values other than those specified in Tables 2.1 and 3.1 or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by paragraph 5.3.5(1) of this section.

2) The disinfection system must have either (I) redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system or (ii) automatic shut-off of delivery of water to the distribution system whenever there is less than 0.2mg/l of residual disinfectant concentration in the water. If the Director determines that automatic shut-off would cause unreasonable risk to health or interfere with fire protection, the system must comply with paragraph 5.3.5(2)(I) of this section.

3) The residual disinfectant concentration in the water entering the distribution system measured as specified in section 5.5 cannot be less than 0.2 mg/l for more than 4 hours.

4) The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine or chlorine dioxide as specified in Section 5.5 cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public.

   Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml measured as heterotrophic plate count (HPC) as specified in section 5.5 is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement. Thus, the value "V" in the following formula cannot exceed 5 per cent in one month for any two consecutive months:

$$V = \frac{c+d+e}{a+b} \times 100$$

where:

a= number of instances where the residual disinfectant concentration is measured;

b= number of instances where the residual disinfectant concentration is not measured but the heterotrophic bacteria plate count (HPC) is measured;

c= number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

d= number of instances where the residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

e= number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

5.3.6 Disinfection requirements for public water systems which provide filtration.

Each public water system that provides filtration treatment must provide disinfection treatment as follows:

1) The disinfection treatment must be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent(3-log) inactivation and/or removal of Giardia lamblia cysts and at least 99.99 percent (4-log) inactivation and/or removal of viruses as determined by the Director.

2) The residual disinfectant concentration in the water entering the distribution system measured as specified in section 5.5 cannot be less than 0.2 mg/l for more than 4 hours.

3) The residual disinfectant concentration in the distribution system, measured as total chlorine, combined chlorine or chlorine dioxide, as specified in Section 5.5 cannot be undetectable in more than 5 percent of the samples each month, for any two consecutive months that the system serves water to the public.

Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as heterotrophic plate count (HPC) as specified in section 5.5 is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement.

Thus the value of "V" cannot exceed 5 percent in one month for any two consecutive months. [See formula in 5.3.5.4].

5.4 ***Filtration:***

5.4.1 A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in section 5.2 for avoiding filtration, must provide treatment consisting of both disinfection, as specified in 5.3.6 and filtration treatment which complies with the requirements of section 5.4 by June 29, 1993, or within 18 months of the failure to meet any one of the criteria for avoiding filtration, whichever is later. Failure to meet any requirement of this section by the date specified in Section 5.4.1, shall constitute a treatment technique violation.

5.4.2 Conventional filtration treatment or direct filtration:

1) For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 0.5 NTU in at least 95 percent of the measurements taken each month, measured as specified in section 5.5. However, if the Director determines that the system is capable of achieving at least 99.9 percent removal an/or inactivation of Giardia lamblia cysts at some turbidity level higher than 0.5 NTU in at least 95 percent of the measurements taken each month, the Director may substitute this higher turbidity limit for that system.

   In no case will a turbidity limit that allows more than 1 NTU in more than 5 percent of the samples taken each month, measured as specified in Section 5.5 be approved.

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU measured as specified in section 5.5.

5.4.3 ***Slow Sand Filtration:***

1) For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water must be less that or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in section 5.5.

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU measured as specified in section 5.5.

5.4.4 ***Diatomaceous Earth Filtration:***

1) For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water must be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month, measured as specified in section 5.5.

2) The turbidity level of representative samples of a system's filtered water must at no time exceed 5 NTU, measured as specified in section 5.5.

5.4.5 ***Other Filtration Technologies:***

A public water system may use a filtration technology not listed in sections 5.4.2, 5.4.3 or 5.4.4, if it demonstrates to the Director, using pilot plant studies or other means, that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of section 5.3.6, consistently achieves 99.9 percent removal and/or inactivation of Giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of section 5.4.3 apply.

5.5 ***Analytical Monitoring Requirements***

5.5.1 Only the analytical method(s) specified in this section, or otherwise approved by the Director may be used to demonstrate compliance with the requirements of sections 5.2, 5.3, or 5.4.

Measurements for pH, temperature, turbidity, and residual disinfectant concentrations must be conducted by a party approved by the Director.

Measurements for total coliforms, fecal coliforms and HPC must be conducted by a laboratory certified by the Director or EPA to do such analysis.

5.5.2 The following procedures shall be performed in accordance with the methods listed.

1) Fecal Coliform/E. Coli Concentration Method, as set forth in Appendix 1.

2) Total Coliform Concentration, as set forth in Appendix 1.

3) Heterotrophic Plate Count, as set forth in Appendix 1.

4) Turbidity, as set forth in Appendix 1.

5) Residual Disinfectant Concentration, as set forth in Appendix 1.

6) Temperature, Method 212, pp126-127, as set forth in Appendix 1.

7) pH Method 423 (pH value) pp 429-437 as set forth in Appendix 1.

8) Minimal Medium ONPG-MUG method for simultaneous enumeration of total coliform and E. Coli as set forth in Appendix 1.

9) Indigo Method for determination of Ozone in water as set forth in Appendix 1.

5.6 ***Monitoring Requirements for Systems That Do Not Provide Filtration:***

5.6.1 A public water system that uses a surface water source and does not provide filtration treatment must begin monitoring, as specified in this section beginning December 31, 1990, unless the Director has determined that filtration is required in writing, in which case the Director may specify alternative monitoring requirements, until filtration is in place.

A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must begin monitoring as specified in this section 6 months after the Director determines that the ground water source is under the direct influence of surface water, unless the Director has determined that filtration is required in writing.

1) Fecal coliform or total coliform density measurements as required by section 5.2.5 must be performed on representative source water samples immediately prior to the first or only point of disinfectant application. The system must sample for fecal or total coliforms at the following minimum frequency each week the system serves water to the public:

System Size (Persons Served)	***Samples/Week ****
<500	1
501 to 3,300	2
3,301 to 10,000	3
10,001 to 25,000	4
>25,000	5

*****Samples must be taken on separate days

Also, 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 toward the weekly coliform

sampling requirement,) unless the Director determines that the system for logistical reasons outside the system's control cannot have the sample analyzed within 30 hours of collection.

2) Turbidity measurements as required by section 5.2.5(2) 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 Director.

3) The total inactivation ratio for each day that the system is in operation must be determined based on the CT99.9 values in Tables 1.1-1.6, 2.1 and 3.1 of this section, as appropriate. The parameters necessary to determine the total inactivation ratio must be monitored as follows:

   i) The temperature of the disinfected water must be measured at least once er day at each residual disinfectant concentration sampling point.

   ii) 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.

   iii) The disinfectant contact time(s) ("T") must be determined for each day during peak hourly flow.

   iv) The residual disinfectant concentration(s) ("C") of the water before or at the first customer must be measured each day during peak hourly flow.

   v) If a system uses a disinfectant other than chlorine, the system may demonstrate to the Director, through the use of a protocol approved by the Director for on-site disinfection challenge studies or other information satisfactory to the Director that CT99.9 values other than those specified in Tables 2.1 and 3.1 in this section or other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by section 5.3.5(1).

4) The total inactivation ratio must be calculated as follows:

i) If the system uses only one point of disinfectant application, the system may determine the total inactivation ratio based on either of the following two methods:

A) One inactivation ratio (CT calc/CT99.9) is determined before or at the first customer during peak hourly flow and if the CT calc/CT99.9>1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved; OR

B) Successive CTcalc/CT99.9 values representing sequential inactivation ratios, are determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow. Under this alternative, the following method must be used to calculate the total inactivation ratio:

(1) Determine (CT calc/CT 99.9) for each sequence

(2) Add the (CT calc/CT 99.9) values together (the sum of all CT calc/CT 99.9)

(3) If the sum of (CT calc/CT 99.9) >1.0

Then the 99.9 percent Giardia lamblia inactivation requirement has been achieved.

ii) If the system uses more than one point of disinfectant application before or at the first customer, the system must determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The CTcalc/CT99.9 value of each sequence and the sum of CTcalc/CT99.9 must be calculated using the method in section 5.6.1(4)(I)(B) of this section to determine if the system is in compliance with section 5.3.5.

iii) Although not required, the total percent inactivation for a system with one or more points of residual disinfectant concentration monitoring may be calculated by solving the following equation:

Percent inactivation = $100-(100/10^{Z})$
where Z=3x the sum of (Ctcalc/CT99.9)

5) The residual disinfectant concentration of the water entering the distribution system must be monitored continuously, and the lowest value must be

recorded each day. In the event of system monitoring failure, grab sampling may be conducted every 4 hours, for no more than 5 working days.

Systems serving 3,300 or fewer persons may take grab samples in lieu of continuous monitoring on an ongoing basis at the frequencies prescribed below:

System Size by Population	***Samples/day ****
<501	1
501 to 1,000	2
1,001 to 2,500	3
2,501 to 3,300	4

*****The day's samples cannot be taken at the same time.
The sampling intervals are subject to the Director's review and approval.

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.

6) 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 section16.4, however the Director may allow a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source to take disinfectant residual samples at points other than the total coliform sampling points, if the Director determines that such points are more representative of treated (disinfected) water quality within the distribution system.

Heterotrophic bacteria, measured as heterotrophic plate count (HPC) as specified in section 5.5.2 may be measured in lieu of residual disinfectant concentration.

5.7 *Monitoring Requirements for Systems Using Filtration Treatment*

5.7.1 A public water system that uses a surface water source or a ground water 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 section 5.4 must be performed on representative samples of the systems filtered water 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 Director.

For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration or diatomacious earth filtration, the Director may reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance.

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

2) The residual disinfectant concentration of the water entering the distribution system must be monitored as indicated in sections 5.6.1(5) and 5.6.1(6).

5.8 ***Reporting and Record Keeping Requirements:***

5.8.1 A public water system that uses a surface water source and does not provide filtration treatment must report the following information monthly to the Director beginning December 31, 1990 unless the Director has determined that filtration is required in writing in which case the Director may specify alternate reporting requirements as appropriate until filtration is in place.

A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment must report monthly to the Director, the following information beginning no later than six (6) months after the Director determines that the ground water source is under the direct influence of surface water.

1) Source water quality information must be reported to the Director within ten (10) days after the end of each month the system serves water to the public.
Information that must be reported:

i) The cumulative number of months for which results are reported.

ii) The number of fecal and/or total coliform samples, whichever are analyzed during the month (if a system monitors for both, only fecal

coliforms must be reported,) the dates of sample collection and the dates when the turbidity level exceeded 1 NTU.

iii) The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms and/or equal to or less than 100/100 ml total coliforms, whichever are analyzed.

iv) The cumulative number of fecal or total coliform samples, whichever are analyzed during the previous six months the system served water to the public.

v) The cumulative number of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed during the previous six months the system served water to the public.

vi) The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed during the previous six months the system served water to the public.

vii) The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded 5 NTU, and the date(s) the occurrence(s) was reported to the Director.

viii) For the first 12 months of record-keeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU and after one year of record keeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public.

ix) For the first 120 months of record keeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU and after 10 years of record keeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months they system service water to the public.

2) Disinfection information must be reported to the Director within 10 days after the end of each month the system serves water to the public. Information that must be reported:

i) For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system.

ii) The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the Director was notified of the occurrence.

iii) The daily residual disinfectant concentration(s) (in mg/l) and disinfectant contact time(s) (in minutes) used for calculating the CT value(s).

iv) If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection.

v) The daily measurement(s) of water temperature in degrees centigrade following each point of disinfection.

vi) The daily CT calc and CTcalc/CT99.9 values for each disinfectant measurement or sequence and the sum of all CTcalc/CT99.9 values (CTcalc/CT99.9) before or at the first customer.

vii) The daily determination of whether disinfection achieves adequate Giardia cyst and virus inactivation, i.e. whether (CTcalc/CT99.9) is at least 1.0 or where disinfectants other than chlorine are used, other indicator conditions that the Director determines are appropriate, are met.

viii) The following information on the samples taken in the distribution system in conjunction with total coliform monitoring specified as in section 5.3.

A) number of instances where the residual disinfectant concentration is measured;

B) number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count (HPC) is measured;

C) number of instances where the residual disinfectant concentration is measured, but not detected and no HPC is measured;

D) number of instances where the residual disinfectant concentration is detected and where HPC is >500/ml;

E) number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml;

F) for the current and previous month the system served water to the public, the value of "V", as defined in section 5.3.5.

ix) A system need not report the data listed in section 5.8.1(2)(i) and (iii)-(vi) if all data listed in 5.8.1(2) (i)-(viii) remain on file at the system and the Director determines that:

A) The system has submitted to the Director all the information required for at least 12 months; and

B) The Director has determined that the system is not required to provide filtration treatment

3) No later than October 10 of each year each system must provide to the Director a report which summarizes its compliance with all watershed control program requirements specified in 5.2.6(2).

4) A report on the on-site inspection conducted during that year as specified in 5.2.6(3).

5) Each system upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred must report that occurrence to the Director as soon as possible, but no later than the end of the next business day.

If at any time the turbidity exceeds 5 NTU, the system must inform the Director as soon as possible, but no later than the end of the next business day.

If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system must notify the Director as soon as possible, but no later than by the end of the next business day. The system must notify the Director by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

5.8.2 A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment must report monthly to the Director the following information, beginning June 29, 1993 or when filtration is installed, whichever is later:

1) Turbidity measurements as required by section 5.7.1 (1) must be reported within 10 days after the end of each month the system serves water to the public and shall include no less than the following:

i) The total number of filtered water turbidity measurements taken during the month.

ii) The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in section 5.4 for the filtration technology being used.

iii) The date and value of any turbidity measurements taken during the month which exceed 5 NTU.

2) Disinfection information must be reported to the Director within 10 days after the end of each month and must include all items specified in sections 5.8.1(2)(i),(ii), (viii), and 5.8.1(5).

TABLE 1.1 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5°C OR LOWER[1]

Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	176	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	226	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533
2.8	178	213	257	310	375	452	543
3.0	181	217	261	316	382	460	552

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.2 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5°C[1]

Free Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.3 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10.0° C[1]

Free Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	183	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	114	137	166	200	240
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.4 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 15.0°C[1]

Free Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	49	59	70	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.5 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 20.0°C[1]

Free Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	36	44	52	62	74	89	105
0.6	38	45	54	64	77	92	109
0.8	39	46	55	66	79	95	113
1.0	39	47	56	67	81	98	117
1.2	40	48	57	69	83	100	120
1.4	41	49	58	70	85	103	123
1.6	42	50	59	72	87	105	126
1.8	43	51	61	74	89	108	129
2.0	44	52	62	75	91	110	132
2.2	44	53	63	77	93	113	135
2.4	45	54	65	78	95	115	138
2.6	46	55	66	80	97	117	141
2.8	47	56	67	81	99	119	143
3.0	47	57	68	83	101	122	146

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 1.6 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 25°C[1] AND HIGHER

Free Residual (mg/l)				**pH**			
	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	24	29	35	42	50	59	70
0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

[1]These CT values achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values may be determined by interpolation. CT values between the indicated temperatures of different tables may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature and at the higher pH.

TABLE 2.1 CT VALUES ($CT_{99.9}$) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE[1]

Free Residual (mg/l)	*Temperature*					
	1 °C	5°C	10°C	15°C	20°C	>25°C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.0	1.9	1.4	0.95	0.72	0.46

[1]These CT values achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

TABLE 3.1 CT VALUES ($CT_{99.9}$) for 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORAMINES[1]

Temperature					
<1 °C	5 °C	10 °C	15 °C	20 °C	>25 °C
2.0	1.9	1.4	0.95	0.72	0.46

[1]These values are for pH values of 6 to 9. These CT values may be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system must demonstrate, based on on-site studies or other information, as approved by the State, that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures may be determined by linear interpolation. If no interpolation is used, use the $CT_{99.9}$ value at the lower temperature for determining $CT_{99.9}$ values between indicated temperatures.

Section 6.0 *CONTROL OF LEAD AND COPPER*

§6.80 *General Requirements*

(a) ***Applicability and Effective Dates***

(1) The requirements of Section 6 constitute the national primary drinking water regulations for lead and copper. Unless otherwise indicated, each of the provisions of this section applies to community water systems and non-transient, non-community water systems (hereinafter referred to as "water systems" or "systems").

(2) The requirements set forth in §§6.86-6.91 shall take effect July 7, 1991. The requirements in §§6.80-6.85 shall take effect December 7, 1992.

(b) ***Scope***

These regulations establish a treatment technique that includes requirements for corrosion control treatment, source water treatment, lead service line replacement, and public education. These requirements are triggered, in some cases, by lead and copper action levels measured in samples collected at consumers' taps.

(c) ***Lead and Copper Action Levels***

(1) The lead action level is exceeded if the concentration of lead in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with §6.86 is greater than 0.015 mg/L (i.e., if the "90th percentile" lead level is greater than 0.015 mg/L).

(2) The copper action level is exceeded if the concentration of copper in more than 10 percent of tap water samples collected during any monitoring period conducted in accordance with §6.86 is greater than 1.3 mg/L (i.e., if the "90th percentile" copper level is greater than 1.3 mg/L).

(3) The 90th percentile lead and copper levels shall be computed as follows:

(i) The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken.

(ii) The number of samples taken during the monitoring period shall be multiplied by 0.9.

(iii) The contaminant concentration in the numbered sample yielded by the calculation in paragraph (c)(3)(ii) is the 90th percentile contaminant level.

(iv) For water systems serving fewer than 100 people that collect 5 samples per monitoring period, the 90th percentile is computed by taking the average of the highest and second highest concentrations.

(d) ***Corrosion Control Treatment Requirements***

(1) All water systems shall install and operate optimal corrosion control treatment as defined in Section 1.

(2) Any water system that complies with the applicable corrosion control treatment requirements specified by the Director under §§6.81 and 6.82 shall be deemed in compliance with the treatment requirement contained in paragraph (d)(1) of this section.

(e) ***Source Water Treatment Requirements***

Any system exceeding the lead or copper action level shall implement all applicable source water treatment requirements specified by the Director under §6.83.

(f) ***Lead Service Line Replacement Requirements***

Any system exceeding the lead action level after implementation of applicable corrosion control and source water treatment requirements shall complete the lead service line replacement requirements contained in §6.84.

(g) ***Public Education Requirements***

Any system exceeding the lead action level shall implement the public education requirements contained in §6.85.

(h) ***Monitoring and Analytical Requirements***

Tap water monitoring for lead and copper, monitoring for water quality parameters, source water monitoring for lead and copper, and analyses of the monitoring results under this subpart shall be completed in compliance with §§6.86, 6.87, 6.88, and 6.89.

(i) ***Reporting Requirements***

Systems shall report to the Director any information required by the treatment provisions of this subpart and §6.90.

(j) ***Record Keeping Requirements***

Systems shall maintain records in accordance with §6.91.

(k) Failure to comply with the applicable requirements of §§6.80-6.91, including requirements established by the Director pursuant to these provisions, shall constitute a violation of these regulations.

§6.81 ***Applicability of Corrosion Control Treatment Steps to Small, Medium-size and Large Water Systems***

(a) Systems shall complete the applicable corrosion control treatment requirements described in §6.82 by the deadlines established in this section.

(1) A large system (serving >50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (d) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(2) or (b)(3) of this section.

(2) A small system (serving $\leq$3300 persons) and a medium-size system (serving >3,300 and $\leq$50,000 persons) shall complete the corrosion control treatment steps specified in paragraph (e) of this section, unless it is deemed to have optimized corrosion control under paragraph (b)(1), (b)(2), or (b)(3) of this section.

(b) A system is deemed to have optimized corrosion control and is not required to complete the applicable corrosion control treatment steps identified in this section if the system satisfies one of the criteria specified in paragraphs (b)(1) through (b)(3) of this section. Any such system deemed to have optimized corrosion control under this paragraph, and which has treatment in place, shall continue to operate and maintain optimal corrosion control treatment and meet any requirements that the Director determines appropriate to ensure optimal corrosion control treatment is maintained.

(1) A small or medium-size water system is deemed to have optimized corrosion control if the system meets the lead and copper action levels during each of two consecutive six-month monitoring periods conducted in accordance with §6.86.

(2) Any water system may be deemed by the Director to have optimized corrosion control treatment if the system demonstrates to the satisfaction of the Director that it has conducted activities equivalent to the corrosion control steps applicable to such system under this section. If the Director makes this determination, the Director shall provide the system with written notice explaining the basis for his decision and shall specify the water quality control parameters representing optimal corrosion control in accordance with §6.82(f). Water systems deemed to have optimized corrosion control under this paragraph shall operate in compliance with the Director-designated optimal water quality control parameters in accordance with §6.82(g) and continue to conduct lead and copper tap and water quality parameter sampling in accordance with §6.86(d)(3) and §6.87(d), respectively. A system shall provide the Director with the following information in order to support a determination under this paragraph:

(i) the results of all test samples collected for each of the water quality parameters in §6.82(c)(3).

(ii) a report explaining the test methods used by the water system to evaluate the corrosion control treatments listed in §6.82(c)(1), the results of all tests conducted, and the basis for the system's selection of optimal corrosion control treatment;

(iii) a report explaining how corrosion control has been installed and how it is being maintained to insure minimal lead and copper concentrations at consumers' taps; and

(iv) the results of tap water samples collected in accordance with §6.86 at least once every six months for one year after corrosion control has been installed.

(3) Any water system is deemed to have optimized corrosion control if it submits results of tap water monitoring conducted in accordance with §6.86 and source water monitoring conducted in accordance with §6.88 that demonstrates for two consecutive six-month monitoring periods that the difference between the 90th percentile tap water lead level computed under §6.80(c)(3), and the highest source water lead concentration, is less than the Practical Quantitation Level for lead specified in §6.89(a)(1)(ii).

(i) Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.

(ii) Any water system deemed to have optimized corrosion control in accordance with this paragraph shall continue monitoring for lead and copper at the tap no less frequently than once every three calendar years using the reduced number of sites specified in §6.86(c) and collecting the samples at times and locations specified in §6.86(d)(4)(iv). Any such system that has not conducted a round of monitoring pursuant to §6.86(d) since September 30, 1997, shall complete a round of monitoring pursuant to this paragraph no later than September 30, 2000.

(iii) Any water system deemed to have optimized corrosion control pursuant to this paragraph shall notify the Director in writing pursuant to §6.90(a)(3) of any change in treatment or the addition of a new source. The Director may require any such system to conduct additional monitoring or to take other action the Director deems appropriate to ensure that such systems maintain minimal levels of corrosion in the distribution system.

(iv) As of July 12, 2001, a system is not deemed to have optimized corrosion control under this paragraph, and shall implement corrosion control treatment pursuant to paragraph (b)(3)(v) of this section unless it meets the copper action level.

(v) Any system triggered into corrosion control because it is no longer deemed to have optimized corrosion control under this paragraph shall implement corrosion control treatment in accordance with the deadlines in paragraph (e) of this section. Any such large system shall adhere to the schedule specified in that paragraph for medium-size systems, with the time periods for completing each step being triggered by the date the system is no longer deemed to have optimized corrosion control under this paragraph.

(c) Any small or medium-size water system that is required to complete the corrosion control steps due to its exceedance of the lead or copper action level may cease completing the treatment steps whenever the system meets both action levels during each of two consecutive monitoring periods conducted pursuant to §6.86 and submits the results to the Director. If any such water system thereafter exceeds the lead or copper action level during any monitoring period, the system shall recommence completion of the applicable treatment steps, beginning with the first treatment step which was not previously completed in its entirety. The Director may require a system to repeat treatment steps previously completed by the system where the Director determines that this is necessary to implement properly the treatment requirements of this section. The Director shall notify the system in writing of such a determination and explain the basis for its decision. The requirement for any small- or medium-size system to implement corrosion control treatment steps in accordance with paragraph (e) of this section (including systems deemed to have optimized corrosion control under paragraph (b)(1) of this section) is triggered whenever any small- or medium-size system exceeds the lead or copper action level.

(d) ***Treatment Steps and Deadlines for Large Systems***

Except as provided in paragraph (b)(2) and (3) of this section, large systems shall complete the following corrosion control treatment steps (described in the referenced portions of §§6.82, 6.86, and 6.87) by the indicated dates.

(1) *Step 1:* The system shall conduct initial monitoring (§6.86(d)(1) and §6.87(b)) during two consecutive six-month monitoring periods by January 1, 1993.

(2) *Step 2:* The system shall complete corrosion control studies (§6.82(c)) by July 1, 1994.

(3) *Step 3:* The Director shall designate optimal corrosion control treatment (§6.82(d)) by January 1, 1995.

(4) *Step 4:* The system shall install optimal corrosion control treatment (§6.82(e)) by January 1, 1997.

(5) *Step 5*: The system shall complete follow-up sampling (§6.86(d)(2) and §6.87(c)) by January 1, 1998.

(6) *Step 6*: The Director shall review installation of treatment and designate optimal water quality control parameters (§6.82(f)) by July 1, 1998.

(7) *Step 7:* The system shall operate in compliance with the Director-specified optimal water quality control parameters (§6.82(g)) and continue to conduct tap sampling (§6.86(d)(3) and §6.87(d)).

(e) ***Treatment Steps and Deadlines for Small and Medium-size Systems***

Except as provided in paragraph (b) of this section, small and medium-size systems shall complete the following corrosion control treatment steps (described in the referenced portions of §§6.82, 6.86 and 6.87) by the indicated time periods.

(1) *Step 1:* The system shall conduct initial tap sampling (§6.86(d)(1) and §6.87(b)) until the system either exceeds the lead or copper action level or becomes eligible for reduced monitoring under §6.86(d)(4). A system exceeding the lead or copper action level shall recommend optimal corrosion control treatment (§6.82(a)) within six months after it exceeds one of the action levels.

(2) *Step 2:* Within 12 months after a system exceeds the lead or copper action level, the Director may require the system to perform corrosion control studies (§6.82(b)). If the Director does not require the system to perform such studies, the Director shall specify optimal corrosion control treatment (§6.82(d)) within the following time frames:

(i) for medium-size systems, within 18 months after such system exceeds the lead or copper action level,

(ii) for small systems, within 24 months after such system exceeds the lead or copper action level.

(3) *Step 3*: If the Director requires a system to perform corrosion control studies under step 2, the system shall complete the studies (§6.82(c)) within 18 months after the Director requires that such studies be conducted.

(4) *Step 4:* If the system has performed corrosion control studies under step 2, the Director shall designate optimal corrosion control treatment (§6.82(d)) within 6 months after completion of step 3.

(5) *Step 5*: The system shall install optimal corrosion control treatment (§6.82(e)) within 24 months after the Director designates such treatment.

(6) *Step 6:* The system shall complete follow-up sampling (§6.86(d)(2) and §6.87(c)) within 36 months after the Director designates optimal corrosion control treatment.

(7) *Step 7:* The Director shall review the system's installation of treatment and designate optimal water quality control parameters (§6.82(f)) within 6 months after completion of step 6.

(8) *Step 8:* The system shall operate in compliance with the Director-designated optimal water quality control parameters (§6.82(g)) and continue to conduct tap sampling (§6.86(d)(3) and §6.87(d)).

§6.82 ***Description of Corrosion Control Treatment Requirements***

Each system shall complete the corrosion control treatment requirements described below which are applicable to such system under §6.81.

(a) ***System Recommendation Regarding Corrosion Control Treatment***

Based upon the results of lead and copper tap monitoring and water quality parameter monitoring, small and medium-size water systems exceeding the lead or copper action l evel shall recommend installation of one or more of the corrosion control treatments listed in paragraph (c)(1) of this section which the system believes constitutes optimal corrosion control for that system. The Director may require the system to conduct additional water quality parameter monitoring in accordance with §6.87(b) to assist the Director in reviewing the system's recommendation.

(b) ***Decision to Require Studies of Corrosion Control Treatment (Applicable to Small and Medium-size Systems)***

The Director may require any small or medium-size system that exceeds the lead or copper action level to perform corrosion control studies under paragraph (c) of this section to identify optimal corrosion control treatment for the system.

(c) ***Performance of Corrosion Control Studies***

(1) Any public water system performing corrosion control studies shall evaluate the effectiveness of each of the following treatments, and, if appropriate, combinations of the following treatments to identify the optimal corrosion control treatment for that system:

(i) alkalinity and pH adjustment;

(ii) calcium hardness adjustment; and

(iii) the addition of a phosphate or silicate based corrosion inhibitor at a concentration sufficient to maintain an effective residual concentration in all test tap samples.

(2) The water system shall evaluate each of the corrosion control treatments using either pipe rig/loop tests, metal coupon tests, partial-system tests, or analyses based on documented analogous treatments with other systems of similar size, water chemistry and distribution system configuration.

(3) The water system shall measure the following water quality parameters in any tests conducted under this paragraph before and after evaluating the corrosion control treatments listed above:

(i) lead;

(ii) copper;

(iii) pH;

(iv) alkalinity;

(v) calcium;

(vi) conductivity;

(vii) orthophosphate (when an inhibitor containing a phosphate compound is used);

(viii) silicate (when an inhibitor containing a silicate compound is used);

(ix) water temperature.

(4) The water system shall identify all chemical or physical constraints that limit or prohibit the use of a particular corrosion control treatment and document such constraints with at least one of the following:

(i) data and documentation showing that a particular corrosion control treatment has adversely affected other water treatment processes when used by another water system with comparable water quality characteristics; and/or

(ii) data and documentation demonstrating that the water system has previously attempted to evaluate a particular corrosion control treatment and has found that the treatment is ineffective or adversely affects other water quality treatment processes.

(5) The water system shall evaluate the effect of the chemicals used for corrosion control treatment on other water quality treatment processes.

(6) On the basis of an analysis of the data generated during each evaluation, the water system shall recommend to the Director in writing the treatment option that the corrosion control studies indicate constitutes optimal corrosion control treatment for that system. The water system shall provide a rationale for its recommendation along with all supporting documentation specified in paragraphs (c)(1) through (5) of this section.

(d) ***Designation of Optimal Corrosion Control Treatment***

(1) Based upon consideration of available information including, where applicable, studies performed under paragraph c) of this section and a system's recommended treatment alternative, the Director shall either approve the corrosion control treatment option recommended by the system, or designate alternative corrosion control treatment(s) from among those listed in paragraph (c)(1) of this section. When designating optimal treatment the Director shall consider the effects that additional corrosion control treatment will have on water quality parameters and on other water quality treatment processes.

(2) The Director shall notify the system of its decision on optimal corrosion control treatment in writing and explain the basis for this determination. If the Director requests additional information to aid its review, the water system shall provide the information.

(e) ***Installation of Optimal Corrosion Control***

Each system shall properly install and operate throughout its distribution system the optimal corrosion control treatment designated by the Director under paragraph (d) of this section.

(f) ***Review of Treatment and Specification of Optimal Water Quality Control Parameters***

The Director shall evaluate the results of all lead and copper tap samples and water quality parameter samples submitted by the water system and determine whether the system has properly installed and operated the optimal corrosion control treatment designated by the Director in paragraph (d) of this section. Upon reviewing the results of tap water and water quality parameter monitoring by the system, both before and after the system installs optimal corrosion control treatment, the Director shall designate:

(1) a minimum value or a range of values for pH measured at each entry point to the distribution system;

(2) a minimum pH value, measured in all tap samples. Such value shall be equal to or greater than 7.0, unless the Director determines that meeting a pH level of 7.0 is not technologically feasible or is not necessary for the system to optimize corrosion control;

(3) if a corrosion inhibitor is used, a minimum concentration or a range of concentrations for the inhibitor, measured at each entry point to the distribution system and in all tap samples, that the Director determines is necessary to form a passivating film on the interior walls of the pipes of the distribution system;

(4) if alkalinity is adjusted as part of optimal corrosion control treatment, a minimum concentration or a range of concentrations for alkalinity, measured at each entry point to the distribution system and in all tap samples;

(5) if calcium carbonate stabilization is used as part of corrosion control, a minimum concentration or a range of concentrations for calcium, measured in all tap samples.

The values for the applicable water quality control parameters listed above shall be those that the Director determines to reflect optimal corrosion control treatment for the system. The Director may designate values for additional water quality control parameters determined by the Director to reflect optimal corrosion control for the system. The Director shall notify the system in writing of these determinations and explain the basis for its decisions.

(g) ***Continued Operation and Monitoring***

All systems optimizing corrosion control shall continue to operate and maintain optimal corrosion control treatment, including maintaining water quality parameters at or above minimum values or within ranges designated by the Director under paragraph (f) of this section, in accordance with this paragraph for all samples collected under §§6.87(d)-(f). Compliance with the requirements of this paragraph shall be determined every six months, as specified under §6.87(d). A water system is out of compliance with the requirements of this paragraph for a six-month period if it has excursions for any Director-specified parameter on more than nine days during the period. An excursion occurs whenever the daily value for one or more of the water quality parameters measured at a sampling location is below the minimum value or outside the range designated by the Director. Daily values are calculated as follows. The Director has the discretion to delete results of obvious sampling errors from this calculation.

(1) On days when more than one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the average of all results collected during the day regardless of whether they are collected through continuous monitoring, grab sampling, or a combination of both.

(2) On days when only one measurement for the water quality parameter is collected at the sampling location, the daily value shall be the result of that measurement.

(3) On days when no measurement is collected for the water quality parameter at the sampling location, the daily value shall be the daily value calculated on the most recent day on which the water quality parameter was measured at the sample site.

(h) ***Modification of the Director's Treatment Decisions***

Upon his own initiative or in response to a request by a water system or other interested party, the Director may modify its determination of the optimal corrosion control treatment under paragraph (d) of this section or optimal water quality control parameters under paragraph (f) of this section. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Director may modify its determination where it concludes that such change is necessary to ensure that the system continues to optimize corrosion control treatment. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Director's decision, and provide an implementation schedule for completing the treatment modifications.

§6.83 ***Source Water Treatment Requirements***

Systems shall complete the applicable source water monitoring and treatment requirements (described in the referenced portions of paragraph (b) of this section, and in §§6.86, and 6.88) by the following deadlines.

(a) ***Deadlines for Completing Source Water Treatment Steps***

(1) *Step 1*: A system exceeding the lead or copper action level shall complete lead and copper source water monitoring (§6.88(b)) and make a treatment recommendation to the Director (§6.83(b)(1)) within 6 months after exceeding the lead or copper action level.

(2) *Step 2:* The Director shall make a determination regarding source water treatment (§6.83(b)(2)) within 6 months after submission of monitoring results under step 1.

(3) *Step 3*: If the Director requires installation of source water treatment, the system shall install the treatment (§6.83(b)(3)) within 24 months after completion of step 2.

(4) *Step 4:* The system shall complete follow-up tap water monitoring (§6.86(d)(2) and source water monitoring (§6.88(c)) within 36 months after completion of step 2.

(5) *Step 5:* The Director shall review the system's installation and operation of source water treatment and specify maximum permissible source water levels (§6.83(b)(4)) within 6 months after completion of step 4.

(6) *Step 6:* The system shall operate in compliance with the Director-specified maximum permissible lead and copper source water levels (§6.83(b)(4)) and continue source water monitoring (§6.88(d)).

(b) ***Description of Source Water Treatment Requirements***

(1) System treatment recommendation

Any system which exceeds the lead or copper action level shall recommend in writing to the Director the installation and operation of one of the source water treatments listed in paragraph (b)(2) of this section. A system may recommend that no treatment be installed based upon a demonstration that source water treatment is not necessary to minimize lead and copper levels at users' taps.

(2) The Director shall complete an evaluation of the results of all source water samples submitted by the water system to determine whether source water treatment is necessary to minimize lead or copper levels in water delivered to users' taps. If the Director determines that treatment is needed, the Director shall either require installation and operation of the source water treatment recommended by the system (if any) or require the installation and operation of another source water treatment from among the following: ion exchange, reverse osmosis, lime softening or coagulation/filtration. If the Director requests additional information to aid in its review, the water system shall provide the information by the date specified by the Director in its request. The Director shall notify the system in writing of its determination and set forth the basis for its decision.

(3) ***Installation of Source Water Treatment***

Each system shall properly install and operate the source water treatment designated by the Director under paragraph (b)(2) of this section.

(4) The Director shall review the source water samples taken by the water system both before and after the system installs source water treatment, and determine whether the system has properly installed and operated the source water treatment designated by the Director. Based upon its review, the Director shall designate the maximum permissible lead and copper concentrations for finished water entering the distribution system. Such levels shall reflect the contaminant removal capability of the treatment properly operated and maintained. The Director shall notify the system in writing and explain the basis for its decision.

(5) ***Continued Operation and Maintenance***

Each water system shall maintain lead and copper levels below the maximum permissible concentrations designated by the Director at each sampling point monitored in accordance with §6.88. The system is out of compliance with this paragraph if the level of lead or copper at any sampling point is greater than the maximum permissible concentration designated by the Director.

(6) ***Modification of Treatment Decisions***

Upon its own initiative or in response to a request by a water system or other interested party, the Director may modify its determination of the source water treatment under paragraph (2) of this section, or maximum permissible lead and copper concentrations for finished water entering the distribution system under paragraph (4) of this section. A request for modification by a system or other interested party shall be in writing, explain why the modification is appropriate, and provide supporting documentation. The Director may modify his determination where it concludes that such change is necessary to ensure that the system continues to minimize lead and copper concentrations in source water. A revised determination shall be made in writing, set forth the new treatment requirements, explain the basis for the Director's decision, and provide an implementation schedule for completing the treatment modifications.

§6.84 ***Lead Service Line Replacement Requirements***

(a) Systems that fail to meet the lead action level in tap samples taken pursuant to §6.86(d)(2), after installing corrosion control and/or source water treatment (whichever sampling occurs later), shall replace lead service lines in accordance with the requirements of this section. If a system is in violation of §6.81 or §6.83 for failure to install source water or corrosion control treatment, the Director may require the system to commence lead service line replacement under this section after the date by which the system was required to conduct monitoring under §6.86(d)(2) has passed.

(b) A water system shall replace annually at least 7 percent of the initial number of lead service lines in its distribution system. The initial number of lead service lines is the number of lead lines in place at the time the replacement program begins. The system shall identify the initial number of lead service lines in its distribution system, including an identification of the portion(s) owned by the system, based upon a materials evaluation, including the evaluation required under §6.86(a) and relevant legal authorities (e.g., contracts, local ordinances) regarding the portion owned by the system. The first year of lead service line replacement shall begin on the date the action level was exceeded in tap sampling referenced in paragraph (a) of this section.

(c) A system is not required to replace an individual lead service line if the lead concentration in all service line samples from that line, taken pursuant to §6.86(b)(3), is less than or equal to 0.015 mg/L.

(d) A water system shall replace that portion of the lead service line that it owns. In cases where the system does not own the entire lead service line, the system shall notify the owner of the line, or the owner's authorized agent, that the system will replace the portion of the service line that it owns and shall offer to replace the owner's portion of the line. A system is not required to bear the cost of replacing the privately-owned portion of the line, nor is it required to replace the privately-owned portion where the owner chooses not to pay the cost of replacing the privately-owned portion of the line, or where replacing the privately-owned portion would be precluded by the State, local or common law. A water system that does not replace the entire length of the service line also shall complete the following tasks.

(1) At least 45 days prior to commencing with the partial replacement of a lead service line, the water system shall provide notice to the resident(s) of all buildings served by the line explaining that they may experience a temporary increase of lead levels in their drinking water, along with guidance on measures consumers can take to minimize their exposure to lead. The Director may allow the water system to provide notice under the previous sentence less than 45 days prior to commencing partial lead service line replacement where such replacement is in conjunction with emergency repairs. In addition, the water system shall inform the resident(s) served by the line that the system will, at the system's expense, collect a sample from each partially-replaced lead service line that is representative of the water in the service line for analysis of lead content, as prescribed under §6.86(b)(3), within 72 hours after the completion of the partial replacement of the service line. The system shall collect the sample and report the results of the analysis to the owner and the resident(s) served by the line within three business days of receiving the results. Mailed notices post-marked within three business days of receiving the results shall be considered "on time."

(2) The water system shall provide the information required by paragraph (1) of this section to the residents of individual dwellings by mail or by other methods approved by the Director. In instances where multi-family dwellings are served by the line, the water system shall have the option to post the information at a conspicuous location.

(e) The Director shall require a system to replace lead service lines on a shorter schedule than that required by this section, taking into account the number of lead service lines in the system, where such a shorter replacement schedule is feasible. The Director shall make this determination in writing and notify the system of its finding within 6 months after the system

is triggered into lead service line replacement based on monitoring referenced in paragraph (a) of this section.

(f) Any system may cease replacing lead service lines whenever first draw samples collected pursuant to §6.86(b)(2) meet the lead action level during each of two consecutive monitoring periods and the system submits the results to the Director. If the first draw tap samples collected in any such system thereafter exceeds the lead action level, the system shall recommence replacing lead service lines, pursuant to paragraph (b) of this section.

(g) To demonstrate compliance with paragraphs (a)-(d) of this section, a system shall report to the Director the information specified in §6.90(e).

§6.85 *Public Education and Supplemental Monitoring Requirements*

A water system that exceeds the lead action level based on tap water samples collected in accordance with §6.86 shall deliver the public education materials contained in paragraphs (a) and (b) of this section in accordance with the requirements in paragraph (c) of this section.

(a) ***Content of Written Public Education Materials.***

(1) ***Community Water Systems***

A community water system shall include the following text in all of the printed materials it distributes through its lead public education program.Systems may delete information pertaining to lead service lines, upon approval by the Director, if no lead service lines exist anywhere in the water system service area. Public education language at paragraphs (a)(1)(iv)(B)(5) and (a)(1)(iv)(D)(2) of this section may be modified regarding building permit record availability and consumer access to these records, if approved by the Director. Systems may also continue to utilize pre-printed materials that meet the public education language requirements in 7 6.85, effective December 7, 1991. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by lay people.

(i) ***Introduction***

The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Although most homes have very low levels of lead in their drinking water, some homes in the community have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we

are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect you and your family by reducing your exposure to lead in drinking water.

(ii) ***Health Effects of Lead***

Lead is a common metal found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination -- like dirt and dust --that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(iii) ***Lead in Drinking Water***

(A) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead.

(B) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome plated brass faucets, and in some cases, pipes made of lead that connect your house to the water main (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

(C) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon after returning from work or school, can contain fairly high levels of lead.

(iv) ***Steps You Can Take in The Home to Reduce Exposure to Lead in Drinking Water***

(A) Despite our best efforts mentioned earlier to control water corrosivity and remove lead from the water supply, lead levels in some homes or buildings can be high. To find out whether you need to take action in your own home, have your drinking water tested to determine if it contains excessive concentrations of lead. Testing the water is essential because you cannot see, taste, or smell lead in drinking water. Some local laboratories that can provide this service are listed at the end of this booklet. For more information on having your water tested, please call [insert phone number of water system].

(B) If a water test indicates that the drinking water drawn from a tap in your home contains lead above 15 ppb, then you should take the following precautions:

(1) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in your home's plumbing the more lead it may contain. Flushing the tap means running the cold water faucet until the water gets noticeably colder, usually about 15-30 seconds. If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking. Although toilet flushing or showering flushes water through a portion of your home's plumbing system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your family's health. It usually uses less than one or two gallons of water and costs less than [insert a cost estimate based on flushing two times a day for 30 days] per month. To conserve water, fill a couple of bottles for drinking water after flushing the tap, and whenever possible use the first flush water to wash the dishes or water the plants. If you live in a high-rise building, letting the water flow before using it may not work to lessen your risk from lead. The plumbing systems have more, and sometimes larger pipes than smaller buildings. Ask your landlord for help in locating the source of the lead and for advice on reducing the lead level.

(2) Try not to cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and heat it on the stove.

(3) Remove loose lead solder and debris from the plumbing materials installed in newly constructed homes, or homes in which the plumbing has recently been replaced, by removing the faucet strainers from all taps and running the water from 3 to 5 minutes. Thereafter, periodically remove the strainers and flush out any debris that has accumulated over time.

(4) If your copper pipes are joined with lead solder that has been installed illegally since it was banned in 1986, notify the plumber who did the work and request that he or she replace the lead solder with lead-free solder. Lead solder looks dull gray, and when scratched with a key looks shiny. In addition, notify the Division of Drinking Water Quality, RI Department of Health about the violation.

(5) Determine whether or not the service line that connects your home or apartment to the water main is made of lead. The best way to determine if your service line is made of lead is by either hiring a licensed plumber to inspect the line or by contacting the plumbing contractor who installed the line. You can identify the plumbing contractor by checking the city's record of building permits which should be maintained in the files of the [insert name of department that issues building permits]. A licensed plumber can at the same time check to see if your home's plumbing contains lead solder, lead pipes, or pipe fittings that contain lead. The public water system that delivers water to your home should also maintain records of the materials located in the distribution system. If the service line that connects your dwelling to the water main contributes more than 15 ppb to drinking water, after our comprehensive treatment program is in place, we are required to replace the portion of the line we own. If the line is only partially owned by the [insert the name of the city, county, or water system that owns the line], we are required to provide the owner of the privately-owned portion of the line with information on how to replace the privately-owned portion of the service line, and offer to replace that portion of the line at the owner's expense. If we replace only the portion of the line that we own, we also are required to notify you in advance and provide you

with information on the steps you can take to minimize exposure to any temporary increase in lead levels that may result from the partial replacement, to take a follow-up sample at our expense from the line within 72 hours after the partial replacement, and to mail or otherwise provide you with the results of that sample within three business days of receiving the results. Acceptable replacement alternatives include copper, steel, iron, and plastic pipes.

(6) Have an electrician check your wiring. If grounding wires from the electrical system are attached to your pipes, corrosion may be greater. Check with a licensed electrician or your local electrical code to determine if your wiring can be grounded elsewhere. DO NOT attempt to change the wiring yourself because improper grounding can cause electrical shock and fire hazards.

(C) The steps described above will reduce the lead concentrations in your drinking water. However, if a water test indicates that the drinking water coming from your tap contains lead concentrations in excess of 15 ppb after flushing, or after we have completed our actions to minimize lead levels, then you may want to take the following additional measures:

(1) Purchase or lease a home treatment device. Home treatment devices are limited in that each unit treats only the water that flows from the faucet to which it is connected, and all of the devices require periodic maintenance and replacement. Devices such as reverse osmosis systems or distillers can effectively remove lead from your drinking water. Some activated carbon filters may reduce lead levels at the tap, however all lead reduction claims should be investigated. Be sure to check the actual performance of a specific home treatment device before and after installing the unit.

(2) Purchase bottled water for drinking and cooking.

(D) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

(1) The Office of Drinking Water Quality within the RI Dept. of Health at 222-6867 can provide you with information about your community's water supply, and a list of local laboratories that have been certified by the Health Department for testing water quality;

(2) [insert the name of city of county department that issues building permits] at [insert phone number] can provide you with information about building permit records that should contain the names of plumbing contractors that plumbed your home; and

(3) The Division of Family Health within the RI Dept. of Health at 222-2312 can provide you with information about the health effects of lead and how you can have your child's blood tested.

(E) The following is a list of some State approved laboratories in your area that you can call to have your water tested for lead. [Insert names and phone numbers of at least two laboratories].

(2) ***Non-transient Non-community Water Systems***

A non-transient non-community water system shall either include the text specified in paragraph (a)(1) of this section or shall include the following text in all of the printed materials it distributes through its lead public education program. Water systems may delete information pertaining to lead service lines upon approval by the Director if no lead service lines exist anywhere in the water system service area. Any additional information presented by a system shall be consistent with the information below and be in plain English that can be understood by lay people.

(i) ***Introduction***

The United States Environmental Protection Agency (EPA) and [insert name of water supplier] are concerned about lead in your drinking water. Some drinking water samples taken from this facility have lead levels above the EPA action level of 15 parts per billion (ppb), or 0.015 milligrams of lead per liter of water (mg/L). Under Federal law we are required to have a program in place to minimize lead in your drinking water by [insert date when corrosion control will be completed for your system]. This program includes corrosion control treatment, source water treatment, and public education. We are also required to replace the portion of each lead service line that we own if the line contributes lead concentrations of more than 15 ppb after we have completed the comprehensive treatment program. If you have any questions about how we are carrying out the requirements of the lead regulation please give us a call at [insert water system's phone number]. This brochure explains the simple steps you can take to protect yourself by reducing your exposure to lead in drinking water.

(ii) ***Health Effects of Lead***

Lead is found throughout the environment in lead-based paint, air, soil, household dust, food, certain types of pottery porcelain and pewter, and water. Lead can pose a significant risk to your health if too much of it enters your body. Lead builds up in the body over many years and can cause damage to the brain, red blood cells and kidneys. The greatest risk is to young children and pregnant women. Amounts of lead that won't hurt adults can slow down normal mental and physical development of growing bodies. In addition, a child at play often comes into contact with sources of lead contamination - like dirt and dust - that rarely affect an adult. It is important to wash children's hands and toys often, and to try to make sure they only put food in their mouths.

(iii) ***Lead in Drinking Water***

(A) Lead in drinking water, although rarely the sole cause of lead poisoning, can significantly increase a person's total lead exposure, particularly the exposure of infants who drink baby formulas and concentrated juices that are mixed with water. The EPA estimates that drinking water can make up 20 percent or more of a person's total exposure to lead.

(B) Lead is unusual among drinking water contaminants in that it seldom occurs naturally in water supplies like rivers and lakes. Lead enters drinking water primarily as a result of the corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing. These materials include lead-based solder used to join copper pipe, brass and chrome-plated brass faucets, and in some cases, pipes made of lead that connect houses and buildings to water mains (service lines). In 1986, Congress banned the use of lead solder containing greater than 0.2% lead, and restricted the lead content of faucets, pipes and other plumbing materials to 8.0%.

(C) When water stands in lead pipes or plumbing systems containing lead for several hours or more, the lead may dissolve into your drinking water. This means the first water drawn from the tap in the morning, or later in the afternoon if the water has not been used all day, can contain fairly high levels of lead.

(iv) ***Steps You Can Take to Reduce Exposure to Lead in Drinking Water***

(A) Let the water run from the tap before using it for drinking or cooking any time the water in a faucet has gone unused for more than six hours. The longer water resides in plumbing the more lead it may contain. Flushing the tap means running the cold water faucet for about 15-30 seconds. Although toilet flushing or showering flushes water through a portion of the plumbing

system, you still need to flush the water in each faucet before using it for drinking or cooking. Flushing tap water is a simple and inexpensive measure you can take to protect your health. It usually uses less than one gallon of water.

(B) Do not cook with, or drink water from the hot water tap. Hot water can dissolve more lead more quickly than cold water. If you need hot water, draw water from the cold tap and then heat it.

(C) The steps described above will reduce the lead concentrations in your drinking water. However, if you are still concerned, you may wish to use bottled water for drinking and cooking.

(D) You can consult a variety of sources for additional information. Your family doctor or pediatrician can perform a blood test for lead and provide you with information about the health effects of lead. State and local government agencies that can be contacted include:

(1) [insert the name or title of facility official if appropriate] at [insert phone number] can provide you with information about your facility's water supply; and

(2) The Office of Drinking Water Quality within the Rhode Island Department of Health at 222-6867 can provide you with information about the health effects of lead.

(b) ***Content of Broadcast Materials:*** A water system shall include the following information in all public service announcements submitted under its lead public education program to television and radio stations for broadcasting:

(1) Why should everyone want to know the facts about lead and drinking water? Because unhealthy amounts of lead can enter drinking water through the plumbing in your home. That's why I urge you to do what I did. I had my water tested for [insert free or $ per sample]. You can contact the [insert the name of the city or water system] for information on testing and on simple ways to reduce your exposure to lead in drinking water.

(2) To have your water tested for lead, or to get more information about this public health concern, please call [insert the phone number of the city or water system].

(c) ***Delivery of a Public Education Program***

(1) In communities where a significant proportion of the population speaks a language other than English, public education materials shall be communicated in the appropriate language(s).

(2) A community water system that exceeds the lead action level on the basis of tap water samples collected in accordance with §6.86, and that is not already repeating public education tasks pursuant to paragraph (c)(3), (c)(7), or (c)(8), of this section, shall, within 60 days:

(i) insert notices in each customer's water utility bill or do a special mailing containing the information in paragraph (a) of this section, along with the following alert on the water bill itself in large print: "SOME HOMES IN THIS COMMUNITY HAVE ELEVATED LEAD LEVELS IN THEIR DRINKING WATER. LEAD CAN POSE A SIGNIFICANT RISK TO YOUR HEALTH. PLEASE READ THE ENCLOSED NOTICE FOR FURTHER INFORMATION." A community water system having a billing cycle that does not include a billing within 60 days of exceeding the action level, or that cannot insert information in the water utility bill without making major changes to its billing system, may use a separate mailing to deliver the information in paragraph (a)(1) of this section as long as the information i s delivered to each customer within 60 days of exceeding the action level. Such water systems shall also include the "alert" language specified in this paragraph.

(ii) submit the information in paragraph (a)(1) to the editorial departments of the major daily and weekly newspapers circulated throughout the community.

(iii) deliver pamphlets and/or brochures that contain the public education materials in paragraphs (a)(1)(ii) and (a)(1)(iv) of this section to facilities and organizations, including the following:

(A) public schools and/or local school boards;

(B) health department;

(C) Women, Infants, and Children and/or Head Start Program(s) whenever available;

(D) public and private hospitals and/or clinics;

(E) pediatricians;

(F) family planning clinics; and

(G) local welfare agencies.

(iv) submit the public service announcement in paragraph (b) of this section to at least five of the radio and television stations with the largest audiences that broadcast to the community served by the water system.

(3) A community water system shall repeat the tasks contained in paragraphs (c)(2)(I), (ii) and (iii) of this section every 12 months, and the tasks contained in paragraphs (c)(2)(iv) of this section every 6 months for as long as the system exceeds the lead action level.

(4) Within 60 days after it exceeds the lead action level (unless it already is repeating public education tasks pursuant to paragraph (c)(5) of this section), a non-transient non-community water system shall deliver the public education materials specified by paragraphs (a)(1) of this section or the public education materials specified by paragraph (a)(2) of this section as follows:

(i) post informational posters on lead in drinking water in a public place or common area in each of the buildings served by the system; and

(ii) distribute informational pamphlets and/or brochures on lead in drinking water to each person served by the non-transient non-community water system. The Director may allow the system to utilize electronic transmission in lieu of or combined with printed materials as long as it achieves at least the same coverage.

(5) A non-transient noncommunity water system shall repeat the tasks contained in paragraph (c)(4) of this section at least once during each calendar year in which the system exceeds the lead action level.

(6) A water system may discontinue delivery of public education materials if the system has met the lead action level during the most recent six-month monitoring period conducted pursuant to §6.86. Such a system shall recommence public education in accordance with this section if it subsequently exceeds the lead action level during any monitoring period.

(7) A community water system may apply to the Director, in writing, to use the text specified in paragraph (a)(2) of this section in lieu of the text in paragraph (a)(1) of this section and to perform the tasks listed in paragraphs (c)(4) and (c)(5) of this section in lieu of the tasks in paragraphs (c)(2) and (c)(3) of this section if:

(i) The system is a facility, such as a prison or a hospital, where the population served is not capable of or is prevented from making improvements to plumbing or installing point of use treatment devices; and

(ii) The system provides water as part of the cost of services provided and does not separately charge for water consumption.

(8)(i) A community water system serving 3,300 or fewer people may omit the task contained in paragraph (c)(2)(iv) of this section. As long as it distributes notices containing the information contained in paragraph (a)(1) of this section to every household served by the system, such systems may further limit their public education programs as follows:

(A) Systems serving 500 or fewer people may forego the task contained in paragraph (c)(2)(ii) of this section. Such a system may limit the distribution of the public education materials required under paragraph (c)(2)(iii) of this section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children, unless it is notified by the Director in writing that it must make a broader distribution.

(B) If approved by the Director in writing, a system serving 501 to 3,300 people may omit the task in paragraph (c)(2)(ii) of this section and/or limit the distribution of the public education materials required under paragraph (c)(2)(iii) of this section to facilities and organizations served by the system that are most likely to be visited regularly by pregnant women and children.

(ii) A community water system serving 3,300 or fewer people that delivers public education in accordance with paragraph (c)(8)(i) of this section shall repeat the required public education tasks at least once during each calendar year in which the system exceeds the lead action level.

(d) ***Supplemental Monitoring and Notification of Results***

A water system that fails to meet the lead action level on the basis of tap samples collected in accordance with §6.86 shall offer to sample the tap water of any customer who requests it. The system is not required to pay for collecting or analyzing the sample, nor is the system required to collect and analyze the sample itself.

§6.86 ***Monitoring Requirements for Lead and Copper in Tap Water***

(a) ***Sample Site Location***

(1) By the applicable date for commencement of monitoring under paragraph (d)(1) of this section, each water system shall complete a materials evaluation of its distribution system in order to identify a pool of targeted sampling sites that meets the requirements of this section, and which is sufficiently large to ensure that the water system can collect the number of lead and copper tap samples required in paragraph c) of this section. All sites from which first draw samples are collected shall be selected from this pool of targeted sampling sites. Sampling sites may not include faucets that have point-of-use or point-of-entry treatment devices designed to remove inorganic contaminants.

(2) A water system shall use the information on lead, copper, and galvanized steel that is required when conducting a materials evaluation (presence of Lead from piping, solder, caulking, interior home plumbing, Copper from piping and alloys, service lines, and home plumbing, and Galvanized piping, service lines, and home plumbing within the distribution system.) When an evaluation of the information collected pursuant to the above is insufficient to locate the requisite number of lead and copper sampling sites that meet the targeting criteria in paragraph (a) of this section the water system shall review the sources of information listed below in order to identify a sufficient number of sampling sites. In addition, the system shall seek to collect such information where possible in the course of its normal operations (e.g., checking service line materials when reading water meters or performing maintenance activities):

(i) all plumbing codes, permits, and records in the files of the building department(s) which indicate the plumbing materials that are installed within publicly and privately owned structures connected to the distribution system;

(ii) all inspections and records of the distribution system that indicate the material composition of the service connections that connect a structure to the distribution system; and

(iii) all existing water quality information, which includes the results of all prior analyses of the system or individual structures connected to the system, indicating locations that may be particularly susceptible to high lead or copper concentrations.

(3) The sampling sites selected for a community water system's sampling pool ("tier 1 sampling sites") shall consist of single family structures that:

(i) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) are served by a lead service line.

When multiple-family residences comprise at least 20 percent of the structures served by a water system, the system may include these types of structures in its sampling pool.

(4) Any community water system with insufficient tier 1 sampling sites shall complete its sampling pool with "tier 2 sampling sites", consisting of buildings, including multiple-family residences that:

(i) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) are served by a lead service line.

(5) Any community water system with insufficient tier 1 and tier 2 sampling sites shall complete its sampling pool with "tier 3 sampling sites", consisting of single family structures that contain copper pipes with lead solder installed before 1983. A community water system with insufficient tier 1, tier 2, and tier 3 sampling sites shall complete its sampling pool with representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(6) The sampling sites selected for a non-transient non-community water system ("tier 1 sampling sites") shall consist of buildings that:

(i) contain copper pipes with lead solder installed after 1982 or contain lead pipes; and/or

(ii) are served by a lead service line.

(7) A non-transient non-community water system with insufficient tier 1 sites that meet the targeting criteria in paragraph (a)(6) of this section shall complete its sampling pool with sampling sites that contain copper pipes with lead solder installed before 1983. If additional sites are needed to complete the sampling pool, the non-transient non-community water system shall use representative sites throughout the distribution system. For the purpose of this paragraph, a representative site is a site in which the plumbing materials used at that site would be commonly found at other sites served by the water system.

(8) Any water system whose distribution system contains lead service lines shall draw 50 percent of the samples it collects during each monitoring period from sites that contain lead pipes, or copper pipes with lead solder, and 50 percent of the samples from sites served by a lead service line. A water system that cannot identify a sufficient number of sampling sites served by a lead service line shall collect first draw samples from all of the sites identified as being served by such lines.

(b) ***Sample Collection Methods***

(1) All tap samples for lead and copper collected in accordance with this subpart, with the exception of lead service line samples collected under §6.84(c) and samples collected under paragraph (b)(5) of this section, shall be first draw samples.

(2) Each first-draw tap sample for lead and copper shall be one liter in volume and have stood motionless in the plumbing system of each sampling site for at least six hours. First draw samples from residential housing shall be collected from the cold-water kitchen tap or bathroom sink tap. First-draw samples from a non-residential building shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. Non-first-draw samples collected in lieu of first-draw samples pursuant to paragraph (b)(5) of this section shall be one liter in volume and shall be collected at an interior tap from which water is typically drawn for consumption. First draw samples may be collected by the system or the system may allow residents to collect first draw samples after instructing the residents of the sampling procedures specified in this paragraph. To avoid problems of residents handling nitric acid, acidification of first draw samples may be done up to 14 days after the sample is collected. After acidification to resolubilize the metals, the sample must stand in the original container for the time specified in the approved EPA method before the sample can be analyzed. If a system allows residents to perform sampling, the system may not challenge, based on alleged errors in sample collection, the accuracy of sampling results.

(3) Each service line sample shall be one liter in volume and have stood motionless in the lead service line for at least six hours. Lead service line samples shall be collected in one of the following three ways:

(i) at the tap after flushing the volume of water between the tap and the lead service line. The volume of water shall be calculated based on the interior diameter and length of the pipe between the tap and the lead service line;

(ii) tapping directly into the lead service line; or

(iii) if the sampling site is a building constructed as a single-family residence, allowing the water to run until there is a significant change in temperature which would be indicative of water that has been standing in the lead service line.

(4) A water system shall collect each first draw tap sample from the same sampling site from which it collected a previous sample. If, for any reason, the water system cannot gain entry to a sampling site in order to collect a follow-up tap sample, the system may collect the follow-up tap sample from another sampling site in its sampling pool as long as the new site meets the same targeting criteria, and is within reasonable proximity of the original site.

(5) A non-transient non-community water system, or a community water system that meets the criteria of §§6.85(c)(7)(i) and (ii), that does not have enough taps that can supply first-draw samples, as defined in section 1.24, may apply to the Director in writing to substitute non-first-draw samples. Such systems must collect as many first-draw samples from appropriate taps as possible and identify sampling times and locations that would likely result in the longest standing time for the remaining sites. The Director has the discretion to waive the requirement for prior Director approval of non-first-draw sample sites selected by the system, either through State regulation or written notification to the system.

(c) ***Number of Samples***

Water systems shall collect at least one sample during each monitoring period specified in paragraph (d) of this section from the number of sites listed in the first column ("standard monitoring") of the table in this paragraph. A system conducting reduced monitoring under paragraph (d)(4) of this section shall collect at least one sample from the number of sites specified in the second column ("reduced monitoring") of the table in this paragraph during each monitoring period specified in paragraph (d)(4) of this section. Such reduced monitoring sites shall be representative of the sites required for standard monitoring. The Director may specify sampling locations when a system is conducting reduced monitoring. The table is as follows:

System Size (# Number of People Served)	***# Number of sites (Standard Monitoring)***	***# Number of sites (Reduced Monitoring)***
>100,000	100	50
10,001-100,000	60	30
3,301 to 10,000	40	20
501 to 3,300	20	10
101 to 500	10	5
≤100	5	5

(d) ***Timing of Monitoring***

(1) ***Initial Tap Sampling***

The first six-month monitoring period for small, medium-size and large systems shall begin on the following dates:

System Size (# People Served)	***First Six-Month Monitoring Period Begins On***
>50,000	January 1, 1992
3,301 to 50,000	July 1, 1992
≤3,300	July 1, 1993

(i) All large systems shall monitor during two consecutive six-month periods.

(ii) All small and medium-size systems shall monitor during each six-month monitoring period until:

(A) the system exceeds the lead or copper action level and is therefore required to implement the corrosion control treatment requirements under §6.81, in which case the system shall continue monitoring in accordance with paragraph (d)(2) of this section, or

(B) 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 (d)(4) of this section.

(2) ***Monitoring after Installation of Corrosion Control and Source Water Treatment***

(i) Any large system which installs optimal corrosion control treatment pursuant to §6.81(d)(4) shall monitor during two consecutive six-month monitoring periods by the date specified in §6.81(d)(5).

(ii) Any small or medium-size system which installs optimal corrosion control treatment pursuant to §6.81(e)(5) shall monitor during two consecutive six-month monitoring periods by the date specified in §6.81(e)(6).

(iii) Any system which installs source water treatment pursuant to §6.83(a)(3) shall monitor during two consecutive six-month monitoring periods by the date specified in §6.83(a)(4).

(3) ***Monitoring after the Director Specifies Water Quality Parameter Values for Optimal Corrosion Control***

After the Director specifies the values for water quality control parameters under §6.82(f), the system shall monitor during each subsequent six-month monitoring period, with the first monitoring period to begin on the date the Director specifies the optimal values under §6.82(f).

(4) ***Reduced Monitoring***

(i) A small or medium-size water system that meets the lead and copper action levels during each of two consecutive six-month monitoring periods may reduce the number of samples in accordance with paragraph (c) of this section, and reduce the frequency of sampling to once per year.

(ii) Any water system that maintains the range of values for the water quality control parameters reflecting optimal corrosion control treatment specified by the Director under §6.82(f) during each of two consecutive six-month monitoring periods may reduce the frequency of monitoring to once per year and reduce the number of lead and copper samples in accordance with paragraph c) of this section if it receives written approval from the Director. The Director shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §6.90,and shall notify the system in writing when the Director determines the system is eligible to commence reduced monitoring pursuant to this paragraph. The Director shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(iii) 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 Director under §6.82(f) during three consecutive years of monitoring may reduce the frequency of monitoring from annually to once every three years if it receives written approval from the Director. The Director shall review monitoring, treatment, and other relevant information submitted by the water system in accordance with §6.90, and shall notify the system in writing, when the Director determines the system is

eligible to reduce the frequency of monitoring to once every three years. The Director shall review, and where appropriate, revise its determination when the system submits new monitoring or treatment data, or when other data relevant to the number and frequency of tap sampling becomes available.

(iv) A water system that reduces the number and frequency of sampling shall collect these samples from representative sites included in the pool of targeted sampling sites identified in paragraph (a) of this section. Systems sampling annually or less frequently shall conduct the lead and copper tap sampling during the months of June, July, August or September unless the Director has approved a different sampling period in accordance with paragraph (d)(4)(iv)(A) of this section.

(A) The Director, at his or her discretion, may approve a different period for conducting the lead and copper tap sampling for systems collecting a reduced number of samples. Such a period shall be no longer than four consecutive months and must represent a time of normal operation where the highest levels of lead are most likely to occur. For a non-transient non-community water system that does not operate during the months of June through September, and for which the period of normal operation where the highest levels of lead are most likely to occur is not known, the Director shall designate a period that represents a time of normal operation for the system.

(B) Systems monitoring annually, that have been collecting samples during the months of June through September and that receive the Director's approval to alter their sample collection period under paragraph (d)(4)(iv)(A) of this section, must collect their next round of samples during a time period that ends no later than 21 months after the previous round of sampling. Systems monitoring triennially that have been collecting samples during the months of June through September, and receive the Director's approval to alter the sampling collection period as per paragraph (d)(4)(iv)(A) of this section, must collect their next round of samples during a time period that ends no later than 45 months after the previous round of sampling. Subsequent rounds of sampling must be collected annually or triennially, as required by this section.

(v) Any water system that demonstrates for two consecutive 6-month monitoring periods that the tap water lead level computed under §6.80(c)(3) is less than or equal to 0.005 mg/L and the tap water copper level computed under §6.80(c)(3) is less than or equal to 0.65 mg/L may reduce the number of samples in accordance with paragraph (c) of this section and reduce the frequency of sampling to once every three calendar years.

(vi) (A) A small or medium-size water system subject to reduced monitoring that exceeds the lead or copper action level shall resume sampling in accordance paragraph c) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section. Such a system shall also conduct water quality parameter monitoring in accordance with 6.87(b),(c) or (d) (as appropriate) during the monitoring period in which it exceeded the action level. Any such system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(i) of this section and/or may resume triennial monitoring for lead and copper at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section.

(B) Any water system subject to the reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Director under §6.82(f) for more than nine days in any six-month period specified in §6.87(d) shall conduct tap water sampling for lead and copper at the frequency specified in paragraph (d)(3) of this section, collect the number of samples specified for standard monitoring under paragraph (c) of this section, and shall resume monitoring for water quality parameters within the distribution system in accordance with §6.87(d). Such a system may resume reduced monitoring for lead and copper at the tap and for water quality parameters within the distribution system under the following conditions:

(1) The system may resume annual monitoring for lead and copper at the tap at the reduced number of sites specified in paragraph (c) of this section after it has completed two subsequent six-month rounds of monitoring that meet the criteria of paragraph (d)(4)(ii) of this section and the system has received written approval from the Director that it is appropriate to resume reduced monitoring on an annual frequency.

(2) The system may resume triennial monitoring for lead and copper at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (d)(4)(iii) or (d)(4)(v) of this section and the system has received written approval from the Director that it is appropriate to resume triennial monitoring.

(3) The system may reduce the number of water quality parameter tap water samples required in accordance with §6.87(e)(1) and the frequency with which it collects such samples in accordance with §6.87(e)(2). Such a

system may not resume triennial monitoring for water quality parameters at the tap until it demonstrates, in accordance with the requirements of §6.87(e)(2), that it has re-qualified for triennial monitoring.

(vii) Any water system subject to a reduced monitoring frequency under paragraph (d)(4) of this section that either adds a new source of water or changes any water treatment shall inform the Director in writing in accordance with §6.90(a)(3). The Director may require the system to resume sampling in accordance with paragraph (d)(3) of this section and collect the number of samples specified for standard monitoring under paragraph (c) of this section or take other appropriate steps such as increased water quality parameter monitoring or re-evaluation of its corrosion control treatment given the potentially different water quality considerations.

(e) ***Additional Monitoring by Systems***

The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Director in making any determinations (i.e., calculating the 90th percentile lead or copper level) under this subpart.

(f) ***Invalidation of Lead or Copper Tap Water Samples***

A sample invalidated under this paragraph does not count toward determining lead or copper 90th percentile levels under §6.80(c)(3) or toward meeting the minimum monitoring requirements of paragraph (c) of this section.

(1) The Director may invalidate a lead or copper tap water sample at least if one of the following conditions is met.

(i) The laboratory establishes that improper sample analysis caused erroneous results.

(ii) The Director determines that the sample was taken from a site that did not meet the site selection criteria of this section.

(iii) The sample container was damaged in transit.

(iv) There is substantial reason to believe that the sample was subject to tampering.

(2) The system must report the results of all samples to the Director and all supporting documentation for samples the system believes should be invalidated.

(3) To invalidate a sample under paragraph (f)(l) of this section, the decision and the rationale for the decision must be documented in writing. The Director shall not

invalidate a sample solely on the grounds that a follow-up sample result is higher or lower than that of the original sample.

(4) The water system must collect replacement samples for any samples invalidated under this section if, after the invalidation of one or more samples, the system has too few samples to meet the minimum requirements of paragraph (c) of this section. Any such replacement samples must be taken as soon as possible, but no later than 20 days after the date the Director invalidates the sample or by the end of the applicable monitoring period, whichever occurs later. Replacement samples taken after the end of the applicable monitoring period shall not also be used to meet the monitoring requirements of a subsequent monitoring period. The replacement samples shall be taken at the same locations as the invalidated samples or, if that is not possible, at locations other than those already used for sampling during the monitoring period.

§6.87 *Monitoring Requirements for Water Quality Parameters*

All large water systems, and all small and medium-size systems that exceed the lead or copper action level shall monitor water quality parameters in addition to lead and copper in accordance with this section. The requirements of this section are summarized in the table at the end of this section.

(a) ***General Requirements***

(i) ***Sample Collection Methods***

(i) Tap samples shall be representative of water quality throughout the distribution system taking into account the number of persons served, the different sources of water, the different treatment methods employed by the system, and seasonal variability. Tap sampling under this section is not required to be conducted at taps targeted for lead and copper sampling under §6.86(a). [Note: Systems may find it convenient to conduct tap sampling for water quality parameters at sites used for coliform sampling.

(ii) Samples collected at the entry point(s) to the distribution system shall be from locations representative of each source after treatment. 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).

(2) ***Number of Samples***

(i) Systems shall collect two tap samples for applicable water quality parameters during each monitoring period specified under paragraphs (b)-(e) of this section from the following number of sites.

System Size (# People Served)	***# of sites for Water Quality Parameters***
>100,000	25
10,001-100,000	10
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(ii) Except as provided in paragraph (c)(3) of this section, systems shall collect two samples for each applicable water quality parameter at each entry point to the distribution system during each monitoring period specified in paragraph (b) of this section. During each monitoring period specified in paragraphs (c)-(e) of this section, systems shall collect one sample for each applicable water quality parameter at each entry point to the distribution system.

(b) ***Initial Sampling***

All large water systems shall measure the applicable water quality parameters as specified below at taps and at each entry point to the distribution system during each six-month monitoring period specified in §6.86(d)(1). All small and medium-size systems shall measure the applicable water quality parameters at the locations specified below during each six-month monitoring period specified in §6.86(d)(1) during which the system exceeds the lead or copper action level.

(1) At taps:

(i) pH;

(ii) alkalinity;

(iii) orthophosphate, when an inhibitor containing a phosphate compound is used;

(iv) silica, when an inhibitor containing a silicate compound is used;

(v) calcium;

(vi) conductivity; and

(vii) water temperature.

(2) At each entry point to the distribution system: all of the applicable parameters listed in paragraph (b)(1) above.

(c) ***Monitoring after Installation of Corrosion Control***

Any large system which installs optimal corrosion control treatment pursuant to §6.81(d)(4) shall measure the water quality parameters at the locations and frequencies specified below during each six-month monitoring period specified in §6.86(d)(2)(I). Any small or medium-size system which installs optimal corrosion control treatment shall conduct such monitoring during each six-month monitoring period specified in §6.86(d)(2)(ii) in which the system exceeds the lead or copper action level.

(1) At taps, two samples for:

(i) pH;

(ii) alkalinity;

(iii) orthophosphate, when an inhibitor containing a phosphate compound is used;

(iv) silica, when an inhibitor containing a silicate compound is used;

(v) calcium, when calcium carbonate stabilization is used as part of corrosion control.

(2) Except as provided in paragraph (c)(3) of this section, at each entry point to the distribution system, at least one sample no less frequently than every two weeks (bi-weekly) for:

(i) pH;

(ii) when alkalinity is adjusted as part of optimal corrosion control, a reading of the dosage rate of the chemical used to adjust alkalinity, and the alkalinity concentration; and

(iii) when a corrosion inhibitor is used as part of optimal corrosion control, a reading of the dosage rate of the inhibitor used, and the concentration of orthophosphate or silica (whichever is applicable).

(3) Any ground water system can limit entry point sampling described in paragraph (c)(2) of this section to those entry points that are representative of water quality and treatment conditions throughout the system. If water from untreated ground water sources mixes with water from treated ground water sources, the system must monitor for water quality parameters both at representative entry points receiving treatment and representative entry points receiving no treatment. Prior to the start of any monitoring under this paragraph, the system shall provide to the Director written information identifying the selected entry points and documentation, including information on seasonal variability, sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(d) ***Monitoring after the Director Specifies Water Quality Parameter Values for Optimal Corrosion Control***

After the Director specifies the values for applicable water quality control parameters reflecting optimal corrosion control treatment under §6.82(f), all large systems shall measure the applicable water quality parameters in accordance with paragraph c) of this section and determine compliance with the requirements of §6.82(g) every six months with the first six-month period to begin on the date the Director specifies the optimal values under §6.82(f). Any small or medium-size system shall conduct such monitoring during each six-month period specified in this paragraph in which the system exceeds the lead or copper action level. For any such small and medium-size system that is subject to a reduced monitoring frequency pursuant to §6.86(d)(4) at the time of the action level exceedance, the end of the applicable six-month period under this paragraph shall coincide with the end of the applicable monitoring period under §6.86(d)(4). Compliance with Director-designated optimal water quality parameter values shall be determined as specified under §6.82(g).

(e) ***Reduced Monitoring***

(1) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment during each of two consecutive six-month monitoring periods under paragraph (d) of this section shall continue monitoring at the entry point(s) to the distribution system as specified in

paragraph (c)(2) of this section. Such system may collect two tap samples for applicable water quality parameters from the following reduced number of sites during each six-month monitoring period.

System Size (# People Served)	*Reduced # of Sites for Water Quality Parameters*
>100,000	10
10,001 to 100,000	7
3,301 to 10,000	3
501 to 3,300	2
101 to 500	1
≤100	1

(2)(i) Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Director under §6.82(f) during three consecutive years of monitoring may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in this paragraph (e)(1) from every six months to annually. Any water system that maintains the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the State under §6.82(f) during three consecutive years of annual monitoring under this paragraph may reduce the frequency with which it collects the number of tap samples for applicable water quality parameters specified in paragraph (e)(1) from annually to every three years.

(ii) A water system may reduce the frequency with which it collects tap samples for applicable water quality parameters specified in paragraph (e)(1) of this section to every three years if it demonstrates during two consecutive monitoring periods that its tap water lead level at the 90th percentile is less than or equal to the PQL for lead specified in §6.89 (a)(1)(ii), that its tap water copper level at the 90th percentile is less than or equal to 0.65 mg/L for copper in §6.80(c)(2), and that it also has maintained the range of values for the water quality parameters reflecting optimal corrosion control treatment specified by the Director under §6.82(f).

(3) A water system that conducts sampling annually shall collect these samples evenly throughout the year so as to reflect seasonal variability.

(4) Any water system subject to reduced monitoring frequency that fails to operate at or above the minimum value or within the range of values for the water quality parameters specified by the Director under §6.82(f) for more than nine days in any six-month period specified in §6.82(g) shall resume distribution system tap water

sampling in accordance with the number and frequency requirements in paragraph d) of this section. Such a system may resume annual monitoring for water quality parameters at the tap at the reduced number of sites specified in paragraph (e)(1) of this section after it has completed two subsequent consecutive six-month rounds of monitoring that meet the criteria of that paragraph and/or may resume triennial monitoring for water quality parameters at the tap at the reduced number of sites after it demonstrates through subsequent rounds of monitoring that it meets the criteria of either paragraph (e)(2)(i) or (e)(2)(ii) of this section.

(f) ***Additional Monitoring by Systems***

The results of any monitoring conducted in addition to the minimum requirements of this section shall be considered by the system and the Director in making any determinations (i.e., determining concentrations of water quality parameters) under this section or §6.82.

SUMMARY OF MONITORING REQUIREMENTS FOR WATER QUALITY PARAMETERS[1]			
Monitoring Period	**Parameters[2]**	**Location**	**Frequency**
Initial Monitoring	pH, alkalinity, orthophosphate or silica[3], calcium, conductivity, temperature	Taps and at entry point(s)to distribution system	Every 6 months
After Installation of Corrosion Control	pH, alkalinity, orthophosphate or silica[3], calcium[4]	Taps	Every 6 months
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]	Entry point(s) to distribution system	No less frequently than every two weeks
After Director Specifies Parameter Values For Optimal Corrosion Control	pH, alkalinity, orthophosphate or silica[3], calcium[4]	Taps	Every 6 months
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]	Entry point(s) to distribution system	No less frequently than every two weeks
Reduced Monitoring	pH, alkalinity, orthophosphate or silica[3], calcium[4]	Taps	Every 6 months, annually[7] or every 3 years[8] reduced number of sites
	pH, alkalinity dosage rate and concentration (if alkalinity adjusted as part of corrosion control), inhibitor dosage rate and inhibitor residual[5]	Entry point(s) to distribution system	No less frequently than every two weeks

1 Table is for illustrative purposes; consult the text of this section for precise regulatory requirements.

2 Small and medium-size systems have to monitor for water quality parameters only during monitoring periods in which the system exceeds the lead or copper action level.

3 Orthophosphate must be measured only when an inhibitor containing a phosphate compound is used. Silica must be measured only when an inhibitor containing silicate compound is used.

4 Calcium must be measured only when calcium carbonate stabilization is used as part of corrosion control.

5 Inhibitor dosage rates and inhibitor residual concentrations (orthophosphate or silica) must be measured only when an inhibitor is used.

6 Ground water systems may limit monitoring to representative locations throughout the system.

7 Water systems may reduce frequency of monitoring for water quality parameters at the tap from every six months to annually if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of monitoring.

8 Water systems may further reduce the frequency of monitoring for water quality parameters at the tap from annually to once every 3 years if they have maintained the range of values for water quality parameters reflecting optimal corrosion control during 3 consecutive years of annual monitoring. Water systems may accelerate to triennial monitoring for water quality parameters at the tap if they have maintained 90th percentile lead levels less than or equal to 0.005 mg/L, 90th percentile copper levels less than or equal to 0.65 mg/L, and the range of water quality parameters designated by the Director under §6.82(f) as representing optimal corrosion control during two consecutive six-month monitoring periods.

§6.88 *Monitoring Requirements for Lead and Copper in Source Water*

(a) ***Sample Location, Collection Methods, and Number of Samples***

(1) A water system that fails to meet the lead or copper action level on the basis of tap samples collected in accordance with §6.86 shall collect lead and copper source water samples in accordance with the following requirements regarding sample location, number of samples, and collection methods:

(i) 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). The system shall take one sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(ii) 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 system at a point which is representative of each source after treatment (hereafter called a sampling point). The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant. NOTE: For the purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

(iii) 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).

(iv) The Director may reduce the total number of samples which must be analyzed by allowing the use of compositing. Compositing of samples must be done by certified laboratory personnel. Composite samples from a maximum of five samples are allowed, provided that if the lead concentration in the composite sample is greater than or equal to 0.001 mg/L or the copper concentration is greater than or equal to 0.160 mg/L, then either:

(A) A follow-up sample shall be taken and analyzed within 14 days at each sampling point included in the composite; or

(B) If duplicates of or sufficient quantities from the original samples from each sampling point used in the composite are available, the system may use these instead of resampling.

(2) Where the results of sampling indicate an exceedance of maximum permissible source water levels established under §6.83(b)(4), the Director may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point. If a Director-required confirmation sample is taken for lead or copper, then the results of the initial and confirmation sample shall be averaged in determining compliance with the Director-specified maximum permissible levels. Any sample value below the detection limit shall be considered to be zero. Any value above the detection limit but below the PQL shall either be considered as the measured value or be considered one-half the PQL.

(b) ***Monitoring Frequency after System Exceeds Tap Water Action Level***

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.

(c) ***Monitoring Frequency after Installation of Source Water Treatment***

Any system which installs source water treatment pursuant to §6.83(a)(3) 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 §6.83(a)(4).

(d) ***Monitoring Frequency after the Director Specifies Maximum Permissible Source Water Levels or Determines That Source Water Treatment Is Not Needed***

(1) A system shall monitor at the frequency specified below in cases where the Director specifies maximum permissible source water levels under §6.83(b)(4) or determines that the system is not required to install source water treatment under §6.83(b)(2).

(i) A water system using only groundwater shall collect samples once during the three-year compliance period (as that term is defined in Section 1) in effect when the applicable Director determination under paragraph (d)(1) of this section is made. Such systems shall collect samples once during each subsequent compliance period.

(ii) 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 Director determination is made under paragraph (d)(1) of this section.

(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 under paragraph (d)(1)(I) or (ii) of this section.

(e) ***Reduced Monitoring Frequency***

(1) A water system using only groundwater may reduce the monitoring frequency for lead and/or copper in source water to once during each nine-year compliance cycle (as that term is defined in Section 1) if the system meets one of the following criteria.

(i) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Director in §6.83(b)(4) during at least three consecutive compliance periods under paragraph (d)(1) of this section; or

(ii) The Director has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive compliance periods in which sampling was conducted under paragraph (d)(1) of this section, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(2) A water system using surface water (or a combination of surface water and ground water)may reduce the monitoring frequency in paragraph (d)(1) of this section to once during each nine-year compliance cycle (as that term is defined in Section 1) if the system meets one of the following criteria:

(i) The system demonstrates that finished drinking water entering the distribution system has been maintained below the maximum permissible lead and copper concentrations specified by the Director in §6.83(b)(4) for at least three consecutive years; or

(ii) The Director has determined that source water treatment is not needed and the system demonstrates that, during at least three consecutive years, the concentration of lead in source water was less than or equal to 0.005 mg/L and the concentration of copper in source water was less than or equal to 0.65 mg/L.

(3) 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 Director in §6.83(a)(5).

§6.89 ***Analytical Methods***

(a) Analyses for lead, copper, pH, conductivity, calcium, alkalinity, orthophosphate, silica and temperature shall be conducted with the methods in Appendix 1.

(1) Analyses under this section shall only be conducted by certified laboratories using the methods specified in Appendix 1. Analyses for pH and temperature shall be conducted using methods specified in Appendix 1 by a party approved by the Director. To obtain certification to conduct analyses for lead and copper, laboratories must:

(i) Analyze performance evaluation samples which include lead and copper provided by a third party accredited provider or equivalent samples provided by the State; and

(ii) Achieve quantitative acceptance limits as follows:

(A) For lead: + 30 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L. The Practical Quantitation Level, or PQL for lead is 0.005 mg/L.

(B) For Copper: + 10 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L. The Practical Quantitation Level, or PQL for copper is 0.050 mg/L;

(iii) Achieve the method detection limit for lead of 0.001 mg/L according to the procedures in appendix B of part 136 of 40 CFR. This need only be accomplished if the laboratory will be processing source water composite samples under §6.88(a)(1)(iii).

(iv) Be currently certified by EPA or the State to perform analyses to the specifications described in paragraph (a)(2) of this section.

(2) The Director may allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of this Section.

(3) All lead and copper levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL specified for lead and copper in Appendix 1. All levels below the lead and copper MDLs must be reported as zero.

(4) All copper levels measured between the PQL and the MDL must be either reported as measured or they can be reported as one-half the PQL (0.025 mg/L). All levels below the copper MDL must be reported as zero.

(b) [Reserved]

§6.90 ***Reporting Requirements***

All water systems shall report all of the following information to the Director in accordance with this section.

(a) ***Reporting Requirements for Tap Water Monitoring for Lead and Copper and for Water Quality Parameter Monitoring***

(1) Except as provided in paragraph (a)(1)(viii) of this section, a water system shall report the information specified below for all tap water samples specified in §6.86 and for all water quality parameter samples specified in §6.87 within the first 10 days following the end of each applicable monitoring period specified in §6.86 and §6.87 (i.e., every six-months, annually, every 3 years, or every 9 years).

(i) the results of all tap samples for lead and copper including the location of each site and the criteria under §6.86(a)(3),(4),(5),(6), and/or (7) under which the site was selected for the system's sampling pool;

(ii) Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to §6.86(f)(2);

(iii) [Reserved];

(iv) the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period (calculated in accordance with §6.80(c)(3)) unless the Director calculates the system's 90th percentile lead and copper levels under paragraph (h) of this section;

(v) with the exception of initial tap sampling conducted pursuant to §6.86(d)(1), the system shall designate any site which was not sampled during previous monitoring periods, and include an explanation of why sampling sites have changed;

(vi) the results of all tap samples for pH, and where applicable, alkalinity, calcium, conductivity, temperature, and orthophosphate or silica collected under §6.87(b)-(e);

(vii) the results of all samples collected at the entry point(s) to the distribution system for applicable water quality parameters under §6.87(b)-(e).

(viii) A water system shall report the results of all water quality parameter samples collected under §6.87(c)-(f) during each six-month monitoring period specified in §6.87(d) within the first 10 days following the end of the monitoring period unless the Director has specified a more frequent reporting requirement.

(2) For a non-transient non-community water system, or a community water system meeting the criteria of §§6.85(c)(7)(i) and (ii), that does not have enough taps that can provide first-draw samples, the system must either:

(i) Provide written documentation to the Director identifying standing times and locations for enough non-first-draw samples to make up its sampling pool under §6.86(b)(5) by the start of the first applicable monitoring period under §6.86(d) that commences after April 11, 2000, unless the Director has waived prior Director's approval of non-first-draw sample sites selected by the system pursuant to §6.86(b)(5); or

(ii) If the Director has waived prior approval of non-first-draw sample sites selected by the system, identify, in writing, each site that did not meet the six-hour minimum standing time and the length of standing time for that particular substitute sample collected pursuant to §6.86(b)(5) and include this information with the lead and copper tap sample results required to be submitted pursuant to paragraph (a)(1)(i) of this section.

(3) No later than 60 days after the addition of a new source or any change in water treatment, unless the Director requires earlier notification, a water system deemed to have optimized corrosion control under §6.81(b)(3), a water system subject to reduced monitoring pursuant to §6.86(d)(4), or a water system subject to a monitoring waiver pursuant to §6.86(g), shall send written documentation to the Director describing the change. In those instances where prior Director's approval

of the treatment change or new source is not required, water systems are encouraged to provide the notification to the Director beforehand to minimize the risk the treatment change or new source will adversely affect optimal corrosion control.

(4) Each ground water system that limits water quality parameter monitoring to a subset of entry points under §6.87(c)(3) shall provide, by the commencement of such monitoring, written correspondence to the Director that identifies the selected entry points and includes information sufficient to demonstrate that the sites are representative of water quality and treatment conditions throughout the system.

(b) ***Source Water Monitoring Reporting Requirements***

(1) A water system shall report the sampling results for all source water samples collected in accordance with §6.88 within the first 10 days following the end of each source water monitoring period (i.e., annually, per compliance period, per compliance cycle) specified in §6.88.

(2) With the exception of the first round of source water sampling conducted pursuant to §6.88(b), the system shall specify any site which was not sampled during previous monitoring periods, and include an explanation of why the sampling point has changed.

(c) ***Corrosion Control Treatment Reporting Requirements***

By the applicable dates under §6.81, systems shall report the following information:

(1) for systems demonstrating that they have already optimized corrosion control, information required in §6.81(b) (2) or (3).

(2) for systems required to optimize corrosion control, their recommendation regarding optimal corrosion control treatment under §6.82(a).

(3) for systems required to evaluate the effectiveness of corrosion control treatments under §6.82(c), the information required by that paragraph.

(4) for systems required to install optimal corrosion control designated by the Director under §6.82(d), a letter certifying that the system has completed installing that treatment.

(d) ***Source Water Treatment Reporting Requirements***

By the applicable dates in §6.83, systems shall provide the following information to the Director:

(1) if required under §6.83(b)(1), their recommendation regarding source water treatment;

(2) for systems required to install source water treatment under §6.83(b)(2), a letter certifying that the system has completed installing the treatment designated by the Director within 24 months after the Director designated the treatment.

(e) ***Lead Service Line Replacement Reporting Requirements***

Systems shall report the following information to the Director to demonstrate compliance with the requirements of §6.84:

(1) Within 12 months after a system exceeds the lead action level in sampling referred to in §6.84(a), the system shall demonstrate in writing to the Director that it has conducted a materials evaluation, including the evaluation in §6.86(a), to identify the initial number of lead service lines in its distribution system, and shall provide the Director with the system's schedule for replacing annually at least 7 percent of the initial number of lead service lines in its distribution system.

(2) Within 12 months after a system exceeds the lead action level in sampling referred to in §6.84(a), and every 12 months thereafter, the system shall demonstrate to the Director in writing that the system has either:

(i) replaced in the previous 12 months at least 7 percent of the initial lead service lines (or a greater number of lines specified by the Director under §6.84(f)) in its distribution system, or

(ii) conducted sampling which demonstrates that the lead concentration in all service line samples from an individual line(s), taken pursuant to §6.86(b)(3), is less than or equal to 0.015 mg/L. In such cases, the total number of lines replaced and/or which meet the criteria in §6.84(c) shall equal at least 7 percent of the initial number of lead lines identified under paragraph (a) of this section (or the percentage specified by the Director under §6.84(f)).

(3) The annual letter submitted to the Director under paragraph (e)(2) of this section shall contain the following information:

(i) the number of lead service lines scheduled to be replaced during the previous year of the system's replacement schedule;

(ii) the number and location of each lead service line replaced during the previous year of the system's replacement schedule;

(iii) if measured, the water lead concentration and location of each lead service line sampled, the sampling method, and the date of sampling.

(4) Any system which collects lead service line samples following partial lead service line replacement required by §6.84 shall report the results to the Director within the first ten days of the month following the month in which the system receives the laboratory results, or as specified by the Director. The Director, at his or her discretion may eliminate this requirement to report these monitoring results. Systems shall also report any additional information as specified by the Director, and in a time and manner prescribed by the Director, to verify that all partial lead service line replacement activities have taken place.

(f) ***Public Education Program Reporting Requirements***

1) Any water system that i s subject to the public education requirements in §6.85 shall, within ten days after the end of each period in which the system is required to perform public education tasks in accordance with §6.85(c), send written documentation to the Director that contains:

(i) A demonstration that the system has delivered the public education materials that meet the content requirements in §6.85(a) and (b) and the delivery requirements in §6.85(c); and

(ii) A list of all the newspapers, radio stations, television stations, and facilities and organizations to which the system delivered public education materials during the period in which the system was required to perform public education tasks.

(2) Unless required by the Director, a system that previously has submitted the information required by paragraph (f)(1)(ii) of this section need not resubmit the information required by paragraph (f)(1)(ii) of this section, as long as there have been no changes in the distribution list and the system certifies that the public education materials were distributed to the same list submitted previously.

(g) ***Reporting of Additional Monitoring Data***

Any system which collects sampling data in addition to that required by this subpart shall report the results to the Director within the first ten (10) days following the end of the applicable monitoring period under §§6.86, 6.87 and §6.88 during which the samples are collected.

(h) ***Reporting of 90th Percentile Lead and Copper Concentrations Where the Director Calculates a System's 90th Percentile Concentration***

A water system is not required to report the 90th percentile lead and copper concentrations measured from among all lead and copper tap water samples collected during each monitoring period, as required by paragraph (a)(1)(iv) of this section if:

(1) The Director has previously notified the water system that it will calculate the water system's 90th percentile lead and copper concentrations, based on the lead and copper tap results submitted pursuant to paragraph (h)(2)(i) of this section, and has specified a date before the end of the applicable monitoring period by which the system must provide the results of lead and copper tap water samples;

(2) The system has provided the following information to the Director by the date specified in paragraph (h)(1) of this section:

(i) The results of all tap samples for lead and copper including the location of each site and the criteria under §6.86(a)(3), (4), (5), (6), and/or (7) under which the site was selected for the system's sampling pool, pursuant to paragraph (a)(1)(i) of this section; and

(ii) An identification of sampling sites utilized during the current monitoring period that were not sampled during previous monitoring periods, and an explanation why sampling sites have changed; and

(3) The Director has provided the results of the 90th percentile lead and copper calculations, in writing, to the water system before the end of the monitoring period.

§6.91 ***Record Keeping Requirements***

Any system subject to the requirements of this Section shall retain on its premises original records of all sampling data and analyses, reports, surveys, letters, evaluations, schedules, Director determinations, and any other information required by §6.81 through §6.88. Each water system shall retain the records required by this section for no fewer than 12 years.

Section 7.0 ***Connections Between Distribution Systems***

7.1 No person shall maintain a physical connection joining a public water system with any other water system, unless such connection is approved by the Director.

7.2 It is the responsibility of the public water system to register all existing or proposed connections between the PWS and any other water supply with the Director on or before January 1, 1992 or as they are proposed or discovered, whichever is later.

Section 8.0 ***Contamination of Tanks***

8.1 ***Connected to Unsafe Supplies***

Any person who maintains a public water system connection to a tank which is also supplied with water from a water system found by the Director to be unsafe shall maintain the tank open to atmospheric pressure, and the public water supply pipe shall terminate at least two pipe diameters above the maximum level of water in the tank. The tank overflow shall be of adequate size to fix definitely the maximum level.

8.2 ***Avoidance of Contamination in Tanks***

Any person who is furnished water from a public water system and maintains a tank supplied only by such water shall have such tank so constructed and maintained to prevent contaminants from gaining access to the tank interior.

Section 9.0 ***Assurance of Safety in Public Supply***

9.1 Any person maintaining a public water system shall operate and maintain the water supply facilities so that the water furnished the public is safe and potable.

Section 10.0 ***Correction of Unsafe Conditions***

10.1 When the water from a public water system is not safe or is subject to contamination, as determined by the Director, the person maintaining such public water system shall take immediate action to correct sanitary defects, improve operation, provide necessary water treatment, or make any other changes or additions deemed necessary by the Director to provide safe water.

10.2 Any person maintaining a water system who is aware of an unsafe condition, that the water is not safe or is subject to contamination, shall notify the Director immediately.

Section 11.0 ***Reports as to Public Supplies***

11.1 Any person maintaining a public water system shall submit or cause to be submitted by operating personnel such reports of operation pertaining to the sanitary quality, treatment and output as may be required by the Director. Such operation reports shall be submitted within ten (10) days after demand and shall be accurate and complete as required by the Director. Violations of maximum contaminant levels shall be reported to the Director within 48 hours after such a determination is made unless otherwise required for specific contaminants.

11.2 It is the responsibility of the water system to collect, have analyzed, and report the results of all water quality samples required by these regulations. Samples must be collected in accordance with a written sample siting plan. These plans are subject to the Director's review and revision.

Section 12.0 ***Certified Laboratories***

12.1 For the purpose of determining compliance with these regulations, only analyses carried out by the Department of Health or in a laboratory certified by the Department of Health, EPA, or by reciprocity with another state will be considered with the exception of turbidity pH, temperature, and residual disinfectant concentration determinations, which must be carried out by a party approved by the Director.

Section 13.0 ***Ground Water Microbiology***

13.1 Ground water sources shall meet the stipulated microbiological standard prior to disinfection where disinfection is practiced.

Section 14.0 ***Consecutive Water System Monitoring***

14.1 These regulations shall also pertain to a public water system which is supplied by another public water system except as specifically modified by the Director and agreed upon by the EPA Administrator.

Section 15.0 ***Variances And Exemptions***

15.1 Variances and exemptions to these regulations may be granted by the Director in accordance with Chapter 42-35 of the Rhode Island General Laws of 1956, as amended and if deemed applicable by the Director the provisions of Sections 300g-4 and 300g-5 of 42 USC *et seq.* (Section 1415 variances to regulations promulgated pursuant to the SDWA and Section 1416 exemptions to regulations promulgated pursuant to the SDWA of Public Law 93-523 as amended).

15.1.1 Variances pursuant to Section 1415 may be granted as follows:

(a) The Director may grant variances from an applicable national primary drinking water regulation to a public water system which, because of characteristics of the raw water sources which are reasonably available to the system, cannot meet the requirements respecting the maximum contaminant levels of such drinking water regulation. A variance may be issued to a system on condition that the system install the best technology, treatment techniques, or other means, which the Director finds are available (taking costs into consideration) and based upon an evaluation satisfactory to the Director that indicates that alternative sources of water are not reasonably available to the system.

Before the Director may grant a variance under this subparagraph, the Director must find that the variance will not result in an unreasonable risk to health. If the Director grants a public water system a variance under this subparagraph, the Director shall prescribe at the time the variance is granted, a schedule for:

(i) compliance (including increments of progress) by the public water system with each contaminant level requirement with respect to which the variance was granted, and

(ii) implementation by the public water system of such additional control measures as the State may require for each contaminant, subject to such contaminant level requirement, during the period ending on the date compliance with such requirement is required. Before a schedule prescribed pursuant to this subparagraph may take effect, the Director shall provide notice and opportunity for a public hearing on the schedule. A schedule prescribed pursuant to this subparagraph for a public water system granted a variance shall require compliance by the system with each contaminant level requirement with respect to which the variance was granted as expeditiously as practicable.

(b) The Director may grant variances from any provisions of a national primary drinking water regulation which requires the use of a specified treatment technique with respect to a contaminant if the public water system applying for the variance demonstrates to the satisfaction of the Director that such treatment technique is not necessary to protect the health of persons because of the nature of the raw water source of such system. A variance granted under this subparagraph shall be conditioned on such monitoring and other requirements as the Director may prescribe.

(c) Before a variance proposed to be granted by the Director under subparagraph (a) or (b) may take effect, the Director shall provide notice and opportunity for public hearing on the proposed variance. The Director shall promptly notify the Administrator of all variances that are granted. Such notification shall contain the reason for the variance [and in the case of a variance under subparagraph (a), the basis for the finding required by that subparagraph before the granting of the variance] and documentation of the need for the variance.

(d) Each public water system's variance granted under subparagraph (a) shall be conditioned upon compliance by the public water system with the schedule prescribed by the Director pursuant to that subparagraph.

(e) For such variance issued under this subparagraph, the Director

(1) must document all findings that are required under Section 1415(a) of the SDWA.

(2) If the Director prescribes a schedule pursuant to section 15.1.1(a) requiring compliance with a contaminant level for which the variance is granted later than five years from the date of issuance of the variance the Director must

(i) Document the rationale for the extended compliance schedule;

(ii) Discuss the rationale for the extended compliance schedule in the required public notice and opportunity for public hearing; and

(iii) Provide the shortest practicable time schedule feasible under the circumstances.

(f) ***Variances for Small Systems***

General Provisions

(1) What is a small system variance?

Small system variances are variances from the requirement to comply with a maximum contaminant level or treatment technique to systems serving fewer than 10,000 persons. The purpose of this subpart is to provide the procedures and criteria for obtaining these variances.

(2) Who can issue a small system variance?

A small system variance under this subpart may only be issued by the Director.

(3) Which size public water systems can receive a small system variance?

(a) The Director may grant a small system variance to public water systems serving 3,300 or fewer persons.

(b) With the approval of the EPA Regional Administrator, the Director may grant a small system variance to public water systems serving more than 3,300 persons but fewer than 10,000 persons.

(c) In determining the number of persons served by the public water system, persons served by consecutive systems must be included. A small system variance granted to a public water system would also apply to any consecutive system served by it.

(4) For which of the regulatory requirements is a small system variance available?

(a) A small system variance is not available under this subpart for a national primary drinking water regulation for a microbial contaminant (including a bacterium, virus, or other organism) or an indicator or treatment technique for a microbial contaminant.

(b) A small system variance under this subpart is otherwise only available for compliance with a requirement specifying a maximum contaminant level or treatment technique for a contaminant with respect to which:

(1) a national primary drinking water regulation was promulgated on or after January 1, 1986; and

(2) the Administrator has published a small system variance technology pursuant to Section 1412(b)(15) of the Safe Drinking Water Act.

Note to paragraph (b)(1): Small system variances are not available for public water systems above the pre-1986 maximum contaminant level even if subsequently revised. If the agency revises a pre-1986 maximum contaminant level and makes it more stringent, then a variance would be available for that contaminant, but only up to the pre-1986 maximum contaminant level.

(5) When can a small system variance be granted by the Director?

No small system variance can be granted by the Director until the later of the following:

(a) 90 days after the Director proposed to grant the small system variance;

(b) If the Director is proposing to grant a small system variance to a public water system serving 3,300 or fewer persons and the Administrator objects to the small system variance, the date on which the Director makes the recommended modifications or responds in writing to each objection; or

(c) If the Director is proposing to grant a small system variance to a public water system serving a population more than 3,300 and fewer than 10,000 persons, the date the Administrator approves the small system variance. The Administrator must approve or disapprove the variance within 90 days after it is submitted to the Administrator for review.

Review of Small System Variance Application

(6) What are the responsibilities of the public water system, Director, and the Administrator in ensuring that sufficient information is available and for evaluation of a small system variance application?

(a) A public water system requesting a small system variance must provide accurate and correct information to the Director to issue a small system variance in accordance with this subpart.

(b) Based upon an application for a small system variance and other information, and before a small system variance may be proposed under this subpart, the Director must find and document the following:

(1) The public water system is eligible for a small system variance pursuant to 15.1.1(f)(3) (i.e., the system serves a population of fewer than 10,000 persons) and (f)(4) (i.e., the contaminant for which the small system variance is sought is not excluded from variance eligibility);

(2) The public water system cannot afford to comply, in accordance with the affordability criteria established by the Director, with the national primary drinking water regulation for which a small system variance is sought, including by:

(i) treatment;

(ii) Alternative sources of water supply;

(iii) Restructuring or consolidation changes, including ownership change and/or physical consolidation with another public water system; or

(iv) Obtaining financial assistance;

(3) The public water system meets the source water quality requirements for installing the small system variance technology;

(4) The public water system is financially and technically capable of installing, operating, and maintaining the applicable small system variance technology; and

(5) The terms and conditions of the small system variance, as developed through compliance with (f)(7) ensure adequate protection of human health, considering the following:

(i) The quality of the source water for the public water system; and

(ii) Removal efficiencies and expected useful life of the small system variance technology.

(7) What terms and conditions must be included in a small system variance?

(a) The Director must clearly specify enforceable terms and conditions of a small system variance.

(b) The terms and conditions of a small system variance issued under this subpart must include, at a minimum, the following requirements:

(1) Proper and effective installation, operation, and maintenance of the applicable small system variance technology taking into consideration any relevant source water characteristics and any other site-specific conditions that may affect proper and effective operation and maintenance of the technology;

(2) Monitoring requirements, for the contaminant for which a small system variance is sought; and

(3) Any other terms or conditions that are necessary to ensure adequate protection of public health, which may include:

(i) Public education requirements; and

(ii) Source water protection requirements.

(c) The Director must establish a schedule for the public water system to comply with the terms and conditions of the small system variance which must include, at a minimum, the following requirements:

(1) Increments of progress, such as milestone dates for the public water system to apply for financial assistance and begin capital improvements;

(2) Quarterly reporting to the Director of the public water system's compliance with the terms and conditions of the small system variance;

(3) Schedule for the Director to review the small system variance under paragraph (d) of this section; and

(4) Compliance with the terms and conditions of the small system variance as soon as practicable but not later than 3 years after the date on which the small system variance is granted. The Director

may allow up to 2 additional years if the Director determines that additional time is necessary for the public water system to:

(i) Complete necessary capital improvements to comply with the small system variance technology, secure an alternative source of water, or restructure or consolidate; or

(ii) Obtain financial assistance.

(d) The Director must review each small system variance granted not less often than every 5 years after the compliance date established in the small system variance to determine whether the public water system continues to meet the eligibility criteria and remains eligible for the small system variance and is complying with the terms and conditions of the small system variance. If the public water system would no longer be eligible for a small system variance, the Director must determine whether continuing the variance is in the public interest. If the Director finds that continuing the variance is not in the public interest, the variance must be withdrawn.

Public Participation

(8) What public notice is required before the Director proposes to issue a small system variance?

(a) At least fifteen (15) days before the date of proposal, and at least thirty (30) days prior to a public meeting to discuss the proposed small system variance, the Director or public water system as directed by the Director, must provide notice to all persons served by the public water system. For billed customers, identified in paragraph (a)(1) of this section, this notice must include the information listed in paragraph (c) of this section.

For other persons regularly served by the system, identified in paragraph (a)(2) of this section, the notice shall include the information identified in paragraph (d) of this section. Notice must be provided to all persons served by:

(1) Direct mail or other home delivery to billed customers or other service connections; and

(2) Any other method reasonably calculated to notify, in a brief and concise manner, other persons regularly served by the system. Such methods may include publication in a local newspaper, posting in public places, or delivery to community organizations.

(b) At the time of proposal, the Director must publish a notice in a newspaper or newspapers of wide circulation in the State. This notice shall include the information listed in paragraph (c) of this section.

(c) The notice in paragraphs (a)(1) and (b) of this section must include, at a minimum, the following:

(1) Identification of the contaminant(s) for which a small system variance is sought;

(2) A brief statement of the health effects associated with the contaminant(s) for which a small system variance is sought using language in section 16.10 of these regulations;

(3) The address and telephone number at which interested persons may obtain further information concerning the contaminant and the small system variance;

(4) A brief summary, in easily understandable terms, of the terms and conditions of the small system variance;

(5) A description of the consumer petition process under section 15.1.1(f)(10) and information on contacting the EPA Regional Office;

(6) A brief statement announcing the public meeting required under Section (f)(9)(a), including a statement of the purpose of the meeting, information regarding the time and location for the meeting, and the address and telephone number at which interested persons may obtain further information concerning the meeting; and

(7) In communities with a large proportion of non-English-speaking residents, as determined by the Director, information in the appropriate language regarding the content and importance of the notice.

(d) The notice in paragraph (a)(2) of this section must provide sufficient information to alert readers to the proposed variance and direct them where to receive additional information.

(e) At his option, the Director or the Administrator may choose to issue separate notices or additional notices related to the proposed small system variance, provided that the requirements in paragraphs (a) through (d) of this section are satisfied.

(f) Prior to promulgating the final variance, the Director must respond in writing to all significant public comments received relating to the small system variance. Response to public comment and any other documentation supporting the issuance of a variance must be made available to the public after final promulgation.

(9) What are the public meeting requirements associated with the proposal of a small system variance?

(a) The Director must provide for at least one (1) public meeting on the small system variance no later than 15 days after the small system variance is proposed.

(b) At the time of the public meeting, the Director must prepare and make publicly available, in addition to the information listed in 15.1.1(f)(8)(c) either:

(1) The proposed small system variance, if the public meeting occurs after proposal of the small system variance; or

(2) A draft of the proposed small system variance, if the public meeting occurs prior to proposal of the proposed small system variance.

(c) Notice of the public meeting must be provided in the manner required under 15.1.1(f)(8) at least 30 days in advance of the public meeting. This notice must be provided by the Director or the public water system as directed by the Director.

(10) How can a person served by the public water system obtain EPA review of a small system variance proposed by the Director?

(a) Any person served by the public water system may petition the Administrator to object to the granting of a small system variance within 30 days after the Director proposes to grant a small system variance for a public water system.

(b) The Administrator must respond to a petition filed by any person served by the public water system and determine whether to object to the small system variance no later than 60 days after the receipt of the petition.

EPA Review and Approval of Small System Variances

(11) What procedures allow the Administrator to object to a proposed small system variance or overturn a granted small system variance for a public water system serving 3,300 or fewer persons?

(a) At the time the Director proposes to grant a small system variance under this subpart, the Director must submit to the Administrator the proposed small system variance and all supporting information, including any written public comments received prior to proposal.

(b) The Administrator may review and object to any proposed small system variance within 90 days of receipt of the proposed small system variance. The Administrator must notify the Director in writing of each basis for the objection and propose a modification to the small system variance to resolve the concerns of the Administrator. The Director must make the recommended modification, respond in writing to each objection, or withdraw the proposal to grant the small system variance.

(c) If the Director issues the small system variance without resolving the concerns of the Administrator, the Administrator may overturn the decision to grant the variance if the Administrator determines that the Director's decision does not comply with the Safe Drinking Water Act or this rule.

(12) What EPA action is necessary when the Director proposes to grant a small system variance to a public water system serving a population of more than 3,300 and fewer than 10,000 persons?

(a) At the time the Director proposes to grant a small system variance to a public water system serving a population of more than 3,300 and fewer than 10,000 persons, the Director must submit the proposed small system variance and all supporting information, including public comments received prior to proposal, to the Administrator.

(b) The Administrator must approve or disapprove the small system variance within 90 days of receipt of the proposed small system variance and supporting information. The Administrator must approve the small system variance if it meets each requirement within the Act and this rule.

(c) If the Administrator disapproves the small system variance, the Administrator must notify the Director in writing of the reasons for disapproval and the small system variance does not become effective. The Director may resubmit the small system variance for review and approval with modifications to address the objections stated by the Administrator.

15.1.2 ***Exemptions Pursuant to Section 1416 of the Safe Drinking Water Act***

(a) Exemptions may be granted by the Director from any requirement respecting a maximum contaminant level or any treatment technique requirement, or from both, of an applicable national primary drinking water regulation upon a finding that:

(1) due to compelling factors (which may include economic factors, including qualification of the public water system as a system serving a disadvantaged community), the public water system is unable to comply with such contaminant level or treatment technique requirement or to implement measures to develop an alternative source of water supply;

(2) the public water system was in operation on the effective date of such contaminant level or treatment technique requirement or for a system that was not in operation by that date, only if no reasonable alternative source of drinking water is available to such new system;

(3) the granting of the exemption will not result in an unreasonable risk to health; and

(4) management or restructuring changes (or both) cannot reasonably be made that will result in compliance or, if compliance cannot be achieved, improve the quality of the drinking water.

(b) If the Director grants a public water system an exemption under subsection (a), the exemption shall include a schedule which includes the items listed

in this paragraph. Before a schedule prescribed by the Director pursuant to this subsection may take effect, the Director shall provide notice and opportunity for a public hearing on the schedule.

(1) Director shall prescribe, at the time the exemption is granted, a schedule for:

(A) compliance (including increments of progress or measures to develop an alternative source of water supply) by the public water system with each contaminant level requirement or treatment technique requirement with respect to which the exemption was granted, and

(B) implementation by the public water system of such control measures as the Director may require for each contaminant, subject to such contaminant level requirement or treatment technique requirement, during the period ending on the date compliance with such requirement is required.

(2) A schedule prescribed pursuant to this subsection for a public water system granted an exemption under subsection (a) shall require the following:

(A) compliance by the system with each contaminant level and treatment technique requirement with respect to which the exemption was granted as expeditiously as practicable but not later than 3 years after the otherwise applicable compliance date.

(B) No exemption shall be granted unless the public water system establishes that:

(i) the system cannot meet the standard without capital improvements which cannot be completed prior to the otherwise applicable compliance date;

(ii) in the case of a system which needs financial assistance for the necessary improvements, the system has entered into an agreement to obtain such financial assistance or assistance is reasonably likely to be available within the period of the exemption; or

(iii) the system has entered into an enforceable agreement to become a part of a regional public water system; and the system is taking all practicable steps to meet the standard.

(C) In the case of a system which does not serve more than a population of 3,300 and which needs financial assistance for the necessary improvements, an exemption granted under clause (i) or (ii) of subparagraph (B) may be renewed for one or more additional 2-year periods, but not to exceed a total of 6 years, if the system establishes that it is taking all practicable steps to meet the requirements of subparagraph (B).

(D) Limitation - A public water system may not receive an exemption under this section if the system was granted a variance under section 15.1.1.

(3) Each public water system's exemption granted by the Director under subsection (a) shall be conditioned upon compliance by the public water system with the schedule prescribed pursuant to this subsection.

(c) The Director shall promptly notify the Administrator of the granting of all exemptions. Such notification shall contain the reasons for the exemption and document the need for the exemption.

(d) The Director must document all findings that are required under Section 1416 of the Act:

(1) Before finding that management and restructuring changes cannot be made, the Director must consider the following measures, and the availability of State Revolving Loan Fund assistance, or any other Federal or State program, that is reasonably likely to be available within the period of the exemption to implement these measures:

(A) Consideration of rate increases, accounting changes, the appointment of a State-certified operator under the State's Operator Certification program, contractual agreements for joint operation with one or more public water systems;

(B) Activities consistent with the State's Capacity Development Strategy to help the public water system acquire and maintain technical, financial, and managerial capacity to come into compliance; and

(C) Ownership changes, physical consolidation with another public water system, or other feasible and appropriate means of consolidation which would result in compliance;

(2) The Director must consider the availability of an alternative source of water, including the feasibility of partnerships with neighboring public water

systems, as identified by the public water system or by the Director consistent with the Capacity Development Strategy.

15.2 Variances or exemptions from MCL (Maximum Contaminant Level) to total coliforms or from any of the treatment technique requirements of Section 5 contained herein will not be granted.

15.2.1 Exceptions to section 15.2 with respect to the MCL for total coliforms can be granted if the system can demonstrate to the Director that:

A. the violation of the total coliform MCL is due to a persistent growth of total coliforms in the distribution system;

B. no fecal or pathogenic contamination exists;

C. no treatment lapse or deficiency has occurred;

D. no problem in the operation or maintenance of the distribution system exists.

15.3 Variances and Exemptions from the maximum contaminant levels for organic and inorganic contaminants and the treatment technique for lead and copper.

a) Community water systems and non-transient, non-community water systems shall be required to install and/or use any treatment method identified in 16.1 (t) and 16.2 c) as a condition for granting a variance except as provided in paragraph 15.3(a)(1) of this section. If, after the systems's installation of the treatment method, the system cannot meet the MCL, that system shall be eligible for a variance.

1) If a system can demonstrate through comprehensive engineering assessments, which may include pilot plant studies, that the treatment methods identified in 16.1 (t) and 16.2 c) would only achieve a de minimis reduction in contaminants, the Director may issue a schedule of compliance that requires the system being granted the variance to examine other treatment methods as a condition of obtaining the variance.

2) If the Director determines that a treatment method identified in paragraph 15.3(a)(1) of this section is technically feasible, the system will be required to install and/or use that treatment method in connection with a compliance schedule. The Director's determination shall be based upon studies by the system and other relevant information.

15.4 In addition to the requirements of 15.3, a public water system may be required to use bottled water, point-of-use devices, point-of-entry devices or other means as a condition of granting a variance or an exemption to avoid an unreasonable risk to health.

The Director may require a public water system to use bottled water and point-of-use devices or other means, but not point-of-entry devices, as a condition for granting an

exemption from corrosion control treatment requirements for lead and copper in section 6.81 and 6.82 to avoid an unreasonable risk to health. The Director may require a public water system to use point-of-entry devices as a condition for granting an exemption for the source water and lead service line replacement requirements for lead and copper under section 6.83 or 6.84 to avoid an unreasonable risk to health.

(a) Public water systems that use bottled water as a condition for receiving a variance or an exemption from the requirements of section 16.2(a) and (b) and 16.1 or an exemption from the requirements of 6.81-6.84 must use bottled water that is approved by the Director.

(b) In requiring the use of a point-of-entry device as a condition for granting an exemption from the treatment requirements for lead and copper under section 6.83 or 6.84, the Director must be assured that use of the device will not cause increased corrosion of lead and copper bearing materials located between the device and the tap that could increase contaminant levels at the tap.

15.5 At the discretion of the Director, nitrate levels not to exceed 20 mg/l may be allowed in a non-community water system if the supplier of water demonstrates to the satisfaction of the Director that:

(a) Such water will not be available to children under 6 months of age; and

(b) There will be continuous posting of the fact that nitrate levels exceed 10 mg/l and the potential health effects of exposure; and

(c) Local and state public health authorities will be notified annually of nitrate levels that exceed 10 mg/l; and

(d) No adverse health effects shall result.

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Section 16.0 ***Community Water System Requirements***

16.1 ***Inorganic Chemicals***

Maximum Contaminant Levels (MCLs) For Certain Inorganic Chemicals

Contaminant	***MCL (mg/l)***
(1) Fluoride	4.0
(2) Asbestos	7 million Fibers/liter longer than 10 um)
(3) Barium	2
(4) Cadium	0.005
(5) Chromium	0.1
(6) Mercury	0.002
(7) Nitrate	10 (as Nitrogen)
(8) Nitrite	1 (as Nitrogen)
(9) Total Nitrate and Nitrite	10 (as Nitrogen)
(10) Selenium	0.05
(11) Antimony	0.006
(12) Beryllium	0.004
(13) Cyanide (as free Cyanide)	0.2
(14) Nickel	0.1
(15) Thallium	0.002

a) Community water systems shall conduct monitoring to determine compliance with the MCLs specified in this section. Monitoring shall be conducted as follows:

(1) 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) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

(2) 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 system at a point which is representative of each source after treatment (hereafter called a sampling point) beginning in the initial compliance period. The system shall take each sample at the same sampling point unless conditions make another sampling point more representative of each source or treatment plant.

Note: For purpose of this paragraph, surface water systems include systems with a combination of surface and ground sources.

(3) 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).

(4) The Director may reduce the total number of samples which must be analyzed by allowing the use of compositing. Composite samples from a maximum of five samples are allowed, provided that the detection limit of the method used for analysis is less than one-fifth of the MCL. Compositing of samples must be done in the laboratory.

(i) If the concentration in the composite sample is greater than or equal to one-fifth of the MCL of any inorganic chemical, then a follow-up sample must be taken within 14 days at each sampling point included in the composite. These samples must be analyzed for the contaminants which exceeded one-fifth of the MCL in the composite sample. Detection limits for each analytical method are found in Appendix 1.

(ii) If the population served by the system is > 3,300 persons, then compositing may only be permitted by the Director at sampling points within a single system. In systems serving < 3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.

(iii) 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 duplicates must be analyzed and the results reported to the State within 14 days of collection.

(5) The frequency of monitoring for asbestos shall be in accordance with 16.1 (b); the frequency of monitoring for antimony, barium beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium and thallium shall be in accordance with 16.1 (c); the frequency of monitoring for nitrate shall be in accordance with 16.1(d); and the frequency of monitoring for nitrite shall be in accordance with 16.1(e).

(b) The frequency of monitoring conducted to determine compliance with the maximum contaminant level for asbestos shall be conducted as follows:

(1) 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.

(2) 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 Director for a waiver of the monitoring requirement in paragraph (b)(1) of this section. If the Director grants the waiver, the system is not required to monitor.

(3) The Director may grant a waiver based on a consideration of the following factors:

(i) Potential asbestos contamination of the water source, and

(ii) The use of asbestos-cement pipe for finished water distribution and the corrosive nature of the water.

(4) A 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 of paragraph (b)(1) of this section.

(5) 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.

(6) A system vulnerable to asbestos contamination due solely to source water shall monitor in accordance with the provision of 16.1(a) of this section.

(7) 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.

(8) A system which exceeds the maximum contaminant levels shall monitor quarterly beginning in the next quarter after the violation occurred.

(9) The Director may decrease the quarterly monitoring requirement to the frequency specified in paragraph (b) (1) of this section provided the Director has determined that the system is reliably and consistently below the maximum contaminant level. In no case can the Director make this determination unless a groundwater system takes a minimum of two quarterly samples and a surface (or combined surface/ground) water system take a minimum of four quarterly samples.

(10) If monitoring data collected after January 1, 1990 are generally consistent with the requirements of App. 1 then the Director may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period beginning January 1, 1993.

(c) The frequency of monitoring conducted to determine compliance with the maximum contaminant levels in 16.1 for antimony, barium, beryllium, cadmium, chromium, cynanide, fluoride, mercury, nickel, thallium and selenium shall be as follows:

(1) Groundwater systems shall take one sample at each sampling point during each compliance period. Surface water systems (or combines surface/ground) shall take one sample annually at each sampling point.

(2) The system may apply to the Director for a waiver from the monitoring frequencies specified in paragraph (c) (1) of this section. The Director may grant a public water system a waiver for monitoring of cyanide, provided that the State determines that the system is not vulnerable due to lack of any industrial source of cyanide.

(3) 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).

(4) The Director may grant a waiver provided 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). Both surface and groundwater systems shall demonstrate that all previous analytical results were less than the maximum contaminant level. 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.

(5) In determining the appropriate reduced monitoring frequency, the Director shall consider:

(i) Reported concentrations from all previous monitoring;

(ii) The degree of variation in reported concentrations; and

(iii) Other factors which may affect contaminant concentration 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.

(6) A decision by the Director to grant a waiver shall be made in writing and shall set forth the basis for the determination. The determination may be initiated by the Director or upon an application by the public water system. The public water system shall specify the basis for its request. The Director 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.

(7) Systems which exceed the maximum contaminant levels as calculated in 16.1 (I) of this section shall monitor quarterly beginning in the next quarter after the violation occurred.

(8) The Director may decrease the quarterly monitoring requirement to the frequencies specified in paragraph (c)(1) and (c)(2) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case can a Director make this determination unless a groundwater system

takes a minimum of two quarterly samples and a surface water system take a minimum of four quarterly samples.

(d) 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 nitrate in section 16.1.

(1) Community and non-transient, non-community water systems served by groundwater systems shall monitor annually; systems served by surface water shall monitor quarterly beginning January 1, 1993.

(2) 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 i n which the concentration is greater than or equal to 50 percent of the MCL. The Director may allow a groundwater system to reduce the sampling frequency to annually after four consecutive quarterly samples are reliably and consistently less than the MCL.

(3) For community and non-transient, non-community water systems, the Director may allow a surface water system to reduce the sampling frequency to annually if all analytical results from four consecutive quarters are < 50 percent of the MCL. A surface water system shall return to quarterly monitoring if any sample is greater than or equal to 50 percent of the MCL.

(4) 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) 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.

(1) All public water systems shall take a minimum of one sample at each sampling point in each compliance period.

(2) After the initial sample, systems where an analytical result for nitrite is < 50 percent of the MCL shall monitor at the frequency specified by the Director.

(3) 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 > 50 percent of the MCL. The Director may allow a system to reduce the sampling frequency to annually after determining the system is reliably and consistently less than the MCL.

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

(f) ***Confirmation Samples:***

(1) Where the results of sampling for asbestos, antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium indicate an exceeding of the maximum contaminant level, the Director may require that one additional sample be collected as soon as possible after the initial sample was taken (but not to exceed two weeks) at the same sampling point.

(2) Where nitrate or nitrite sampling results indicate an exceeding 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. Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with 16.8 or 17.6. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

(3) If a required confirmation sample is taken for any contaminant, then the results of the initial and confirmation sample shall be averaged. The resulting average shall be used to determine the system's compliance in accordance with paragraph (I) of this section. The Director has the discretion to delete results of obvious sampling errors.

(g) The Director may require more frequent monitoring than specified in paragraphs (b), (c), (d) and (e) of this section or may require confirmation samples for positive and negative results at its discretion.

(h) Systems may apply to the Director to conduct more frequent monitoring than the minimum monitoring frequencies specified in this section.

(i) Compliance with 16.1 shall be determined based on the analytical result(s) obtained at each sampling point.

(1) For systems which are conducting monitoring at a frequency greater than annual, compliance with the maximum contaminant levels for antimony, asbestos, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium is determined by a running annual average at any sampling point. If the average at any sampling point is greater than the MCL, then the system is out of compliance. If any one sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any sample below the method

detection limit shall be c alculated at zero for the purpose of determining the annual average.

(2) For systems which are monitoring annually, or less frequently, the system is out of compliance with the maximum contaminant levels for asbestos, antimony, barium, beryllium, cadmium, chromium, cyanide, fluoride, mercury, nickel, selenium or thallium if the level of a contaminant at any sampling point is greater than the MCL. If a confirmation sample is required by the Director, the determination of compliance will be based on the average of the two samples.

(3) Compliance with the maximum contaminant levels for nitrate and nitrite is determined based on one sample if the levels of these contaminants are below the MCLs. If the levels of nitrate and/or nitrite exceed the MCLs in the initial sample, a confirmation sample is required in accordance with paragraph (f)(2) of this section, and compliance shall be determined based on the average of the initial and confirmation samples.

(j) Sample collection and analyses for the purpose of determining compliance with arsenic shall be conducted using the requirements specified in Appendix 1.

(1) Analyses for all community water systems utilizing surface water sources shall be repeated at yearly intervals.

(2) Analyses for all community water systems utilizing only ground water sources shall be repeated at three-year intervals.

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

(4) The maximum contaminant level for arsenic is 0.05 mg/l and applies to community water systems only.

(k) If the result of an analysis made under paragraph (j) of this section indicates that the arsenic concentration exceeds the maximum contaminant level, the supplier of the water shall report to the Director within 7 days and initiate three additional analyses at the same sampling point within one month.

(l) When the average of four analyses made pursuant to paragraph (k) of this section, rounded to the same number of significant figures as the maximum contaminant level for arsenic exceeds the maximum contaminant level, the supplier of water shall notify the Director pursuant to 11.2 and give notice to the public pursuant to 16.8. Monitoring after public notification shall be at a frequency designated by the Director and shall continue until the maximum contaminant level 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.

(m) *Reserved*

(n) *Reserved*

(o) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only the area served by that portion of the system which is out of compliance.

(p) Each public water system shall monitor at the time designated by the Director during each compliance period.

(q) ***Mechanical Fluoride Adjustment - Monitoring Frequency and Reporting Requirements***

i) For each source where the fluoride concentration is mechanically adjusted, a fluoride determination of the treated water shall be made and recorded daily by the water purveyor. Fluoride analysis shall be conducted in accordance with Appendix 1. Results shall be reported monthly to the Director within ten (10) days after the end of the month.

ii) Failure to comply with the requirements of this paragraph (q) is not subject to the public notice requirements of section 16.8.

(r) ***Monitoring Protocol for Sodium***

Each community system will sample each of its active sources at the entry point of the source into the distribution system, following any treatment provided to one or more sources of water, as follows:

Surface water sources shall be sampled during the months of January, February, and March of each calendar year:

Six consecutive biweekly samples may be composited into a single sample. Compositing must be done at the laboratory. (Groundwater sources, shall be sampled annually during the months of March or April.

Samples shall be analyzed for sodium. Results shall be reported to the Director within ten (10) days after determination. when the result of any sample equals or exceeds a sodium level of 100 mg/l, measured as sodium, the water purveyor shall initiate a public notice within fourteen (14) days in a manner approved by the Director.

(s) ***Analytical Techniques*** - Inorganic chemical analyses shall be made in accordance with Appendix 1 of these regulations.

(t) ***BAT for Inorganic Contaminants***

The following are hereby identified as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for inorganic contaminants identified in this section, except fluoride:

BAT For Inorganic Contaminants	
CHEMICAL NAME	**BAT(S)**
Antimony	2,7
Asbestos	2,3,8
Barium	5,6,7,9
Beryllium	1,2,5,6,7
Cadmium	2,5,6,7
Chromium	2,5,6[2],7
Cyanide	5,7,10
Mercury	2[1],4,6[1],7[1]
Nickel	5,6,7
Nitrate	5,7,9
Nitrite	5,7
Selenium	1,2[3],6,7,9
Thallium	1,5

BAT only if influent Hg concentrations <10µg/1.

[2]BAT for Chromiuym III only.

[3]BAT for Selenium IV only.

Key to BATS in Table

1=Activated Alumina
2=Coagulation/Filtration (not BAT for systems <500 service connections)
3=Direct and Diatomite Filtration
4=Granular Activated Carbon
5=Ion Exchange
6=Lime Softening (not BAT for systems <500 service connections)
7=Reverse Osmosis
8=Corrosion Control
9=Electrodialysis

10=Chlorine
11=Ultraviolet

16.2 *Organic Chemicals*

(a) Maximum contaminant levels for organic contaminants

Contaminant	***MCL (mg/l)***
Alachlor	0.002
Aldicarb	reserved
Aldicarb sulfoxide	reserved
Aldicarb sulfone	reserved
Altrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dibromochloropropane	0.0002
2,4-D	0.07
Ethylene dibromide	0.00005
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Polychlorinated biphenyls	0.0005
Pentachlorophenol	0.001
Toxaphene	0.003
2,4,5-TP	0.05
Benzo[a]pyrene	0.0002
Dalapon	0.2
Di(2-ethylhexyl) adipate	0.4
Di(2-ethylhexyl) phthalate	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1

Contaminant	*MCL (mg/l)*
Endrin	0.002
Glyphosate	0.7
Hexacholorbenzene	0.001
Hexachlorocyclopentadiene	0.05
Oxamyl (Vydate)	0.2
Picloram	0.5
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	$3x10^{-8}$
Total Trihalomethanes	0.1

(the sum of the concentrations of bromodichloromethane, dibromochloromethane, tribromomethane (bromoform) and trichloromethane (chloroform))

Analysis of the contaminants listed in 16.2 (a) for the purposes of determining compliance with the maximum contaminant level shall be conducted as follows except that monitoring for the contaminants aldicarb, aldicarb sulfoxide, and aldicarb sulfone shall be conducted in accordance with section 16.7:

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

(2) 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.

Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

(3) 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 if being used).

(4) ***Monitoring frequency:***

(i) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 16.2 (a) during each compliance period beginning with the initial compliance period.

(ii) 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.

(iii) 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.

(5) Each community and non-transient non-community water system may apply to the Director for a waiver from the requirement of paragraph (h) (4) of this section. A system must reapply for a waiver for each compliance period.

(6) The Director may grant a waiver after evaluating the following factor(s): Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone of influence of the system. If a determination by the Director reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted. If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

(i) Previous analytical results.

(ii) 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, or from hazardous and municipal waste landfills and other waste handling or treatment facilities. Non-point sources include the use of pesticides to control insect and weed pests on agricultural areas, forest lands, home and gardens, and other land application uses.

(iii) The environmental persistence and transport of the pesticide or PCBs.

(iv) How well the water source is protected against contamination due to such factors as depth of the well and the type of soil and the integrity of the well casing.

(v) Elevated nitrate levels at the water supply source.

(vi) Use of PCBs in equipment used in the production, storage, or distribution of water (i.e., PCBs used in pumps, transformers, etc.).

(7) If an organic contaminant listed in 16.2 (a) is detected (as defined by paragraph (a) (18) of this section) in any sample, then:

(i) Each system must monitor quarterly at each sampling point which resulted in a detection.

(ii) The Director may decrease the quarterly monitoring requirement specified in paragraph (a) (7) (I) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Director 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.

(iii) After the Director determines the system is reliably and consistently below the maximum contaminant level the Director may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter that previously yielded the highest analytical result.

(iv) Systems which have 3 consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in paragraph (a) (6) of this section.

(v) If monitoring results in detection of one or more of certain related contaminants (aldicarb, aldicarb sulfone, aldicarb sulfoxide and heptachlor, heptachlor epoxide), than subsequent monitoring shall analyze for all related contaminants.

(8) Systems which violate the requirements of 16.2 (a) as determined by paragraph (a) (11) of this section must monitor quarterly. After a minimum of four quarterly samples show the system is in compliance and the Director determines the system is reliably and consistently below the MCL, as specified in paragraph (a) (11) of this section, the system shall monitor at the frequency specified in paragraph (a) (7) (iii) of this section.

(9) The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result must be averaged with the first sampling result and the average used for the compliance determination as specified by paragraph (a) (11) of this section. The Director has discretion to delete results of obvious sampling errors from this calculation.

(10) The Director 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. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.

(i) If the concentration in the composite sample is greater than or equal to 0.0005 mg/l for any contaminant listed in section 16.2(a), then a follow-up sample must be taken within 14 days at each sampling point included in the composite and be analyzed for that contaminant.

(ii) 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 Director within 14 days of collection.

(iii) If the population served by the system is > 3,300 persons, then compositing may only be permitted by the Director at sampling points within a single system. In systems serving less than or equal to 3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.

(11) Compliance with 16.2 (a) shall be determined based on the analytical results obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately. Any samples below the detection limit shall be calculated as zero for purposes of determining the annual average.

(ii) 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. If a confirmation sample is required by the Director, the determination of compliance will be based on the average of two samples.

(iii) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only that portion of the system which is out of compliance.

(12) Analysis for the contaminants listed in 16.2 (a) shall be conducted using the EPA methods or their equivalent as approved by EPA and as described in Appendix 1.

(13) If monitoring data collected after January 1, 1990, are generally consistent with the requirements of 16.2 (a) then the Director may allow systems to use that data to satisfy the monitoring requirement for the initial compliance period.

(14) The Director 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).

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

(16) Each public water system shall monitor at the time designated by the Director within each compliance period.

(17) Detection as used in this paragraph shall be defined as greater than or equal to the following concentrations for each contaminant.

Contaminant	*Detection limit (mg/l)*
Alachlor	0.0002
Aldicarb	.0005
Aldicarb sulfoxide	.0005
Aldicarb sulfone	.0008
Atrazine	.0001 .
Benzo[a]pyrene	.00002
Carbofuran	.0009
Chlordane	.0002
Dalapon	.001
Dibromochloropropane (DBCP)	.00002
Di (2-ethylhexyl) adipate	.0006
Di (2-ethylhexyl) phthalate	.0006
Dinoseb	.0002
Diquat	.0004
2,4-D	.0001
Endothall	.009
Endrin	.00001
Ethylene dibromide (EDB)	.00001
Glyphosate	.006
Heptachlor	.00004
Heptachlor epoxide	.00002
Hexachlorobenzene	.0001
Hexachlorocyclopentadiene	.0001
Lindane	.00002
Methoxychlor	.0001
Oxamyl	.002
Picloram	.0001
Polychlorinated biphenyis (PCBs) (as decachlorobiphenyl)	.0001
Pentachlorophenol	.00004
Simazine	.00007
Toxaphene	.001
2,3,7,8-TCDD (Dixon)	.000000005
2,4,5-TP (Silvex)	.0002

(18) Notwithstanding paragraphs (1) through (17) of this section, monitoring for endrin and total trihalomethanes shall be as stipulated here.

Monitoring Frequency - Each active drinking water source maintained by a water purveyor shall be analyzed or, endrin at least once every three (3) years.

Water systems which practice disinfection of the water shall be monitored for total trihalomethanes.

Water systems serving less than 10,000 people shall be monitored for total trihalomethanes at the discretion of the Director. Water systems serving at least 10,000 people shall be monitored in the following manner:

i) a minimum of four (4) samples per quarter per treatment plant collected on the same day shall be analyzed. Twenty-five percent (25%) of the samples shall reflect maximum storage time of the water in the distribution system while seventy-five (75%) percent shall be collected at representative points in the system. The results of all samples analyzed in any calendar quarter shall be averaged;

ii) compliance with the maximum contaminant level for total trihalomethanes shall be based on the average of the findings in any four (4) consecutive calendar quarters. Based on a history of low trihalomethanes, the Director may grant a reduction in monitoring frequency to one sample per treatment plant per quarter collected at a point which reflects maximum storage time of the water in the distribution system;

iii) additional monitoring shall be required whenever there is reason to believe an organic chemical maximum contaminant level is or may be exceeded.

(19) ***Analytical Techniques*** - Trihalomethane analyses shall be made in accordance with Appendix 1.

16.2 (b) ***Volatile Organic Chemicals***

Maximum contaminant levels for certain volatile organic chemicals:

Contaminant	***MCL (mg/l)***
(1) Vinyl Chloride	0.002
(2) Benzene	0.005
(3) Carbon Tetrachloride	0.005
(4) 1,2-Dichloroethane	0.005
(5) Trichloroethylene	0.005
(6) p-Dichlorobenzene	0.075
(7) 1,1-Dichloroethylene	0.007
(8) 1,1,1-Trichloroethane	0.2
(9) cis-1,2-Dichloroethylene	0.07
(10) 1,2-Dichloropropane	0.005
(11) Ethylbenzene	0.7
(12) Monochlorobenzene	0.1
(13) o-Dichlorobenzene	0.6
(14) Styrene	0.1
(15) Tetrachloroethylene	0.005
(16) Toluene	1
(17) trans-1,2-Dichloroethylene	0.1
(18) Xylenes (total)	10
(19) Dichloromethane	0.005
(20) 1,2,4-Trichlorobenzene	.07
(21) 1,1,2-Trichloroethane	.005

Beginning with the initial compliance period, analysis of the contaminants listed in 16.2 (b) (1) through (21) for the purpose of determining compliance with the maximum contaminant level shall be conducted as follows:

(22) 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). Each sample must be taken at the same sampling point unless conditions make another sampling point more representative of each source, treatment plant, or within the distribution system.

(23) Surface water systems (or combined surface/ground) 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, treatment plant, or within the distribution system.

(24) 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 if being used).

(25) Each community and non-transient non-community water system shall take four consecutive quarterly samples for each contaminant listed in 16.2 (b) (2) through (21) during each compliance period, beginning in the initial compliance period.

(26) If the initial monitoring for contaminants listed in 16.2 (b) (1) through (8) and the monitoring for the contaminants listed in 16.2 (b) (9) through (21) as allowed in paragraph 16.2 (b) (37) has been completed by December 31, 1992, and the system did not detect any contaminant listed in 16.2 (b) (1) through (21), than each ground and surface water system shall take one sample annually beginning with the initial compliance period.

(27) After a minimum of three years of annual sampling, the Director may allow groundwater systems with no previous detection of any contaminant listed in 16.2 (b) to take one sample during each compliance period.

(28) Each community and non-transient groundwater system which does not detect a contaminant listed in 16.2 (b) (1) through (21) may apply to the Director for a waiver from the requirements of paragraphs (26) and (27) of this section after completing the initial monitoring. (For the purposes of this section, detection is defined as greater than or equal to 0.0005 mg/l.) A waiver shall be effective for no more than six years (two compliance periods). The Director may also issue waivers to small systems for the initial round of monitoring for 1,2,4-trichlorobenzene.

(29) The Director may grant a waiver after evaluating the following factor(s):

(i) Knowledge of previous use (including transport, storage, or disposal) of the contaminant within the watershed or zone influence of the system. If a determination by the Director reveals no previous use of the contaminant within the watershed or zone of influence, a waiver may be granted.

(ii) If previous use of the contaminant is unknown or it has been used previously, then the following factors shall be used to determine whether a waiver is granted.

(A) Previous analytical results.

(B) 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, or from hazardous and municipal waste landfills and other waste handling or treatment facilities.

(C) The environmental persistence and transport of the contaminants.

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

(E) How well the water source is protected against contamination, such as whether it is a surface or groundwater system. Groundwater systems must consider factors such as depth of the well, the type of soil, and wellhead protection. Surface water systems must consider watershed protection.

(30) As a condition of the waiver 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 its vulnerability assessment considering the factors listed in paragraph (29) of this section. Based on this vulnerability assessment the Director must reconfirm that the system is non-vulnerable. If the Director 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 (26) of this section.

(31) Each community and non-transient surface water system which does not detect a contaminant listed in 16.2 (b) (1) through (21) may apply to the Director for a waiver from the requirements of (26) of this section after completing the initial monitoring. 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. Systems meeting this criterion must be determined by the Director to be non-vulnerable based on a vulnerability assessment during each compliance period. Each system receiving a waiver shall sample at the frequency specified by the Director (if any).

(32) If a contaminant listed in 16.2 (b) (2) through (21) is detected at a level exceeding 0.0005 mg/l in any sample, then:

(i) The system must monitor quarterly at each sampling point which resulted in a detection.

(ii) The Director may decrease the quarterly monitoring requirement specified in paragraph (32) (I) of this section provided it has determined that the system is reliably and consistently below the maximum contaminant level. In no case shall the Director 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.

(iii) If the Director determines that the system is reliably and consistently below the MCL, the Director may allow the system to monitor annually. Systems which monitor annually must monitor during the quarter(s) which previously yielded the highest analytical result.

(iv) Systems which have three consecutive annual samples with no detection of a contaminant may apply to the Director for a waiver as specified in paragraph (28) of this section.

(v) Groundwater systems which have detected one or more of the following two-carbon organic compounds: trichloroethylene, tetrachloroethylene, 1,2-dichloroethane, 1,1,1-trichloroethane, cis-1,2-dichloroethylene, trans-1,2-dichloroethylene, or 1,1-dichloroethylene shall monitor quarterly for vinyl chloride. A vinyl chloride sample shall be taken at each sampling point at which one or more of the two carbon organic compounds was detected. If the results of the first analysis do not detect vinyl chloride, the Director may reduce the quarterly monitoring frequency of vinyl chloride monitoring to one sample during each compliance period. Surface water systems are required to monitor for vinyl chloride as specified by the Director.

(33) Systems which violate the requirements of 16.2 (b) (1) through (21), as determined by paragraph (36) 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 (36) of this section the system and the Director determines the system and the Director determines that the system is reliably and consistently below the maximum contaminant level, the system may monitor at the frequency and time specified in paragraph (32) (iii) of this section.

(34) The Director may require a confirmation sample for positive or negative results. If a confirmation sample is required by the Director, the result must be average with the first sampling result and the average is used for the compliance determination as specified by paragraph (36). The Director has discretion to delete results of obvious sampling errors from this calculation.

(35) The Director 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. Compositing of samples must be done in the laboratory and analyzed within 14 days of sample collection.

(i) If the concentration in the composite sample detects one or more contaminants listed in section 16.2 (b), then a follow-up sample must be taken within 14 days at each sampling point included in the composite, and be analyzed for that contaminant.

(ii) 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.

(iii) If the populations served by the system is >3,300 persons, then compositing may only be permitted by the Director at sampling points within a single system. In systems serving ≤ 3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.

(36) Compliance with 16.2 (b) (1) through (21) shall be determined based on the analytical results obtained at each sampling point.

(i) For systems which are conducting monitoring at a frequency greater than annual, compliance is determined by a running annual average of all samples taken at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is out of compliance. If the initial sample or a subsequent sample would cause the annual average to be exceeded, then the system is out of compliance immediately.

(ii) If monitoring if 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. If a confirmation sample is required by the Director, the determination of compliance will be based on the average of two samples.

(iii) If a public water system has a distribution system separable from other parts of the distribution system with no interconnections, the Director may allow the system to give public notice to only that area served by that portion of the system which is out of compliance.

(37) Analysis for the contaminants listed in 16.2 (b) (1) through (21) shall be conducted using EPA methods or their equivalent as approved by EPA and as specified in Appendix 1.

(38) The Director may allow the use of monitoring data collected after January 1, 1988, for purposes of initial monitoring compliance. If the data are generally consistent with the other requirements in this section, the Director may use these data (i.e., a single sample rather than four quarterly samples) to satisfy the initial monitoring requirement of paragraph (4) of this section. Systems which use grand fathered samples and did not detect any contaminant listed in 16.2 (b) (1) through (21) shall begin monitoring annually in accordance with paragraph (26) of this section beginning with the initial compliance period.

(39) The Director may increase required monitoring where necessary to detect variations within the system.

(40) Each public water system shall monitor at the time designated by the Director within each compliance period.

(41) Reserved.

(42) Bottled water may be used on a temporary basis to avoid an unreasonable risk to health. If bottled water is used, it must be obtained from an approved source. Public water systems shall not use bottled water to achieve compliance with a maximum contaminant level listed in Section (b) unless required by the Director as a condition for granting an exemption and providing there are reasonable assurances that the bottled water will not exceed maximum contaminant levels.

(43) Compliance with a maximum contaminant level shall be achieved by installation of central treatment using BAT as stipulated in section (c). Point-of-use or point of entry devices may be used only as a condition for obtaining a variance from the requirement for adoption of central treatment providing the devices and a monitoring plan for their maintenance are approved by the Director prior to their installation, and that every building connected to the water system has a device installed, maintained and adequately monitored by the public water system.

(44) Reserved.

16.2 (c) ***BAT for Organic Contaminants***

The following table identifies granular activated carbon (GAC), packed tower aeration (PTA), or oxidation (OX) as the best technology, treatment technique, or other means available for achieving compliance with the maximum contaminant level for organic contaminants identified in paragraphs (a) and (b) of this section:

BAT for Organic Contaminants Listed in Sections 16.2(a) and (b)

CAS No.	CONTAMINANT	GAC	PTA	OX
15972-60-8	Alachlor	X	.....	.....
116-06-3	Aldicarb	X	.....	.....
1646-88-4	Aldicarb sulfone	X	.....	.....
1646-87-3	Aldicarb sulfoxide	X	.....	.....
1912-24-9	Atrazine	X	.....	.....
71-43-2	Benzene	X	X	.....
50-32-8	Benzo[a]pyrene	X	.....	.....
1563-66-2	Carbofuran	X	.....	.....
56-23-5	Carbon tetrachloride	X	X	.....
57-74-9	Chlordane	X	.....	.....
75-99-0	Dalapon	X	.....	.....
94-75-7	2,4-D	X	.....	.....
103-23-1	Di(2-ethylhexyl) adipate	X	X	.....
117-81-7	Di (2-ethylhexyl) phthalate	X	.....	.....
96-12-8	Dibromochloropropane (DBCP)	X	X	.....
95-50-1	o-Dichlorobenzene	X	X	.....
106-46-7	para-Dichlorobenzene	X	X	.....
107-06-2	1,2-Dichloroethane	X	X	.....
75-35-4	1,1-Dichloroethylene	X	X	.....
156-59-2	cis-1,2-Dichloroethylene	X	X	.....
156-60-5	trans-1,2-Dichloroethylene	X	X	.....
75-09-2	Dichloromethane	.....	X	.....
78-87-5	1,2-Dichloropropane	X	X	.....
88-85-7	Dinoseb	X	.....	.....
85-00-7	Diquat	X	.....	.....
145-73-3	Endothall	X	.....	.....
72-20-8	Endrin	X	.....	.....
100-41-4	Ethylbenzene	X	X	.....
106-93-4	Ethylene Dibromide (EDB)	X	X	.....

CAS No.	CONTAMINANT	GAC	PTA	OX
1071-83-6	Gylphosate	.....	.....	X
76-44-8	Heptachlor	X	.....	.....
1024-57-3	Heptachlor epoxide	X	.....	.....
118-74-1	Hexachlorobenzene	X	.....	.....
77-47-3	Hexachlorocyclopentadiene	X	X	.....
58-89-9	Lindane	X	.....	.....
72-43-5	Methoxychlor	X	.....	.....
108-90-7	Monochlorobenzene	X	X	.....
23135-22-0	Oxamyl (Vydate)	X	.....	.....
87-86-5	Pentachlorophenol	X	.....	.....
1918-02-1	Picloram	X	.....	.....
1336-36-3	Polychlorinated biphenyls (PCB)	X	.....	.....
122-34-9	Simazine	X	.....	.....
100-42-5	Styrene	X	X	
1746-01-6	2,3,7,8-TCDD (Dioxin)	X	.....	.....
127-18-4	Tetrachloroethylene	X	X	.....
108-88-3	Toluene	X	X	.....
8001-35-2	Toxaphene	X	.....	.....
93-72-1	2,4,5-TP (Silvex)	X	.....	.....
120-82-1	1,2,4-Trichlorobenzene	X	X	.....
71-55-6	1,1,1-Trichloroethane	X	X	.....
79-00-5	1,1,2-Trichloroethane	X	X	.....
79-01-6	Trichloroethylene	X	X	.....
75-01-4	Vinyl chloride	.....	X	.....
1330-20-7	Xylene	X	X	.....

d) Treatment techniques for acrylamide and epichlorohydrin.

Each public water system must certify annually in writing to the Director (using third party or manufacturer's certification) that when acrylamide and epichlorohydrin are used in drinking water systems, the combination (or product) of dose and monomer level does not exceed the levels specified as follows:

Acrylamide = 0.05% dosed at 1 ppm (or equivalent)

Epichlorohydrin = 0.01% dosed at 20 ppm (or equivalent)

Certifications can rely on manufacturers or third parties, as approved by the Director.

16.3 ***Turbidity***

a) ***Applicability -*** The maximum contaminant level for turbidity applies only to surface water sources. The turbidity of the water shall be determined and recorded daily by the water purveyor and measured at a representative entry point into the distribution system.

The requirements in section 16.3(a) and (b) apply to unfiltered systems until December 30, 1991 unless the Director has determined prior to that date, in writing pursuant to Section 5 that filtration is required. The requirements in this section apply to filtered systems until June 29, 1993. The requirements in this section apply to unfiltered systems that the Director has determined in writing pursuant to Section 5 must install filtration, until June 29, 1993 or until filtration is installed, whichever is later.

b) ***Maximum Contaminant Level for Turbidity*** - The maximum contaminant level for turbidity shall not exceed a monthly average of 1 turbidity unit (TU). A turbidity monthly average of two (2) turbidity units may be acceptable provided it is demonstrated the higher turbidities did not interfere with disinfection, and a residual disinfection was maintained throughout the distribution system and did not interfere with microbiological determinations. An average of five (5) turbidity units shall not be exceeded for any 2 consecutive days.

c) ***Analytical Techniques*** - Turbidity measurements shall be made in accordance with Appendix 1.

d) A public water system that uses surface water or ground water under the direct influence of surface water, as defined in Section 1 and does not practice filtration in compliance with Section 5.4, must collect at least one sample near the first service connection each day the turbidity level of the source water measured as specified in Section 5, exceeds 1 NTU. This sample must be analyzed for the presence of total coliforms. 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 excedence, unless the Director determines that the system, for logistical reasons outside of the system's control cannot have the sample analyzed within 30 hours of collection. Sample results from this coliform monitoring must be included in determining compliance with the MCL for total coliforms in Section 16.4 c).

16.4 ***Microbiological***

a) ***Routine Monitoring:*** Community water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample siting plan. These plans are subject to the Director's review and revision.

The monitoring frequency for total coliforms for community water systems is based on the population served by the system as follows:

Total Coliform Monitoring Frequency For Community Water Systems	
Population Served	***Minimum Number of Samples per Month***
25 to 1,000[1]	1
1,001 to 2,500	2
2,501 to 3,300	3
3,301 to 4,100	4
4,101 to 4,900	5
4,901 to 5,800	6
5,801 to 6,700	7
6,701 to 7,600	8
7,601 to 8,500	9
8,501 to 12,900	10
12,901 to 17,200	15
17,201 to 21,500	20
21,501 to 25,000	25
25,001 to 33,000	30
33,001 to 41,000	40
41,001 to 50,000	50
50,001 to 59,000	60
59,001 to 70,000	70
70,001 to 83,000	80
83,001 to 96,000	90
96,001 to 130,000	100
130,001 to 220,000	120
220,001 to 320,000	150
320,001 to 450,000	180
450,001 to 600,000	210
600,001 to 780,000	240
780,001 to 970,000	270
970,001 to 1,230,000	300
1,230,001 to 1,520,000	330

Population Served	*Minimum Number of Samples per Month*
1,520,001 to 1,850,000	360
1,850,001 to 2,270,000	390
2,270,001 to 3,020,000	420
3,020,001 to 3,960,000	450
3,960,001 or more	480

[1] Includes public water systems which have at least 15 service connections, but serve fewer than 25 persons.

1) The Director may reduce the monitoring frequency of a community water system serving 25-1000 persons in a written directive to not less than one sample per quarter if:

   i) A sanitary survey conducted in the past five years shows that the system is supplied solely by a protected ground water source and is free of sanitary defects, and

   ii) Said water system has no history of total coliform contamination in its current configuration.

2) The public water system must collect samples at regular time intervals throughout the month, *EXCEPT:* a system which uses groundwater not under the direct influence of surface water as determined by the Director, and serves 4,900 persons or less, may collect all required samples on a single day, if they are taken from different sites.

3) A public water system that uses surface water or ground water under the direct influence of surface water, as determined by the Director, and does not practice filtration in compliance with Section 5 must:

   i) collect at least one sample near the first service connection each day the turbidity level exceeds 1 NTU. This sample must be analyzed for the presence of total coliforms.

   ii) When one or more turbidity measurements exceed 1 NTU, the system must collect the coliform sample within 24 hours of the first exceedence unless the Director determines that the system for logistical reasons outside the system's control cannot have the sample analyzed within 30 hours of collection. Sample results must be included in determining compliance with the MCL for total coliforms, as indicated in section 16.4 c).

b) ***Analytical Methodology*** - Coliform organism examinations shall be made in accordance with Appendix 1.

1) the standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 ml.

2) public water systems need only determine the presence or absence of total coliforms: a determination of total coliform density is not required

3) If any routine or repeat sample is total coliform positive, the system must analyze the culture medium to determine if fecal coliforms are present. The system may test for E. Coli in lieu of fecal coliforms.

The Director 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 Director as specified in paragraph (e) of this section and the provisions of 16.4 c) 6) c) apply.

c) ***Maximum Contaminant Levels (MCLs) for Microbiological Contaminants***:

1) The goal for total Coliforms(including fecal coliforms and Eschereichia coli) is ZERO

2) The following constitute the best technology treatment techniques, or other means available for achieving compliance with the MCL:

A) Protection of wells from contamination by coliforms by appropriate placement and construction;

B) Maintenance of a disinfectant residual throughout the distribution system;

C) Proper maintenance of the distribution system;

D) Filtration and/or disinfection of surface water as described in Section 5; and

E) The development and implementation of an approved wellhead protection program, or watershed protection plan, if applicable.

3) The MCL is based on the presence or absence of total coliforms in a sample, rather than coliform density.

4) 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.

5) Special purpose samples such as those taken to determine disinfection practices, shall not be used to determine compliance with the MCL for total coliforms. Repeat samples must be used in determination of the monthly MCL compliance.

6) The following constitutes a violation of the MCL for total coliforms:

A) If a system collects at least 40 samples per month, the system is not in compliance with the MCL for total coliforms if more than 5.0 per cent of the samples collected during the month are total coliform positive.

B) If a system collects less than 40 samples per month, the system is not in compliance with the MCL for total coliforms if more than ONE sample is total coliform positive.

C) *If any repeat sample is fecal coliform or E.coli positive.

D) *If any repeat sample is total coliform positive following a fecal coliform or E.Coli positive routine sample.

*For purposes of public notification, this is a violation that may pose an acute health risk.

7) The Director must be notified of any total coliform MCL violation by the end of the day on which the system learns of the violation or by the end of the next business day if state offices are closed.

d) ***Repeat monitoring:*** If a routine sample is total coliform-positive, the public water system must collect a set of repeat samples for each total coliform positive within 24 hours of being notified of the positive result as follows:

1) > 1 routine sample/month: 3 repeat samples

(Total volume collected must be at least 300 ml)

2) 1 or < 1 routine sample/month: 4 repeat samples (Total volume collected must be at least 400 ml)

3) The Director may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of an extension, the Director will specify how much time the system has to collect the repeat samples.

4) At least one repeat sample must be collected from the sampling tap where the original positive sample was taken; at least one repeat sample within 5 service connections upstream; and one repeat sample within 5 service connections

downstream. If a total coliform-positive sample is at the end of the distribution system, or one away from the end of the distribution system, the Director may waive the requirement to collect at least one repeat sample upstream or downstream of the original sampling site.

5) These repeat samples must be collected on the same day, except that the Director may allow a system with a single service connection to collect the required set of repeat samples over a four-day period or to collect a larger volume 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/month).

6) If one or more repeat sample in the set is total coliform-positive, the public water system must collect an additional set of repeat samples as described in this section. 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 has been exceeded and notifies the Director.

7) Results of all routine and repeat samples not invalidated by the Director must be included in determining compliance with the MCL for total coliforms in Section 16.4 c).

8) Any system collecting fewer than five routine samples per month must collect at least five samples during the month following repeat sampling for total coliform positive samples. The Director can waive this requirement on a case by case basis.

   A) The Director may waive the requirement to collect five routine samples the next month the system provides water to the public if the Director performs a site visit before the end of the next month the system provides water to the public. Although a sanitary survey need not be performed, the site visit must be sufficiently detailed to allow the Director to determine whether additional monitoring and/or any corrective action is needed.

   B) The Director may waive the requirement to collect five routine samples the next month the system provides water to the public if the Director has determined in writing 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. 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. The Director will not 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. Under this paragraph, 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 it to determine compliance with the MCL for total coliforms in section 16.4.

e) ***Fecal Coliforms/E.coli Testing****:*

If any routine or repeat sample is total coliform positive, the system must analyze the culture medium to determine if fecal coliforms are present. The system may test for E. Coli in lieu of fecal coliforms. If either are present, the system must notify the Director by the end of that day or the next business day if state offices are closed.

16.4 F) ***Invalidation of Samples***

1) A total coliform sample invalidated under this paragraph does not count towards meeting the minimum monitoring requirements of this section.

2) The Director will invalidate a total coliform-positive sample and document same in writing only if:

i) The laboratory establishes that improper sample analysis caused the total coliform-positive result,

ii) The Director determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem.

iii) The Director has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. (In this case, the system must still collect all repeat samples required.

3) A total coliform-positive sample will not be invalidated solely on the grounds that all repeat samples are total coliform negative.

4) A laboratory must invalidate a total coliform sample, unless total coliforms are detected, if

i) the sample produces a turbid culture in the absence of gas production using the method cited in section 16.4 b) 4) a);

ii) the sample produces a turbid culture in the absence of an acid reaction; using the method cited in section 16.4 b) 4) c).

iii) it exhibits confluent growth , or produces colonies too numerous to count, using the method cited in section 16.4 b) 4) b).

5) If a laboratory invalidates a sample for the above reasons, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the result. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The Director may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of a extension, the Director will specify how much time the system has to collect the repeat samples.

16.4 G) ***Sanitary Surveys:***

1) Public water systems which do not collect five or more routine samples/month must undergo an initial sanitary survey by June 29, 1994 for community public water systems and June 29, 1999 for non-community water systems. Thereafter, systems must undergo another sanitary survey every five years, except that non-community water systems using only protected and disinfected ground water as defined by the Director must undergo subsequent sanitary surveys at least every ten years after the initial sanitary survey.

2) Public water systems are responsible for making all necessary facilities, personnel and records available so that a sanitary survey may be completed.

3) Deficiencies listed in a sanitary survey are considered to be unsafe conditions and must be addressed as provided for in Section 10 of these regulations.

16.4 h) ***Reporting Requirements:***

1) The supplier of water must report to the Director any failure to comply with any drinking water regulation within 48 hours, except where different reporting is specified in these regulations.

2) A public water system which has exceeded the MCL for total coliforms must report the violation to the Director no later than the end of the next business day, and notify the public in accordance with Section 16.8.

3) A public water system which has failed to comply with a coliform monitoring requirement, including the sanitary survey must report the monitoring violation to the Director within ten days after the system discovers the violation, and notify the public in accordance with Section 16.8.

16.5 ***Radioactivity***

(a) ***Monitoring Frequency***--monitoring requirements for gross alpha particle activity, radium 226 and radium 228. Each source of a community water system shall be analyzed for

gross alpha particle activity once every four (4) years following initial sampling. Initial sampling shall be conducted on a schedule prescribed by the Director.

(1) ***Initial sampling***--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.

(i) When the gross alpha particle activity exceeds 5 pCi/l, the same or equivalent sample shall be analyzed for radium 226. If the concentration of radium 226 exceeds 3 pCi/l, the same or an equivalent sample shall be analyzed for radium 228. If the gross alpha particle activity is 5 pCi/l or less, there is no need to analyze for radium 226 and radium 228.

(ii) For the initial analysis required by paragraph (a)(1) of this section, data acquired prior to the effective date of this part may be substituted at the discretion of the Director.

(2) Community water systems shall monitor at least once every four years following the procedure required by paragraph (a)(1) of this section. At the discretion of the Director, when the existing sampling history taken in conformity with paragraph (a)(1) of this section has established that the annual concentration is less than half of the maximum contaminant level (MCL), analysis of a single sample may be substituted for the quarterly sampling procedure required by paragraph (a)(1) of this section.

(i) More frequent monitoring shall be conducted when ordered by the Director.

(ii) A supplier of water shall monitor in conformity with paragraph (a)(1) of this section, in a schedule specified by the Director, when a new source is introduced for a community water system. More frequent monitoring shall be conducted when ordered by the Director 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.

(iii) 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 in the distribution system, when ordered by the Director.

(iv) Suppliers of water shall conduct annual monitoring of any community water in which the radium 226 concentration exceeds 3 pCi/l, when ordered by the Director.

(3) If the average annual maximum contaminant level for gross alpha particle activity or total radium as set forth in paragraph (b) of this section is exceeded, the supplier of the community water system shall give notice to the Director pursuant to section 11.0 of the regulations and notify the public as required by section 16.8. Monitoring at quarterly intervals shall be continued until the average concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(b) ***Maximum Contaminant Level for Gross Alpha Particle Activity and Radium 226 and 228***

Contaminant	***Picocuries per Liter(pCi/l)***
Radium 226 and Radium 228 Combined	5
Gross alpha particle activity	15

(c) ***Maximum Contaminant Level for Manmade Beta Particle and Photon Emitters*** - The average annual concentration of manmade beta particle and photon emitters s hall not meet or exceed an annual dose equivalent of 4 millirems/year.

(1) Systems using surface water sources and serving more than 100,000 persons and such other community water systems as are designated by the Director shall be monitored for compliance. Initial sampling shall be a composite of four consecutive quarterly samples or analysis of four quarterly samples. Compliance is assumed without further analysis if the average annual concentration of gross beta particle activity is less than 50 pCi/l and if the annual concentrations of tritium and strontium 90 are less than those listed in Table "A", provided that if both radionuclides are present the sum of their annual dose equivalents to bone marrow shall not exceed 4 millirem/year.

(i) 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 with (c)(1).

TABLE "A"

Average Annual Concentrations Assumed to Produce a Total Body or Organ Dose of 4 millirem/year

Radionuclide	**Critical Organ**	**pCi/l**
tritium	total body	20,000
strontium	bone marrow	8

(ii) Suppliers of water shall conduct additional monitoring, as ordered by the Director, to determine the concentration of man-made radioactivity in principal watersheds designated by the Director.

(iii) At the discretion of the Director, suppliers of water utilizing only ground water may be required to monitor for man-made radioactivity.

(2) After the initial analysis required by paragraph (c)(1) of this section suppliers of water shall monitor at least every four years following the procedure given in paragraph (b)(1) of this section.

At the discretion of the Director, when the existing sampling history taken in conformity with paragraph (c)(1) of this section has established that the annual concentration is less than half of the MCL, analysis of a single sample may be substituted for the quarterly sampling procedure required in paragraph (c)(1) of this section.

(3) If the average annual maximum contaminant level for man-made radioactivity set forth in section 16.5(c)(1) is exceeded, the operator of a community water system shall give notice to the Director pursuant to section 11.0 and to the public as required by section 16.8. Monitoring at monthly intervals shall be continued until the concentration no longer exceeds the maximum contaminant level or until a monitoring schedule as a condition to a variance, exemption or enforcement action shall become effective.

(d) ***Analytical Techniques*** **-** Analyses to determine compliance with the radioactivity requirements shall be made in accordance with the methods specified in Appendix 1.

(e) Where monitoring results exceed the MCLs specified in paragraphs 16.5(b) or (c) of this section, compliance shall be achieved by installation of central treatment which is approved by the Director. Point of use or point of entry devices may be used only as a condition of a variance from this paragraph and only if a plan for their maintenance and operation is approved by the Director and every building connected to the water system has a device installed and adequately monitored by the public water system.

16.6 ***Unregulated Contaminants:*** Community water systems shall monitor for the following volatile organic contaminants:

(1) Chloroform
(2) Bromodichloromethane
(3) Chlorodibromomethane
(4) Bromoform
(5) Dibromomethane
(6) m-Dichlorobenzene
(8) 1,1-Dichloropropene

(9) 1,1-Dichloroethane
10) 1,1,2,2-Tetrachloroethane
(11) 1,3-Dichloropropane
(12) Chloromethane
(13) Bromomethane
(14) 1,2,3-Trichloropropane
(15) 1,1,1,2-Tetrachloroethane
(16) Chloroethane
(17) 2,2-Dichloropropane
(18) o-Chlorotoluene
(19) p-Chlorotoluene
(20) Bromobenzene
(21) 1,3-Dichloropropene

(a) ***Monitoring Frequency*** - Effective January 8, 1999 only community systems serving more than 10,000 persons must comply with section 16.6 herein._Each active drinking water source maintained by a water purveyor shall be analyzed for the unregulated contaminants listed in this section. Systems must sample at each entry point to the distribution system and after any treatment provided to the sources of water. Each entry point must be sampled for four (4) consecutive quarters at least once every five (5) years for each surface water source and at least one sample per entry point to the distribution system every five (5) years for each groundwater source beginning no later than January 1, 1989 for water systems serving 3,300 or more persons, and no later than January 1, 1991 for water systems serving less than 3300 persons.

(b) ***Notification*** - Upon completion of the sampling required under this section, the water purveyor shall notify persons served by the system of the availability of the analytical results and shall identify a person and telephone number to contact for information regarding these results. The notification shall be performed by either a notice in the first set of water bills issued by the system after the receipt of the results or written notice within three (3) months.

(c) ***Analytical Techniques*** - Analyses shall be conducted in accordance with Appendix 1 and only by a laboratory certified by EPA or the Department of Health to perform volatile organic chemical analyses by the appropriate method.

16.7 Special monitoring for inorganic and organic contaminants*

* Note: Monitoring requirements of section 16.7 were completed as of December 31, 1995.

(a) Monitoring of the contaminants listed in 16.7 (a) (11) and (12) 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) (11) of this section and report the results to the Director. Monitoring must be completed by December 31, 1995.

(2) Each community and non-transient non-community water system shall take one sample at each sampling point for each contaminant listed in paragraph (a) (12) of this section and report the results to the Director. Monitoring must be completed by December 31, 1995.

(3) Each community and non-transient non-community water system may apply to the Director for a waiver from the requirements of paragraph (a) (1) and (2) of this section.

(4) The Director may grant a waiver for the requirement of paragraph (a) (1) of this section based on the criteria specified in 16.2(a)(6). The Director may grant a waiver from the requirement of paragraph (a) (2) of this section if previous analytical results indicate contamination would not occur, provided this data was collected after January 1, 1990.

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

(6) 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.

Note: For purposes of this paragraph, surface water systems include systems with a combination of surface and ground sources.

(7) 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).

(8) The Director may require a confirmation sample for positive or negative results.

(9) The Director 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. Compositing of samples must be done in the laboratory and the composite sample must be analyzed within 14 days of collection. If the population served by the system is > 3,300 persons, then

compositing may only be permitted by the Director at sampling points within a single system. In systems serving less than or equal to 3,300 persons, the Director may permit compositing among different systems provided the 5-sample limit is maintained.

(10) 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 Director stating that the system is available for sampling. This letter must be sent to the Director by January 1, 1994. The system shall not send such samples to the Director, unless requested to do so by the Director.

(11) ***List of Unregulated Organic Contaminants:***

Organic contaminants

Aldrin
Butachlor
Carbaryl
Dicamba
Dieldrin
3-Hydroxycarbofuran
Methomyl
Metolachlor
Metribuzin
Propachlor

(12) ***List of Unregulated Inorganic Contaminants:***

Contaminant

sulfate

16.8 ***Public Notification***

a) Any community water system which fails to comply with a maximum contaminant level, treatment technique, or requirements of any schedule prescribed pursuant to a variance or exemption issued under these regulations or has an occurrence of a water-borne disease outbreak shall give notice approved by the Director, to the persons served by the water system in each of the following manners:

(i) publication within 14 days after the violation or failure in a daily or weekly newspaper of general circulation in the area that is served by the system.

(ii) mail delivery or hand delivery within 45 days after the violation or failure or within 72 hours for violations determined by the Director to be acute, and to be repeated every 3 months thereafter for as long as the violation or failure exists. The Director may waive the requirement for mail delivery or hand delivery of the

notice if the violation or failure is corrected within 45 days after the violation or failure.

(iii) furnishing a copy of the notice to radio and television stations serving the area within 72 hours after the violation of the maximum contaminant level for nitrate or nitrite or any maximum contaminant level violation determined by the Director to pose an acute risk to human health.

b) Any community water system which fails to perform monitoring of Unregulated Contaminants required by Section 16.7 of the regulations or any other monitoring requirement of these regulations, or fails to comply with a testing procedure established in these regulations, or is subject to an exemption or variance respecting a maximum contaminant level or any treatment technique requirement applicable to a national primary drinking water regulation, shall notify persons served by the system within three (3) months of the violation or granting of a variance or exemption by publication in a daily or weekly newspaper of general circulation in the area served by the system. The content of this notice shall be approved by the Director. The owner or operator of the public water system must give notice at least once every three (3) months by mail delivery or by hand delivery for as long as the violation exists. Repeat notice of the existence of a variance related to Section 1415 or 1416 of Public Law 93-523 as amended must be given every three (3) months for as long as the variance or exemption remains in effect.

c) Each time a public notice is issued by a water purveyor, a copy must be submitted to the Director within ten (10) days of issuance.

d) The owner or operator of a community water system must give a copy of the most recent public notice for any outstanding violation of any maximum contaminant level, or any treatment technique requirement, or any variance or exemption to all new billing units or new hookups prior to or at the time service begins.

e) Each notice must provide a clear and readily understandable explanation of the violation, any potential adverse health effects including the mandatory health effects language specified in Appendix 2 the population at risk, the steps that the public water system is taking to correct such violation, the necessity for seeking alternative sources of water, and any preventative measures the consumer should take until the violation is corrected. Each notice shall be conspicuous and shall not contain unduly technical language and unduly small print. Each notice shall include the telephone number of the owner, operator, or designee of the public water system as a source of additional information. Where appropriate, the notice shall be multi-lingual.

16.9 ***Records***

a) Records of analyses shall be maintained by the water purveyor. The records of each sample analyzed to comply with these regulations shall contain the following information:

1. The time, date, and place of sampling and the name of the sample collector;

2. The sampling point and the reason for collection;

3. Date analysis started and completion date if more than one day is needed;

4. Name of laboratory and person responsible for performing the analysis;

5. The analytical technique or method used;

6. The results of the analysis.

b) Records of microbiological examinations shall be readily available for at least 5 years.

c) Records of organic and inorganic chemical, radiological, and turbidity analyses shall be readily available for at least 10 years.

d) Any written document relating to a sanitary survey of a public water system shall be kept for at least 10 years. Records of action taken to correct a violation of these regulations shall be kept for at least 3 years after the last action taken with respect to the particular violation involved.

e) Records concerning a variance or exemption granted to a system shall be kept for at least 5 years following the expiration date of such variance or exemption.

16.10 ***Consumer Confidence Reports***

16.10 (1) ***Purpose and Applicability of this Subpart***

(a) This subpart establishes the minimum requirements for the content of annual reports that community water systems must deliver to their customers. These reports must contain information on the quality of the water delivered by the systems and characterize the risks (if any) from exposure to contaminants detected in the drinking water in an accurate and understandable manner.

(b) Notwithstanding the provisions of section 2, this subpart applies only to community water systems.

(c) For the purpose of this subpart, customers are defined as billing units or service connections to which water is delivered by a community water system.

(d) For the purpose of this subpart, detected means: at or above the levels prescribed by Appendix 1for the inorganic contaminants listed at 16.1(1)—(15), for the synthetic organic contaminants listed in 16.2(a) or the volatile organic contaminants listed in 16.2(b)(1)—(21) or the radioactive contaminants listed at 16.5(b) and (c).

16.10 (2) ***Effective Dates***

(a) The regulations in this subpart shall take effect on January 1, 2000.

(b) Each existing community water system must deliver a consumer confidence report by July 1, 2000, and subsequent reports by July 1 annually thereafter. The first report must contain data collected during, or prior to, calendar year 1999 as prescribed in 1 6.10(3)(d)(3). Each report thereafter must contain data collected during, or prior to, the previous calendar year.

(c) A new community water system must deliver its first report by July 1 of the year after its first full calendar year in operation and annually thereafter.

(d) A community water system that sells water to another community water system must deliver the applicable information required in 16.10(3) to the buyer system:

(1) No later than April 1, 2000, and by April 1 annually thereafter or

(2) On a date mutually agreed upon by the seller and the purchaser, and specifically included in a contract between the parties.

16.10 (3) ***Content of the Reports***

(a) Each community water system must provide to its customers an annual report that contains the information specified in this section and section 16.10(4).

(b) Information on the source of the water delivered:

(1) Each report must identify the source(s) of the water delivered by the community water system by providing information on:

(i) The type of the water: e.g., surface water, ground water; and

(ii) The commonly used name (if any) and location of the body (or bodies) of water.

(2) If a source water assessment has been completed, the report must notify consumers of the availability of this information and the means to obtain it. In addition, systems are encouraged to highlight in the report significant sources of contamination in the source water area if they have readily available information. Where a system has received a source water assessment from the Department, the

report must include a brief summary of the system's susceptibility to potential sources of contamination, using language provided by the Department or written by the operator.

(c) ***Definitions***

(1) Each report must include the following definitions:

(i) Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

(ii) Maximum Contaminant Level or MCL: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

(2) A report for a community water system operating under a variance or an exemption issued under section 15 of these regulations (excepting a variance pursuant to the requirements of section 3 New Water Sources) must include the following definition: Variances and Exemptions: State or EPA permission not to meet an MCL or a treatment technique under certain conditions.

(3) A report which contains data on a contaminant for which EPA has set a treatment technique or an action level must include one or both of the following definitions as applicable:

(i) Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

(ii) Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

(d) ***Information on Detected Contaminants***

(1) This subsection specifies the requirements for information to be included in each report for contaminants subject to mandatory monitoring (except Cryptosporidium). It applies to:

(i) Contaminants subject to an MCL, action level, or treatment technique (regulated contaminants);

(ii) Contaminants for which monitoring is required by section 16.6 (unregulated contaminants); and

(iii) Disinfection byproducts or microbial contaminants for which monitoring is required by [RESERVED for future rulemaking 141.142 and 141.143 equivalent] except as provided under paragraph (e)(1) of this section, and which are detected in the finished water.

(2) The data relating to these contaminants must be displayed in one table or in several adjacent tables. Any additional monitoring results which a community water system chooses to include in its report must be displayed separately.

(3) The data must be derived from data collected to comply with EPA and State monitoring and analytical requirements during calendar year 1999 for the first report and subsequent calendar years thereafter except that:

(i) Where a system is allowed to monitor for regulated contaminants less often than once a year, the table(s) must include the date and results of the most recent sampling and the report must include a brief statement indicating that the data presented in the report are from the most recent testing done in accordance with the regulations. No data older than 5 years need be included.

(ii) Results of monitoring in compliance with [RESERVED for future rulemaking 141.142 and 141.143 equivalent] need only be included for 5 years from the date of last sample or until any of the detected contaminants becomes regulated and subject to routine monitoring requirements, whichever comes first.

(4) For detected regulated contaminants (listed in appendix A to this subpart), the table(s) must contain:

(i) The MCL for that contaminant expressed as a number equal to or greater than 1.0 (as provided in appendix A to this subpart);

(ii) The MCLG for that contaminant expressed in the same units as the MCL;

(iii) If there is no MCL for a detected contaminant, the table must indicate that there is a treatment technique, or specify the action level, applicable to that contaminant, and the report must include the definitions for treatment technique and/or action level, as appropriate, specified in paragraph(c)(3) of this section;

(iv) For contaminants subject to an MCL, except turbidity and total coliforms, the highest contaminant level used to determine compliance with the MCL and the range of detected levels, as follows:

(A) When compliance with the MCL is determined annually or less frequently: The highest detected level at any sampling point and the range of detected levels expressed in the same units as the MCL.

(B) When compliance with the MCL is determined by calculating a running annual average of all samples taken at a sampling point: the highest average of any of the sampling points and the range of all sampling points expressed in the same units as the MCL.

(C) When compliance with the MCL is determined on a systemwide basis by calculating a running annual average of all samples at all sampling points: the average and range of detection expressed in the same units as the MCL.

Note to paragraph (d)(4)(iv): When rounding of results to determine compliance with the MCL is allowed by the regulations, rounding should be done prior to multiplying the results by the factor listed in appendix A of this subpart;

(v) ***For turbidity***

(A) When it is reported pursuant to section 16.3: The highest average monthly value.

(B) When it is reported pursuant to the requirements of section 5.2: the highest monthly value. The report should include an explanation of the reasons for measuring turbidity.

(C) When it is reported pursuant to section 5.4: The highest single measurement and the lowest monthly percentage of samples meeting the turbidity limits specified in section 5.4 for the filtration technology being used. The report should include an explanation of the reasons for measuring turbidity;

(vi) ***For lead and copper***: the 90th percentile value of the most recent round of sampling and the number of sampling sites exceeding the action level;

(vii) ***For total coliform***:

(A) The highest monthly number of positive samples for systems collecting fewer than 40 samples per month; or

(B) The highest monthly percentage of positive samples for systems collecting at least 40 samples per month;

(viii) ***For fecal coliform***: The total number of positive samples; and

(ix) The likely source(s) of detected contaminants to the best of the operator's knowledge. Specific information regarding contaminants may be available in sanitary surveys and source water assessments, and should be used when available to the operator. If the operator lacks specific information on the likely source, the report must include one or more of the typical sources for that contaminant listed in appendix B to this subpart which are most applicable to the system.

(5) If a community water system distributes water to its customers from multiple hydraulically independent distribution systems that are fed by different raw water sources, the table should contain a separate column for each service area and the report should identify each separate distribution system. Alternatively, systems could produce separate reports tailored to include data for each service area.

(6) The table(s) must clearly identify any data indicating violations of MCLs or treatment techniques and the report must contain a clear and readily understandable explanation of the violation including: the length of the violation, the potential adverse health effects, and actions taken by the system to address the violation. To describe the potential health effects, the system must use the relevant language of appendix C to this subpart.

(7) For detected unregulated contaminants for which monitoring is required (except Cryptosporidium), the table(s) must contain the average and range at which the contaminant was detected. The report may include a brief explanation of the reasons for monitoring for unregulated contaminants.

(e) ***Information on Cryptosporidium, Radon, and Other Contaminants:***

(1) If the system has performed any monitoring for Cryptosporidium, including monitoring performed to satisfy the requirements of [RESERVED for future rulemaking 141.143 equivalent], which indicates that Cryptosporidium may be present in the source water or the finished water, the report must include:

(i) A summary of the results of the monitoring; and

(ii) An explanation of the significance of the results.

(2) If the system has performed any monitoring for radon which indicates that radon may be present in the finished water, the report must include:

(i) The results of the monitoring; and

(ii) An explanation of the significance of the results.

(3) If the system has performed additional monitoring which indicates the presence of other contaminants in the finished water, the system is strongly encouraged to report any results which may indicate a health concern. To determine if results may indicate a health concern, it is recommended that systems find out if EPA has proposed an NPDWR or issued a health advisory for that contaminant by calling the Safe Drinking Water Hotline (8004264791). Detects above a proposed MCL or health advisory level are considered to indicate possible health concerns. For such contaminants, it is recommended that the report include:

(i) The results of the monitoring; and

(ii) An explanation of the significance of the results noting the existence of a health advisory or a proposed regulation.

(f) ***Compliance with NPDWR***

In addition to the requirements of section 16.10(3)(d), the report must note any violation that occurred during the year covered by the report of a requirement listed below, and include a clear and readily understandable explanation of the violation, any potential adverse health effects, and the steps the system has taken to correct the violation.

(1) Monitoring and reporting of compliance data;

(2) Filtration and disinfection prescribed by section 5 of these regulations. For systems which have failed to install adequate filtration or disinfection equipment or processes, or have had a failure of such equipment or processes which constitutes a violation, the report must include the following language as part of the explanation of potential adverse health effects: Inadequately treated water may contain disease causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

(3) Lead and copper control requirements prescribed by section 6 of these regulations. For systems which fail to take one or more actions prescribed by sections 6.80(d), 6.81, 6.82, 6.83, or 6.84 herein, the report must include the applicable language of appendix C to this subpart for lead, copper, or both.

(4) Treatment techniques for Acrylamide and Epichlorohydrin prescribed by section 16.2(d) of these regulations. For systems which violate the requirements of section 16.2(d) herein, the report must include the relevant language from appendix C to this subpart.

(5) *Recordkeeping of Compliance Data*

(6) Special monitoring requirements prescribed by sections 16.6, 16.7, and 16.1(r); and

(7) Violation of the terms of a variance, an exemption, or an administrative or judicial order.

(g) ***Variances and Exemptions***

If a system is operating under the terms of a variance or an exemption issued under Sec. 1415 or 1416 of SDWA, the report must contain:

(1) An explanation of the reasons for the variance or exemption;

(2) The date on which the variance or exemption was issued;

(3) A brief status report on the steps the system is taking to install treatment, find alternative sources of water, or otherwise comply with the terms and schedules of the variance or exemption; and

(4) A notice of any opportunity for public input in the review, or renewal, of the variance or exemption.

(h) ***Additional Information***:

(1) The report must contain a brief explanation regarding contaminants which may reasonably be expected to be found in drinking water including bottled water. This explanation may include the language of paragraphs (h)(1) (i) through (iii) or systems may use their own comparable language. The report also must include the language of paragraph (h)(1)(iv) of this section.

(i) The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

(ii) Contaminants that may be present in source water include:

(A) Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

(B) Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff,

industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

(C) Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.

(D) Organic chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.

(E) Radioactive contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

(iii) In order to ensure that tap water is safe to drink, EPA prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

(iv) Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's Safe Drinking Water Hotline (800-426-4791).

(2) The report must include the telephone number of the owner, operator, or designee of the community water system as a source of additional information concerning the report.

(3) In communities with a large proportion of non-English speaking residents, as determined by the Director, the report must contain information in the appropriate language(s) regarding the importance of the report or contain a telephone number or address where such residents may contact the system to obtain a translated copy of the report or assistance in the appropriate language.

(4) The report must include information (e.g., time and place of regularly scheduled board meetings) about opportunities for public participation in decisions that may affect the quality of the water.

(5) The systems may include such additional information as they deem necessary for public education consistent with, and not detracting from, the purpose of the report.

16.10 (4) ***Required Additional Health Information***

(a) All reports must prominently display the following language:

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

(b) A system which detects arsenic at levels above 25 µg/ l, but below the MCL:

(1) Must include in its report a short informational statement about arsenic, using language such as: EPA is reviewing the drinking water standard for arsenic because of special concerns that it may not be stringent enough. Arsenic is a naturally-occurring mineral known to cause cancer in humans at high concentrations.

(2) May write its own educational statement, but only in consultation with the Director.

(c) A system which detects nitrate at levels above 5 mg/l, but below the MCL:

(1) Must include a short informational statement about the impacts of nitrate on children using language such as: Nitrate in drinking water at levels above 10 ppm is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome. Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. If you are caring for an infant you should ask advice from your health care provider.

(2) May write its own educational statement, but only in consultation with the Director.

(d) Systems which detect lead above the action level in more than 5%, but fewer that 10%, of homes sampled:

(1) Must include a short informational statement about the special impact of lead on children using language such as: Infants and young children are typically more vulnerable to lead in drinking water than the general population. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing. If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested

and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the Safe Drinking Water Hotline (800-426-4791).

(2) May write its own educational statement, but only in consultation with the Director.

16.10 (5) ***Report Delivery and Recordkeeping***

(a) Except as provided in paragraph (g) of this section, each community water system must mail or otherwise directly deliver one copy of the report to each customer.

(b) The system must make a good faith effort to reach consumers who do not get water bills, using means recommended by the Director. It is expected that an adequate good faith effort will be tailored to the consumers who are served by the system but are not bill-paying customers, such as renters or workers. A good faith effort to reach consumers would include a mix of methods appropriate to the particular system such as: Posting the reports on the Internet; mailing to postal patrons in metropolitan areas; advertising the availability of the report in the news media; publication in a local newspaper; posting in public places such as cafeterias or lunch rooms of public buildings; delivery of multiple copies for distribution by single-biller customers such as apartment buildings or large private employers; delivery to community organizations.

(c) No later than the date the system is required to distribute the report to its customers, each community water system must mail a copy of the report to the Director, followed within 3 months by a certification that the report has been distributed to customers, and that the information is correct and consistent with the compliance monitoring data previously submitted to the Director.

(d) No later than the date the system is required to distribute the report to its customers, each community water system must deliver the report to any other agency or clearinghouse identified by the Director.

(e) Each community water system must make its reports available to the public upon request.

(f) Each community water system serving 100,000 or more persons must post its current year's report to a publicly-accessible site on the Internet.

(g) Any system subject to this section must retain copies of its consumer confidence report for no less than 5 years.

Appendix A to Section 16.10--Converting MCL Compliance Values for Consumer Confidence Reports

Key

AL=Action Level
MCL=Maximum Contaminant Level
MCLG=Maximum Contaminant Level Goal
MFL=million fibers per liter
mrem/year=millirems per year (a measure of radiation absorbed by the body)
NTU=Nephelometric Turbidity Units
pCi/l=picocuries per liter (a measure of radioactivity)
ppm=parts per million, or milligrams per liter (mg/l)
ppb=parts per billion, or micrograms per liter (µ/l)
ppt=parts per trillion, or nanograms per liter
ppq=parts per quadrillion, or picograms per liter
TT=Treatment Technique

Contaminant	***MCL in compliance units (mg/L)***	***multiply by . . .***	***MCL in CCR Units***	***MCLG in CCR units***
Microbiological Contaminants				
1. Total Coliform Bacteria.....	.....	.....	Presence of coliform bacteria in ≥5% of monthly samples.	0
2. Fecal coliform and E. coli.....	.....	.....	A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive.	0
3. Turbidity..... .	.....	.....	TT (NTU).....	n/a
Radioactive Contaminants				
4. Beta/photon emitters.....	4 mrem/yr.....	.....	4 mrem/yr.....	0
5. Alpha emitters.....	15 pCi/l.....	.....	15 pCi/l.....	0
6. Combined radium.....	5 pCi/l.....	.....	5 pCi/l.....	0
Inorganic Contaminants				
7. Antimony.....	.006.....	1000	6 ppb.....	6
8. Arsenic.....	.05.....	1000	50 ppb.....	.n/a
9. Asbestos.....	7 MFL.....	.....	7 MFL.....	7
10. Barium.....	2.....	.....	2 ppm.....	2
11. Beryllium.....	.004.....	1000	4 ppb.....	4
12. Cadmium.....	.005.....	1000	5 ppb.....	5
13. Chromium.....	.1.....	1000	100 ppb.....	100
14. Copper.....	AL=1.3.....	.....	AL=1.3 ppm.....	1.3

Contaminant	*MCL in compliance units (mg/L)*	*multiply by . . .*	*MCL in CCR Units*	*MCLG in CCR units*
15. Cyanide.....	.2.....	1000	200 ppb.....	200
16. Fluoride.....	4.....	.....	4 ppm.....	4
17. Lead.....	AL=.015.....	1000	AL=15 ppb.....	0
18. Mercury (inorganic).....	.002.....	1000	2 ppb.....	2
19. Nitrate (as Nitrogen).....	10.....	.....	10 ppm.....	10
20. Nitrite (as Nitrogen).....	1.....	.....	1 ppm.....	1
21. Selenium.....	.05.....	1000	50 ppb.....	50
22. Thallium.....	.002.....	1000	2 ppb.....	0.5
Synthetic Organic Contaminants including Pesticides and Herbicides				
23. 2,4-D..... .	.07.....	1000	70 ppb.....	70
24. 2,4,5-TP [Silvex].....	.05.....	1000	50 ppb.....	50
25. Acrylamide.....	.....	.....	TT.....	0
26. Alachlor.....	.002.....	1000	2 ppb.....	0
27. Atrazine.....	.003.....	1000	3 ppb.....	3
28. Benzo(a)pyrene [PAH].....	.0002.....	1,000,000	200 ppt.....	0
29. Carbofuran.....	.04.....	1000	40 ppb.....	40
30. Chlordane.....	.002.....	1000	2 ppb.....	0
31. Dalapon.....	.2.....	1000	200 ppb.....	200
32. Di(2-ethylhexyl)adipate.....	.4.....	1000	400 ppb.....	400
33. Di(2-ethylhexyl) phthalate...	.006.....	1000	6 ppb.....	0
34. Dibromochloropropane.....	.0002.....	1,000,000	200 ppt.....	0
35. Dinoseb.....	.007.....	1000	7 ppb.....	7
36. Diquat.....	.02.....	1000	20 ppb.....	20
37. Dioxin [2,3,7,8-TCDD].....	.00000003.....	1,000,000,000	30 ppq.....	0
38. Endothall.....	.1.....	1000	100 ppb.....	100
39. Endrin.....	.002.....	1000	2 ppb.....	2
40. Epichlorohydrin.....	.....	.....	TT.....	0

Contaminant	*MCL in compliance units (mg/L)*	*multiply by . . .*	*MCL in CCR Units*	*MCLG in CCR units*
41. Ethylene dibromide.....	.00005.....	1,000,000	50 ppt.....	0
42. Glyphosate.....	.7.....	1000	700 ppb.....	700
43. Heptachlor.....	.0004.....	1,000,000	400 ppt.....	0
44. Heptachlor epoxide.....	.0002.....	1,000,000	200 ppt.....	0
45. Hexachlorobenzene.....	.001.....	1000	1 ppb.....	0
46. Hexachloro-cyclopentadiene....	.05.....	1000	50 ppb.....	50
47. Lindane.....	.0002.....	1,000,000	200 ppt.....	200
48. Methoxychlor.....	.04.....	1000	40 ppb.....	40
49. Oxamyl [Vydate].....	.2.....	1000	200 ppb.....	200
50. PCBs [Polychlorinated biphenyls].	.0005.....	1,000,000	500 ppt.....	0
51. Pentachlorophenol.....	.001.....	1000	1 ppb.....	0
52. Picloram.....	.5.....	1000	500 ppb.....	500
53. Simazine.....	.004.....	1000	4 ppb.....	4
54.Toxaphene.....	.003.....	1000	3 ppb.....	0
Volatile Organic Contaminants				
55. Benzene.....	.005.....	1000	5 ppb.....	0
56. Carbon tetrachloride.....	.005.....	1000	5 ppb.....	0
57. Chlorobenzene.....	.1.....	1000	100 ppb.....	100
58. o-Dichlorobenzene.....	.6.....	1000	600 ppb.....	600
59. p-Dichlorobenzene.....	.075.....	1000	75 ppb.....	75
60. 1,2-Dichloroethane.....	.005.....	1000	5 ppb.....	0
61. 1,1-Dichloroethylene.....	.007.....	1000	7 ppb.....	7
62. cis-1,2-Dichloroethylene.....	.07.....	1000	70 ppb.....	70
63. trans-1,2-Dichloroethylene....	.1.....	1000	100 ppb.....	100
64. Dichloromethane.....	.005.....	1000	5 ppb.....	0
65. 1,2-Dichloropropane.....	.005.....	1000	5 ppb.....	0
66. Ethylbenzene.....	.7.....	1000	700 ppb.....	700

Contaminant	*MCL in compliance units (mg/L)*	*multiply by . . .*	*MCL in CCR Units*	*MCLG in CCR units*
67. Styrene.....	.1.....	1000	100 ppb.....	100
68. Tetrachloroethylene.....	.005.....	1000	5 ppb.....	0
69. 1,2,4-Trichlorobenzene.....	.07.....	1000	70 ppb.....	70
70. 1,1,1-Trichloroethane.....	.2.....	1000	200 ppb.....	200
71. 1,1,2-Trichloroethane.....	.005.....	1000	5 ppb.....	3
72. Trichloroethylene.....	.005.....	1000	5 ppb.....	0
73. TTHMs [Total trihalomethanes].	.10.....	1000	100 ppb.....	0
74. Toluene.....	1.....	.....	1 ppm.....	1
75. Vinyl Chloride.....	.002.....	1000	2 ppb.....	0
76. Xylenes.....	10.....	.....	10 ppm.....	10

Appendix B to Section 16.10--Regulated Contaminants

Key
AL=Action Level
MCL=Maximum Contaminant Level
MCLG=Maximum Contaminant Level Goal
MFL=million fibers per liter
mrem/year=millirems per year (a measure of radiation absorbed by the body)
NTU=Nephelometric Turbidity Units
pCi/l=picocuries per liter (a measure of radioactivity)
ppm=parts per million, or milligrams per liter (mg/l)
ppb=parts per billion, or micrograms per liter (µ/l)
ppt=parts per trillion, or nanograms per liter
ppq=parts per quadrillion, or picograms per liter
TT=Treatment Technique

Contaminant (units)	*MCLG*	*MCL*	*Major Sources in Drinking Water*
Microbiological Contaminants			
1. Total Coliform Bacteria.....	0	Presence of coliform bacteria in ≥5% of monthly samples.	Naturally present in the environment.
2. Fecal coliform and E. coli.....	0	A routine sample and a repeat sample are total coliform positive, and one is also fecal coliform or E. coli positive.	Human and animal fecal waste.
3. Turbidity.....	n/a	TT.....	Soil runoff.
Radioactive Contaminants			
4. Beta/photon emitters (mrem/yr).....	0	4.....	Decay of natural and man-made deposits.
5. Alpha emitters (pCi/l).....	0	15.....	Erosion of natural deposits.
6. Combined radium (pCi/l).....	0	5.....	Erosion of natural deposits.
Inorganic Contaminants			
7. Antimony (ppb).....	6	6.....	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder.
8. Arsenic (ppb).....	n/a	50.....	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes.
9. Asbestos (MFL).....	7	7.....	Decay of asbestos cement water mains; Erosion of natural deposits.
10. Barium (ppm).....	2	2.....	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.

Contaminant (units)	*MCLG*	*MCL*	*Major Sources in Drinking Water*
11. Beryllium (ppb).....	4	4.....	Discharge from metal refineries and coal-burning factories; Discharge from electrical, aerospace, and defense industries.
12. Cadmium (ppb).....	5	5.....	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; runoff from waste batteries and paints.
13. Chromium (ppb).....	100	100.....	Discharge from steel and pulp mills; Erosion of natural deposits.
14. Copper (ppm).....	1.3	AL=1.3.....	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives.
15. Cyanide (ppb).....	200	200.....	Discharge from steel/metal factories; Discharge from plastic and fertilizer factories.
16. Fluoride (ppm).....	4	4.....	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
17. Lead (ppb).....	0	AL=15.....	Corrosion of household plumbing systems; Erosion of natural deposits.
18. Mercury [inorganic] (ppb).....	2	2.....	Erosion of natural deposits; Discharge from refineries and factories; Runoff from landfills; Runoff from cropland.
19. Nitrate [as Nitrogen] (ppm).....	10	10.....	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
20. Nitrite [as Nitrogen] (ppm).....	1	1.....	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits.
21. Selenium (ppb).....	50	50.....	Discharge from petroleum and metal refineries; Erosion of natural deposits; Discharge from mines.
22. Thallium (ppb).....	0.5	2.....	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories.
Synthetic Organic Contaminants Including Pesticides and Herbicides			
23. 2,4-D (ppb).....	70	70.....	Runoff from herbicide used on row crops.
24. 2,4,5-TP [Silvex] (ppb).....	50	50.....	Residue of banned herbicide.
25. Acrylamide.....	0	TT.....	Added to water during sewage/wastewater treatment.
26. Alachlor (ppb).....	0	2.....	Runoff from herbicide used on row crops.
27. Atrazine (ppb).....	3	3.....	Runoff from herbicide used on row crops.
28. Benzo(a)pyrene [PAH] (nanograms/l).	0	200.....	Leaching from linings of water storage tanks and distribution lines.

Contaminant (units)	*MCLG*	*MCL*	*Major Sources in Drinking Water*
29. Carbofuran (ppb).....	40	40.....	Leaching of soil fumigant used on rice and alfalfa.
30. Chlordane (ppb).....	0	2.....	Residue of banned termiticide.
31. Dalapon (ppb).....	200	200.....	Runoff from herbicide used on rights of way.
32. Di(2-ethylhexyl) adipate (ppb).....	400	400.....	Discharge from chemical factories.
33. Di(2-ethylhexyl) phthalate (ppb)...	0	6.....	Discharge from rubber and chemical factories.
34. Dibromochloropropane (ppt).....	0	200.....	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards.
35. Dinoseb (ppb).....	7	7.....	Runoff from herbicide used on soybeans and vegetables.
36. Diquat (ppb).....	20	20.....	Runoff from herbicide use.
37. Dioxin [2,3,7,8-TCDD] (ppq).....	0	30.....	Emissions from waste incineration and other combustion; Discharge from chemical factories.
38. Endothall (ppb).....	100	100.....	Runoff from herbicide use.
39. Endrin (ppb).....	2	2.....	Residue of banned insecticide.
40. Epichlorohydrin.....	0	TT.....	Discharge from industrial chemical factories; An impurity of some water treatment chemicals.
41. Ethylene dibromide (ppt).....	0	50.....	Discharge from petroleum refineries
42. Glyphosate (ppb).....	700	700.....	Runoff from herbicide use.
43. Heptachlor (ppt).....	0	400.....	Residue of banned termiticide.
44. Heptachlor epoxide (ppt).....	0	200.....	Breakdown of heptachlor.
45. Hexachlorobenzene (ppb).....	0	1.....	Discharge from metal refineries and agricultural chemical factories.
46. Hexachlorocyclopentadiene (ppb).	50	50.....	Discharge from chemical factories.
47. Lindane (ppt).....	200	200.....	Runoff/leaching from insecticide used on cattle, lumber, gardens.
48. Methoxychlor (ppb).....	40	40.....	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock.
49. Oxamyl [Vydate](ppb).....	200	200.....	Runoff/leaching from insecticide used on apples, potatoes and tomatoes.
50. PCBs [Polychlorinated biphenyls] (ppt).	0	500.....	Runoff from landfills; Discharge of waste chemicals.
51. Pentachlorophenol (ppb).....	0	1.....	Discharge from wood preserving factories.
52. Picloram (ppb).....	500	500.....	Herbicide runoff.

Contaminant (units)	*MCLG*	*MCL*	*Major Sources in Drinking Water*
53. Simazine (ppb).....	4	4.....	Herbicide runoff.
54. Toxaphene (ppb).....	0	3.....	Runoff/leaching from insecticide used on cotton and cattle.
Volatile Organic Contaminants			
55. Benzene (ppb).....	0	5.....	Discharge from factories; Leaching from gas storage tanks and landfills.
56. Carbon tetrachloride (ppb).....	0	5.....	Discharge from chemical plants and other industrial activities.
57. Chlorobenzene (ppb).....	100	100.....	Discharge from chemical and agricultural chemical factories.
58. o-Dichlorobenzene (ppb).....	600	600.....	Discharge from industrial chemical factories.
59. p-Dichlorobenzene (ppb).....	75	75.....	Discharge from industrial chemical factories.
60. 1,2-Dichloroethane (ppb).....	0	5.....	Discharge from industrial chemical factories.
61. 1,1-Dichloroethylene (ppb).....	7	7.....	Discharge from industrial chemical factories.
62. cis-1,2-Dichloroethylene (ppb)	70	70.....	Discharge from industrial chemical factories.
63. trans-1,2-Dichloroethylene (ppb).	100	100.....	Discharge from industrial chemical factories.
64. Dichloromethane (ppb).....	0	5.....	Discharge from pharmaceutical and chemical factories.
65. 1,2-Dichloropropane (ppb).....	0	5.....	Discharge from industrial chemical factories.
66. Ethylbenzene (ppb).....	700	700.....	Discharge from petroleum refineries.
67. Styrene (ppb).....	100	100.....	Discharge from rubber and plastic factories; Leaching from landfills.
68. Tetrachloroethylene (ppb).....	0	5.....	Leaching from PVC pipes; Discharge from factories and dry cleaners.
69. 1,2,4-Trichlorobenzene (ppb).....	70	70.....	Discharge from textile- finishing factories.
70. 1,1,1-Trichloroethane (ppb).....	200	200.....	Discharge from metal degreasing sites and other factories.
71. 1,1,2-Trichloroethane (ppb).....	3	5.....	Discharge from industrial chemical factories.
72. Trichloroethylene (ppb).....	0	5.....	Discharge from metal degreasing sites and other factories.
73. TTHMs [Total trihalomethanes] (ppb)	0	100.....	By-product of drinking water chlorination.
74. Toluene (ppm).....	1	1.....	Discharge from petroleum factories.
75. Vinyl Chloride (ppb).....	0	2.....	Leaching from PVC piping; Discharge from plastics factories.

Contaminant (units)	*MCLG*	*MCL*	*Major Sources in Drinking Water*
76. Xylenes (ppm).....	10	10.....	Discharge from petroleum factories; Discharge from chemical factories.

Appendix C to Section 16.10--Health Effects Language

Microbiological Contaminants

(1) ***Total Coliform***. Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other, potentially-harmful, bacteria may be present. Coliforms were found in more samples than allowed and this was a warning of potential problems.

(2) ***Fecal coliform/E.Coli.*** Fecal coliforms and E. coli are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.

(3) ***Turbidity.*** Turbidity has no health effects. However, turbidity can interfere with disinfection and provide a medium for microbial growth. Turbidity may indicate the presence of disease-causing organisms. These organisms include bacteria, viruses, and parasites that can cause symptoms such as nausea, cramps, diarrhea, and associated headaches.

Radioactive Contaminants

(4) ***Beta/photon emitters***. Certain minerals are radioactive and may emit forms of radiation known as photons and beta radiation. Some people who drink water containing beta and photon emitters in excess of the MCL over many years may have an increased risk of getting cancer.

(5) ***Alpha emitters***. Certain minerals are radioactive and may emit a form of radiation known as alpha radiation. Some people who drink water containing alpha emitters in excess of the MCL over many years may have an increased risk of getting cancer.

(6) ***Combined Radium 226/228***. Some people who drink water containing radium 226 or 228 in excess of the MCL over many years may have an increased risk of getting cancer.

Inorganic Contaminants

(7) ***Antimony.*** Some people who drink water containing antimony well in excess of the MCL over many years could experience increases in blood cholesterol and decreases in blood sugar.

(8) ***Arsenic***. Some people who drink water containing arsenic in excess of the MCL over many years could experience skin damage or problems with their circulatory system, and may have an increased risk of getting cancer.

(9) ***Asbestos.*** Some people who drink water containing asbestos in excess of the MCL over many years may have an increased risk of developing benign intestinal polyps.

(10) ***Barium.*** Some people who drink water containing barium in excess of the MCL over many years could experience an increase in their blood pressure.

(11) ***Beryllium.*** Some people who drink water containing beryllium well in excess of the MCL over many years could develop intestinal lesions.

(12) ***Cadmium.*** Some people who drink water containing cadmium in excess of the MCL over many years could experience kidney damage.

(13) ***Chromium.*** Some people who use water containing chromium well in excess of the MCL over many years could experience allergic dermatitis.

(14) ***Copper.*** Copper is an essential nutrient, but some people who drink water containing copper in excess of the action level over a relatively short amount of time could experience gastrointestinal distress. Some people who drink water containing copper in excess of the action level over many years could suffer liver or kidney damage. People with Wilson's Disease should consult their personal doctor.

(15) ***Cyanide.*** Some people who drink water containing cyanide well in excess of the MCL over many years could experience nerve damage or problems with their thyroid.

(16) ***Fluoride.*** Some people who drink water containing fluoride in excess of the MCL over many years could get bone disease, including pain and tenderness of the bones. Children may get mottled teeth.

(17) ***Lead.*** Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

(18) ***Mercury (inorganic).*** Some people who drink water containing inorganic mercury well in excess of the MCL over many years could experience kidney damage.

(19) ***Nitrate.*** Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(20) ***Nitrite.*** Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.

(21) ***Selenium.*** Selenium is an essential nutrient. However, some people who drink water containing selenium in excess of the MCL over many years could experience hair or fingernail losses, numbness in fingers or toes, or problems with their circulation.

(22) ***Thallium.*** Some people who drink water containing thallium in excess of the MCL over many years could experience hair loss, changes in their blood, or problems with their kidneys, intestines, or liver.

Synthetic Organic Contaminants Including Pesticides and Herbicides

(23) ***2,4-D.*** Some people who drink water containing the weed killer 2,4-D well in excess of the MCL over many years could experience problems with their kidneys, liver, or adrenal glands.

(24) ***2,4,5-TP (Silvex)***. Some people who drink water containing silvex in excess of the MCL over many years could experience liver problems.

(25) ***Acrylamide***. Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.

(26) ***Alachlor.*** Some people who drink water containing alachlor in excess of the MCL over many years could have problems with their eyes, liver, kidneys, or spleen, or experience anemia, and may have an increased risk of getting cancer.

(27) ***Atrazine.*** Some people who drink water containing atrazine well in excess of the MCL over many years could experience problems with their cardiovascular system or reproductive difficulties.

(28) ***Benzo(a)pyrene (PAH)***. Some people who drink water containing benzo(a)pyrene in excess of the MCL over many years may experience reproductive difficulties and may have an increased risk of getting cancer.

(29) ***Carbofuran.*** Some people who drink water containing carbofuran in excess of the MCL over many years could experience problems with their blood, or nervous or reproductive systems.

(30) ***Chlordane***. Some people who drink water containing chlordane in excess of the MCL over many years could experience problems with their liver or nervous system, and may have an increased risk of getting cancer.

(31) ***Dalapon***. Some people who drink water containing dalapon well in excess of the MCL over many years could experience minor kidney changes.

(32) ***Di (2-ethylhexyl) adipate.*** Some people who drink water containing di (2-ethylhexyl) adipate well in excess of the MCL over many years could experience general toxic effects or reproductive difficulties.

(33) ***Di (2-ethylhexyl) phthalate.*** Some people who drink water containing di (2-ethylhexyl) phthalate in excess of the MCL over many years may have problems with their liver, or experience reproductive difficulties, and may have an increased risk of getting cancer.

(34) ***Dibromochloropropane (DBCP)***. Some people who drink water containing DBCP in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

(35) ***Dinoseb***. Some people who drink water containing dinoseb well in excess of the MCL over many years could experience reproductive difficulties.

(36) ***Dioxin (2,3,7,8-TCDD)***. Some people who drink water containing dioxin in excess of the MCL over many years could experience reproductive difficulties and may have an increased risk of getting cancer.

(37) ***Diquat.*** Some people who drink water containing diquat in excess of the MCL over many years could get cataracts.

(38) ***Endothall.*** Some people who drink water containing endothall in excess of the MCL over many years could experience problems with their stomach or intestines.

(39) ***Endrin.*** Some people who drink water containing endrin in excess of the MCL over many years could experience liver problems.

(40) ***Epichlorohydrin.*** Some people who drink water containing high levels of epichlorohydrin over a long period of time could experience stomach problems, and may have an increased risk of getting cancer.

(41) ***Ethylene dibromide***. Some people who drink water containing ethylene dibromide in excess of the MCL over many years could experience problems with their liver, stomach, reproductive system, or kidneys, and may have an increased risk of getting cancer.

(42) ***Glyphosate.*** Some people who drink water containing glyphosate in excess of the MCL over many years could experience problems with their kidneys or reproductive difficulties.

(43) ***Heptachlor.*** Some people who drink water containing heptachlor in excess of the MCL over many years could experience liver damage and may have an increased risk of getting cancer.

(44) ***Heptachlor epoxide***. Some people who drink water containing heptachlor epoxide in excess of the MCL over many years could experience liver damage, and may have an increased risk of getting cancer.

(45) ***Hexachlorobenzene.*** Some people who drink water containing hexachlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys, or adverse reproductive effects, and may have an increased risk of getting cancer.

(46) ***Hexachlorocyclopentadiene.*** Some people who drink water containing hexachlorocyclopentadiene well in excess of the MCL over many years could experience problems with their kidneys or stomach.

(47) ***Lindane***. Some people who drink water containing lindane in excess of the MCL over many years could experience problems with their kidneys or liver.

(48) ***Methoxychlor.*** Some people who drink water containing methoxychlor in excess of the MCL over many years could experience reproductive difficulties.

(49) ***Oxamyl [Vydate]***. Some people who drink water containing oxamyl in excess of the MCL over many years could experience slight nervous system effects.

(50) ***PCBs [Polychlorinated biphenyls]***. Some people who drink water containing PCBs in excess of the MCL over many years could experience changes in their skin, problems with their thymus gland, immune deficiencies, or reproductive or nervous system difficulties, and may have an increased risk of getting cancer.

(51) ***Pentachlorophenol***. Some people who drink water containing pentachlorophenol in excess of the MCL over many years could experience problems with their liver or kidneys, and may have an increased risk of getting cancer.

(52) ***Picloram.*** Some people who drink water containing picloram in excess of the MCL over many years could experience problems with their liver.

(53) ***Simazine.*** Some people who drink water containing simazine in excess of the MCL over many years could experience problems with their blood.

(54) ***Toxaphene.*** Some people who drink water containing toxaphene in excess of the MCL over many years could have problems with their kidneys, liver, or thyroid, and may have an increased risk of getting cancer.

Volatile Organic Contaminants

(55) ***Benzene.*** Some people who drink water containing benzene in excess of the MCL over many years could experience anemia or a decrease in blood platelets, and may have an increased risk of getting cancer.

(56) ***Carbon Tetrachloride.*** Some people who drink water containing carbon tetrachloride in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

(57) ***Chlorobenzene.*** Some people who drink water containing chlorobenzene in excess of the MCL over many years could experience problems with their liver or kidneys.

(58) ***o-Dichlorobenzene.*** Some people who drink water containing o-dichlorobenzene well in excess of the MCL over many years could experience problems with their liver, kidneys, or circulatory systems.

(59) ***p-Dichlorobenzene.*** Some people who drink water containing p-dichlorobenzene in excess of the MCL over many years could experience anemia, damage to their liver, kidneys, or spleen, or changes in their blood.

(60) ***1,2-Dichloroethane.*** Some people who drink water containing 1,2-dichloroethane in excess of the MCL over many years may have an increased risk of getting cancer.

(61) ***1,1-Dichloroethylene***. Some people who drink water containing 1,1-dichloroethylene in excess of the MCL over many years could experience problems with their liver.

(62) ***cis-1,2-Dichloroethylene.*** Some people who drink water containing cis-1,2-dichloroethylene in excess of the MCL over many years could experience problems with their liver.

(63) ***trans-1,2-Dicholoroethylene.*** Some people who drink water containing trans-1,2-dichloroethylene well in excess of the MCL over many years could experience problems with their liver.

(64) ***Dichloromethane.*** Some people who drink water containing dichloromethane in excess of the MCL over many years could have liver problems and may have an increased risk of getting cancer.

(65) ***1,2-Dichloropropane.*** Some people who drink water containing 1,2-dichloropropane in excess of the MCL over many years may have an increased risk of getting cancer.

(66) ***Ethylbenzene.*** Some people who drink water containing ethylbenzene well in excess of the MCL over many years could experience problems with their liver or kidneys.

(67) ***Styrene.*** Some people who drink water containing styrene well in excess of the MCL over many years could have problems with their liver, kidneys, or circulatory system.

(68) ***Tetrachloroethylene.*** Some people who drink water containing tetrachloroethylene in excess of the MCL over many years could have problems with their liver, and may have an increased risk of getting cancer.

(69) ***1,2,4-Trichlorobenzene.*** Some people who drink water containing 1,2,4-trichlorobenzene well in excess of the MCL over many years could experience changes in their adrenal glands.

(70) ***1,1,1,-Trichloroethane.*** Some people who drink water containing 1,1,1-trichloroethane in excess of the MCL over many years could experience problems with their liver, nervous system, or circulatory system.

(71) ***1,1,2-Trichloroethane.*** Some people who drink water containing 1,1,2-trichloroethane well in excess of the MCL over many years could have problems with their liver, kidneys, or immune systems.

(72) ***Trichloroethylene.*** Some people who drink water containing trichloroethylene in excess of the MCL over many years could experience problems with their liver and may have an increased risk of getting cancer.

(73) ***TTHMs [Total Trihalomethanes].*** Some people who drink water containing trihalomethanes in excess of the MCL over many years may experience problems with their liver, kidneys, or central nervous systems, and may have an increased risk of getting cancer.

(74) ***Toluene.*** Some people who drink water containing toluene well in excess of the MCL over many years could have problems with their nervous system, kidneys, or liver.

(75) ***Vinyl Chloride.*** Some people who drink water containing vinyl chloride in excess of the MCL over many years may have an increased risk of getting cancer.

(76) ***Xylenes.*** Some people who drink water containing xylenes in excess of the MCL over many years could experience damage to their nervous system.

Section 17.0 *Non-community Water System Requirements*

17.1 *Microbiological*

a) ***Routine monitoring*:** Public water systems must collect total coliform samples at sites which are representative of water throughout the distribution system according to a written sample siting plan. At least one representative sample shall be collected each calendar quarter when the system is in operation. These plans are subject to review and revision by the director.

***Monitoring Frequency**:* For total coliforms for non-community water systems is as follows:

i) a non-community water system using only ground water and serving 1,000 persons or fewer must monitor each calendar quarter that the system provides water to the public.

ii) a non-community water systems using only ground water , and serving more than 1000 persons during any month must monitor at the same frequency as a like-sized community water system, as specified in section 16.4 a of these regulations.

iii) 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 as specified in section 16.4 a of these regulations.

iv) A non-community water system using ground water under the direct influence of surface water, as determined by the director, in total or in part must monitor at the same frequency as a like-sized community water system, as specified in Section 16.4 a) of these regulations, within 6 months of said determination by the director.

b) The following requirements for public water systems found in Section 16.4 also apply to non-community water systems. This includes Sections:

16.4a)2)and 3)	Routine Monitoring;
16.4b)	Analytical Methodology;
16.4c)	Maximum Contaminant Levels for Microbiological Contaminants;
16.4d)	Repeat Monitoring;
16.4e)	Fecal Coliforms/E. colitesting;
16.4f)	Invalidation of Samples;
16.4g)	Sanitary Surveys
16.4h)	Reporting Requirements

17.2 *Inorganic Chemicals*

Non-transient non-community water systems shall be required to comply with the requirements of Sections 6 and 16.1 with the following exception. Monitoring and compliance with the requirements for sodium shall not be required.

a) ***Nitrate and Nitrite***

The maximum contaminant levels for nitrate, nitrite and combined nitrate and nitrite are as follows:

Contaminant	***MCL (mg/l)***
Nitrate	10 (as Nitrogen)
Nitrite	1 (as Nitrogen)
Total Nitrate and Nitrite	10 (as Nitrogen)

When the nitrate or nitrite sampling results indicate an excess of the maximum contaminant level, a second analyses shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum contaminant level the supplier shall notify the director and initiate public notification.

Systems unable to comply with the 24-hour sampling requirement must immediately notify the consumers served by the area served by the public water system in accordance with Section 17.6. Systems exercising this option must take and analyze a confirmation sample within two weeks of notification of the analytical results of the first sample.

b) ***Monitoring Frequency*** - The nitrate concentration of each active drinking water source maintained by a water purveyor shall be determined as required by section 16.1(e) of these regulations. Beginning January 1, 1993 the nitrite and total nitrate/nitrite concentration shall also be determined annually.

c) ***Analytical Techniques*** - Nitrate analyses shall be made in accordance with the methods specified in Appendix 1.

17.3 ***Organic Chemicals***

Non-transient, non-community water systems shall be required to comply with the requirements of Section 16.2 with the following exceptions. Monitoring and compliance with the requirements for total trihalomethanes shall not be required.

17.4 ***Turbidity***

Non-community water systems shall comply with the requirements of Section 16.3.

17.5 ***Unregulated Contaminants and Special***

Non-transient non-community water systems that serve more than 10,000 persons (effective January 8, 1999) shall be required to monitor for unregulated contaminants in conformance with Section 16.6 and 16.7.

17.6 ***Public Notification***

a) Any non-community water system which fails to comply with a maximum contaminant level, treatment technique, or requirements of any schedule prescribed pursuant to a variance or exemption issued under these regulations, or which has an occurrence of a waterborne disease outbreak, shall give notice to the persons served by the water system within 14 days after the violation or failure, or within 72 hours for violations determined to be acute by the director. The content of this notice shall be approved by the director. The notice may be either by hand delivery, or by continuous posting in conspicuous places within the area served by the system. Notices shall be repeated every 3 months for as long as the violation or failure exists.

b) Any non-community water system which fails to perform required monitoring or reporting of contaminants required by Section 17 of these regulations or fails to comply with testing procedures established in the regulations, or is subject to an exemption or variance respecting a maximum contaminant level or any treatment technique requirement applicable to a national primary drinking water regulation shall give notice within three (3) months of the violation or the granting of the variance or exemption to the persons served by the water system. The content of this notice shall be approved by the director. The notice may be either by hand delivery or by continuous posting in conspicuous places within the area served by the system. Posting must continue for as long as the violation exists, or a variance or exemption related to Section 1415 or 1416 of Public Law 93-523 as amended remains in effect. Notice by hand delivery must be repeated at least every three (3) months for as long as the violation exists or a variance or exemption remains in effect.

c) Each notice must provide a clear and readily understandable explanation of the violation, any potential adverse health effects including the mandatory health effects language specified in Appendix 2, the population at risk, the steps that the public water system is taking to correct such violation, the necessity for seeking alternative sources of water, and any preventative measures the consumer should take until the violation is corrected. Each notice shall include the telephone number of the owner, operator, or designee of the public water system as a source of additional information. Where appropriate, the notice shall be multi-lingual.

17.7 ***Records***

a) Records of analyses performed by the water purveyor shall be maintained by the water purveyor. The records shall contain the following information:

1. The time, date, and place of sampling and the name of the sample collector;

2. The sampling point and the reason for collection;

3. Date analysis started and completion date if more than one day is needed;

4. Name of laboratory and person responsible for performing the analysis;

5. The analytical technique or method used; and

6. The results of the analysis.

b) Records of microbiological examinations shall be readily available for at least 5 years and records of nitrate analyses and turbidity determinations shall be readily available for 10 years. Any written document relating to a sanitary survey of a public water system shall be kept for at least 10 years.

c) Records of action taken to correct a violation of these regulations shall be kept for at least 3 years after the last action taken with respect to the particular violation involved.

d) Records concerning a variance or exemption granted to a system shall be kept for at least 5 years following the expiration date of such variance or grant.

October 25, 2001
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Section 18.0 ***Fee Schedule***

18.1 Pursuant to the amended section 46-13-3 of the General Laws Chapter 46-13, entitled "Public Drinking Water Supply", the Director is authorized to charge fees to support the collection and analysis of samples that are required to meet the minimum monitoring requirements for public drinking water supplies.

18.2 Any Public Drinking Water Supply for which analytical and collection services are provided by the R.I. Department of Health to meet the minimum monitoring requirements for public drinking water is liable for payment of the fee for these services.

18.3 The fee for each chemical, radiological and microbiological test required and conducted by the Division of Laboratories shall be reasonable and shall be determined on the basis of current costs for conducting the analysis. Such cost shall include administrative, personnel, equipment and such other related costs which may be incurred in the analysis. The laboratory fee schedule is listed in table 18-1.

18.4 The fee for each collection of each sample by the Division of Drinking Water Quality shall be reasonable and shall be determined on the basis of current costs for such service. The current sampling fee is $21.00. Sampling fees will be assessed for each on-site visit to the supply for the purpose of collecting samples. It is the responsibility of the purveyor to make the necessary operational arrangement for sampling. Scheduled on-site visits canceled in the field because of lack of proper operational arrangement will be assessed the sampling fee for the visit and any subsequent visit.

18.5 Payment for scheduled services will be required on the due date. The Department of Health will provide bills approximately six weeks in advance of the due date. Billing will be on a quarterly basis. Payment shall be made payable to the General Treasurer, State of Rhode Island.

18.6 Services will be provided only if payment in full has been received. It remains the responsibility of the purveyor to meet all compliance testing requirements.

18.7 A surcharge shall be placed on overdue sampling and analysis payments. The surcharge shall be set at the rate of $5.00 per month.

TABLE 18-1

Laboratory Fee Schedule			
Chemical Group	***Analysis Code***	***Test***	***Fee***
Inorganic Chemistry	WL 1	Turbidity	$ 3.00
	WL 2	Sediment	3.00
	WL 3	Odor	3.00
	WL 4	Color	3.00
	WL 5	Total Solids	15.00
	WL 6	Ignition Solids	15.00
	WL 7	Suspended Solids	15.00
	WL 8	Settleable Solids	10.00
	WL 9	% Moisture	8.00
	WL 10	BOD (5 day)	30.00
	WL 11	Cyanide	35.00
	WL 12	Phosphorous (total)	20.00
	WL 13	pH	5.00
	WL 14 (lab)	Residual Chlorine	15.00
	WL 15	Ammonia Nitrogen	15.00
	WL 16	Nitrate	10.00
	WL 56	Nitrite	10.00
	WL 17	Phosphate (ortho)	20.00
	WL 18	Alkalinity	10.00
	WL 19	Aluminum	12.00
	WL 20	Chloride	10.00
	WL 21	Fluoride	12.00
	WL 22	Hardness	15.00
	WL 23	Iron	12.00
	WL 24	Manganese	12.00
	WL 25	Sodium	12.00

Chemical Group	*Analysis Code*	*Test*	*Fee*
	WL 26	Potassium	12.00
Inorganic Chemistry	WL 27	Calcium	12.00
	WL 28	Magnesium	12.00
	WL 29	Sulfate	15.00
	WL 30	Arsenic	17.00
	WL 31	Barium	12.00
	WL 32	Cadmium	17.00
	WL 33a	Chromium (hex)	15.00
	WL 33b	Chromium (total)	17.00
	WL 34	Copper	12.00
	WL 35	Lead	17.00
	WL 36	Mercury	30.00
	WL 37	Nickel	12.00
	WL 38	Selenium	17.00
	WL 39	Silver	17.00
	WL 40	Zinc	12.00
	WL 41	Specific Conductance	10.00
	WL 42	Oil & Grease	30.00
	WL 43	MBAS	35.00
	WL 44	Antimony	17.00
	WL 45	Beryllium	17.00
	WL 46	Turbidity (screen)	3.00
	WL 47	Thallium	17.00
	WL 49	Total Phenol	30.00
	WL 50	Foam Screen	3.00
	WL A	Inorganic Testing	44.00

Chemical Group	*Analysis Code*	*Test*	*Fee*
	WL J	Limited Metals Testing	110.00
	WL K	Limited IOC Testing	51.00
	WL 55	Composited Sodium	22.00
	WL F	Metals	110.00
Volatile Organic Chemistry	TO 2	4 Trihalomethane (THM) and Total Trihalomethane	100.00
	TO 4	Petroleum Hydrocarbons	180.00
	TO 12	Water Quality Volatile Organics	200.00
	TO 14	Other Base Neutral Extractable	200.00
	TO 17	Petroleum Hydrocarbons and TO 12	200.00
	TO 25	Method 525 Organic Compounds by Liquid- Solid Extraction	250.00
Organic Chemistry	PE 4	Carbamates	75.00
	PE 18	Pesticides/PCB's, Method 508	173.00
	PE 14	EDB and DBCP, Method 504	100.00
	PE 19	Chlorinated Acid Herbicides Method 515.2	200.00
Radiological	RA 1	Gross Alpha	27.00
	RA 2	Gross Beta	27.00
Microbiology	SM 1	Total and Fecal Coliform (Non Potable)	25.00
	SM 1a	Total and Fecal Coliform (Potable)	25.00
	SM 2	Total Coliform MF	15.00
	SM 3	Heterotrophic Plate Count	7.00
	SM 35	Fecal Coliform (confirmation)	10.00
	SM 36	Total Coliform PA method	15.00
	SM 34	Total & Focal Coliform (MMO-MUG)	25.00
Sampling	CL 1	Sampling fee (per on site visit)	21.00

Section 19.0 ***Rules Governing Practices and Procedures***

19.1 All hearings and reviews required under the provisions of Chapter 46-13 of the General Laws of Rhode Island, 1956, as amended, shall be held in accordance with the provisions of the rules and regulations promulgated by the Rhode Island Department of Health entitled *Rules and Regulations of the Rhode Island Department of Health Regarding Practices and Procedures Before the Department of Health and Access to Public Records of the Department of Health (R42-35-PP).*

Section 20.0 ***Violations, Noncompliance, and Enforcement***

20.1 In order to obtain and/or maintain any approval, permit, certification, and/or license, compliance with the provisions of the Act and these regulations is required. Failure to comply with these requirements of the Act and/or these regulations shall constitute grounds to revoke, suspend, or otherwise limit or restrict any approval, permit, certification, and/or license issued by the Director. In addition, any person who violates the provisions of Chapter 46-13, or these regulations shall be subject to the penalties and remedies set forth in section 46-13-16 of the Act.

Furthermore, the Director is authorized pursuant to the provisions of sections 46-13-10 and 46-13-12 to issue orders requiring corrective action(s) necessary to provide safe and potable water."

20.2 (a) ***Purpose and Goals***

(1) To assure the protection of public health, safety, and welfare by promoting compliance and deterring noncompliance with the Act, and the rules, regulations, approvals, permits, certification, license and orders adopted pursuant to the Act and these regulations;

(2) To assure that the Department assesses administrative penalties, and otherwise implements the Act and these regulations, lawfully, fairly, and consistently;

(3) To clarify the Department's authority to enforce the Act and the rules, regulations, approvals, permits, and orders adopted pursuant to the Act.

(b) ***Policy***

These regulations promote a policy of assuring the effective enforcement of the Act as administered by the Director and to deter noncompliance with the rules, regulations, approvals, permits, certification, license and orders adopted pursuant to the Act and these regulations:

(1) seeking any appropriate legal and equitable relief, including:

(i) removal of any economic benefit or competitive advantage realized as a direct or indirect result of the violation;

(2) assessing administrative penalties, where appropriate, which:

(i) reflect the nature and gravity of the violation and the potential for harm to the public health;

(ii) reflect the length of time during which the violation was repeated or continued;

(iii) will deter future noncompliance by the person in violation; and

(iv) will encourage continued compliance by persons similarly regulated;

(3) seeking from any person found to be in violation, those additional or extraordinary costs which are actually expended by the Director during the course of the investigation and enforcement of noncompliance for which the State of Rhode Island is not otherwise reimbursed other than non-overtime personnel costs; and

(4) pursuing any other lawful enforcement option necessary to achieve compliance.

(c) ***Application***

(1) These regulations shall be liberally construed to permit the Department to effectuate the purposes of the Act.

(2) These regulations shall apply to all persons subject to enforcement action by the Department under the Act, and the rules, regulations, approvals, permits, certification, license and orders adopted pursuant to the Director's authority hereunder.

(3) These regulations shall be applied in a manner that is consistent with or more stringent than any applicable Federal program requirements for delegated programs.

(d) ***Enforcement Options***

The Director may pursue any combination of administrative and judicial enforcement actions depending upon the circumstances and gravity of each case. The penalty and remedies prescribed by the Act (section 46-13-16) shall be deemed to be concurrent and the existence of an exercised remedy shall not prevent the Director from exercising any other remedy.

(e) ***Preconditions for Assessment of Administrative Penalty***

An administrative penalty may be assessed only for a violation or a failure to comply that, at the time it occurred, constituted noncompliance with a legal requirement:

(1) which was then in effect; and

(2) to which the person was then subject; and

(3) to which these regulations apply.

(f) ***Assessment of Administrative Penalty - Penalty Ceiling***

No penalty shall exceed the maximum penalty allowed by the Act. The maximum administrative penalty which the Director has the authority to impose under the Act is $5000.00 per violation per day.

(1) A penalty may be assessed "per day," multi-day violations are counted from the initial day of noncompliance until compliance is achieved.

(2) A penalty may be assessed "per violation", multiple violations of the same law, rule, regulation, permit approval, certification, license or order are counted as separate violations if any violation:

(i) involves a prohibited act which is distinguishable from any other by the nature of the act itself; or

(ii) involves a prohibited act which is distinct from any other by the time or place of its commission; or

(iii) involves a prohibited act which is distinct from any other by definition; or

(iv) presents a risk of harm to the public health, safety or welfare which is distinguishable from the risk threatened by any other violation.

(3) Each day following service of a Notice of Violation, or Immediate Compliance Order or Cease and Desist Order, to which the Director is a party, during which a violation is repeated, continued or remains in place, constitutes a continuing violation. The Director may assess an additional administrative penalty, not to exceed five thousand dollars ($5,000) for each day the violation or failure to comply is repeated, continued or remains in place.

(4) The penalty imposed shall continue to accrue from the day the Notice of Violation, Immediate Compliance Order or Cease and Desist Order is issued until compliance is achieved.

(g) ***Assessment of Administrative Penalty - Calculation***

The amount of the penalty will be calculated based on the factors enumerated below.

(1) The penalty may be based on the gravity of the violation. That portion will be calculated according to the "DWQ Penalty Matrix" (See Appendix 3). The applicable penalty range is reached by first determining the "Type of Violation" and the "Deviation from the Standard" of the alleged violation.

(i) "Type of Violation" - refers to the nature of the legal requirement allegedly violated.

(A) Type I violations - Type I violations include violations of legal requirements identified by the Director as directly related to the protection of the public health. Such violations include, but are not necessarily limited to, exceeding any MCL, failure to adhere to new source approval requirements or plan requirements, and/or any failure to comply with an order of the Director which is presently enforceable.

(B) Type II violations also have a direct impact on public health, but are mainly non-compliance with technical safeguards. Such violations include but are not limited to failure to monitor as required, failure to comply with reporting requirements, and failure to make public notice.

(C) Type III violations have an indirect impact on public health and are generally related to poor record keeping. Such violations include, but are not limited to failure to submit monitoring reports, late submittal of monitoring reports, and failure to keep records on file as required.

(ii) "Deviation from the Standard" - refers to the degree to which the violation is out of compliance with the legal requirement allegedly violated. The Deviation from the Standard may be determined without consideration of the factors enunciated below in cases of strict liability. In all other cases, the Department's assessment of whether a violation is a minor, moderate or major deviation from the standard is based upon an evaluation of one or more of the following factors except to the extent already considered:

(A) the degree to which the act or failure to act was from compliance;

(B) whether the person took reasonable and appropriate steps to prevent and/or mitigate the non-compliance;

(C) whether the person has previously failed to comply with any regulations, order, permit or approval issued or adopted by the Department.

(D) the degree of willfulness or negligence, including but not limited to, how much control the violator had over the occurrence of the violation and whether the violation was foreseeable;

(E) any other factor(s) that may be relevant in determining the amount of a penalty, provided that said other factor(s) shall be set forth in the Notice of Violation or other written notice of the assessment of a penalty.

(2) ***The Economic Benefit from Non-Compliance***

The penalty shall include an amount intended to offset the economic benefit of non-compliance.

(i) Such an amount may include, but not be limited to:

(A) the cost of complying;

(B) the cost of equipment needed to comply;

(C) any associated operation and maintenance costs;

(D) the costs of studies needed to achieve compliance;

(E) any other delayed or avoided costs including, interest, market or competitive advantage over other regulated entities which are in compliance.

(ii) The economic benefit portion may not be included in the penalty only if:

(A) there is no identifiable benefit from non-compliance; or

(B) the amount of economic benefit cannot be quantified.

(3) The penalty shall include additional or extraordinary costs which are incurred by the Director during the course of the investigation and enforcement of noncompliance for which the State of Rhode Island is not otherwise reimbursed other than non-overtime personnel costs.

(4) Nothing herein shall preclude the Director from resolving the outstanding penalty through a Consent Agreement at any time he or she deems appropriate.

(h) ***Assessment of Administrative Penalty - Hearing***

(1) Any person against whom the Director seeks to assess an administrative penalty for a violation of a law, rule, regulation, approval, license, certification, or order which is within the Director's authority and responsibility to enforce, has the right to request a hearing thereon. The request for a hearing must be filed with the Director within thirty (30) days after service of the notice assessing said penalty.

(2) If a timely request for a hearing is made, a hearing shall be conducted in accordance with Section 42-35 of the General Laws of Rhode Island, 1956, as amended.

(3) Judicial review of any final decision of the administrative hearing officer shall be available in accordance with Section 42-35-15 of the General Laws of Rhode Island, 1956, as amended.

(i) ***Assessment of Administrative Penalty - Enforcement***

The Department's proposal of an administrative penalty shall become a final order of the Director upon the person's election to waive, or failure to timely request, an administrative hearing on the violation and/or the penalty. Each day during which the person fails to pay said penalty or otherwise fails to comply with a final order of the Director constitutes a separate and distinct violation. An additional administrative penalty, not to exceed five thousand dollars ($5,000) for each such violation of a final order, may be assessed by the Director.

The Director may also, by summons and complaint, seek to enforce said final order in the Superior court for Providence County.

(j) These regulations shall not be construed to govern any enforcement action which is commenced by the Director prior to the formal adoption of these regulations, or any administrative appeal taken therefrom, except that they shall apply to all unresolved monitoring and public notice violations as of the effective date of these regulations.

Section 21.0 ***Severability***

21.1 If any provision of the rules and regulations herein or the application thereof to any facility or circumstances shall be held invalid, such invalidity shall not affect the provisions or application of the rules and regulations which can be given effect, and to this end the provisions of the rules and regulations are declared to be severable.

October 25, 2001
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SECTION I

A. ***Microbiological Testing***

Reference for Section 5.0 - Surface Water and Ground Water Under the Influence of Surface Water - Section 5.0

1. Public water systems conducting analyses for total coliforms, fecal coliforms, and heterotrophic bacteria, on surface water sources or ground water under the influence of surface water, as required in Section 5.0 of these regulations, must perform these analyses in accordance with one of the following analytical methods and by using analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600\R-94-173, October 1994, which is available at NTIS PB95-104766.

2. ***Total Coliforms:***

a) Total Coliform Fermentation Technique [3,4,5]
Citation[1] 9221 A,B,C

b) Total Coliform Membrane Filter Technique
Citation[1] 92222 A,B,C

c) ONPG-MUG Test [6]
Citation[1] 9223

3. ***Fecal Coliforms*:**

a) Fecal Coliform MPN Procedure [7]
Citation[1] 9221 E

b) Fecal Coliforms Membrane Filter Procedure
Citation[1] 9222 D

4. ***Hetrotropic Bacteria:***[2]

a) Pour Plate Method
Citation[1] 9215B

B. ***Microbiological Testing*** **- for Distribution Samples including Storage Facilities and Ground Water Sources Regulation Sections 16.4 and 17.1**

1. The presence or absence of total coliform need o nly be determined. The total coliform density is not required.

2. The standard sample volume for total coliform analysis, regardless of the analytical method used is 100ml.

3. Public Water systems must conduct total coliform analyses in accordance with one of the analytical methods in the following table.

I) ***Total Coliforms*:**[8]

aa) Total Coliform Fermentation Technique [3,4,5]
Citation[1] 9221 A,B

bb) Total Coliform Membrane Filter Technique
Citation[1] 92222 A,B,C

cc) Presence-Absence (P-A) Coliform Test [5,9]
Citation[1] 92221 D

dd) ONPG-MUG Test [6]
Citation[1] 9223

ee) Colisure Test [10]

4. Public Water systems must conduct fecal coliform analysis in accordance with the following procedure. When the MTF Technique or Presence-Absence (PA) Coliform Test is used to test for total coliforms, shake the lactose-positive presumptive tube or P-A vigorously and transfer the growth with a sterile 3-mm loop or sterile applicator stick into brilliant green lactose bile broth and EC medium to determine the presence of total and fecal coliforms, respectively. For EPA-approved analytical methods which use a membrane filter, transfer the total coliform-positive culture by one of the following methods: remove the membrane containing the total coliform colonies from the substrate with a sterile forceps and carefully curl and insert the membrane into a tube of EC medium (the laboratory may first remove a small portion of selected colonies for verification), swab the entire membrane filter surface with a sterile cotton swab and transfer the inoculum to EC medium (do not leave the cotton swab in the EC medium), or inoculate individual total coliform-positive colonies into EC Medium. Gently shake the inoculated tubes of EC medium to insure adequate mixing and incubate in a waterbath at 44.5 ± 0.2 C for 24 ± 2 hours. Gas production of any amount in the inner fermentation tube of the EC medium indicates a positive fecal coliform test. The preparation of EC medium is described in the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, Method 9221E-p. 9-52, paragraph la. Public water systems need only determine the presence or absence of fecal coliforms; a determination of fecal coliform density is not required.

5. Public water systems must conduct analysis of Escherichia coli in accordance with one of the following analytical methods:

(i) EC medium supplemented with 50 ug/ml of 4-methylumbelliferyl-beta-D-glucuronide (MUG) (final concentration). EC medium is described in the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, Method 9221E--p.9-52, paragraph la. MUG may be added to EC medium before autoclaving. EC medium supplemented with 50 ug/ml of MUG is commercially available. At least 10 ml of EC medium supplemented with MUG must be used. The inner inverted fermentation tube may be omitted. The procedure for transferring a total coliform-positive culture to EC medium supplemented with MUG shall be as specified in paragraph (4) of this section for transferring a total coliform-positive culture to EC medium. Observe fluorescence with an ultraviolet light (366 nm) in the dark after incubating tube at 44.5 $\pm$ 0.2 C for 24 $\pm$ 2 hours; or

(ii) Nutrient agar supplemented with 100 ug/ml 4-methlymbelliferyl-beta-D-glucuronide (MUG) (final concentration). Nutrient Agar is described in the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, p.9-47 to 9-48. This test is used to determine if a total coliform-positive same, as determined by the Membrane Filter Technique or any other method in which a membrane filter is used, contains E. coli. Transfer the membrane filter containing a total coliform colony(ies) to nutrient agar supplemented with 100 ug/ml (final concentration) of MUG. After incubating the agar plate at 35 C for 4 hours, observe the colony(ies under ultraviolet light (366 nm) in the dark for fluorescence. If fluorescence is visible, E. coli are present.

(iii) Minimal Medium ONPG-MUG (MMO-MUG) Test, as set forth in the article "National Field Evaluation of a Defined Substrate Method for the Simultaneous Detection of Total Coliforms and Escherichia coli from Drinking Water: Comparison with Presence-Absence Techniques" (Edgerg et al.), Applied and Environmental Microbiology, Volume 55, pp. 1003-1008, April 1989. (Note: The Autoanalysis Colilert System is an MMO-MUG test). If the MMO-MUG test is total coliform-positive after a 24-hour incubation, test the medium for fluorescence with a 366-nm ultraviolet light (preferably with a 6-watt lamp) in the dark. If fluorescence is observed, the sample is E. coli-positive. If fluorescence is questionable (cannot be definitely read) after 24 hours incubation, incubate the culture for an additional four hours(but not to exceed 28 hours total), and again test the medium for fluorescence. The MMO-MUG Test with hepes buffer in lieu of phosphate buffer is the only approved formulation for the detection of E. coli.

(iv) The Colisure Test. A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730.

6. As an option to the Minimal Medium ONPG-MUG (MMO-MUG) Test, as set forth in paragraph 5(iii) above, a system with a total coliform positive, MUG-negative, MMO-MUG test may further analyze the culture for the presence of E. coli by transferring a 0.1 ml, 28-hour MMO-MUG culture to EC Medium + MUG with a pipet. The formulation and incubation conditions of EC Medium + MUG, and observation of results are described in paragraph 5(i) above.

C. ***Invalidation of Samples***

1. A total coliform sample invalidated under this paragraph does not count towards meeting the minimum monitoring requirements of this section.

2. The director will invalidate a total coliform-positive sample and document same in writing only if:

i) The laboratory establishes that improper sample analysis caused the total coliform-positive result,

ii) The director determines that the total coliform-positive sample resulted from a domestic or other non-distribution system plumbing problem.

iii) The director has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the distribution system. (In this case, the system must still collect all repeat samples required .

3. A total coliform-positive sample will not be invalidated solely on the grounds that all repeat samples are total coliform negative.

4. A laboratory must invalidate a total coliform sample, unless total coliforms are detected, if

i) the sample produces a turbid culture in the absence of gas production using the method cited in section 16.4 b) 4) a);

ii) the sample produces a turbid culture in the absence of an acid reaction; using the method cited in section 16.4 b) 4) c).

iii) it exhibits confluent growth, or produces colonies too numerous to count, using the method cited in section 16.4 b) 4) b).

5. If a laboratory invalidates a sample for the above reasons, the system must collect another sample from the same location as the original sample within 24 hours of being notified of the result. The system must continue to re-sample within 24 hours and have the samples analyzed until it obtains a valid result. The director may extend the 24-hour limit on a case-by-case basis if the system has a logistical problem in collecting the repeat samples within 24 hours that is beyond its control. In the case of a extension, the director will specify how much time the system has to collect the repeat samples.

Footnotes:

[1] Except where noted all methods refer to the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

[2] The time from sample collection to initiation of analysis may not exceed 8 hours.

[3] Lactose broth, as commercially available, may be used in lieu of lauryl tryptose broth, if the system conducts at least 25 parallel tests between this medium and lauryl tryptose broth using the water normally tested, and this comparison demonstrates that the false-positive are for total coliforms, using lactose broth, is less than 10 percent.

[4] Media should cover inverted tubes at least one-half to two-thirds after the sample is added.

[5] No requirement exists to run the completed phase on 10 percent of all total coliform-positive confirmed tubes.

[6] The ONPG-MUG Test is also known as the Autoanalysis Colilert System.

[7] A-1 Broth may be held up to three months in a tightly closed screwcap tube at 4 C.

[8] The time from sample collection to initiation of analysis may not exceed 30 hours.

[9] Six-times formulation strength may be used if the medium is filter-sterilized rather than autoclaved.

[10] The Colisure Test must be incubated for 28 hours before examining the results. If an examination of the results at 28 hours is not convenient, then results may be examined at any time between 28 hours and 48 hours. A description of the Colisure Test may be obtained from the Millipore Corporation, Technical Services Department, 80 Ashby Road, Bedford, MA 01730.

SECTION II

A. *Inorganic Chemistry*

References for Sections 5.0, 6.0, 16.1 and 17.2 of the Regulations

1. ***Surface Water Treatment Rule Monitoring***

a) Public water systems which must conduct analyses to meet the requirements of Section 5.0 for turbidity, temperature and measure residual disinfectant concentrations must use the methods contained in the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992 with other analytical test procedures are contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994, which is available at NTIS PB95-104766. Residual disinfectant concentrations for free chlorine and combined chorine also may be measured by used DPD colorimetric test kits. Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision remain same. Instruments used for continuous monitoring must be calibrated with a grab sample measurement at least every five days, or with a protocol approved by the Director.

2. ***Residual Disinfectant Concentration*:**

a) ***Free Chlorine*:**

(i) Amperometric Titrationation Technique.
Citation 4500-Cl D

(ii) DPD Ferrous Titrimetric.
Citation 4500-Cl F

(iii) DPD Colorimetric.
Citation 4500-Cl G

(iv) Syringaldazine(FACTS).
Citation 4500-Cl H

b) ***Total Chlorine*:**

(i) Amperometric Titrationation Technique.
Citation 4500-Cl D

(ii) Amperometric Titrationation (low level measurement).
Citation 4500-Cl E

(iii) DPD Ferrous Titrimetric.
Citation 4500-Cl F

(iv) DPD Colorimetric.
Citation 4500-Cl G

(v) Iodometric Electrode.
Citation 4500-Cl I

c) *Chlorine Dioxide*:

(i) Amperometric Titrationation Technique.
Citation 4500-ClO_2 C

(ii) DPD Method
Citation 4500-ClO_2 D

(iii) Amperometric Titrationation.
Citation 4500-ClO_2 E

d) *Ozone*:

(i) Indigo Method.
Citation 4500-O_3 B

3. *Turbidity*:

a) Nephelometric Method
Citation[1] 2130 B

b) Nephelometric Method.
Citation[8] 180.1

c) Great Lakes Instruments
Citation[9] Method 2

***Footnotes*:**

1 Except where noted all methods refer to the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

8 "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811

9 GLI Method 2. "Turbidity", November 2, 1992, Great Lakes Instruments, Inc., 8855 North 56th Street, Milwaukee, Wisconsin 53223.

4. ***Regulated Inorganic Chemical Monitoring***

a) ***Methodology***

i) Public water systems conducting analyses of inorganic chemicals as required in Sections 6.0, 16.0 and 17.0 of these regulations shall conduct these analyses in accordance with one of the following analytical methods or their equivalent as determined by EPA. Criteria for analyzing arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, selenium, sodium, and thallium are contained in Technical Notes on Drinking Water Methods, EPA-600\R-94-173, October 1994, which is available at NTIS PB95-104766.

Contaminant	**Methodology**	**EPA**	**ASTM[3]**	**SM[4]**	**Other**	**Minimum Detection Limit (mg/l)**
Antimony	ICP-Mass Spectrometry	[2]200.8				0.0004
	Hydride-Atomic Absorption	……..	D-3697-92			0.001
	Atomic Absorption; Platform	[2]200.9				0.0008
	Atomic Absorption; Furnance	……..		3113B		0.003
Arsenic	Inductively Coupled Plasma	[2]200.7		3120B.		
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
	Atomic Absorption; Furnace	……..	D-2972-93C	3113B.		
	Hydride Atomic Absorption	……..	D-2972-93B	3114B.		
Asbestos	Transmission Electron Microscopy	[9]100.1				0.01 MFL
	Transmission Electron Microscopy	[10]100.2				0.01 MFL
Barium	Inductively Coupled Plasma	[2]200.7		3120B.		0.002
	ICP-Mass Spectrometry	[2]200.8				0.002
	Atomic Absorption; Direct	……..		3111D.		0.1
	Atomic Absorption; Furnace	……..		3113B.		0.002
Beryllium	Inductively Coupled Plasma	[2]200.7		3120B.		0.0003
	ICP-Mass Spectrometry	[2]200.8				0.0003
	Atomic Absorption; Platform	[2]200.9				0.00002
	Atomic Absorption; Furnace	……..	D-3645-93B	3113B.		0.0002
Cadium	Inductively Coupled Plasma	[2]200.7				0.001

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other	Minimum Detection Limit (mg/l)
	ICP-Mass Spectrometry	[2]200.8				0.001
	Atomic Absorption; Platform	[2]200.9				
	Atomic Absorption; Furnace	……..		3113B.		0.0001
Chromium	Inductively Coupled Plasma	[2]200.7		3120B.		0.007
	ICP-Mass Spectrometry	[2]200.8				0.007
	Atomic Absorption; Platform	[2]200.9				
	Atomic Absorption; Furnace	……..		3113B.		0.001
Cyanide	Manual Distillation followed by	……..		4500-CN-C.		
	Spectrophotometric, Amenable	……..	D2036-91B	4500CN-G.		0.02
	Spectrophotometric Manual	……..	D2036-91A	4500-CN-E	[5]1-3300-85	0.02
	Semi-automated	[6]335.4				0.005
	Selective Electrode	……..		4500CN-F.		0.05
Fluoride	Ion Chromatography	[6]300.0	D4327-91	4110B.		
	Manual Distill.;Color. SPADNS	……..		4500F-B,D.		1.0
	Manual Electrode	……..	D1179-93B	4500F-C.		1.0
	Automated Electrode	……..		……..	[11]380-75WE	1.0
	Automated Alizarin	……..		4500F-E	[11]129-71W	1.0
Mercury	Manual, Cold Vapor	[2]245.1	D3223-91	3112B.		0.0002
	Automated, Cold Vapor	[1]245.2				0.0002
	ICP-Mass Spectrometry	[2]200.8				
Nickel	Inductively Coupled Plasma	[2]200.7		3120B.		0.005
	ICP-Mass Spectrometry	[2]200.8				0.0005
	Atomic Absorption; Platform	[2]200.9				0.0006
	Atomic Absorption; Direct	……..		3111B.		
	Atomic Absorption; Furnace	……..		3113B.		0.001
Nitrate	Ion Chromatography	[6]300.0	D4327-91	4110B	[8]B-1011	0.01
	Automated Cadmium Reduction	[6]353.2	D3867-90A	4500-NO_3-F.		0.05
	Ion Selective Electrode	……..		4500-NO_3-D	[7]601	1
	Manual Cadmium Reduction		D3867-90B	4500-NO_3-E.		0.01

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other	Minimum Detection Limit (mg/l)
Nitrite	Ion Chromatography	[6]300.0	D4327-91	4110B	[8]B-1011	0.004
	Automated Cadmium Reduction	[6]353.2	D3867-90A	4500-NO_3-F.		0.05
	Manual Cadmium Reduction	……..	D3867-90B	4500-NO_3-E.		0.01
	Spectrophotometric	……..		4500-NO_2-B.		0.01
Selenium	Hydride-Atomic Absorption	……..	D3859-93-A	3114B.		0.002
	ICP-Mass Spectrometry	[2]200.8				
	Atomic Absorption; Platform	[2]200.9				
	Atomic Absorption; Furnace	……..	D3859-93B	3113B.		0.002
Thallium	ICP-Mass Spectrometry	[2]200.8				0.0003
	Atomic absorption, furnance	279.2		3113B		0.001
	Atomic Absorption; Platform	[2]200.9				0.0007
Lead	Atomic absorption; furnace	……..	D3559-90D	3113B.		
	ICP-Mass Spectrometry	[2]200.8				
	Atomic absorption; platform	[2]200.9				
Copper	Atomic absorption; furnace	……..	D1688-90C	3113B.		
	Atomic absorption; direct aspiration	……..	D1688-90A	3111B.		
	ICP	[2]200.7		3120B		
	ICP-Mass spectrometry	[2]200.8				
	Atomic absorption; platform	[2]200.9				
pH	Electrometric	[1]150.1	D1293-84	4500-H^+-B.		
		[1]150.2				
Conductivity	Conductance	……..	D1125-91A	2510-B.		
Calcium	EDTA titrimetric	……..	D511-93A	3500-Ca-D.		
	Atomic absorption; direct aspiration	……..	D511-93B	3111B.		
	Inductively-coupled plasma	[2]200.7		3120B.		
Alkalinity	Titrimetric	……..	D1067-92B	2320B.		
	Electrometric titration	……..			[5]1-1030-85	
Orthophosphate[12]	Colorimetric, automated, ascorbic acid	[6]365.1		4500-P-F.		

Contaminant	Methodology	EPA	ASTM[3]	SM[4]	Other	Minimum Detection Limit (mg/l)
	Colorimetric, ascorbic acid, single reagent	…….	D515-88A	4500-P-E		
	Colorimetric, phosphomolybdate;	…….		…….	[5]1-1601-85	
	Automated-segmented flow;	…….		…….	[5]1-2601-90	
	Automated discrete	…….		…….	[5]1-2598-85	
	Ion Chromatography	[6]300.0	D4327-91	4110		
Silica	Colorimetric, molybdate blue;	…….		…….	[5]1-1700-85	
	automated-segmented flow	…….		…….	[5]1-2700-85	
	Colormetric	…….	D859-88			
	Molybdosilicate	…….		4500-Si-D.		
	Heteropoly blue	…….		4500-Si-E.		
	Automated method for molybdate-reactive silica	…….		4500-Si-F.		
	Inductively-coupled plasma	[2]200.7		3120B.		
Temperature	Thermometric	…….		2550		
Sodium	Inductively-coupled plasma	[2]200.7				
	atomic absorption; direct aspiration			3111B.		

***FOOTNOTES*:**

1 Methods 150.1, 150.2 and 245.2 are available from US EPA, EMSL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983, which is available at NTIS, PB84-128677.

2 "Methods for the Determination of Metals in Environmental Samples--Supplement I", EPA-600/R-94-111, May 1994. Available at NTIS, PB 94-184942.

3 The procedures shall be done in accordance with the Annual Book of ASTM Standards, 1994, Vols. 11.01 and 11.02, American Society for Testing and Materials. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a)and 1 CFR Part 51. Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capital Street, NW, Suite 700, Washington, DC.

4 The procedures shall be done in accordance with the 18th edition of *Standard Methods for the Examination of Water and Wastewater* 1992, American Public Health Association. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street, NW, Washington, DC

20005. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW, Suite 700, Washington, DC.

[5] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

[6] "Methods for the Determination of Inorganic Substances in Environmental Samples", EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

[7] The procedure shall be done in accordance with the Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water", July 1994, PN 221890-001, Analytical Technology, Inc. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CRF Part 51. Copies may be obtained from ATI Orion, 529 Main Street, Boston, MA 02129. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capital Street, NW, Suite 700, Washington, DC.

[8] Method B-1011, "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography", Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Miliford, MA 01757.

[9] Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water", EPA-600/4-83-043, EPA, September 1983. Available at NTIS, PB83-260471.

[10] Method 100.2, "Determination of Asbestos Structure Over 10µm in Length in Drinking Water", EPA-600/R-94-134, June 1994. Available at NTIS, PB94-201902.

[11] The procedures shall be done in accordance with the Industrial Method No. 129-71W, "Fluoride in Water and Wastewater", December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater", February 1976, Technicon Industrial Systems. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CRF Part 51. Copies may be obtained from the Technicon Industrial Systems, Tarrytown, NY 10591. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW, Washington, DC 20460; or at the Office of the Federal Register, 800 North Capital Street, NW, Suite 700, Washington, DC.

[12] Unfiltered, no digestion or hydrolysis.

b) ***Sampling Protocol***

i) Sample collection for the inorganic chemicals listed below shall be conducted using the sample preservation containers and maximum holding time procedures specified as follows:

Antimony:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

***Arsenic*:**

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass

Time: ASAP but not over 6 months

Asbestos:

Preservative: Cool 4°C
Container: Plastic or glass

***Barium*:**

Preservative: cool,4° C
Container: Plastic or glass
Time: ASAP but not over 6 months

Beryllium:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Cadmium:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Chromium:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Cyanide:

Preservative: Cool 4° C NaOH to pH $\geq$ 12 (6g Ascorbic acid if chlorine is present)
Container: Plastic or glass
Time: ASAP, but not over 14 days

Fluoride:

Preservative: None
Container: Plastic or glass
Time: ASAP, but not over 1 month

Mercury:

Preservative: Con. HNO_3 to pH <2

Container: Plastic or glass
Time: ASAP but not over 28 days

Nickel:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Nitrate:

Preservative:	Chlorinated - Cool, 4°C
	Non-Chlorinated - Con H_2SO_4 to pH <2
Container:	Chlorinated - Plastic or glass
	Non-Chlorinated - Plastic or glass
Time:	Chlorinated - ASAP but not over 28 days
	Non-Chlorinated - ASAP but not over 14 days

Nitrite:

Preservative: Cool, 4°C
Container: Plastic or glass
Time: ASAP but not over 48 hours

Selenium:

Preservative: Con. HNO_2 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Thallium:

Preservative: Con. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months

Lead:

Preservative: Conc. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not over 6 months
NOTE: The technique applicable to total metals must be used and samples cannot be filtered.

Copper:

Preservative: Conc. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP but not more than 6 months
NOTE: The technique applicable to total metals must be used and samples cannot be filtered.

pH:

Preservative: None
Container: Plastic or glass
Time: Test immediately

Conductivity:

Preservative: Cool, 4°C
Container: Plastic or glass
Time: ASAP, but not more than 28 days

Calcium:

Preservative: Conc. HNO_3 to pH <2
Container: Plastic or glass
Time: ASAP, but not more than 6 months

***Alkalinity*:**

Preservative: Cool, 4°C
Container: Plastic or glass
Time: ASAP, but not more than 14 days

***Orthophosphate**:*

Preservative: Cool, 4°C
Container: Plastic or glass
Time: ASAP but not more than 48 hours

Silica:

Preservative: Cool, 4°C
Container: Plastic only
Time: ASAP but not more than 28 days

Sodium:

Container: Plastic or glass

Temperature:

Preservative: None
Container: Plastic or glass
Time: Test immediately

Turbidity:

Preservative: Cool 4^{o} C
Container: Plastic or glass
Time: ASAP but not over 48 hours

Note: **For approved analytical procedures for metals, the technique applicable to total metals must be used.**

c) ***Acceptance Criteria***

(i) For a laboratory to receive certification to conduct analyses for the inorganic chemicals listed in Appendix 1 Section II (4) (a) of these regulations, the laboratory must

(ii) Analyze Performance Evaluation samples which include those substances provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the State.

(iii) Achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	***Acceptance limit***
Antimony	$\pm$30 at $\geq$0.006 mg/1
Asbestos	2 standard deviations based on study statistics
Barium	$\pm$15% at $\geq$0.15 mg/1
Beryllium	$\pm$15% at $\geq$0.001 mg/1
Cadmium	$\pm$20% at $\geq$0.002 mg/1
Chromium	$\pm$15% at $\geq$0.01 mg/1
Cyanide	$\pm$25% at $\geq$0.1 mg/1
Fluoride	$\pm$10% at $\geq$1 to 10 mg/1
Mercury	$\pm$30% at $\geq$0.0005 mg/1
Nickel	$\pm$15% at $\geq$0.01 mg/1
Nitrate	$\pm$10% at $\geq$0.4 mg/1
Nitrite	$\pm$15% at $\geq$0.4 mg/1
Selenium	$\pm$20% at $\geq$0.01 mg/1
Thallium	$\pm$30% at $\geq$0.002 mg/1

Lead: $\pm$30 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.005 mg/L. The Practical Quantitation Level, or PQL for lead is 0.005 mg/L.

Copper: $\pm$10 percent of the actual amount in the Performance Evaluation sample when the actual amount is greater than or equal to 0.050 mg/L The Practical Quantitation Level, or PQL for copper is 0.03 mg/L.

Achieve method detection limits as follows for lead and copper:
Lead: 0.001 mg/L must be achieved (only if source water compositing is done under S6.23(a)(4)).
Copper: 0.001 mg/L or 0.020 mg/L when atomic absorption direct aspiration is used (only if source water compositing is done under S6.23(a)(4).

iv) The Director has the authority to allow the use of previously collected monitoring data for purposes of monitoring, if the data were collected and analyzed in accordance with the requirements of this subpart for lead and copper monitoring.

v) All lead and copper levels measured between the PQL and MDL must be with reported as measured or they can be reported as one-half the PQL (0.0025mg/L). All levels below the lead and copper MDLs must be reported as zero.

vi) All copper levels measured between the PQL and MDL must be either reported as measured or they can be reported as one-half the PQL (0.015 mg/L). All levels below the copper MDL must be reported as zero.

4. ***Special Inorganic Chemical Monitoring***

a. System monitoring for the unregulated inorganic contaminant sulfate shall use one of the method(s) identified below:

i) EPA Method 300.0, and 375.2.2 are in Methods for the Determination of Inorganic Substances in Environmental Samples", EPA600/R-93-100, August 1993 Available at NTIS, PB94-121811

ii) Method D4327-91 shall be done in accordance with the Annual book of ASTM Standards, 1994, Vol. 11.01 and 11.02, American Society for Testing and Materials, 1961 Race Street, Philadelphia, PA 19103.

iii) Method 4110, 4500-SO_4-F and 4500-SO_4-C,D shall be followed in accordance with the Standard Methods for the Examination of Water and Wastewater 18th Edition Supplement, 1992, American Public Health Association. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Site 700, Washington DC.

SECTION II

B *Volatile Organic Chemistry (Voc's)*

References for Sections 16.2, 16.6, 17.3 and 17.5 of the Regulations

1. *Regulated Volatile Organic Chemicals*

a) ***Methodology***

(i) Public water systems conducting analyses of inorganic chemicals as listed below and as required in Section 16.0 and 17.0 of these regulations shall conduct these analyses in accordance with one of the following analytical methods or their equivalent as determined by EPA:

aa) Method 502.2 is in "Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991.

bb) Method 551 is in Methods for the Determination of Organic Compounds in Drinking Water--Supplement I, EPA-600-4-90-020, July 1990.

cc) Method 524.2 is in Methods for the Determination of Organic Compounds in Drinking Water -- Supplement II, EPA-600/R-92-129, August 1992.

Contaminant	***Method***
Benzene	502.2, 524.2.
Carbon tetrachloride	502.2, 524.2, 551.
Chlorobenzene	502.2, 524.2
1,2-Dichlorobenzene	502.2, 524.2.
1,4-Dichlorobenzene	502.2, 524.2.
1,2-Dichloroethane	502.2, 524.2.
Cis-Dichloroethylene	502.2, 524.2.
Trans-dichloroethylene	502.2, 524.2.
Dichloromethane	502.2, 524.2.
1,2-Dichloropropane	502.2, 524.2.
Ethylbenzene	502.2, 524.2.
Styrene	502.2, 524.2.

Tetrachloroethylene	502.2, 524.2, 551.
1,1,1-Trichloroethane	502.2, 524.2, 551.
Contaminant	***Method***
Trichloroethylene	502.2, 524.2, 551.
Toluene	502.2, 524.2.
1,2,4-Trichlorobenzene	502.2, 524.2.
1,1-Dichloroethylene	502.2, 524.2.
1,1,2-Trichloroethane	502.2, 524.2.
Vinyl chloride	502.2, 524.2.
Xylenes (total)	502.2, 524.2.

b. ***Certification Criteria***

(i) To receive certification to conduct analyses for the contaminants listed in Appendix 1 Section II B (1), above the laboratory must:

(ii) Analyze Performance Evaluation samples which include these substances provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the State.

(iii) Achieve the quantitative acceptance limits under paragraphs (iv) and (v) of this section for at least 80 percent of the regulated organic chemicals listed in ref.

(iv) Achieve quantitative results on the analyses performed under paragraph (ii) of this section that are within $\pm$20% of the actual amount of the substances in the Performance Evaluation sample when the actual amount is greater than or equal to 0.010 mg/1.

(v) Achieve quantitative results on the analyses performed under paragraph (ii) of this section that are within $\pm$40 percent of the actual amount of the substances in the Performance Evaluation sample when the actual mount is less than 0.010 mg/1.

(vi) Achieve a method detection limit of 0.0005 mg/1.

(vii) To receive certification for vinyl chloride, the laboratory must:

aa) Analyze Performance Evaluation samples provided by EPA Environmental Monitoring Systems Laboratory or equivalent samples provided by the State.

bb) Achieve quantitative results on the analyses performed under paragraph ref of this section that are within ±40 percent of the actual amount of vinyl chloride in the Performance Evaluation sample.

cc) Achieve a method detection limit of 0.0005 mg/1.

dd) Obtain certification for the contaminants listed in above.

2. ***Total Trihalomethane Chemistry***

a. ***Methodology***

i) Sampling and analyses made pursuant to Section 16.0 shall be conducted by the total trihalomethane methods as listed below and in Technical Notes on Drinking Water Methods, EPA-600\R-94-173, October 1994, which is available at NTIS PB95-104766.

aa) Method 502.2 is in "Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991.

bb) Method 551 is in Methods for the Determination of Organic Compounds in Drinking Water--Supplement I, EPA-600-4-90-020, July 1990.

cc) Method 524.2 is in Methods for the Determination of Organic Compounds in Drinking Water -- Supplement II, EPA-600/R-92-129, August 1992.

3. ***Unregulated Contaminants and Special Monitoring***

a. ***Unregulated Volatile Organic Contaminants Methodology***

i) Analysis for the unregulated contaminants listed in Section 16.6 shall be conducted using EPA Methods 502.2 or 524.2, or their equivalent as determined by EPA, except analysis for bromodichloromethane, bromoform, chlorodibromomethane and chloroform may be conducted by EPA Method 551, and analysis for 1,2,3-trichloropropane also may be conducted by EPA Method 504.1. A source for the EPA methods is listed below:

aa) Method 502.2 is in "Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991.

bb) Method 524.2 is in Methods for the Determination of Organic Compounds in Drinking Water -- Supplement II, EPA-600/R-92-129, August 1992.

cc) Method 551 is in Methods for the Determination of Organic Compounds in Drinking Water--Supplement I, EPA-600-4-90-020, July 1990.

dd) EPA Method 504.1 is available from US EPA EMSL, Cincinnati OH 45268.

4. ***Compositing of Samples:***

All samples must be composited in the laboratory and analyzed within fourteen (14) days of collection.

a. The following procedure must be followed for the compositing samples prior to GC analysis.

i) Add 5 ml or equal larger amounts of each sample (up to 5 samples are allowed) to a 25 ml glass syringe. Special precautions must be made to maintain zero headspace in the syringe.

ii) The samples must be cooled at 4°C during this step to minimize volatilization losses.

iii) Mix well and draw out a 5-ml aliquot for analysis.

iv) Follow sample introduction, purging, and desorption steps described in the method.

v) If less than five samples are used for compositing, a proportionately small syringe may be used.

b. The following procedure must be followed for the compositing samples prior to GC/MS analysis.

i) Inject 5-ml or equal larger amounts of each aqueous sample (up to 5 samples are allowed) into a 25-ml purging device using the sample introduction technique described in the method.

ii) The total volume of the sample in the purging device must be 25 ml.

iii) Purge and desorb as described in the method.

SECTION II

C. *Synthetic Organic Chemistry (Soc's)*

References for Sections 16.2, 16.7, 17.3 and 17.5 of the Regulations

1. *Regulated Synthetic Organic Chemicals*

a. ***Methodology***

(i) Public water systems conducting analyses of the inorganic chemicals listed below as required in Section 16.0 and 17.0 of these regulations shall conduct these analyses in accordance with one of the following analytical methods or their equivalent as determined by EPA.

(ii) Methods 505, 507, 508, 508A, 515.1 and 531.1 are in "Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991.

(iii) Methods 506, 547, 550, 550.1 and 551 are in Methods for the Determination of Organic Compounds in Drinking Water--Supplement I, EPA-600-4-90-020, July 1990.

(iv) Methods 515.2, 524.2, 548.1, 549.1, 552.1 and 555 are in Methods for the Determination of Organic Compounds in Drinking Water-- Supplement II, EPA-600/R-92-129, August 1992.

(v) Method 1613 is titled "Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope-Dilution HRGC/HRMS", EPA-821-B-94-005, October 1994.

The documents referenced in items ii to v above are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-207703 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

vi) EPA Methods 504.1, 508.1 and 525.2 are available from US EPA EMSL, Cincinnati OH 45268.

vii) Methods 6651 and 6610 shall be followed in accordance with the 18th edition of Standard Methods for the Examination of Water and Wastewater, 1992, American Public Health Association. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW., Washington DC 299995. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.

Other analytical test procedures are contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994, NTIS PB95-104766. This document also contains approved analytical methods which will not be acceptable after July 1, 1996.

Synthetic Organic Chemicals

Contaminant	***Method***
2,3,7,8-TCDD (dioxin)	1613
2,4-D	515.2, 555, 515.1.
2,4,5-TP (Silvex)	515.2, 555, 515.1.
Alachlor	505[1], 507, 525.2, 508.1.
Atrazine	505[1], 507, 525.2, 508.1.
Benzo(a)pyrene	525.2, 550, 550.1.
Carbofuran	531.1, 6610.
Chlordane	505, 508, 525.2, 508.1.
Dalapon	552.1, 515.1.
Di(2-ethylhexyl) adipate	506, 525.2.
Di(2-ethylhexyl) phthalate	506, 525.2.
Dibromochloropropane (DBCP)	504.1, 551.
Dinoseb	515.2, 555, 515.1.
Diquat	549.1.
Endothall	548.1.
Endrin	505, 508, 525.2, 508.1.
Ethylene dibromide (EDB)	504.1, 551.
Glyphosate	547, 6651.
Heptachlor	505, 508, 525.2, 508.1.
Heptachlor Epoxide	505, 508, 525.2, 508.1.
Hexachlorobenzene	505, 508, 525.2, 508.1.
Hexachlorocyclopentadiene	505, 525.2, 508, 508.1.
Lindane	505, 508, 525.2, 508.1.

Contaminant	*Method*
Methoxychlor	505, 508, 525.2, 508.1.
Oxamyl	531.1, 6610.
PCBs[2](as decachlorobiphenyl)	508A.
(as Aroclors)	505, 508.
Pentachlorophenol	515.2, 525.2, 555, 515.1.
Picloram	515.2, 555, 515.1.
Simazine	505[1], 507, 525.2, 508.1.
Toxaphene	505, 508, 525.2.
Total Trihalomethanes	502.2, 524.2, 551.

[1] A nitrogen-phosphorous detector should be substituted for the electron capture detector in Method 505 (or another approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.

[2] PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl.

(ix) Polychlorinated biphenyls (PCBs) (as decachlorobiphenyl)

aa) Analysis for PCBs shall be conducted as follows using either Method 505 or Method 508.

bb) If PCBs (as one of seven Aroclors) are detected (as designated in this paragraph) in any sample analyzed using Method 505 or 508, the system shall reanalyze the sample using Method 508A to quantitate PCBs (as decachlorobiphenyl).

Aroclor	*Detection limit (mg/l)*
1016	0.00008
1221	0.02
1232	0.0005
1242	0.0003
1248	0.0001
1254	0.0001
1260	0.0002

cc) Compliance with the PCB MCL shall be determined based upon the quantitiative results of analysis using Method 508A.

b. ***Laboratory Criteria***

i. Analysis under this section shall only be conducted by laboratories that have received certification by EPA or the State and have met the following conditions:

(aa) To receive certification to conduct analyses for the contaminants in B, (SOC's) above the laboratory must:

(i-a) Analyze Performance Evaluation samples which include those substances provided by EPA Environmental Monitoring and Support Laboratory or equivalent samples provided by the State.

(i-b) Achieve quantitative results on the analyses that are within the following acceptance limits:

Contaminant	***Acceptance Limits (percent)***
Alachlor	±45.
Aldicarb	2 standard deviations
Aldicarb sulfoxide	2 standard deviations
Aldicarb sulfone	2 standard deviations
Atrazine	±45.
Benzo(a)oyrene	2 standard deviations
Carbofuran	±45.
Chlordane	±45.
Dalapon	2 standard deviations
Di(2-ethylhexyl)adipate	2 standard deviations
Dibromochloropropane (DBCP)	±40
2,3,7,8-TCDD (Dioxin)	2 standard deviations
2,4-D	±50
2,4,5-TP (Silvex)	±50
Di(2-ethylhexyl)phthalate	2 standard deviations
Dinoseb	2 standard deviations
Diquat	2 standard deviations
Endothall	2 standard deviations
Endrin	±30
Ethylene dibromide (EDB)	±40

Contaminant	*Acceptance Limits (percent)*
Glyphosate	2 standard deviations
Heptachlor	±45
Heptachlor epoxide	±45
Hexachlorobenzene	2 standard deviations
Hexachloro-cyclopentadiene	2 standard deviations
Lindane	±45
Methoxychlor	±45
Oxamyl	2 standard deviations
PCBs (as Decachlorobiphenyl)	0-200
Picloram	2 standard deviations
Pentachlorophenol	±50
Simazine	2 standard deviations
Toxaphene	±45
2,4,5-TP (Silvex)	±50

bb) Detection shall be defined as greater than or equal to the following concentrations for each contaminant:

Contaminant	*Detection Limit (mg/L)*
Alachlor	0.0002
Aldicarb	0.0005
Aldicarb sulfoxide	0.0005
Aldicarb sulfone	0.0008
Atrazine	0.0001
Benzo(a)oyrene	0.00002
Carbofuran	0.0009
Chlordane	0.0002
Dalapon	0.001
Di(2-ethylhexyl)adipate	0.0006
Dibromochloropropane (DBCP)	0.00002
2,3,7,8-TCDD (Dioxin)	0.000000005

Contaminant	*Detection Limit (mg/L)*
2,4-D	0.0001
2,4,5-TP (Silvex)	0.0002
Di(2-ethylhexyl)phthalate	0.0006
Dinoseb	0.0002
Diquat	0.0004
Endothall	0.009
Endrin	0.00001
Ethylene dibromide (EDB)	0.00001
Glyphosate	0.006
Heptachlor	0.00004
Heptachlor eqoxide	0.00002
Hexachlorobenzene	0.0001
Hexachloro-cyclopentadiene	0.0001
Lindane	0.00002
Methoxychlor	0.0001
Oxamyl	0.002
PCBs (as Decachlorobiphenyl)	0.0001
Picloram	0.0001
Pentachlorophenol	0.00004
Simazine	0.00007
Toxaphene	0.001

2. ***Special Monitoring***

a. ***Methodology***

i) Systems shall monitor for the unregulated organic contaminants listed in 16.7 and referenced in Section 17.5 using the method(s) identified below and using the analytical test procedures contained in Technical Notes on Drinking Water Methods, EPA-600/R-94-173, October 1994, which is available at NTIS, PB95-104766.

Contaminants	*Method*
aldicarb	531.1, 6610.

Contaminants	*Method*
aldicarb sulfone	531.1, 6610.
aldicarb sulfoxide	531.1, 6610.
aldrin	505, 508, 525.2, 508.1
butachlor	507, 525.2
carbaryl	531.1, 6610.
dicamba	515.2, 555, 515.1.
dieldrin	505, 508, 525.2, 508.1
3-hydroxycarbofuran	531.1, 6610.
methomyl	531.1, 6610.
metolachlor	507, 525.2, 508.1.
metribuzin	507, 525.2, 508.1.
propachlor	508, 525.2, 508.1.

ii) Methods 505, 507, 508, 515.1 and 531.1 are in "Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991.

iii) Methods 515.2, and 555 are in Methods for the Determination of Organic Compounds in Drinking Water -- Supplement II, EPA-600/R-92-129, August 1992.

The documents referenced in ii & iii above, are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-207703 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161.

iv) Method 6610 shall be followed in accordance with the Standard Methods for the Examination of Water and Wastewater 18th Edition Supplement, 1994, American Public Health Association. Copies may be obtained from the American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Site 700, Washington DC.

v) EPA Methods 508.1 and 525.2 are available from US EPA EMSL, Cincinnati OH 45268.

SECTION II

D. ***Radiological Chemistry***

Reference for Section 16.5 of the Regulations.

1. The methods specified in Interim Radiochemical Methodology for Drinking Water, Environmental Monitoring and Support Laboratory, EPA-600/4-75-008, USEPA, Cincinnati, Ohio 45268, or those listed below, are to be used to determine compliance with S16.5 (radioactivity) except in cases where alternative methods have been approved by the Director.

   a) Gross Alpha and Beta-Method 302 "Gross Alpha and Beta Radioactivity in Water" Standard Methods for the Examination of Water and Wastewater, 13th Edition, American Public Health Association, New York, NY.,1971.

   b) Total Radium--Method 304 "Radium in Water by Precipitation" Ibid.

   c) Radium-226--Method 305 "radium-226 by Radon in Water" Ibid.

   d) Strontium-89, 90 -- Method 303 "Total Strontium and Strontium-90 in Water" Ibid.

   e) Tritium--Method 306 "Tritium in Water" Ibid.

   f) Cesium-134 -- ASTM D-2459 "Gamma Spectrometry in Water, " 1975 Annual Book of ASTM Standards, water and Atmospheric Analysis, Part 31, American Society for Testing and Materials, Philadelphia, PA. (1975).

   g) Uranium-ASTM D-2907 "Microquantities of Uranium in Water by Fluorometry," Ibid.

2. When the identification and measurement of radionuclides other than those listed in paragraph (1) of this section is required, the following references are to be used, except in cases where alternative methods have been approved by the Director.

   a) Procedures for Radiochemical Analysis of Nuclear Reactor Aqueous Solutions, H.L. Krieger and S. Gold, EPA-R4-73-014. USEPA, Cincinnati, Ohio, May 1973.

   b) HASL Procedure Manual, Edited by John H. Harley. HASL 300, ERDA Health and Safety Laboratory, New York, NY., 1973.

3. For the purpose of monitoring radioactivity concentrations in drinking water, the required sensitivity of the radioanalysis is defined in terms of a detection limit. The detection limit shall be that concentration which can be counted with a precision of plus or minus 100 percent at the 95 percent confidence level (1.96 σ where σ is the standard deviation of the net counting rate of the sample).

a) To determine compliance with 16.5 b, Radium 226 & 228, the detection limit shall not exceed 1 pCi/1. To determine compliance with 16.5 b, the detection limit shall not exceed 3 pCi/1.

b) To determine compliance with 16.5 b, Gross Alpha activity including Radium 226 but excluding Radon and Uranium, the detection limits shall not exceed the concentrations listed in Table B.

TABLE B--Detection Limits for Man-made Beta Particle and Photon Emitters

Radionuclide	***Detection Limit***
Tritium	1,000 pCi/l
Strontium-89	10 pCi/l
Strontium-90	2 pCi/l
Iodine-131	1 pCi/l
Cesium-134	10 pCi/l
Gross beta	4 pCi/l
Other radionuclides	1/10 of the applicable limit

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APPENDIX 2

MANDATORY HEALTH EFFECTS INFORMATION

The following language must be included, word for word, in any notice involving a violation related to one of the twelve following contaminants.

1) ***1,1-Dichloroethylene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,1-dichloroethylene is a health concern at certain levels of exposure. This chemical is used n industry and is found in drinking water as a result of the breakdown of related solvents. The solvents are used as cleaners and degreasers of metals and generally get into drinking water by improper waste disposal. This chemical has been shown to cause liver and kidney damage in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals which cause adverse effects in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standards for 1,1-dichloroethylene at 0.007 parts per million (ppm) to reduce the risk of these adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

2) ***1,1,1-Trichloroethane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,1,1-trichloroethane is a health concern at certain levels of exposure. This chemical is used as a cleaner and degreaser of metals. It generally gets into drinking water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and circulatory system of laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during their working careers also suffered damage to the liver, nervous system, and circulatory system. Chemicals which cause adverse effects among exposed industrial workers and in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for 1,1,1-trichloroethane at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

3) ***1,2-Dichloroethane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2-dichloroethane is a health concern at certain levels of exposure. This chemical is used as a cleaning fluid for fats, oils, waxes, and resins. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for 1,2-dichloroethane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory

animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

4) ***Benzene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that benzene is a health concern at certain levels of exposure. This chemical is used as a solvent and degreaser of metals. It is also a major component of gasoline. Drinking water contamination generally results from leaking underground gasoline and petroleum tanks or improper waste disposal. This chemical has been associated with significantly increased risks of leukemia among certain industrial workers who were exposed to relatively large amounts of this chemical during their working careers. This chemical has also been shown to cause cancer in laboratory animals when the animals are exposed at high levels over their lifetimes. Chemicals that cause increased risk of cancer among exposed industrial workers and in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for benzene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

5) ***Carbon tetrachloride:*** The United States Environmental protection Agency (EPA) sets drinking water standards and has determined that carbon tetrachloride is a health concern at certain levels of exposure. This chemical was once a popular household cleaning fluid. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for carbon tetrachloride at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

6) ***Fecal coliforms/E. coli***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of fecal coliforms or E. coli is a serious health concern. Fecal coliforms and E. coli are generally not harmful themselves, but their presence in drinking water is serious because they usually are associated with sewage or animal wastes. The presence of these bacteria in drinking water is generally a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possible jaundice, and associated headaches and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set an enforceable drinking water standard for fecal coliforms and E. coli to reduce the risk of these adverse health effects. Under this standard all drinking water samples must be free of these bacteria. Drinking water

which meets this standard is associated with little or none of this risk and should be considered safe. State and local health authorities recommend that consumers take the following precautions: (To be inserted by the public water system, according to instructions from State authorities).

7) ***Fluoride:*** Contact the RI Department of Health, Division of Drinking Water Quality for required health effects language.

8) ***Microbiological contaminants:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of microbiological contaminants are a health concern at certain levels of exposure. If water is inadequately treated, microbiological contaminants in that water may cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possible jaundice, and any associated headaches and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set enforceable requirements for treating drinking water to reduce the risk of these adverse health effects. Treatment such as filtering and disinfecting the water removes or destroys microbiological contaminants. Drinking water which is treated to meet EPA requirements is associated with little to none of this risk and should be considered safe.

9) ***Para-dichlorobenzene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that para-dichlorobenzene is a health concern at certain levels of exposure. This chemical is a component of deodorizers, moth balls, and pesticides. It generally gets into drinking water by improper waste disposal. The chemical has been shown to cause liver and kidney damage in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals which cause adverse effects in laboratory animals also may cause adverse health effects in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for para-dichlorobenzene at 0.075 parts per million (ppm) to reduce the risk of these adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

10) ***Total coliforms:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that the presence of total coliforms is a possible health concern. Total coliforms are common in the environment and are generally not harmful themselves. The presence of these bacteria in drinking water, however, generally is a result of a problem with water treatment or the pipes which distribute the water, and indicates that the water may be contaminated with organisms that can cause disease. Disease symptoms may include diarrhea, cramps, nausea, and possible jaundice, and any associated headaches and fatigue. These symptoms, however, are not just associated with disease-causing organisms in drinking water, but also may be caused by a number of factors other than your drinking water. EPA has set an enforceable drinking water standard for total coliforms to reduce the risk of these adverse health effects. Under this standard,

no more than 5.0 percent of the samples collected during a month can contain these bacteria, except that systems collecting fewer than 40 samples/month that have one total coliform-positive sample per month are not violating the standard. Drinking water which meets this standard is usually not associated with a health risk from disease-causing bacteria and should be considered safe.

11) ***Trichloroethylene***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that trichloroethylene is a health concern at certain levels of exposure. This chemical is a common metal cleaning and dry cleaning fluid. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set forth the enforceable drinking water standard for trichloroethylene at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

12) ***Vinyl chloride:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that vinyl chloride is a health concern at certain levels of exposure. This chemical is used in industry and is found in drinking water as a result of the breakdown of related solvents. The solvents are used as cleaners and degreasers of metals and generally get into drinking water by improper waste disposal. This chemical has been associated with significantly increased risks of cancer among certain industrial workers who were exposed to relatively large amounts of this chemical during their working careers. This chemical has also been shown to cause cancer in laboratory animals when the animals are exposed at high levels over their lifetimes. Chemicals that cause increased risk of cancer among exposed industrial workers and in laboratory animals also may increase the risk of cancer in humans who are exposed at lower levels over long periods of time. EPA has set the enforceable drinking water standard for vinyl chloride at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in humans and laboratory animals. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

13) ***Asbestos:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that asbestos fibers greater than 10 micrometers in length are a health concern at certain levels of exposure. Asbestos is a naturally occurring mineral. Most asbestos fibers in drinking water are less than 10 micrometers in length and occur in drinking water from natural sources and from corroded asbestos-cement pipes in the distribution system. The major uses of asbestos were in the production of cements, floor tiles, paper products, paint, and caulking; in transportation-related applications; and in the production of textiles and plastics. Asbestos was once a popular insulating and fire retardant material. Inhalation studies have shown that various forms of asbestos have produced lung tumors in laboratory animals. The available information on the risk of

developing gastrointestinal tract cancer associated with the ingestion of asbestos from drinking water is limited. Ingestion of intermediate-range chrysotile asbestos fibers greater than 10 micrometers in length is associated with causing benign tumors in male rats. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for asbestos at 7 million long fibers per liter to reduce the potential risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to asbestos.

14) ***Barium:*** The United States Environmental protection Agency (EPA) sets drinking water standards and has determined that barium is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in some aquifers that serve as sources of ground water. It is also used in oil and gas drilling muds, automotive paints, bricks, tiles and jet fuels. It generally gets into drinking water after dissolving from naturally occurring minerals in the ground. This chemical may damage the heart and cardiovascular system, and is associated with high blood pressure in laboratory animals such as rats exposed to high levels during their lifetimes. In humans, EPA believes that effects from barium on blood pressure should not occur below 2 parts per million (ppm) in drinking water. EPA has set the drinking water standard for barium at 2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to barium.

15) ***Cadmium:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cadmium is a health concern at certain levels of exposure. Food and the smoking of tobacco are common sources of general exposure. This inorganic metal is a contaminant in the metals used to galvanize pipe. It generally gets into water by corrosion of galvanized pipes or by improper waste disposal. This chemical has been shown to damage the kidney in animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the kidney. EPA has set the drinking water standard for cadmium at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cadmium.

16) ***Chromium:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chromium is a health concern at certain levels of exposure. This inorganic metal occurs naturally in the ground and is often used in the electroplating of metals. It generally gets into water from runoff from old mining operations and improper waste disposal from plating operations. This chemical has been shown to damage the kidney, nervous system, and the circulatory system of laboratory animals such as rats and mice when the animals are exposed at high levels. Some humans who were exposed to high levels of this chemical suffered liver and kidney damage,

dermatitis and respiratory problems. EPA has set the drinking water standard for chromium at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chromium.

17) ***Mercury:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that mercury is a health concern at certain levels of exposure. This inorganic metal is used in electrical equipment and some water pumps. It usually gets into water as a result of improper waste disposal. This chemical has been shown to damage the kidney of laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for mercury at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to mercury.

18) ***Nitrate:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrate poses an acute health concern at certain levels of exposure. Nitrate is used in fertilizer and is found in sewage and wastes from human and/or farm animals and generally gets into drinking water from those activities. Excessive levels of nitrate in drinking water have caused serious illness and sometimes death in infants under six months of age. The serious illness in infants is caused because nitrate is converted to nitrite in the body. Nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly in infants. In most cases, health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. Clearly, expert medical advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking standard at 10 parts per million (ppm) for nitrate to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrite at 1 ppm. To allow for the fact that the toxicity of nitrate and nitrite are additive, EPA has also established a standard for the sum of nitrate and nitrite at 10 ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrate.

19) ***Nitrite:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nitrite poses an acute health concern at certain levels of exposure. This inorganic chemical is used in fertilizers and is found in sewage and wastes from human and/or farm animals and generally gets into drinking water as a result of those activities. While excessive levels of nitrite in drinking water have not been observed, other sources of nitrite have caused serious illness and sometimes death in infants under six months of age. The serious illness in infants is caused because nitrite interferes with the oxygen carrying capacity of the child's blood. This is an acute disease in that symptoms can develop rapidly. However, in most cases, health deteriorates over a period of days. Symptoms include shortness of breath and blueness of the skin. Clearly, expert medical

advice should be sought immediately if these symptoms occur. The purpose of this notice is to encourage parents and other responsible parties to provide infants with an alternate source of drinking water. Local and State health authorities are the best source for information concerning alternate sources of drinking water for infants. EPA has set the drinking water standard at 1 part per million (ppm) for nitrite to protect against the risk of these adverse effects. EPA has also set a drinking water standard for nitrate (converted to nitrite in humans) at 10 ppm and for the sum of nitrate and nitrite at 10 ppm. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to nitrite.

20) ***Selenium:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that selenium is a health concern at high levels of exposure. Selenium is also an essential nutrient at low levels of exposure. This inorganic chemical is found naturally in food and soils and is used in electronics, photocopy operations, the manufacture of glass, chemicals, drugs, and as a fungicide and a feed additive. In humans, exposure to high levels of selenium over a long period of time has resulted in a number of adverse health effects, including a loss of feeling and control in the arms and legs. EPA has set the drinking water standard for selenium at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to selenium.

21) ***Acylamide:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that acrylamide is a health concern at certain levels of exposure. Polymers made from acrylamide are sometimes used to treat water supplies to remove particulate contaminants. Acrylamide has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. Sufficiently large doses of acrylamide are known to cause neurological injury. EPA has set the drinking water standard for acrylamide using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of acrylamide in the polymer and the amount of the polymer which may be added to drinking water to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to acrylamide.

22) ***Alachlor:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that alachlor is a health concern at certain levels of exposure. This organic chemical is a widely used pesticide. When soil and climatic conditions are favorable, alachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water

standard for alachlor at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to alachlor.

23) ***Aldicarb:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb at 0.003 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb.

24) ***Aldicarb sufloxide:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfoxide is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfoxide in ground water is primarily a breakdown product of aldicarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfoxide may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfoxide at 0.004 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfoxide.

25) ***Aldicarb sulfone***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that aldicarb sulfone is a health concern at certain levels of exposure. Aldicarb is a widely used pesticide. Aldicarb sulfone is formed from the breakdown of aldicarb and is considered for registration as a pesticide under the name aldoxycarb. Under certain soil and climatic conditions (e.g., sandy soil and high rainfall), aldicarb sulfone may leach into ground water after normal agricultural applications to crops such as potatoes or peanuts or may enter drinking water supplies as a result of surface runoff. This chemical has been shown to damage the nervous system in laboratory animals such as rats and dogs exposed to high levels. EPA has set the drinking water standard for aldicarb sulfone at 0.002 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to aldicarb sulfone.

26) ***Atrazine***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that atrazine is a health concern at certain levels of exposure. This organic chemical is a herbicide. When soil and climatic conditions are favorable,

atrazine may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to affect offspring of rats and the heart of dogs. EPA has set the drinking water standard for atrazine at 0.003 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to atrazine.

27) ***Carbofuran:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that carbofuran is a health concern at certain levels of exposure. This organic chemical is a pesticide. When soil and climatic conditions are favorable, carbofuran may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the nervous and reproductive systems of laboratory animals such as rats and mice exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical during their working careers also suffered damage to the nervous system. Effects on the nervous system are generally rapidly reversible. EPA has set the drinking water standard for carbofuran at 0.04 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to carbofuran.

28) ***Chlordane***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that chlordane is a health concern at certain levels of exposure. This organic chemical is a pesticide used to control termites. Chlordane is not very mobile in soils. It usually gets into drinking water after application near water supply intakes or wells. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for chlordane at 0.002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to chlordane.

29) ***Dibromochloropropane (DBCP)***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that DBCP is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, dibromochloropropane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for DBCP at 0.0002 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to DBCP.

30) ***o-Dichlorobenzene***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that o-dichlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent in the production of pesticides and dyes. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and the blood cells of laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, nervous system, and circulatory system. EPA has set the drinking water standard for o-dichlorobenzene at 0.6 parts per million (pm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to o-dichlorobenzene.

31) ***cis-1,2-Dichloroethylene***: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that cis-1,2-dichloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for cis-1,2-dichloroethylene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to cis-1,2-dichloroethylene.

32) ***trans-1,2-Diochloroethylene***: The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that trans-1,2-diochloroethylene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and intermediate in chemical production. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, nervous system, and the circulatory system of laboratory animals such as rats and mice when exposed at high levels over their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for trans-1,2-diochloroethylene at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to trans-1,2-diochloroethylene.

33) ***1,2-Dichloropropane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 1,2-dichloropropane is a health concern at certain levels of exposure. This organic chemical is used as a solvent and pesticide. When soil and climatic conditions are favorable, 1,2-dichloropropane may get into drinking water by runoff into surface water or by leaching into ground water. It may also get into drinking

water through improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for 1,2-dichloropropane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 1,2-dichloropropane.

34) ***2,4-D***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4-D is a health concern at certain levels of exposure. This organic chemical is used as a herbicide and to control algae in reservoirs. When soil and climatic conditions are favorable, 2.4-D may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for 2, 4-D at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4-D.

35) ***Epichlorohydrin:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that epichlorohydrin is a health concern at certain levels of exposure. Polymers made from epichlorohydrin are sometimes used in the treatment of water supplies as a flocculent to remove particulates. Epichlorohydrin generally gets into drinking water by improper use of these polymers. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for epichlorohydrin using a treatment technique to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. This treatment technique limits the amount of epichlorohydrin in the polymer and the amount of the polymer which may be added to drinking water as a flocculent to remove particulates. Drinking water systems which comply with this treatment technique have little to no risk and are considered safe with respect to epichlorohydrin.

36) ***Ethylbenzene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined ethylbenzene is a health concern at certain levels of exposure. This organic chemical is a major component of gasoline. It generally gets into water by improper waste disposal or leaking gasoline tanks. This chemical has been shown to damage the kidney, liver, and nervous system of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for ethylbenzene at 0.7 part per million (ppm) to protect against the risk of these adverse

health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to ethylbenzene.

37) ***Ethylene dibromide (EDB):*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that EDB is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, EDB may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for EDB at 0.00005 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to EDB.

38) ***Heptachlor:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standards for heptachlor at 0.0004 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor.

39) ***Heptachlor epoxide:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that heptachlor epoxide is a health concern at certain levels of exposure. This organic chemical was once a popular pesticide. When soil and climatic conditions are favorable, heptachlor epoxide may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standards for heptachlor epoxide at 0.0002 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to heptachlor epoxide.

40) ***Lindane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that lindane is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are

favorable, lindane may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and immune system of laboratory animals such as rats, mice and dogs exposed at high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system and circulatory system. EPA has established the drinking water standard for lindane at 0.0002 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to lindane.

41) ***Methoxychlor***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that methoxychlor is a health concern at certain levels of exposure. This organic chemical is used as a pesticide. When soil and climatic conditions are favorable, methoxychlor may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver, kidney, nervous system, and reproductive system of laboratory animals such as rats exposed at high levels during their lifetimes. It has also been shown to produce growth retardation in rats. EPA has set the drinking water standard for methoxychlor at 0.04 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to methoxychlor.

42) ***Monochlorobenzene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that monochlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a solvent. It generally gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. EPA has set the drinking water standard for monochlorobenzene at 0.1 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to monochlorobenzene.

43) ***Polychlorinated biphenyls (PCBs):*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that polychlorinated biphenyls (PCBs) are a health concern at certain levels of exposure. These organic chemicals were once widely used in electrical transformers and other industrial equipment. They generally get into drinking water by improper waste disposal or leaking electrical industrial equipment. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for PCBs at 0.0005 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to PCBs.

44) ***Pentachlorophenol:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that pentachlorophenol is a health concern at certain levels of exposure. This organic chemical is used as a wood preservative, herbicide, disinfectant, and defoliant. It generally gets into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to produce adverse reproductive effects and to damage the liver and kidneys of laboratory animals such as rats exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the liver and kidneys. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed to high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for pentachlorophenol at 0.001 parts per million (ppm) to protect against the risk of cancer or other adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to pentachlorophenol.

45) ***Styrene***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that styrene is a health concern at certain levels of exposure. This organic chemical is commonly used to make plastics and is sometimes a component of resins used for drinking water treatment. Styrene may get into drinking water from improper waste disposal. This chemical has been shown to damage the liver and nervous system in laboratory animals when exposed at high levels during their lifetimes. EPA has set the drinking water standard for styrene at 0.1 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to styrene.

46) ***Tetrachloroethylene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that tetrachloroethylene is a health concern at certain levels of exposure. This organic chemical has been a popular solvent, particularly for dry cleaning. It generally gets into drinking water by improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for tetrachloroethylene at 0.005 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to tetrachloroethylene.

47) ***Toluene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toluene is a health concern at certain levels of exposure. This organic chemical is used as a solvent and in the manufacture of gasoline for airplanes. It generally gets into water by improper waste disposal or leaking underground storage tanks. This chemical has been shown to damage the kidney, nervous system, and

circulatory system of laboratory animals such as rats and mice exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the liver, kidney and nervous system. EPA has set the drinking water standard for toluene at 1 part per million (ppm) to protect against the risk of adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to toluene.

48) ***Toxophene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that toxaphene is a health concern at certain levels of exposure. This organic chemical was once a pesticide widely used on cotton, corn, soybeans, pineapples and other crops. When soil and climatic conditions are favorable, toxaphene may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for toxaphene at 0.003 part per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water that meets this standard is associated with little to none of this risk and is considered safe with respect to toxaphene.

49) ***2,4,5-TP:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that 2,4,5-TP is a health concern at certain levels of exposure. This organic chemical is used as a herbicide. When soil and climatic conditions are favorable, 2,4,5-TP may get into drinking water by runoff into surface water or by leaching into ground water. This chemical has been shown to damage the liver and kidney of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some industrial workers who were exposed to relatively large amounts of this chemical during working careers also suffered damage to the nervous system. EPA has set the drinking water standard for 2,4,5-TP at 0.05 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little to none of this risk and is considered safe with respect to 2,4,5-TP.

50) ***Xylenes:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that xylene is a health concern at certain levels of exposure. This organic chemical is used in the manufacture of gasoline for airplanes and as a solvent for pesticides, and as a cleaner and degreaser of metals. It usually gets into water by improper waste disposal. This chemical has been shown to damage the liver, kidney and nervous system of laboratory animals such as rats and dogs exposed to high levels during their lifetimes. Some humans who were exposed to relatively large amounts of this chemical also suffered damage to the nervous system. EPA has set the drinking water standard for xylene at 10 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water that meets the EPA standard is associated with little no none of this risk and is considered safe with respect to xylene.

51) ***Lead:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that lead is a health concern at certain exposure levels. Materials that contain lead have frequently been used in the construction of water supply distribution systems, and plumbing systems in private homes and other buildings. The most commonly found materials include service lines, pipes, brass and bronze fixtures, and solders and fluxes. Lead in these materials can contaminate drinking water as a result of the corrosion that takes place when water comes into contact with those materials. Lead can cause a variety of adverse health effects in humans. At relatively low levels of exposure, these effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing and learning abilities of children, and slight increases in the blood pressure of some adults. EPA's national primary drinking water regulation requires all public water systems to optimize corrosion control to minimize lead contamination resulting from the corrosion of plumbing materials. Public water systems serving 50,000 people or fewer that have lead concentrations below 15 parts per billion (ppb) in more than 90% of tap water samples (the EPA "action level") have optimized their corrosion control treatment. Any water system that exceeds the action level must also monitor their source water to determine whether treatment to remove lead in source water is needed. Any water system that continues to exceed the action level after installation of corrosion control and/or source water treatment must eventually replace all lead service lines contributing in excess of 15 ppb of lead to drinking water. Any water system that exceeds the action level must also undertake a public education program to inform consumers of ways they can reduce their exposure to potentially high levels of lead in drinking water.

(52) ***Copper***: The United State Environmental Protection Agency (EPA) sets drinking water standards and has determined that copper is a health concern at certain exposure levels. Copper, a reddish-brown metal, is often used to plumb residential and commercial structures that are connected to water distribution systems. Copper contaminating drinking water as a corrosion by-product occurs as the result of the corrosion of copper pipes that remain in contact with water for a prolonged period of time. Copper is an essential nutrient, but at high doses it has been shown to cause stomach and intestinal distress, liver and kidney damage, and anemia. Persons with Wilson's disease may be at a higher risk of health effects due to copper than the general public. EPA's national primary drinking water regulation requires all public water systems to install optimal corrosion control to minimize copper contamination resulting from the corrosion of plumbing materials. Public water systems serving 50,000 people or fewer that have copper concentrations below 1.3 parts per million (ppm) in more than 90% of tap water samples (the EPA"action level" are not required to install or improve their treatment. Any water system that exceeds the action level must also monitor their source water to determine whether treatment to remove copper is source water is needed.

(53) ***Antimony:*** The United States Environmental Agency (EPA) sets drinking water standards and has determined that antimony is a health concern at certain levels of exposure. This inorganic chemical occurs naturally in soils, ground water and surface waters and is often

used in the flame retardant industry. It is also used in ceramics, glass, batteries, fireworks and explosives. It may get into drinking water though natural weathering of rock, industrial production, municipal waste disposal or manufacturing processes. This chemical has been shown to decrease longevity, and altered blood levels of cholesterol and glucose in laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for antimony of 0.006 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to antimony.

(54) ***Beryllium***: The United State Environmental Protection Agency (EPA) sets drinking water standards and has determined that beryllium is a health concern at certain levels of exposure. This inorganic metal occurs naturally in soils, ground water and surface waters and is often used in electrical equipment and electrical components. It generally gets into water from runoff from mining operations, discharge from processing plants and improper waste disposal. Beryllium compounds have been associated with damage to the bones and lungs and induction of cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. There is limited evidence to suggest that beryllium may pose a cancer rise via drinking water exposure. Therefore, EPA based the health assessment on noncancer effects with an extra uncertainty factor to account for possible carcinogenicity. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for beryllium at 0.004 part per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to beryllium.

(55) ***Cyanide:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that cyanide is a health concern at certain levels of exposure. This inorganic chemical is used in electroplating, steel processing, plastics., synthetic fabrics and fertilizer products. It usually gets into water as a result of improper waste disposal. This chemical has been shown to damage the spleen, brain and liver of humans fatally poisoned with cyanide. EPA has set the drinking water standard for cyanide at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to cyanide.

(56) ***Nickel:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that nickel poses a health concern at certain levels of exposure. This inorganic metal occurs naturally in soils, ground water and surface waters and is often used in electroplating, stainless steel and alloy products. It generally gets into water from mining and refining operations. This chemical has been shown to damage the heart and liver in laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard at 0.1 parts per million (ppm) for nickel to protect against the risk of these adverse effects. Drinking water which meets the EPA

standard is associated with little to none of this risk of these adverse effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to nickel.

(57) ***Thallium:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that thallium is a health concern at certain levels of exposure. This inorganic metal is found naturally in soils and is used in electronics, pharmaceuticals, and the manufacture of glass and alloys. This chemical has been shown to damage the kidney, liver, brain and intestines of laboratory animals when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard to thallium at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to thallium.

(58) ***Benzo[a]pyrene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that benzo[a]pyrene is a health concern at certain levels of exposure. Cigarette smoke and charbroiled meats are common source of general exposure. The major source of benzo[a]pyrene in drinking water is the leaching from coal tar lining and sealants in water storage tanks. The chemical has been shown to cause cancer in animals such as rats and mice when the animals area exposed at high levels. EPA has set the drinking water standard for benzo[a]pyrene at 0.0002 parts per million (ppm) to protect against the risk of cancer. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to benzo[a]pyrene.

(59) ***Dalapon:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dalapon is a health concern at certain levels of exposure. This organic chemical is a widely used herbicide. It may get into drinking water after application to control grasses in crops, drainage ditches and along railroads. This chemical has been shown to cause damage to the kidney and liver in laboratory animals when the animals are exposed to high levels over their lifetimes. EPA has set the drinking water standard for dalapon at 0.2 parts per million (ppm) to protect against the risk and should be considered safe with respect to dalapon.

(60) ***Dichloromethane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dichloromethane (methylene chloride) is a health concern at certain levels of exposure. This organic chemical is a widely used solvent. It is used in the manufacture of paint remover, as a metal degreaser and as an aerosol propellant. It generally gets into drinking water after improper discharge of waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for dichloromethane at 0.005 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking

water which meets this standard is associated with little to none of this risk and should be considered safe with respect to dichloromethane.

(61) ***Di(2-ethylhexyl)adipate:*** The United State Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)adipate is a health concern at certain levels of exposure. Di(2-ethylhexyl)adipate is a widely used plasticizer in a variety of products, including rubber, food packaging materials and cosmetics. It may get into drinking water after improper waste disposal. This chemical has been shown to damage liver and testes in laboratory animals such as rats and mice exposed to high levels. EPA has set the drinking water standard for di(2-ethylhexl)adipate at 0.4 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water which meets the EPA standards is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)adipate.

(62) ***Di(2-ethylhexyl)phthalate:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that di(2-ethylhexyl)phthalate is a health concern at certain levels of exposure. Di(2-ethylhexyl)phthalate is a widely used plasticizer, which is primarily used in the production of polyvinyl chloride (PVC) resins. It may get into drinking water after improper waste disposal. This chemical has been shown to cause cancer in laboratory animals such as rats and mice exposed to high levels over their lifetimes. EPA has set the drinking water standard for di(2-ethylhexyl)phthalate at 0.006 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to di(2-ethylhexyl)phthalate.

(63) ***Dinoseb:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dinoseb is a health concern at certain levels of exposure. Dinoseb is a widely used pesticide and generally gets into drinking water after application on orchards, vineyards and other crops. This chemical has been shown to damage the thyroid and reproductive organs in laboratory animals such as rats exposed to high levels. EPA has set the drinking water standard for dinoseb at 0.007 parts per million (ppm) to protect against the risk of adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to dinoseb.

(64) ***Diquat:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that diquat is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to damage the liver, kidney and gastrointestinal tract and causes cataract formation in laboratory animals such as dogs and rats exposed at high levels over their lifetimes. EPA has set the drinking water standard for diquat at 0.02 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA

standard is associated with little to none of this risk and should be considered safe with respect to diquat.

(65) ***Endothall***: The United States Environmental Protection Agency (EPA) has determined that endothall is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control terrestrial and aquatic weeds. It may get into water by runoff into surface water. This chemical has been shown to damage the liver, kidney, gastrointestinal tract and reproductive system of laboratory animals such as rats and mice exposed at high levels over their lifetimes. EPA has set the drinking water standard for endothall at 0.1 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endothall.

(66) ***Endrin:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that endrin is a health concern at certain levels of exposure. This organic chemical is a pesticide no longer registered for use in the United States. However, this chemical is persistent in treated soils and accumulates in sediments and aquatic and terrestrial biota. This chemical has been shown to cause damage to the liver, kidney and heart in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for enrin at 0.002 parts per million (ppm) to protect against the risk of these adverse health effects which have been observed in laboratory animals. Drinking water that meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to endrin.

(67) ***Glyphosate:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that glyphosate is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control grasses and weeds. It may get into drinking water by runoff into surface water. This chemical has been shown to cause damage to the liver and kidneys in laboratory animals such as rats and mice when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for glyphosate at 0.7 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to glyphosate.

(68) ***Hexachlorobenzene:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that hexachlorobenzene is a health concern at certain levels of exposure. This organic chemical is produced as an impurity in the manufacture of certain solvents and pesticides. This chemical has been shown to cause cancer in laboratory animals are exposed to high levels during their lifetimes. Chemicals that cause cancer in laboratory animals also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for hexachlorobenzene at 0.001 parts per million (ppm) to protect against the risk of cancer and side effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to hexachlorobenzene.

(69) ***Hexachlorocyclopentadiene:*** The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined that hexachlorocyclopentadiene is a health concern at certain levels of exposure. This organic chemical is used as an intermediate int he manufacture of pesticides and flame retardants. It may get into water by discharge from production facilities. This chemical has been shown to damage the kidney and the stomach of laboratory animals when exposed at high levels over their lifetimes. EPA has set the drinking water standard for hexachlorocyclopentadiene at 0.05 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to hexachlorocyclopentadiene.

(70) ***Oxamyl:*** The United States Environmental Protection Agency (EPA) establishes drinking water standards and has determined the oxamyl is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for the control of insects and other pests. It may get into drinking water by runoff into surface water or leaching into ground water. This chemical has been shown to damage the kidneys of laboratory animals such as rats when exposed at high levels over their lifetimes. EPA has set the drinking water standards for oxamyl at 0.2 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to oxamyl.

(71) ***Picloram:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that picloram is a health concern at certain levels of exposure. This organic chemical is used as a pesticide for broadleaf weed control. It may get into drinking water by runoff into surface water or leaching into ground water as a result of pesticide application and improper waste disposal. This chemical has been shown to cause damage to the kidneys and liver in laboratory animals such as rats when the animals are exposed at high levels over their lifetimes. EPA has set the drinking water standard for picloram at 0.5 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to picloram.

(72) ***Simazine***: The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that simazine is a health concern at certain levels of exposure. This organic chemical is a herbicide used to control annual grasses and broadleaf weeds. It may leach into ground water or runs off into surface water after application. This chemical may cause cancer in laboratory animals such as rats and mice exposed at high levels during their lifetimes. Chemicals that cause cancer in laboratory animals may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for simazine at 0.004 parts per million (ppm) to reduce the risk of cancer or other adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to simazine.

(73) ***1,2,4-Trichlorobenzene:*** The United States Protection Agency (EPA) sets drinking water standards and has determined that 1,2,4-trichlorobenzene is a health concern at certain levels of exposure. This organic chemical is used as a dye carrier and as a precursor in herbicide manufacturer. It generally gets into drinking water by discharges from industrial activities. This chemical has been shown to cause damage to several organs, including the adrenal glands. EPA has set the drinking water standard for 1,2,4-trichlorobenzene at 0.07 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,2,4-trichlorobenzene.

(74) ***1,1,2-Trichloroethane:*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined 1,1,2-trichloroethane is a health concern at certain levels of exposure. This organic chemical is an intermediate in the production of 1,1,2-dichloroethylene. It generally gets into water by industrial discharge of wastes. This chemical has been shown to damage the kidney and liver of laboratory animals such as rats exposed to high levels during their lifetimes. EPA has set the drinking water standard for 1,1,2-trichloroethane at 0.005 parts per million (ppm) to protect against the risk of these adverse health effects. Drinking water which meets the EPA standard is associated with little to none of this risk and should be considered safe with respect to 1,1,2-trichloroethane.

(75) ***2,3,7,8-TCDD (Dioxin):*** The United States Environmental Protection Agency (EPA) sets drinking water standards and has determined that dioxin is a health concern at certain levels of exposure. This organic chemical is an impurity in the production of some pesticides. It may get into drinking water by industrial discharge of wastes. This chemical has been shown to cause cancer in laboratory animals such as rats and mice when the animals are at high levels over their lifetimes. Chemicals that cause cancer in laboratory animal also may increase the risk of cancer in humans who are exposed over long periods of time. EPA has set the drinking water standard for dioxin at 0.00000003 parts per million (ppm) to reduce the risk of cancer or other adverse health effects which have been observed in laboratory animals. Drinking water which meets the standard is associated with little to none of this risk and should be considered safe with respect to dioxin.

Recommended Health Effects Language

EPA is in the process of developing final mandatory health effects language for additional contaminants. Until such language is promulgated, recommended language is provided below.

1) ***Turbidity:*** The United States Protection Agency (EPA) sets drinking water standards and has determined that the turbidity of water is a health concern at certain levels of exposure. The turbidity, or cloudiness, of drinking water is a measure of the minute particles suspended in the water that can interfere with disinfection and with testing for bacteria. Excessive turbidity can allow disease-causing organisms to survive. EPA has set the enforceable drinking water standard for turbidity at 1 turbidity unit (TU) as determined by a monthly average of daily results, and 5 TU based on an average of two consecutive days, to reduce the risk of health effects associated with particles suspended in water. Drinking water which meets this standard is associated with little to none of this risk and should be considered safe.

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APPENDIX 3
DWQ PENALTY MATRIX (1)

The Division of Drinking Water Quality has classified its regulations into the following three categories for use when assessing Administrative Penalties:

***Categories** **

Category I Penalty Range $1,000 - $5,000/day/violation
These types of violation have a direct impact on public health and will be given a high priority.

- ➔ Exceeding any MCL including
  - Bacteria
  - Inorganic
  - Pesticides/Organic
  - Turbidity
  - Radiological
- ➔ Failure to maintain required chlorine residual
- ➔ Failure to adhere to new source approval requirements/plan requirements

Category II Penalty Range $100 - $1000/day/violation

These types of violations/noncompliance, also have a direct impact on public health but are mainly noncompliance with technical safeguards.

- ➔ Failure to monitor as required
- ➔ Failure to comply with reporting requirements
- ➔ Failure to make public notice as required
- ➔ Failure to notify DWQ within 48 hrs after confirmation check samples reveal MCL violations
- ➔ Denial of right of entry provisions
- ➔ Failure to comply with operators certification requirements

Category III Penalty Range $100 - $300/day/violation

These types of violations have an indirect impact on public health and are generally related to poor record keeping.

- ➔ Failure to submit monitoring reports (monitoring was done but system did not send report to DWQ until it was requested)
- ➔ Late submittal of monitoring reports
- ➔ Failure to keep required records on file as required

***** Violation of a Department Order is a separate and additional violation from the violation or violations which gave rise to the issuance of the order, and is given a Base Number of $1000.00. No distinction should be made between a unilateral order and a consent order for the purpose of assessing administrative penalties.

The above classification is subject to change as the Division gets more experience with the Administrative Penalties regulations. The Legal office will be kept informed of all changes.

DWQ PENALTY MATRIX (2)

Sections R46-13-DWQ			*Noncompliance Categories*
1.0	***Definitions***		N/A
2.0	***Coverage***		I
	a)	Approval required	I
	c)	Right of entry	II
3.0	***New Water Sources***		I
4.0	***Approval of Treatment Works, Storage and Pumping Facilities***		I
5.0	***Filtration and Disinfection***		
	5.1	General Requirements	
	5.2	Criteria for avoiding filtration	II
	5.3	Disinfection	I
	5.4	Filtration	I
	5.5	Analytical and monitoring requirements	II
	5.6	Monitoring requirements for systems that do not provide filtration	II
	5.7	Monitoring requirements for systems using filtration equipment	II
	5.8	Reporting and record keeping requirements	III
6.0	***Control of Lead and Copper***		
	§6.80	General requirements	
	§6.81	Applicability of corrosion control treatment steps to small, medium-size and large water systems	I
	§6.82	Description of corrosion control treatment requirements	I
	§6.83	Source water treatment requirements	I
	§6.84	Lead service line replacement requirements	I
	§6.85	Public education and supplemental monitoring requirements	II
	§6.86	Monitoring requirements for lead and copper in tap water	II
	§6.87	Monitoring requirements for water quality parameters	II
	§6.88	Source monitoring requirements for lead and copper in water	II
	S6.89	Analytical methods	II
	§6.90	Reporting requirements	III
	§6.91	Record keeping requirements	III
7.0	***Connections Between Distribution Systems***		II
8.0	***Contamination of Tanks***		I
	8.1	Tanks Connected to Unsafe Supplies	
	8.2	Avoidance of Contamination in Tanks	

9.0	***Assurance of Safety in Public Supply***	II
10.0	***Correction of Unsafe Conditions***	I
Sections R46-13-DWQ		***Noncompliance Categories***
11.0	***Reports as to Public Supplies***	II
12.0	***Certified Laboratories***	II
13.0	***Ground Water Microbiology***	II
14.0	***Consecutive Water System Monitoring***	N/A
15.0	***Variances and Exemptions***	N/A
16.0	***Community Water System Requirements***	
	Maximum Contaminant levels for 16.1 Inorganic Chemicals	I

DWQ PENALTY MATRIX (3)

16.2 Organic Chemicals	
16.3 Turbidity	
16.4 Microbiological	
16.5 Radioactivity	
Monitoring Requirements, Analytical Techniques, and Monitoring Frequency for 16.1, 16.2, 16.3, 16.4,	II
16.5, 16.6 and 16.7	II
16.8 Public Notification	II
16.9 Records	III
17.0 ***Non-Community Water System Requirements***	
Maximum Contaminant levels for	I
17.1 Microbiological	
17.2 Inorganic Chemicals	
17.3 Organic Chemicals	
17.4 Turbidity	
Monitoring Requirements, Analytical Techniques and Monitoring Frequency for 17.1, 17.2, 17.3, 17.4	II
and 17.5	
17.6 Public Notification	II
17.7 Records	III
18.0 ***Fee Schedule***	N/A
19.0 ***Rules Governing Practices and Procedures***	N/A
20.0 ***Violations, Noncompliance, and Enforcement***	
21.0 ***Severability***	N/A
Other Areas of Non-Compliance	
Violations of approval letter requirements	I
Contamination incidents	I
Non-compliance with orders	I

DWQ PENALTY MATRIX (4)

PWSS Civil or Complaint for Penalty Calculation Work Sheet

DATE / /

PWS Name or Owner Name
PWS ID#
LOCATION

Violation Cited

I. Calculate Statutory Maximum Penalty
- (A) Length of Violation (in days)
- (B) Maximum Penalty ____
  Civil Penalty - $5,000/day

Statutory Maximum Penalty

II. Calculate Economic Benefit Component

1. Estimate avoided and delayed costs through reasonable methodology. This must be documented.

III. ***Calculate Gravity Component***

2. **BASE NUMBER** . . . . . ____
3. Impact (+ or -) . . . . . ____
4. Extent (+ or -) . . . . . ____
5. # of Violations (+ or -) . . . . . ____
6. **GRAVITY BASE NUMBER** (Total lines 2,3,4 and 5) ____
   **(Total must be within class range)
7. **NUMBER OF DAYS** (If applicable . . .) ____
   (Must be at least one)
8. **TOTAL GRAVITY BASE NUMBER** (Multiply 6 by 7) ____
9. **PRELIMINARY SETTLEMENT AMOUNT** ____
   (Economic Benefit + Gravity Component

IV. ***Adjustment Factors*** **TO TOTAL GRAVITY BASE NUMBER**

10.	History of Violations	(+)	0 to 50%	____%
11.	Lack of Good Faith	(+)	0 to 100% ...	____%
12.	Financial Condition	(+ or -)	0 to 50%	____%
13.	Public Interest	(+ or -)	0 to 50%	____%
14.	Special Circumstances	(+ or -)	0 to 50%	____%
15.	Litigation Considerations	(-)	0 to 90%	____%

TOTAL PERCENTAGE ADJUSTMENTS

16. (Add lines 10 thru 15) . . . . . ____%
17. **MULTIPLY LINE 16 BY LINE 8** . . . . . $ ____
18. Enforcement Costs . . . . . $ ____

V. ***Final Settlement Amount***

19. **TOTAL PENALTY** (Add lines 1,8,17 and 18) . . . $____

COMMENTS (Briefly note reason for any adjustments)

APPENDIX 4

List of Potential Sources of Groundwater Contamination

- ➔ Agricultural related activities (pesticide and fertilizer storage and application, machinery maintenance and fueling
- ➔ Airports-commercial (maintenance and repair, fuel storage)
- ➔ Animal care and holding areas (stables, kennels, pet shops)
- ➔ Asphalt, coal, tar and concrete companies
- ➔ Automotive repair shops
- ➔ Automotive body shops
- ➔ Auto parts stores
- ➔ Beauty salons
- ➔ Boat builders and refinishers
- ➔ Bus and truck terminals
- ➔ Chemical manufacturers
- ➔ Construction sites
- ➔ Dredge disposal sites
- ➔ Dry cleaners
- ➔ Food processors (meat packers, dairies, bakeries)
- ➔ Fuel oil distributors (product storage, equipment maintenance and storage)
- ➔ Funeral homes and cemeteries
- ➔ Furniture strippers, refinishers
- ➔ Golf courses
- ➔ Hotels and motels
- ➔ Industrial manufacturers
- ➔ Junkyard and salvage yards
- ➔ Land application of sewage sludge
- ➔ Landfills and dumps
- ➔ Laundromats
- ➔ Machine shops
- ➔ Medical facilities (hospitals, clinics, laboratories)
- ➔ Metal and drum cleaning/reconditioning
- ➔ Military facilities (past and present)
- ➔ Nurseries
- ➔ Nursing homes
- ➔ Paint shops
- ➔ Photographic processors
- ➔ Pipelines (oil and sewer)
- ➔ Printers and blueprint shops
- ➔ Prisons
- ➔ Railroad yards
- ➔ Repair shops (engines, appliances, etc.)
- ➔ Research laboratories
- ➔ Residential development (lawn care, septic systems)
- ➔ Restaurants and taverns
- ➔ Retail shopping centers, malls
- ➔ Road salt storage

APPENDIX 4

List of Potential Sources of Groundwater Contamination

- ➔ Rust proofers
- ➔ Sand and gravel mining operations
- ➔ Sawmills
- ➔ Schools, colleges and trade centers
- ➔ Service stations (gas stations)
- ➔ Storm water management facilities (leaching systems)
- ➔ Transmission line rights of way
- ➔ Transportation corridors (road deicing, materials transport)
- ➔ Utility substations/transformers
- ➔ Waste storage, treatment and recycling (hazardous and non-hazardous)
- ➔ Water transfer stations
- ➔ Wastewater treatment plants (past or present sludge disposal)
- ➔ Wood preservers