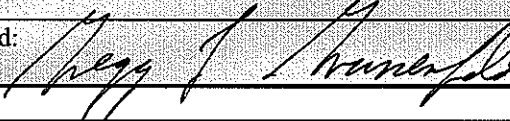


Division of Drinking Water Policy/Procedure

Title:	Limited Alternative to Filtration Implementation	Number F.10
References:	WAC 246-290-010, Part 6 Chapter 246-290 WAC, Section 1412(b)(7)(C) (42 U.S.C.300g-1(b)(7)(C)(v))	
Contact:	Chris McMeen	
Effective Date:	April 8, 2002	
Supersedes:		
Approved:	 Director, Division of Drinking Water	

Drinking water policies are written descriptions of the approach taken by the Program to implement a statute, regulation, court order, or other agency order, and may include the Program's current practice, procedure, or method of action based on that approach. Any generally applicable directives or criteria that provide the basis for imposing penalties or sanctions, or for granting or denying Program approvals, must either be in statute or established in a rule.

POLICY:

This policy identifies the Washington State Department of Health's (WDOH's) implementation details and review process for public water systems that choose to apply for a limited alternative to filtration (LAF), as defined in WAC 246-290-010.

PURPOSE STATEMENT/BACKGROUND:

The Federal Safe Drinking Water Act, as reauthorized in 1996, includes an amendment (Section 106) that provides an alternative compliance framework for some unfiltered surface water systems. A public water system using high quality water from a controlled watershed can seek approval from the WDOH, with concurrence from the Environmental Protection Agency (EPA), to provide treatment that will provide better protection from pathogenic organisms than filtration and chlorine disinfection alone. The full text of this amendment is included in Attachment A to this policy. The State Board of Health regulations governing Group A public water systems, chapter 246-290 WAC, Part 6, establish the state regulatory authority regarding LAF.

PROCEDURE:

The steps for a public water system choosing to apply for a LAF are identified in Attachment A to this policy. The principle point of contact at the WDOH for correspondence will be the regional office engineer in conjunction with the regional office manager. The regional office manager will coordinate any application received with the deputy director of field operations. The approval of any LAF will include a memorandum of agreement (MOA) between WDOH and the EPA. The detailed content of, and appropriate signatories to, this MOA will be determined on a case-by case basis in conjunction with EPA at the time of application.

Attachment A to Division of Drinking Water Policy F.10

Limited Alternative to Filtration

Implementation

Introduction

This attachment identifies the federal and state regulatory background for the Limited Alternative to Filtration (LAF), a specific process for a public water system applying for an LAF, and content requirements for a LAF - Filtration Decision Report.

Regulatory Background

The federal Safe Drinking Water Act, as reauthorized in 1996, includes the following amendment:

SEC. 106. LIMITED ALTERNATIVE TO FILTRATION.

Section 1412(b)(7)(C) (42 U.S.C.300g-1(b)(7)(C) is amended by adding the following after clause (iv):

“(v) As an additional alternative to the regulations promulgated pursuant to clauses (i) and (iii), including the criteria for avoiding filtration contained in 40 CFR 141.71, a State exercising primary enforcement responsibility for public water systems may, on a case-by-case basis, and after notice and opportunity for public comment, establish treatment requirements as an alternative to filtration in the case of systems having uninhabited, undeveloped watersheds in consolidated ownership, and having control over access to, and activities in, those watersheds, if the State determines (and the Administrator concurs) that the quality of the source water and the alternative treatment requirements established by the State ensure greater removal or inactivation efficiencies of pathogenic organisms for which national primary drinking water regulations have been promulgated or that are of public health concern than would be achieved by the combination of filtration and chlorine disinfection (in compliance with this section).”

Chapter 246-290 Washington Administrative Code (WAC) includes language allowing implementation of this statutory provision. For public water systems providing a LAF, the State regulations:

- Require greater removal and/or inactivation of *Giardia lamblia* cysts, viruses, or other selected pathogenic organisms (i.e., *Cryptosporidium* oocysts) than would be provided by filtration and chlorine disinfection (required by the Surface Water Treatment Rule (SWTR) or the Interim Enhanced Surface Water Treatment Rule (IESWTR)).
- Establish a treatment technique violation if water with a turbidity greater than 5.0 NTU at a point immediately prior to the point of primary disinfection is provided to the public (WAC 246-290-632(2)(d)(i)).
- Establish a treatment technique violation if treatment processes do not meet minimum requirements for disinfection of unfiltered systems (WAC 246-290-632(2)(d)(ii)).
- Require that watershed control is maintained at a level as stringent or more stringent than the level required for systems meeting the criteria to remain unfiltered. A system with a LAF can have no human inhabitants in the watershed that are not associated with protection of that watershed.

Source Water Quality and Watershed Control Program

Source Water Quality: In a very specific, and few circumstances where watershed control and source water quality is extraordinary, the LAF allows a treatment process that provides **better** microbial protection than filtration and chlorine disinfection that is in compliance with the Surface Water Treatment Rule and the Interim Enhanced Surface Water Treatment Rule.

Source water quality for a public water system qualifying for the LAF will generally meet the conditions for a utility to remain unfiltered. Source turbidity must be consistently less than 5 NTU to ensure adequate performance of a disinfection approach. While not a specific criterion for consideration of the LAF, it is anticipated that raw water fecal coliform densities more than 20 CFU/ 100 ml occur infrequently.

Watershed Control: It is expected that public water systems applying for the LAF have previously been determined to have adequate watershed control to meet the criteria to remain unfiltered. This previous documentation may be sufficient to meet the watershed protection requirements of the LAF. Additional information that may be needed to satisfy this requirement is identified in the "Filtration Decision Report – Content Requirements" section at the end of this Attachment. Additional copies of the watershed control program will be required with the Filtration Decision Report since these must be forwarded to EPA for their review and concurrence.

Pathogens of Public Health Significance

The Microbial Contaminant Research Committee (a committee of the American Water Works Association) published a document identifying emerging pathogens that may be of public health significance¹. The Committee identified specific bacteria, viruses, protozoa, and Cyanobacteria toxins as emerging microbial pathogens of interest. As additional research regarding the occurrence in drinking water is completed, and applicable treatments are established, any of these organisms may in the future fall under the umbrella requirement of the LAF. A public water system with a LAF may in the future be required to modify its treatment process to address removal and/or inactivation requirements of emerging pathogens of public health concern.

Design and Performance Treatment Requirements

The statute (Section 1412(b)(7)(C) (42 U.S.C.300g-1(b)(7)(C) (v)) and Washington State Regulations (Chapter 246-290 WAC) require greater removal and/or inactivation of regulated microbial contaminants and organisms of public health significance than would be achieved by filtration and chlorination. Neither the federal statute nor the state regulations quantify the specific removal and/or inactivation requirements for a system seeking a LAF. Instead, Congress authorized states to establish treatment requirements as an alternative to filtration, for certain systems, on a case by case basis after notice and opportunity for public comment. The Interim Enhanced and Long Term 1 Enhanced Surface Water Treatment Rules established new filtered water turbidity requirements for surface water systems using rapid rate filtration. Based on several research reports cited by EPA, treatment plants meeting these tightened turbidity requirements (less than 0.3 NTU 95% of the time, less than 1 NTU at all times) should be providing at least 2-log removal of *Cryptosporidium* oocysts.

In this document, WDOH is identifying minimum *design requirements*, and separate minimum, regulatory operational *performance requirements* for microbial inactivation that, at this time, WDOH believes will achieve greater removal and/or inactivation of regulated microbial contaminants and organisms of public health significance than would be achieved by filtration and chlorination. This approach stems from the need to coordinate the underlying intent of the statute with the specific language included in Section 1412(b)(7)(C) (42 U.S.C.300g-1 (b)(7)(C)(v). These two sets of requirements are discussed in turn.

Design Requirements

Design requirements identify the minimum level of treatment that will be used to size treatment system components, based on the best scientific and published data available at the time of design. When reviewing a submitted Project Report required by WAC 246-290-110 and construction documents

¹ AWWA Research Division, Microbial Contaminants Research Committee, M.W. LeChevallier, Chair. Committee Report: Emerging Pathogens-Viruses, Protozoa, and algal toxins *Jour AWWA 91:9:110* (September, 1999)

required by WAC 246-290-120, WDOH will ensure that the proposed microbial inactivation levels are consistent with this section.

At this time, WDOH identifies the following minimum levels of treatment acceptable for meeting design requirements:

- 3-log (99.9 %) inactivation and/or removal of *Cryptosporidium* oocysts under peak plant production conditions.
- 4-log (99.99 %) inactivation and/or removal of *Giardia lamblia* cysts.
- 5-log (99.999 %) inactivation and/or removal of viruses.
- Meeting all of the above is expected to provide better removal and/or inactivation of other regulated microbial contaminants, including *Legionella*, coliform, and Heterotrophic Plate Count bacteria than would be achieved by filtration and chlorine disinfection alone.

It is anticipated that one of the above will control the overall facility design, however the treatment facility Project Report must address this issue and verify that all requirements are satisfied.

Basis for Design Requirements: Congress provided the LAF option for those systems using surface water that “have made extraordinary efforts to protect their watersheds from development.”² Further, Congress supported this idea because the amendment allows public water systems to “utilize another form of treatment that will provide a significantly greater removal of pathogens, than that of filtration.”³ WDOH believes that the intent of the LAF was to provide a level of public health protection from microbial contaminants that is significantly better than would be achievable from a filtration and chlorination facility meeting the SWTR or the IESWTR. These design requirements represent a ten-fold theoretical reduction in pathogenic organisms relative to the treatment requirements of the SWTR or the IESWTR. As well, these reductions are achievable with current treatment technologies. On-going operation consistent with the approved design is required to meet one of the site-specific criteria for systems with a LAF as described in WAC 246-290-691 (3)(a)(i).

Performance Requirements

Performance requirements identify the minimum level of treatment that must be provided at all times the facility serves water to the public. Failure to meet the level of treatment specified by WDOH may trigger Treatment Technique Violations as specified in WAC 246-290-632 (2)(d), and/or compliance action by WDOH. Disinfection inactivation ratios will be established based on the requirements in this section, and the public water system must demonstrate that they exceed an inactivation ratio of 1.0, relative to the specified performance requirement, *at all times*.

At this time, WDOH identifies the following minimum levels of treatment acceptable for meeting performance requirements:

- Greater than 2-log (99 %) inactivation and/or removal of *Cryptosporidium* oocysts under peak plant production conditions.
- Greater than 3-log (99.9 %) inactivation and/or removal of *Giardia lamblia* cysts.
- Greater than 4-log (99.99 %) inactivation and/or removal of viruses.
- Meeting all of the above is expected to provide better removal and/or inactivation of other regulated microbial contaminants, including *Legionella*, coliform, and Heterotrophic Plate Count bacteria than would be achieved by filtration and chlorine disinfection alone.

² Senator Slade Gorton (WA), Congressional Record – Senate, November 29, 1995, S 17755

³ Ibid

Monitoring and Reporting Requirements

The "Performance Requirements" will identify the minimum standard for assessing a treatment technique violation. While *continuous* treatment is the underlying requirement, actual monitoring and reporting must be accomplished using discrete data. The methodology for calculating compliance with these requirements will be established on a case-by-case basis, as appropriate to the technologies employed, and included in the WDOH-EPA Memorandum of Agreement, and any approval correspondence provided to the water system.

Process for Approval of a Limited Alternative to Filtration

1. Public water system submits to WDOH a letter of application requesting a LAF. The application letter shall, at a minimum, provide:
 - Name of public water system;
 - Statement of verification that the public water system owns the watershed, or exercises watershed control through agreements, and that there are no human inhabitants; and
 - A brief statement of the proposed treatment approach and treatment objectives (level of inactivation of viruses, *Giardia lamblia* cysts, and *Cryptosporidium* oocysts).

This letter of application will allow screening of public water systems to ensure that minimum criteria for consideration are satisfied prior to the development of a detailed Filtration Decision Report.

2. Within thirty days of receipt, WDOH responds to the letter of application, stating that either:
 - The application fails to demonstrate that the public water system qualifies for consideration to provide a LAF, and provides the basis for that determination, or
 - The application demonstrates that the public water system qualifies for consideration to provide a LAF, and must develop and submit a Filtration Decision Report. WDOH and applicant meet to discuss the content and timing of the Limited Alternative to Filtration -- Filtration Decision Report that must be developed pursuant to WAC 246-290-696.
3. Applicant submits to WDOH three copies the Filtration Decision Report that must address each of the items identified in the "Filtration Decision Report – Content Requirements" section below.
4. Within ninety days of receipt, WDOH reviews the Report, and responds in writing if there are issues that require further clarification, documentation, or justification. Once all WDOH comments are satisfactorily resolved, WDOH will issue a written preliminary determination finding. WDOH and applicant will then coordinate the solicitation for comments to provide the opportunity for public input. It is anticipated that applicants will have a standard public notification and solicitation for public comment process in policy or code. The applicant will prepare necessary presentation materials for public notice, or a public meeting, if one is required. Comments received from the public will be recorded and summarized by the applicant, and addressed by the applicant or WDOH, as appropriate, to the extent possible and necessary, as determined by WDOH. Once the public comments have been satisfactorily addressed, the Filtration Decision Report will be approved by WDOH.
5. WDOH submits two copies of the approved documentation, along with written findings to the EPA for concurrence by the Administrator. Appropriate compliance timelines will be identified in the request to EPA.
6. The public water system submits to WDOH for approval any of the following documents that may be required: pilot testing protocol, pilot test data, project report (may include pilot test

results), and construction documents. The work associated with these requirements may occur simultaneously with the process described above, however the public water system should note that modifications or additional considerations might arise through the WDOH and EPA review processes.

Filtration Decision Report – Content Requirements

General note:

The requirements for receiving approval to utilize a LAF are described in WAC 246-290-691, and related requirements under Part 6 of chapter 246-290. The following is offered to describe what the Department believes is necessary to meet those requirements, but may approve an LAF application that otherwise documents compliance with the regulatory requirements.

- 1. Provide an executive summary of information included in the report.**
- 2. Provide available background water quality information for the source, to include:**
 - A graphical plot of monthly average and highest raw water fecal coliform levels for the past sixty months, and daily fecal coliform concentrations for any month in which densities exceeded 20 CFU/100 ml on three or more days;
 - A summary of all protozoan testing results conducted on both raw and treated water up to the date of the Filtration Decision Report Submittal. This should include the total number of samples collected, the analytical methods employed, the total detected counts per unit volume (if any), and any additional information regarding the specific limitations or evaluation of the protozoan data that the applicant believes appropriate;
 - A summary (average and highest values) of all disinfection byproduct testing results related to the source of interest. Generally this includes total trihalomethanes and haloacetic acids, if available. Public water systems with multiple sources should attempt to differentiate byproduct results for the source of interest with respect to the LAF from all other sources.
 - A graphical plot of monthly average and highest source water turbidity at a point just prior to the current point of primary disinfection for the past 120 months. A similar graph should be prepared for the intended future point of primary disinfection, if different than above.
 - Any water quality data that may be relevant to the proposed treatment. This may include natural organic matter content, as total or dissolved organic carbon, temperature and pH variations on seasonal (or other appropriate periodic) basis, or inorganic chemicals that may affect treatment design or operation.

Note: WDOH may require additional, site-specific water quality monitoring if sufficient background data are not available.

- 3. The Filtration Decision Report must contain the current Watershed Control Program.** The program must include, at a minimum, all items identified in WAC 246-290-691 (3)(b), and may be imported into the filtration decision report, or submitted as an attachment to the filtration decision report. The Watershed Control Program must be sufficient to allow DOH to determine compliance with the regulatory requirement that the applicant have an uninhabited, undeveloped watershed, owned by the public water system or a known, identified number of parties (consolidated ownership). It must also demonstrate that the applicant has control over human access to, and activities in the watershed. If not already, the following must be included with the Watershed Control Program:
 - Mapping identifying all ownership within the watershed.

- Copies of agreements with all owners within the watershed demonstrating that the applicant can control activities within the watershed that may adversely impact water quality.

4. **Proposed Treatment and Performance Requirements.** The applicant must fully describe the proposed treatment process, and identify the intended removal and/or inactivation levels that will be achieved under the full range of known operating conditions in order to meet the regulatory requirement. A complete submittal includes:

- Identification of the proposed methodology for determining the expected removal and/or inactivation levels. At a minimum, the submittal must include the removal and/or inactivation levels identified in the "Design and Performance Treatment Requirements" Section of this document.
- If not readily available in current literature or regulatory guidance, the applicant shall describe relationships between the efficacy of the treatment technology to be employed, and the applicable natural water quality variations known to exist in the source water (e.g. chlorine CT tables that vary with temperature and pH), including supporting data and information used to develop these relationships. Inactivation levels necessary to meet treatment objectives (e.g. CT levels for 3-log inactivation of *Cryptosporidium*) may have to be revised with new research or regulatory developments.
- Preliminary siting, engineering, and operational information that will demonstrate how the proposed treatment will reliably meet minimum pathogen removal and/or inactivation requirements. Key components include:
 - Hydraulic integration of the treatment facility with existing facilities (intake, transmission, storage, etc.).
 - Additional treatment processes and the integrated effect of all processes on meeting performance requirements.
 - Reliability and redundancy features, including equipment considerations, power reliability, if critical to continuous operation, and operational flexibility (e.g. the ability to temporarily remove the source from service).
 - The instrumentation, monitoring, and control equipment available for the proposed treatment technology, any known limitations of that equipment, and approach for mitigating the known limitations. Monitoring and control instrumentation must be capable of assuring continuous, effective treatment.
 - The expected level of operational expertise required, and proposed staffing for the treatment facility.

A project of this type will likely require the development of a project report, as described in WAC 246-290-110; much or all of the content required in the Filtration Decision Report may be incorporated into the project report. It is expected that planning-level documentation will be used for the purpose of the Filtration Decision Report, while greater technical detail will be provided in the project report.

5. **Secondary Effects and Regulatory Compliance.** The Decision Report must identify and discuss known secondary effects of any proposed treatment approach in order for the public water system to ensure simultaneous compliance with other regulatory requirements, including the Lead and Copper Rule, the Total Coliform Rule, and the Disinfectants and Disinfection Byproducts Rule under WAC Chapter 246-290. . For examples, the report must consider the impacts of the proposed treatment system on corrosion control, the generation of disinfection byproducts and the creation of assimilable organic carbon, or biodegradable organic carbon (AOC or BDOC) where those effects are likely or possible. In the case of the latter, there are a variety of assessment protocols available in the literature.