State of Vermont
Agency of Natural Resources
Department of Environmental Conservation
Water Supply Division

Avoiding Filtration of Surface Water and GWUDI of Surface Water in Vermont

(A guide for Public Water Systems seeking to avoid filtration of surface water sources and GWUDI of surface water sources, to be used with Chapter 21, Vermont's Water Supply Rule)

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(date)

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STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WATER SUPPLY DIVISION

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Introduction:

This Procedure identifies the criteria for avoiding surface water filtration in Vermont. It replaces the 1993 Procedure of the same title. The major change from 1993 is a new section on avoidance of filtration for Ground Waters Under the Direct Influence (GWUDI) of surface water. Like the 1993 document, this Procedure explains the requirement to filter surface waters in Vermont and identifies the criteria used by the agency in evaluating and acting upon filtration avoidance applications.

All surface waters serving Vermont Public Water Systems are required to be filtered unless an Avoidance of Filtration waiver is issued to the system. Surface waters include ground waters determined to be under the direct influence of surface water. The avoidance of filtration criteria in this Procedure is federally mandated; however, the watershed protection portion is established by the state (subject to federal approval) consistent with guidance found in 10 VSA Chapter 56.

Securing an Avoidance of Filtration waiver is generally difficult unless the source water is of high quality, the disinfection facilities are reliable and redundant, and the watershed or source protection area (as applicable) includes an approved management plan for land use control. It is emphasized that an Avoidance of Filtration waiver requires a long-term commitment to system monitoring in order to confirm operational compliance with the waiver conditions. Systems that fail to meet the waiver conditions over time, are considered to be in non-compliance. If this should occur, the avoidance of filtration waiver is revoked and filtration is required.

Background:

The federal Surface Water Treatment Rule (SWTR) as authorized by the Safe Drinking Water Act (SDWA) requires, by June 29, 1993, that Vermont Public Water Systems served by surface water sources treat those sources by filtration and disinfection, unless an avoidance of filtration waiver is obtained. If the water system meets the federal criteria for an avoidance of filtration waiver, the water system is not required to filter but is required to disinfect. Vermont's Water Supply Rule contains filtration requirements as stringent as the federal regulations. Systems (surface water) that do not receive avoidance of filtration waivers are in significant non-compliance as of June 29, 1993, unless a legal extension of this compliance date (June 29, 1993) is granted through issuance of a revised compliance schedule.

In addition to surface waters, Ground Waters Under the Direct Influence (GWUDI) of surface water, are treated as surface water. Water systems with GWUDI sources, must meet surface water treatment requirements for filtration and disinfection unless an avoidance of filtration waiver is obtained. If a water system with a GWUDI source is granted an avoidance of filtration waiver, the water system is not required to filter but is required to disinfect. By June 29, 1994 the Secretary, Vermont Agency of Natural Resources, is to make a determination on whether groundwater sources serving each of Vermont's Public Community Water Systems are Ground Waters Under Direct Influence of surface water. Similarly, by June 29, 1999, the ANR Secretary is to make a determination as to whether groundwater sources serving each of Vermont's Non-Community Public Water Systems are Ground Waters Under the Direct Influence of surface water.

Within six months of the date the ANR Secretary determines that a source is groundwater under the direct influence of surface water, a water system desiring to apply for an avoidance of filtration waiver for that source must begin monitoring and reporting in accordance with 40 CFR Parts 141.74(b) and 141.75(a) to determine whether it meets the avoidance of filtration criteria. Within eighteen months following the determination that a system source is under the direct influence of surface water, the ANR Secretary shall determine whether the water system seeking avoidance must filter, or whether that system satisfies the avoidance of filtration requirements.

Attached to this Procedure is a copy of 40 CFR, (Code of Federal Regulations) Part 141, Subpart H, taken from Appendix F of the Vermont Water Supply Rule (If you have a copy of the Vermont Water Supply Rule, you should already have a copy of this document). This regulation (40 CFR, Part 141, etc.), identifies the complete list of requirements water systems must satisfy for filtration avoidance (except for detailed watershed control criteria which is state based and is identified elsewhere in this Procedure).

General Requirements to Avoid Filtration:

To avoid filtration of surface water, a water system is required to make satisfactory demonstrations in three areas:

(1) Source Water Quality;
(2) Site Specific Conditions; and
(3) Watershed/Source Protection Area (as applicable) Control.

The acceptability of source water quality for filtration avoidance is based on the source's ability to satisfy monitoring criteria and raw water standards for total coliform; fecal coliform; and turbidity. Site specific conditions are satisfied by the system's ability to inactivate pathogenic organisms and show an historic absence of waterborne disease outbreaks. Watershed or source protection area control is satisfied by state approval of a watershed protection plan or source protection plan; such plans must demonstrate the ability of the water system to manage and control giardia cysts and other pathogenic risks to the water system source.

Preparing the Application:

Many water systems find that they are unable to meet the considerable requirements for avoidance of filtration. Therefore, any system seeking a waiver needs to gain a full understanding of the criteria, impacts, and process before committing its resources to that effort. The Water Supply Division can help systems achieve this understanding.

When a decision is made to pursue an avoidance of filtration waiver, the first step is to submit a waiver request letter to the Water Supply Division signed by responsible water system officials. The purpose of this letter is to announce the system's intent to pursue avoidance. With receipt of the letter, the division will work with the water system to review the overall avoidance process, explain and answer questions on the required documentation, and schedule periodic reviews. Considerable information is required over time in support of the avoidance application. In response, many systems have found it helpful to engage a consultant to assist them with portions of the planning, data collection, technical assistance, and compilation/presentation of the application.

Advisory Panel Review:

To help ensure the impartial review of filtration avoidance applications, and to draw upon the expertise found in both the private and public sector, the agency has established an advisory panel to review each application served by a high risk source. Members of the panel include water industry representatives, public water system officials, state officials, and federal advisors. Although the agency retains full responsibility for making the final decision on each application for filtration avoidance, it relies heavily on the advisory panel's recommendation in making that final decision.

Filtration Avoidance Requirements Based on Source Type:

The requirements for filtration avoidance are based on the type of surface water source and (for GWUDI sources) the MPA Risk Ranking. For purposes of this Procedure, there are two types of surface water source: a) a regular surface water source and b) a Ground Water Under the Direct Influence (GWUDI) surface water source. A regular surface water source includes any stream, lake, or pond serving a public water system. A GWUDI surface water source may consist of a well, gallery, or spring used by a water system that, because of its depth, construction, geology, MPA testing and/or proximity to surface water, is determined to be directly influenced by surface water.

There are three demonstration requirements that must be included in all avoidance of filtration applications. They are: a) Source water quality; b) Site specific conditions; and c) Watershed/ Source protection area control. The requirements of these demonstrations are delineated below and are specific to the surface water source type and (for GWUDI sources) MPA Risk Ranking.

1. Filtration Avoidance Requirements for Surface Water Source:

A. **Source Water Quality Conditions Criteria**

Each system must demonstrate that its source water is and has been historically of such high quality that filtration is not necessary to protect the public health. To meet this demonstration the following criteria apply: (See Appendix F, 40 CFR, Parts 141.70 through 141.75 for the detailed descriptions of the technical requirements which apply.)

1. Fecal Coliform Concentrations (Weekly Sampling)

Not greater than 20 per 100 milliliter in at least 90 percent of the representative samples of source water taken during the most recent 6 months of system operation; or (if fecal coliform is not measured)

2. Total Coliform Concentrations (Weekly Sampling)

Not greater than 100 per 100 milliliters. (If both measurements are made the fecal coliform standard must be met.)

3. Turbidity

Not greater than 5 NTU as specified in Appendix F, 40 CFR, Parts 141.74 (a) (4) and (b) (2) in representative samples prior to disinfection. More than two events in 12 months or more than 5 events in 120 months will disqualify the system, unless the WSD determines that an exceedance (event) was caused by unusual and unpredictable circumstances. Turbidity measurements must be performed on representative grab samples every four hours (or more frequently) or turbidity may be continuously monitored when approved by the WSD.

B. **Site Specific Conditions Criteria (Disinfection)**

In addition to proving that the source water is of high quality, each system seeking to avoid filtration must be able to meet the following disinfection requirements (See Appendix F, pages 975-980, 40 CFR, Parts 141.71 and 141.72 for the exact requirements).

1. At least 99.9 percent (3-log) inactivation of giardia lamblia cysts;

2. 99.99 percent (4-log) inactivation of viruses;

3. Calculation of CT values as specified in Appendix F, Pages 982-985, 40 CFR, Part 141.74 (b) (3);

4. Determination that CT values are sufficient to achieve the specified inactivation rates for giardia lamblia cysts and viruses;

5. (i) redundant disinfection components including auxiliary power supply with automatic start up and alarm, or (ii) automatic shut-off of water;

6. Residual disinfectant concentration entering the distribution system of not less than 0.2 mg/l for more than 4 hours.

In addition to the above, any system seeking to avoid filtration must have no prior record of waterborne disease outbreaks associated with the source(s).

C. Watershed Control Demonstrations

The WSD, with recommendations from its review panel, will evaluate the adequacy of the water system's watershed control program. For this evaluation, each system must provide "watershed information" and address the "watershed control criteria" in its application to avoid filtration. The purpose of the watershed control program is to minimize the potential for contamination by giardia lamblia and viruses.

1. Watershed Information

Watershed information includes a review of hydrology, land use, and land use control:

Hydrology

a. map(s) at 1:24,000 or 1:5,000 scale showing:
   (1) watershed boundary;
   (2) perennial streams;
   (3) lakes, ponds, and wetlands;
   (4) topography; and
   (5) source protection area.

b. Water quality data
   (1) trophic state of lakes and ponds (if available);
   (2) copies of raw water quality data including turbidity (if available);
      (a) evidence of mammalian wildlife populations in or near the source (by observation or from Fish & Wildlife Department).

c. Water Quantity data

(1) estimates of relative stream flow in all tributaries;
(2) estimate of flushing rate of impoundment (if appropriate).

Land Uses

a. Maps at 1:24,000 or 1:5,000 scale showing land uses including:

(1) forest, wood lots;
(2) recreational areas (parks, swimming areas, camping areas);
(3) urban areas (sewered);
(4) industrial/commercial areas;
(5) residential areas (sewered);
(6) residential areas (non-sewered);
(7) waste point discharge by type of waste (domestic, storm water, industrial by SICN, and commercial);
(8) landfills and other known non-point discharge areas;
(9) agricultural feed lots;
(10) " manure handling/storage;
(11) " barns;
(12) " crop lands;
(13) " pasture
(14) known and suspected sources of giardia, viruses and other pathogens;
(15) major components of water supply system, including intakes and treatment facilities;
(16) system property owned or controlled including isolation zones.

Land Ownership and Control

a. Map(s) at 1:24,000 or 1:5,000 scale showing:

(1) watershed boundary;
(2) parcel ownership (tax maps);
(3) municipal, state and federal boundaries (if appropriate);
(4) location of zoning, local ordinances and erosion control programs and agreements with landowners.

2. Watershed Control Criteria

When addressing the watershed control criteria, the public water system shall present the methods they will rely on to meet the criteria for the activities listed below. These methods may include land ownership, legal control over land uses,

or binding agreements with land owners. A summary of control authorities is included and shall be addressed as appropriate.

Where control mechanisms are already in place, the applicant must be able to show that these control mechanisms have been actively managed by the applicant.

Activities/Event and Criterion(a)

Activity/Event	Criterion(a)
a. Unsewered development	System controls new and replacement on-site systems. Annual site inspections performed and recorded. System has records of on-site septic system failures and effective remediation actions taken.
b. Construction, forestry and other erosion causing activities	System has erosion control agreements in place with land owners adjacent to water courses in watershed.
c. Disposal of pathogenic waste other than approved on-site domestic treatment systems	System shall be able to prevent waste disposal practices in watershed including sewage sludge and septic disposal.
d. Agricultural practices	Grazing and feed lot control in watershed. Water courses separated from till land by undisturbed buffer strip. Appropriate storage of farm chemicals in water shed. Written agreements with landowners to control these activities in the future.

Activity/Event	Criterion(a)
e. Other Human activities	System controls access to source intake. System can prevent fishing or boating within 2000 ft. of intake. System can prevent organized swimming within 2 miles of intake.
f. Mammalian wildlife	Ongoing watershed protection area program which includes mammalian wildlife control in the watershed and a public outreach effort.
g. Storm water	Storm water runoff control near the source.

A summary of control authorities

The following lists possible components of the water system's watershed control program.

a. Records of agreements and covenants with property owners throughout watershed (if appropriate)

b. Records of agreements with municipal, state and federal governments (if appropriate)

c. Records of local ordinances, zoning, erosion control agreements.

d. Records of other control authorities (if available), control, subdivision, health, overlay zoning, etc.

2. **Filtration Avoidance Requirements for GWUDI Sources:**

The protocol for determining whether a groundwater source is Ground Water Under the Direct Influence of surface water is contained in the ANR document entitled, "Guidance Document for Assistance in Completing GWUDI of Surface Water Exemption Application". If the groundwater source evaluation requires a Microscopic Particulate Analysis (MPA), the test results provide a risk ranking for groundwater contamination. This MPA risk ranking is either Low, Moderate, or High. A ranking of Moderate or High

is considered a GWUDI source and must meet the Surface Water Treatment Rule requirements for filtration and disinfection. A groundwater source with a Low risk ranking or a groundwater source exempt from the MPA test, is not considered a surface water and is not required to filter.

A water system with a GWUDI designated source applying for an avoidance of filtration waiver, must satisfy the requirements below. The required demonstrations are keyed to the level of MPA Risk Ranking (High or Moderate) assigned to the GWUDI source.

A. Requirements for GWUDI Sources with High MPA Risk Rankings:

For purposes of this Procedure, a GWUDI source with a High MPA Risk Ranking is treated as though it were a regular surface water source. Accordingly, a system applying for avoidance with this type source must demonstrate compliance with the filtration avoidance requirements found on pages 3-8 of this Procedure. This includes compliance with the Source Water Quality Conditions Criteria, the Site Specific Conditions Criteria, and the Watershed Control Demonstrations Criteria. In addition, the application is subject to Advisory Panel review.

B. Requirements for GWUDI Sources with Moderate MPA Risk Rankings:

A GWUDI source with a Moderate MPA Risk Ranking may be reviewed for an avoidance waiver without Advisory Panel review. Adoption of a state approved Source Protection Plan is required by the system. A water system applying for an avoidance of filtration waiver with this source must comply with the following requirements:

1. The water system must demonstrate compliance with the Source Water Quality Conditions Criteria and the Site Specific Conditions Criteria of the Filtration Avoidance Requirements for Surface Water Sources as found in Parts 1A and 1B (Pages 3-5) of this Procedure.

2. The water system must have adopted a state approved Source Protection Plan (SPP) that gives major focus to protection of the source from giardia and other pathogens (disease-causing organisms). The Source Protection Plan shall identify and address requirements on Watershed Information, Land Uses, and Land Ownership and Control as delineated in Watershed Control Demonstrations, Part 1C (Pages 5-8) of this Procedure. Control measures must consider and, as appropriate include, the following: a) modifications around the source to control and divert surface water runoff away from said source; b) reconstruction of the sanitary seal around the source to protect against the entry of surface water into the aquifer through the annular space adjacent to the source; and c) an animal control program to help prevent wildlife or domestic animals (considered common carriers

of giardia) from contaminating the source.

The required control measures will be developed around the specific characteristics of the individual source and Source Protection Area. Pre-existing Source Protection Plans involving GWUDI sources may require upgrading/modification in order to satisfy the Source Protection Plan requirements herein for securing an avoidance of filtration waiver.

Application Decision Process:

The agency will conduct reviews of waiver applications submitted, will notify the applicant of review comments and results, and may (as appropriate) request supplemental documentation to support a comprehensive and complete application. When the application requires review/ approval of the filtration avoidance Advisory Panel, said application will not be forwarded to the panel until the technical review staff considers the application complete. Because substantial information is required to support an affirmative finding for a waiver, application reviews may result in a preliminary denial of a waiver based on insufficient documentation in the application. Should the water system submit supplemental data that addresses the absence or thoroughness of documentation, the preliminary denial may be reconsidered by the agency for issuance of an avoidance of filtration waiver.

When review of an avoidance application is completed and the recommendation is made to issue an Avoidance of Filtration Waiver for specified sources, the Secretary, Agency of Natural Resources, (or designee) upon concurrence with that recommendation, signs/issues the waiver document authorizing avoidance of filtration.

Appeal of a Decision to Deny an Avoidance of Filtration Waiver:

In the event the Secretary, Agency of Natural Resources, denies an application for an Avoidance of Filtration Waiver, the water system owner may appeal the decision to the Vermont Water Resources Board within 30 days of such decision. The water system may appeal a decision of the Water Resources Board to the Superior Court, State of Vermont, within 30 days of the board's decision, following the procedure provided by Section 1680 of 10 VSA for an appeal from a decision by the Secretary.

-- END OF PROCEDURE --

(3/26/98)