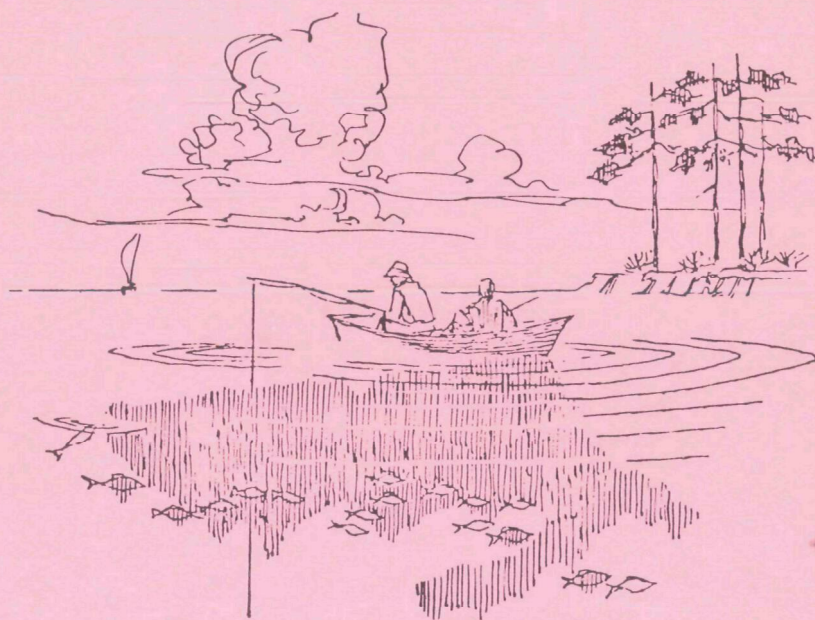




WATER QUALITY STANDARDS CRITERIA DIGEST  
A COMPILATION OF FEDERAL/STATE CRITERIA ON

**-DISINFECTION-**



ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C.

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## INTRODUCTION

This digest was compiled in order to provide general information to the public as well as to Federal, State, and local officials. It contains excerpts from the individual Federal-State water quality standards establishing disinfection criteria for interstate waters. The water quality standards program is directed by the Environmental Protection Agency, an independent regulatory agency which has responsibility for approving State-adopted standards for interstate waters, evaluating adherence to the standards, and overseeing enforcement of standards compliance.

Standards, the first nationwide strategy for water quality management, contain four major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial, or agricultural) to be made of the interstate water; criteria to protect those uses; implementation plans (for needed industrial-municipal waste treatment improvements, among others) and enforcement plans; and an antidegradation statement to protect existing high quality waters.

Minimum water quality criteria, or numerical specifications of physical, chemical, temperature, and biological levels, are stated in the National Technical Advisory Committee report to the Secretary of the Interior, Water Quality Criteria, dated April 1, 1968, and published by the Government Printing Office, Washington, D.C. Unavailability of the NTAC report before June 30, 1967--the date set by the Water Quality Act of 1965 for formal adoption of State standards--resulted in significant variations between the state-adopted and the NTAC minimum criteria. Some standards were adopted and approved before the NTAC report became available. Also, the Water Quality Criteria report is subject to updating in light of new scientific and technical information.

Although natural waters contain dissolved solids consisting mainly of carbonates, biocarbonates, chlorides, sulfates, phosphates, and possibly nitrates with traces of metallic elements, increases in these substances above normal are undesirable and sometimes detrimental. Concentrations or effects of these substances can be raised or synergistically altered by, for example, the addition of chemical wastes, dissolved salts, acids, alkalis, gas and oil-well brines, or irrigation drainage. Adverse effects may be unpalatable drinking water, fish kills, crop damage, or corrosion damage in water systems.

The Water Quality Criteria report recommends that dissolved solids concentrations not exceed 500 mg/l for drinking water supplies; and for the protection of freshwater fish, concentrations should not exceed 50 milliosmoles (the equivalent of 1500 mg/l NaCl).

Disinfection is employed to protect public water supplies, primary and secondary-body-contact recreational waters, shellfisheries (because oysters, clams, and mussels can accumulate microorganisms, including bacteria and viruses, and transmit them to consumers), and agricultural waters for domestic animals. Disinfection reduces the water-borne coliforms--organisms existing in feces, and other sources, used as indicators of pathogen content of the disease-producing potential of water. Inadequately disinfected sewage can contaminate receiving waters with *Salmonella*, *Shigella*, *Escherichia coli*, *Leptospira*, and *Mycobacterium*. Enteric viruses such as polio and hepatitis can also be present. ✓

Since water quality standards experience revisions and upgrading from time to time, following procedures set forth in the Federal Water Pollution Control Act, individual entries in this digest may be superseded. As these revisions are accomplished, this digest will be updated and reissued. Because this publication is not intended for use other than as a general information resource, for the latest information, and for special purposes and applications, refer to the existing approved water quality standards which can be obtained from the State water pollution control agencies or EPA Washington, D.C. or regional offices.

Individual State-adopted criteria follow.

## KEY

USPHS

U.S. Public Health Service

mg/l

milligrams per liter

MPN

mean probable number

ppm

parts per million

BOD

biochemical oxygen demand

## DISINFECTION

Alabama	All sewage discharged to waters of the state used as sources of public water supply, used for the harvesting of oysters or customarily used by the public for swimming and other whole body water-contact activities shall receive a minimum of secondary treatment and, if necessary, disinfection.
Alaska	Disinfection required where necessary.
Arizona	Chlorination is required when wastes contain pathogenic organisms.
Arkansas	The State Water Pollution Control Commission has the authority to require whatever treatment is necessary including disinfection of effluents.
California	North Coastal streams only - Treated wastes which may indirectly enter a North Coastal stream must be disinfected so as to contain not more than a median MPN of 50/100 ml total coliform.
Colorado	All wastes capable of treatment or control prior to discharge into any waters of the State, shall receive secondary treatment with disinfection or its industrial waste equivalent, as determined by the State Water Pollution Control Commission.
Connecticut	All sewage treatment plant effluents shall receive disinfection before discharge to the watercourse. The degree of treatment and disinfection shall be as required by the State.
Delaware	All wastes (exclusive of storm water bypass) containing human excreta or disease producing organisms shall be chlorinated.
Florida	Treatment requirements may be accomplished by the following processes . . . addition of chemicals. . .
Georgia	Secondary treatment or the equivalent with disinfection is a basic requirement for all wastes discharged to Georgia waters.
Hawaii	No requirement found in standards.
Idaho	Communities and industries . . . having primary treatment and no current waste treatment needs will be required to provide secondary treatment or its equivalent . . . Secondary treatment with disinfection or the equivalent will be required for all new domestic waste discharges.

Illinois

No requirement, except as specified for combined sewer overflows and treatment plant bypasses, found in standards.

The general standards set in-stream maximum fecal coliform levels, i.e.: Based on a minimum of five samples taken over not more than a 30-day period, fecal coliforms shall not exceed a geometric mean of 200 per ml, nor shall more than 10% of the samples during any 30-day period, exceed 400 per 100 ml.

Waters classified for "Restricted Use" must meet the following standards: Based on a minimum of five samples taken over not more than a 30-day period, fecal coliforms shall not exceed a geometric mean of 1,000 per 100 ml, nor shall more than 10% of the samples during any 30-day period exceed 2,000 per 100 ml.

Effluent standards prescribe bacteria limits: No effluent shall exceed 400 fecal coliforms per 100 ml after July 31, 1972, or such concentrations as may have been prescribed for earlier dates by SWB-7 through SWB-15.

Indiana

Continuous disinfection is to be provided throughout the year for all municipal wastewater treatment plant effluent in the Lake Michigan Basin. The Indiana implementation plan shows disinfection specified for most sewage effluents.

Iowa

Continuous disinfection shall be provided for all municipal waste treatment effluents and for all other wastes which may be sources of bacterial pollution throughout the year where such wastes are discharged into waters designated for public water supplies and throughout the recreational season (April to October 31) where such wastes are discharged into waters used or classified for recreational use and at all other times as necessary to prevent bacterial pollution which may endanger the public health or welfare.

Kansas

Continuous disinfection of treated wastes shall be provided for those municipalities and industries which contribute bacterial loadings to a river or stream used as a downstream public water supply and which supplies are within the zone of bacterial influence. Seasonal disinfection (April 1 - October 31) of treated wastes shall be provided for those municipalities or industries which contribute bacterial loadings to rivers or streams which are tributary to waters used for body contact recreation and such waters are within the zone of bacterial influence.

Kentucky	Specific treatment requirements are not included in Kentucky Standards.*
Louisiana	No requirement found in standards.
Maine	Effluent disinfection will be required on a year-round basis for all effluent from sewage treatment plants as well as any other waste treatment plant effluent containing fecal material or other substances which without adequate disinfection would be inimical to the public health. Such disinfection will be required for all classes of water.
Maryland	No requirement found in standards.
Massachusetts	<p>Freshwater - All wastes shall receive appropriate waste treatment which is defined as secondary treatment with disinfection or its industrial waste treatment equivalent except when a higher degree of treatment is required to meet the objectives of the water quality standards, all as determined by the Division of Water Pollution Control. Disinfection from October 1 to May 1 may be discontinued at the discretion of the Division of Water Pollution Control.</p> <p>Coastal or Marine Waters - Appropriate treatment is defined as the degree of treatment with disinfection required for the receiving waters to meet their assigned State or interstate classification and to meet the objectives of the water quality standards. Disinfection from October 1 to May 1 may be discontinued at the discretion of the Division of Water Pollution Control.</p> <p>Freshwater and Coastal or Marine Waters - The amount of disinfection required shall be equivalent to a free and combined chlorine residual of at least 1.0 mg/l after 15 minutes contact time during peak hourly flow or maximum rate of pumpage.</p>
Michigan	Year around disinfection of all final effluents from sewage treatment plants is required.
Minnesota	No treated sewage, or industrial waste or other wastes containing viable pathogenic organisms, shall be discharged into interstate waters of the State without effective disinfection. Effective disinfection of any discharges, including combined flows of sewage and storm water, will be required where necessary to protect the specified uses of the interstate waters.

\*The State Water Pollution Control Commission has the authority to require whatever treatment is necessary including disinfection of effluents.

Mississippi	Effective waste treatment includes chlorination.
Missouri	No requirement found in standards.
Montana	Disinfection required for public drinking water supplies.
Nebraska	No requirement found in standards.
Nevada	No requirement found in standards.
New Hampshire	Insofar as practicable, the initial objective of the control program will be to obtain the installation of primary treatment (with adequate disinfection where sewage discharges are involved) for all discharges of sewage and industrial wastes.
New Jersey	<p>Year-round effective disinfection is an accepted method of treatment required in New Jersey for most domestic wastes and other wastewaters. Effective disinfection is hereby defined as:</p> <p>(a) One (1) mg/l combined chlorine residual after a thirty (30) minute contact period based on design flow or a twenty (20) minute contact period during peak hourly flow or maximum rate of pumping.</p> <p>(b) Coliform organisms not to exceed an MPN of 240 per 100 milliliters.</p>
New Mexico	(No requirement found in standards.)
New York	Continuous year-round disinfection of sewage treatment plant effluents.
North Carolina	Disinfection required for public drinking water supplies.
North Dakota	Effective disinfection of any treated discharges, whether sewage, industrial wastes, or other wastes, or overflow discharges from combined storm water and sanitary discharge, if such discharges constitute a potential or actual interference with the intended usage of the waters of the Red River of the North, the Boise de Sioux, and parts of the Sheyenne and Pembina Rivers may be required by the State Health Department. Disinfection was not mentioned in standards for other interstate waters, however, all public water supply treatment is required to meet USPHS standards.
Ohio	All effluents will be satisfactorily disinfected to meet the criteria for downstream water uses, and the facilities to provide such disinfection will be installed without delay.

Oklahoma	All interstate rivers and tributaries of same have the following requirement: " . . . Waste discharges into waters used or capable of being used for domestic water supplies or body contact aquatic sports including skiing and swimming, shall receive disinfection or equivalent treatment as necessary . . ."
Oregon	All sewage shall receive a minimum of secondary treatment or equivalent (equal to at least 85% removal of 5-day biochemical oxygen demand and suspended solids) and shall be effectively disinfected before being discharged into any public waters of the State.
Pennsylvania	Effective disinfection to control disease producing organisms shall be the production of an effluent which will contain . . . included as part of definition of secondary treatment.
Rhode Island	All sewage treatment plant effluents shall receive disinfection before discharge into a watercourse.
South Carolina	No requirement found in standards.
South Dakota	Effective disinfection of any wastewater discharges, including sewage, industrial wastes, other wastes and overflow from combined storm and sanitary sewer systems, if these discharges constitute an actual or potential interference with the intended beneficial uses of these waters, may be required by the (South Dakota) Committee (on Water Pollution).
Tennessee	No requirement found in standards.
Texas	It is the policy of the State of Texas, acting through the Texas Water Quality Board, to require primary and secondary treatment and disinfection (except for oxidation pond effluents) at all facilities serving the general public and which treat domestic sanitary wastes.
Utah	While the standards described apply generally to receiving stream flow, they can and must become effluent standards as required by lack of dilution water. Furthermore, because of the public health ramifications of the standard for coliform bacteria, it is presently an effluent standard by reason of the requirements stated in Section I-9 b, Exhibit 5, which limits coliform to 5,000/100 ml. in any discharges not isolated from the public. This requirement is given additional force by Section III-82 b, Exhibit 5, which recognizes the limited ability of chemical disinfectants, especially chlorine, to kill bacteria which are protected by layers of organic substance, through a requirement for certain biological oxidation treatment prior to final disinfection. Part III-82 of the Utah State Department of Health Code of Waste Disposal Regulations explain their chlorination requirements which are:



- (a) Treatment works effluents shall be chlorinated for reduction of bacteria and viruses as required by final conditions of disposal and as stipulated by the Boards.
- (b) In general, chlorination will be considered fully effective for the purposes of these regulations when applied to oxidized effluents retaining not more than 25 percent of the raw wastewater BOD and containing not more than 50 mg/l of BOD and not more than 50 mg/l of suspended solids.
- (e) . . . For disinfection, the capacity should be adequate to produce a residual of 1.0 mg/l in the final effluent. . .

Vermont

Appropriate treatment shall be defined as secondary treatment with disinfection or its industrial waste equivalent as determined by the signatory State regulatory agency. Lesser degrees of treatment or control will be permitted only where it can be demonstrated that attainment of the specified water use class criteria of quality can be effectuated.

Virginia

Minute 59 states: Chlorination facilities are to be operated continuously during the entire year and a chlorine residual of at least 2.0 ppm shall be maintained at all times . . . at sewage treatment facilities that discharge effluent to Williams and Upper Machodoc Creeks, King George County.

The Board requires that all treated discharges to the Nansemond River (Suffolk area and Shingle Creek) and the Chickahominy River Basin . . . containing bacteria shall be chlorinated sufficiently and continuously (100% of the time) to maintain a residual which will insure substantially complete removal of coliform organisms. This action is to be instituted immediately by all concerned owners.

Although disinfection is not specifically required for all State interstate waters, the Board has the necessary authority to require it in specific instances as they deem necessary.

Washington

Existing and new domestic waste discharges shall provide adequate secondary sewage treatment, disinfection and outfall facilities. Where existing and new commercial, industrial or domestic wastes discharge to salt water, secondary treatment shall be required unless, after a review of existing data or an engineering study, it can be demonstrated that a lesser degree of treatment will provide for protection of present and future water uses and the preservation or enhancement of existing water quality. In no case, however, will less than primary treatment with disinfection and adequate outfall be accepted.

West Virginia	Chlorination will be required for all installations and will be employed for twelve months of the year."
Wisconsin	Disinfection of sewage effluents is necessary for a fuller use of our surface waters and in the protection of public health. Disinfection is to be used during the May 1 through October 31 period annually where recreational use is involved. The department will require year around disinfection where public water supplies are involved.
Wyoming	Required at sites determined by studies.
District of Columbia	Although disinfection is not specifically mentioned as a requirement in the adopted water quality standards as submitted and approved by the Secretary of the Interior, later enforcement conferences have required it as a policy.
Virgin Islands	Primary treatment with chlorination of effluent before discharge through outfalls equipped with diffusers to give a minimum of 300 to 1 dilution will be required to protect water quality for marine life recreation.
Guam	No specific requirement found in standards.
Puerto Rico	Chlorination of treatment plant effluent will be required in those cases in which it is necessary to maintain the receiving body of water within the specified quality for its use.