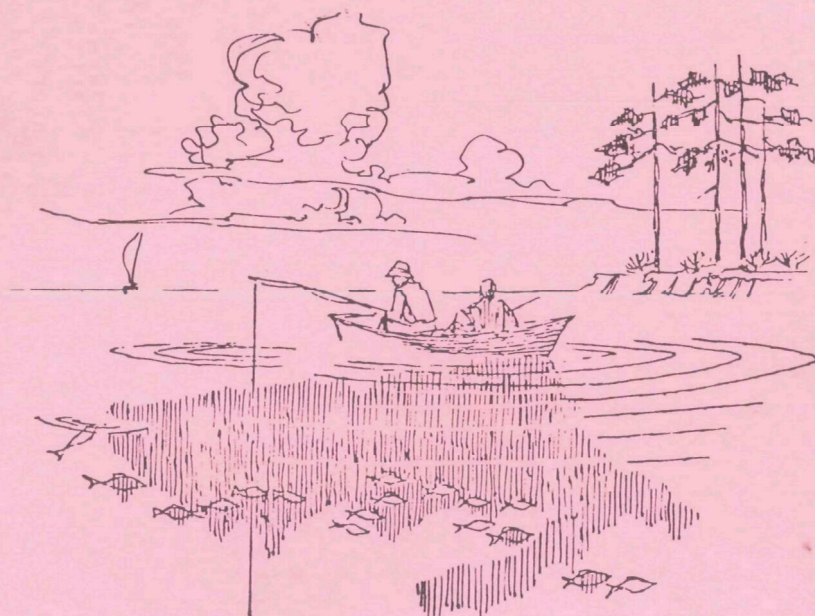


WATER QUALITY STANDARDS CRITERIA DIGEST
A COMPILATION OF FEDERAL/STATE CRITERIA ON
-RADIATION-



ENVIRONMENTAL PROTECTION AGENCY
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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 radiological 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 waters; 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.

Since radioactive materials such as radium, strontium 90, and tritium, are toxic to man as well as being cumulative in his system, these pollutants are subject to control, monitoring, and measurement whatever the contact medium. The total radiation in an individual's environment--his job and medical treatments, the food and water he consumes, and air he breathes--must be considered. Radiation enters our environment from various sources: mining and processing of radioactive ores; nuclear weapons testing fallout; power reactor emissions; and medical, research, and industrial applications, as well as natural emissions from stellar bodies and geological deposits.

The EPA-recommended criteria limits on these materials in water are:

Gross Beta	500 pc/l	(picocuries per liter)
Radium	1.0 pc/l	
Strontium-90	10.0 pc/l	
Tritium	3000.0 pc/l	

These criteria essentially duplicate or parallel the recommended limits in the U.S. Public Health Service Drinking Water Standards, cited by the NTAC report, Water Quality Criteria.

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

PWS	Public Water Supply
F&WL	Fish and Wildlife
Agr.	Agricultural
Ind.	Industrial
MPCw	Maximum Permissible Concentration per week
pc/l & pCi/l	Picocuries per liter
USPHS	U.S. Public Health Service

(For explanation of use classifications, see EPA publication, "General Stream Use Designations.")

RADIATION CRITERIA

Alabama ¹

(1) Public Water Supply. No radionuclide or mixture of radionuclides shall be present at concentrations greater than those specified by the EPA (USPHS) drinking water standards.

(2) Other Uses. The concentrations of radioactive materials present shall not exceed the radiation protection guides recommended by the Criteria and Standards Division, Office of Radiation Protection, EPA (formerly Federal Radiation Council).

Alaska

Conform with current USPHS drinking water standards.

Arizona

The concentration of radioactivity in the surface waters of the state shall not:

- a. Exceed 1/30th of the MPCw values given for continuous occupational exposure in National Bureau of Standards handbook No. 69.
- b. Exceed the Public Health Service Drinking water standards for waters used for domestic supplies.
- c. Result in the accumulation of radioactivity in edible plants or animals that present a hazard to consumers.
- d. Be harmful to aquatic life.

Arkansas

The Rules and Regulations for the Control of Sources of Ionizing Radiation, of the Division of Radiological Health, Arkansas State Board of Health, shall apply as to the limits established for radiation levels in uncontrolled areas.

California

None present in concentrations exceeding levels set forth in California Radiation Control Regulations, Subchapter 4, Chapter 5, Title 17, California Administrative Code at any place. Some variation in this statement was adopted by the 32 regional water quality boards.

1. As proposed by EPA in the Federal Register, March 11, 1972.

Colorado	Radioactive materials attributable to municipal, industrial or other controllable sources will be minimum concentrations that are physically and economically feasible to achieve. In no case shall such materials in the stream exceed the limits established in the current edition of the U.S. Public Health Service Drinking Water Standards or the limits approved by the Federal Radiation Council, or, in the absence of any limits specified by the U.S. Public Health Service or the Federal Radiation Council, 1/30 of the 168-hour-week values for other radioactive substances specified in the National Bureau of Standards Handbook 69.
Connecticut	Alpha emitters 3 pc/l Beta emitters 1000 pc/l Also USPHS Drinking Water Standards
Delaware	Alpha emitters 3 pc/l Beta emitters 1000 pc/l
Florida	Gross Beta Activity - (in known absence of Strontium-90 and alpha emitters), not to exceed one thousand micro-microcuries at any time.
Georgia	The maximum permissible concentrations of radionuclides in the waters of the state must conform to the limits which are cited in Chapter 270-5-20 "Control of Radioactive Materials" of the Rules and Regulations of the Georgia Department of Public Health.
Hawaii	The concentrations of radioactivity in water shall not exceed 1/30th of the MPCw values given for continuous occupational exposure in National Bureau of Standards Handbook No. 69. No radionuclides or mixture of radionuclides shall be present at concentrations greater than those specified by the U.S. Public Health Service, Publication No. 956, as revised in 1962, as acceptable for drinking water. The concentration of radioactive materials present in fresh, estuarine, and marine waters shall be less than those that would require restrictions on the use of organisms harvested from the area in order to meet the Radiation Protection Guides recommended by the Federal Radiation Council. These water quality criteria are based upon the best currently available data. It is possible that studies planned to be made in connection with the implementation program may prove them to be either inadequate or unattainable. For this reason, they will be subject to periodic review and, where necessary, to change. Any

change will be made only after public hearing, held in compliance with the Hawaii Administrative Procedure Act and the Rules of Practice and Procedure of the Department of Health.

Idaho

Radioactive materials of other than natural origin shall not be present in any amount which reflects failure in any case to apply all controls which are physically or economically feasible. In no case shall such materials exceed the limits established in the 1962 USPHS Drinking Water Standards.

Illinois

The General Standards listed below will protect the State's water for aquatic life, (public and food processing water supply) agricultural use, primary and secondary contact use, and most industrial uses, and ensure the aesthetic quality of the State's aquatic environment...Gross beta concentration shall not exceed 100 pico curies per liter (pCi/l). Concentrations of radium 226 and strontium 90 shall not exceed 1 and 2 pico curies per liter respectively.

Indiana

Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 picocuries per liter, respectively. In the known absence of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000 picocuries per liter.

Iowa

Gross beta activity (in the known absence of 90 strontium and alpha emitters) shall not exceed 1000 picocuries per liter.

The concentration of 226 radium and 90 strontium shall not exceed 3 and 10 picocuries per liter respectively.

The annual average concentration of specific radionuclides, other than 226 radium and 90 strontium, shall not exceed 1/30 of the appropriate maximum permissible concentration for the 168 hour week as set forth by the International Commission of Radiological Protection and the National Committee on Radiation Protection.

Because any human exposure to unnecessary ionizing radiation is undesirable, the concentrations of radioisotopes in natural waters shall be maintained at the lowest practicable level.

Kansas

USPHS Drinking Water Standards shall apply, except that for substances generally toxic to fish, standards generally accepted for fishery environment will be considered.

Kentucky

Gross beta activity not to exceed 1,000 picocuries per liter, (pCi/l), nor shall activity from dissolved Strontium-90 exceed 10 pCi/l, nor shall activity from dissolved alpha emitters exceed 3pCi/l.

Maine

Fresh Water:

- Class A No radioactive matter or substances shall be permitted in these waters other than that occurring from natural phenomena.
- Class B No radioactive matter or substances shall be discharged to these waters which will raise the radionuclide concentrations above the standards established by USPHS as being acceptable for drinking water.
- Class C
- Class D

Salt Water: (All Classes)

No radioactive matter or substances shall be permitted in these waters which would be harmful to humans, animals or aquatic life and there shall be no disposal of any matter or substance which would result in radio-nuclide concentrations in edible fish or other aquatic life thereby rendering them dangerous for human consumption.

Maryland

USPHS Drinking Water Standards apply.

Massachusetts

PWS (Fresh Water) - None other than that occurring from natural phenomena.

All other Classes: None in concentrations or combinations which would be harmful to human, animal, or aquatic life for the appropriate water use. None in such concentrations which would result in radionuclide concentrations in aquatic life which exceed the recommended limits for consumption by humans.

Michigan

Gross beta emitters 1,000 pc/l
Limits established by Federal Radiation Council.

Minnesota

Not to exceed the lowest concentrations permitted to be discharged to an uncontrollable environment as prescribed by the appropriate authority having control over their uses.

Mississippi

There shall be no radioactive substances added to the waters which will cause the gross beta activity (in the absence of Strontium-90 and alpha emitters) to exceed 1000 micromicrocuries at any time.

Louisiana

Criteria are those contained in Section C and Appendix A of the Louisiana Radiation Regulation.

Missouri

The dissolved radium 226 and strontium-90 shall not exceed 3 and 10 picocuries/liter (pc/l) respectively in the stream due to effluents or surface runoff. In the absence of strontium-90 and alpha emitters, the gross beta concentration shall not exceed 1000 pc/l in the stream due to effluents or surface runoff.

Montana

Class A - Closed - No wastes shall be allowed which increase radioactivity above natural background.

Class	A - Open	}	USPHS Drinking Water Standards
	B		
	C		
	D1	}	Same as A-Open-B-C except where concentration factors of aquatic flora and fauna exceed the recommended reduction factors, then maximum permissible limits shall be reduced below acute or chronic problem levels.
	D2		
	D3		
	E	}	Same as A-Open.
	F		

Nebraska

Radiological limits shall be in accordance with the Radiological Health Regulation, State of Nebraska, 1st Edition 1966, and as amended in its latest edition.

Nevada

Shall not be present in concentrations, from other than natural origin, which are not deleterious to animal, plant, or aquatic life or which exceed the USPHS 1962 Drinking Water Standards.

New Hampshire

(1) No radioactive materials should be present in natural waters as a consequence of the failure of an installation to exercise appropriate controls to minimize releases.

(2) USPHS Drinking Water Standards will apply.

(3) The concentrations of radioactive materials present in fresh, estuarine, and marine waters should be less than those that would require restrictions on the use of organisms harvested from the area to meet the Radiation Protection Guides recommended by the Federal Radiation Council.

New Jersey

USPHS Drinking Water Standards will apply.

New Mexico	The concentrations of radioactivity will be maintained at the lowest practical level. Radionuclides shall not be present in receiving waters in concentrations that are inimical to aquatic life or that will, after conventional drinking water treatment, prevent meeting the U.S. Public Health Service 1962 Drinking Water Standards or be greater than 1/30 of the 168 hour value for other radioactive substances specified in <u>National Bureau of Standards Handbook 69</u> .
New York	USPHS Drinking Water Standards will apply.
North Carolina	Gross beta activity (in the known absence of strontium-90 and alpha emitters) not to exceed 1000 pc/l (picocuries per liter) at any time.
North Dakota	No discharge permitted unless the materials are readily soluble or dispersable in water and of acceptable quantities as recognized by the State Health Department and other appropriate State or Federal agencies.
Ohio	Gross beta activity (in the known absence of strontium-90 and alpha emitters) not to exceed 1,000 micromicrocuries per liter at any time.
Oklahoma	The average concentration of the radio-nuclide (or radionuclides) in water at points of release from the control of the user shall not exceed the limits prescribed for such releases in the applicable portion of the current set of Radiation Protection Regulations, as promulgated by the Oklahoma State Board of Health or subsequent revisions thereof. A reasonable effort shall be made to identify each radionuclide, and to determine its concentrations, which is present in the effluent.
Oregon	Radioisotope concentrations not to exceed Maximum Permissible Concentrations (MPC's) in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock & dairy products or pose an external radiation hazard.
Pennsylvania	Other than a general prohibition against all toxic materials, standards do not contain a specific reference to radionuclides. State permit system is used to place appropriate radionuclide discharge limits on individual dischargers.
Rhode Island	The level of radioactive materials in all waters shall not be in concentrations or combinations which would be harmful to human, animal or aquatic life.
South Carolina	None to exceed limitations set forth in the latest USPHS Drinking Water Standards.

South Dakota Not permitted in concentrations greater than (a) 1/30th of National Bureau of Standards Handbook 69 values, (b) limits set by USPHS in Drinking Water Standards and (c) levels injurious to plant, animal, or aquatic life.

Tennessee Other pollutants shall not be added to the water in quantities that may be detrimental to public health or impair the usefulness of the water as a source of domestic water supply-(or other water use designated).

Texas Levels of ionizing radiation and radioactive materials of all kinds, from both dissolved and suspended matter, shall be regulated by the Texas Radiation Control Act, Article 4590(f), Revised Civil Statutes of Texas, and the Texas Regulations for Control of Radiation issued thereafter.

Utah USPHS Drinking Water Standards 1962 apply. Also,radioactive substances shall not exceed 1/30th of the MPC values specified in the National Bureau of Standards Handbook 69 or result in accumulation of radioactivity in edible plants and animals that present a hazard to consumers.

Vermont Wastes shall be free of chemical and radiological constituents which would be harmful to the governing water class use. In areas where fisheries are the governing consideration and approved limits have not been established, bio-assays shall be performed as required by the appropriate state agencies.

Discharge of radioactive materials to the waters of the state shall not exceed the lowest practicable limits after utilization of the latest technological developments and equipment for control of radioactive emissions.

Virginia All areas except shellfish.

Gross beta	1,000 pc/l
Radium-226	3 pc/l
Strontium-90	10 pc/l

Shellfish

1. Radium 226 not to exceed 3 pc/l
Strontium-90 not to exceed 10 pc/l
2. In the known absence of strontium-90 and alpha emitting radionuclides, gross beta activity not to exceed 1,000 pc/l.

Washington	Less than those which may affect public health, the natural aquatic environment, or the desirability of the water for any usage. (Wording generally the same for all classes).
West Virginia	Gross beta activity 1,000 pCi/l Strontium-90 10 pCi/l Alpha emitters 3 pCi/l
Wisconsin	USPHS Drinking Water Standards apply.
Wyoming	Radioactive materials of other than natural origin shall not be present in any amount which reflects failure in any case to apply all controls which are physically and economically feasible. In no case shall such materials exceed the limits established in the 1962 Public Health Service Drinking Water Standards or 1/30 (168 hour value) of the values for radioactive substances specified in the National Bureau of Standards Handbook 69.
District of Columbia	Waters shall be free of high temperature, toxic, corrosive or other deleterious substances attributable to sewage, industrial waste, or other waste in concentrations or combinations which interfere directly or indirectly with water uses, or which are harmful to human, animal, plant or aquatic life.
Guam	USPHS Drinking Water Standards apply. Also, the concentration of radioactivity shall not: (a) exceed 1/30 of the MPCw values given for continuous occupational exposure in National Bureau of Standards Handbook No. 69 as revised, (b) exceed the current Public Health Service Drinking Water Standards for waters used for public or domestic supplies, (c) result in accumulations of radioactivity in edible plants and animals that present a hazard to consumers, (d) be harmful to aquatic life. Since human exposure to any ionizing radiation is undesirable, the concentration of radioactivity in natural waters will be maintained at the lowest practicable level.
Puerto Rico	Toxic wastes, or deleterious substances alone or in combination with other substances or wastes in sufficient amount as to prevent the survival or propagation of fish life or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
Virgin Islands	Free from substances attributable to municipal, industrial, or other discharges in concentrations or combinations which are toxic or harmful to human, animal, or aquatic life.