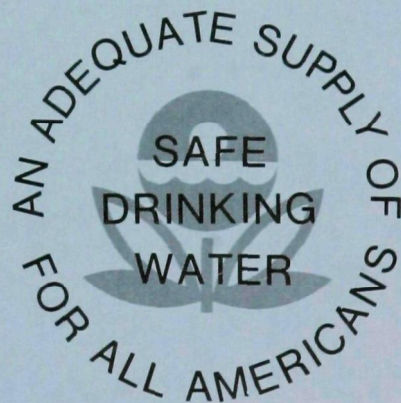


THE UNITED STATES
ENVIRONMENTAL
PROTECTION
AGENCY'S
CONTRIBUTION TO



INTRODUCTION

Few things have more influence on man's health than the food he eats and the water he drinks. Sanskrit sources dating back to 2000 BC indicate the connection between water and health was recognized by early civilizations, but for centuries succeeding generations failed to take advantage of this early knowledge and their communities were ravaged by water-borne disease outbreaks.

In the last 100 years, however, the achievements in the water supply field have been remarkable. One can now travel anywhere in the United States and drink water from public supplies with little fear of getting sick. However, if we were to suggest that the quality, safety, and adequacy of the municipal water supply systems in America today are above reproach, we would be guilty of hypocrisy. Our concern should not be limited solely to community water supply systems. Studies have shown that a large segment of the population served by individual water supply systems are consuming unsafe water. Additionally, some 20 million people do not have running water in their home and must haul water from questionable sources.

A basic problem to be recognized is that while our national water resources are fixed our need for water is continually increasing. This, combined with the growing volumes and varieties of pollutants entering our surface and groundwater, forecasts serious problems for the future. While major strides are being made in water pollution control and more efficient use of water through reuse and recycling is being implemented, the final line of defense is the water supply system itself.

However, a nation which has developed the technology to reach the moon still does not have the ability to detect all of the potentially dangerous chemical and biological substances in our drinking water, has little knowledge of the long-range health effects of many such contaminants, and has not yet developed fully effective and practical treatment methods.

In many areas of the country, water shortages will necessitate thorough consideration of the reclamation and reuse of wastewaters. The health impacts and aspects of such reuse for drinking and other human purposes must be investigated and evaluated.

The absence of adequate planning has resulted in the proliferation of water supply systems to serve metropolitan areas. Many of these systems are too small for efficient or safe operation, thereby resulting in hazards to the health of the public. Inadequacies in the construction, operations and maintenance of drinking water supply systems have caused disease outbreaks. Increased surveillance of drinking water supply systems is needed to control and prevent public health hazards.

We are confident, however, that through the continued cooperative efforts of the water supply industry, the state water supply and pollution control agencies, and the EPA that current problems, can be solved and future challenges successfully met. The following pages describe EPA's contributions toward the provision of an adequate supply of safe water for all Americans.

INVENTORY

EPA is responsible for the maintenance of a National inventory of water supply systems serving the public. The water supply inventory was started in the Public Health Service in 1939. It was published at 5-year intervals until 1963. The 1963 inventory listed 19,236 supplies serving 150 million people. Most of the supplies were small, about 85% served 5,000 or fewer persons. About one-half of the people served by water supplies were served by the 399 supplies serving more than 100,000 persons. The other half were served by the 18,837 small supplies. About 75% of the supplies used ground water, 18% surface water, and 7% mixed sources.

EPA is initiating an update of the inventory. Data collection will be started in the spring of 1972 and is to be completed within one year. It is anticipated that over 30,000 water supply systems will be identified. Collection of the data will require a high degree of cooperation among the EPA, State and local governments, and the utility industry.

The new forms on which the data will be collected have been essentially completed. They have been designed with the assistance of potential users of the data – the Conference of State Sanitary Engineers, the American Water Works Association, the National Water Well Association – and Federal Agencies involved in the field of water supply.

Data from completed forms will be key-punched and fed into the EPA computer as soon as it is received. A computer program is being developed to allow analysis and print-out of the data in a variety of forms.

Membership of the Public Advisory Committee

Mr. Henry J. Ongerth	Conference of State Sanitary Engineers
Mr. George W. Burke, Jr.	Water Pollution Control Federation
Mr. James B. Coulter	American Public Health Association
Dr. Charles C. Croft	Association of State and Territorial Public Health Laboratory Directors
Mr. H. O. Hartung	American Water Works Association
Dr. Hollis S. Ingraham	Association of State and Territorial Health Officers
Dr. T. E. Larson	American Chemical Society
Mr. Garmon C. McCall	National Water Well Association
Mrs. Jessie W. Rudnick	League of Women Voters
Mr. Gerald C. Smith	National Association of Water Companies
Dr. Richard L. Woodward	American Society of Civil Engineers
Dr. John A. Zapp	Society of Toxicology
Mr. Emil C. Jensen	Council of State Governments
Dr. William J. Hausler	Society for Microbiology
Mr. William N. Long	Water Supply Programs Division, OWP, EPA

STANDARDS

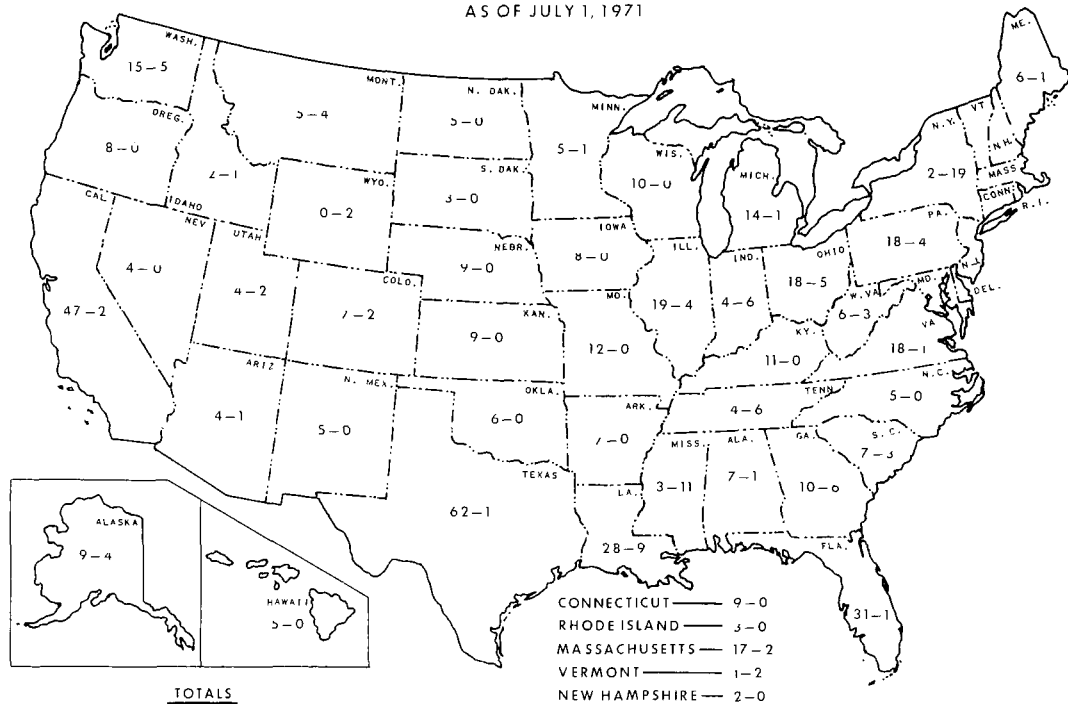
Standards for potable water in this country were first issued in 1912 in response to legislation designed to prevent the interstate spread of communicable disease. Over the years they have been modified and expanded many times. The current revision appears as the 1962 U.S. Public Health Service Drinking Water Standards. When EPA was established, the standard setting authority for potable water was transferred to the new Agency.

In recognition of the need to revise and update certain portions of the Standards, an EPA-sponsored task force of technical experts was assembled to develop recommended revisions to the 1962 Standards. Their work is now completed and the Administrator has assembled a public advisory committee to review the recommended revisions and report their findings to him.

Noteworthy changes proposed are:

- The addition of a standard plate count to the bacteriological standards.
- A provision to allow the partial substitution of chlorine residual determinations for coliform samples.
- A reduction of allowable turbidity from 5 to 1 turbidity units.
- Turbidity to be removed from the esthetic standards list to the health related standards list.
- The addition of a sodium standard to protect those persons on a restricted sodium diet.
- The addition of a limit for mercury.
- The addition of pesticide concentration limits.

CERTIFICATION STATUS BY STATES
AS OF JULY 1, 1971



APPROVED 531 - 130 PROVISIONAL APPROVAL

CERTIFICATION

Under the authority of the Interstate Quarantine Regulations, EPA is responsible for the certification of water supply systems serving trains, planes, busses, and vessels crossing state lines or using international ports or terminals.

Classifications are based on information and recommendations provided by the states. This is supplemented by Federal or Joint State-Federal Surveys of the water supply systems. Supplies that are found to be in substantial compliance with the Federal Drinking Water Standards are classified as Approved. Where serious deficiencies exist in the actual water quality, the surveillance provided, or the physical facilities and their operation, the supply is Prohibited for use by interstate carriers. A provisionally approved classification is given if there are significant deficiencies, however, an imminent and substantial danger to health does not exist.

As of July 1, 1971, there were 661 water supply systems serving interstate carriers as well as a resident population of 80 million people; 531 systems were approved and 130 were provisionally approved. In addition, between August of 1970 and March of 1972, 15 supplies have been prohibited for use by interstate carriers.

RESEARCH

The foundation under “An Adequate Supply of Safe Drinking Water for All Americans” is an effective research program. This program is essential for the promulgation of drinking water quality standards, the improvement in water storage, treatment and distribution practices, and intelligent surveillance and monitoring of drinking water supply systems. Major research activities include:

Epidemiological investigations of water-borne diseases and toxicities to elucidate the relationship between water quality and disease. Such information is essential in the development of drinking water standards.

Development and application of methods for the isolation and identification of viruses and bacterial pathogens of sufficient sensitivity to detect the quantities likely to be present in finished drinking water. The products of this research are applicable to the development of treatment methods, to the development of bacterial criteria for drinking water, and to the determination of finished drinking water quality.

Development and application of methods for recovery and identification of organics in drinking water. These procedures will isolate organics from the water in an unaltered state and provide means for identification, purification, and the production of a material suitable for toxicological assessment.

Studies to determine the acute and the long-range chronic effects of organic and inorganic chemicals that may be found in drinking water. Many of the 12,000 different toxic chemicals in industrial use today may find their way into drinking water sources. Knowledge of the long-range effects of man's exposure to water is essential for the development of safe tolerance limits for these materials in drinking water.

Development and evaluation of water treatment processes. Conventional water treatment processes are ineffective in removing many inorganic and organic chemicals that may be found in drinking supply sources. Research is conducted to develop and evaluate innovated processes and techniques for the removal of these potentially toxic chemicals. Recent studies have demonstrated that many types of enteric viruses are resistant to the usual levels of chlorine doses.

Development of simple rapid methods for detection and quantification of bacteria, chemicals, and toxic agents in water. Many of the current assay methods for contaminants in water are complicated and time-consuming. They are, therefore, not applicable to routine monitoring of drinking water supplies, particularly if the analyses are to be conducted in water plant laboratories or by field investigations personnel. Current studies include the development of bacterial assays that can be completed in a few hours; automated analytical systems for chemical constituents; and rapid screening tests using cell culture techniques for toxic agents in water.

SPECIAL FIELD STUDIES AND INVESTIGATIONS

Special studies are a key part of the EPA's water supply program. Through this means, vital information is obtained which is then used to shape and direct EPA's activities in research, training, standards development and technical assistance.

THE COMMUNITY WATER SUPPLY STUDY

This study, which was completed in 1970, consisted of a detailed evaluation of 969 community water supply systems throughout the country. A broad range of system sizes, types of source waters, and complexity of treatment facilities were included. Primary findings were as follows:

- 36% of 2,600 individual tap water samples contained one or more bacteriological or chemical constituents exceeding the limits of the Drinking Water Standards.

- 56% of the systems evidenced physical deficiencies.

- 77% of the plant operators were inadequately trained in water microbiology and 46% were deficient in chemistry relating to their plant operation.

- 79% of the systems were not inspected by State or county authorities in the last full calendar year prior to the study.

Overall, the smaller systems evidenced more numerous deficiencies than the larger ones.

PILOT STUDIES OF FEDERALLY-RELATED WATER SUPPLIES AT RECREATIONAL AREAS AND REST STOPS

A study of water supplies at Federal reservoir installations constructed by the Corps of Engineers has been completed.

A similar study of water supplies constructed by the Bureau of Reclamation is under way and studies of water supplies at national park camp areas and along Federal Interstate highways are in the planning stages.

The results of pilot studies completed show 15 percent of the water supplies exceed bacteriological quality limits and 23 percent of the supplies exceed either the bacteriological or the chemical mandatory limits.

INDIVIDUAL WATER SUPPLY STUDIES

Drinking water for more than 50 million Americans is supplied from individual wells, springs, rain-water catchments or unprotected surface water sources. Historically and traditionally, ground water coming from its natural environment has been considered of good sanitary quality — safe to drink, if palatable.

However, recent studies of these individual drinking water systems in several states have shown that a large segment of our population is drinking water that is bacteriologically unsafe and of poor chemical quality. The results of the surveys indicate that more than 1/3 of the water supplies sampled are potentially hazardous to the users.

SPECIAL WATER QUALITY MONITORING STUDIES

Periodically, the need arises to conduct studies to determine the presence of particular contaminants, rather than to gain information about a type of water supply system. Recent examples of these studies are investigations to detect the presence of herbicides and mercury in drinking water.

TECHNICAL ASSISTANCE

Through the provision of technical assistance to State and local governmental groups and water utilities, EPA is able to disseminate and promote the use of the latest technological developments and practices in the water supply industry. The technical assistance takes several forms:

Evaluation of State Water Supply Programs

Where requested by a State, EPA will perform a comprehensive evaluation of their water supply program. These evaluations are being made as a result of the findings of the 1970 Community Water Supply Study of 969 water systems which revealed inadequacies in State surveillance programs. The evaluations involve a representative sample of water supply systems and include a review of State laws, rules, regulations, and policies; surveillance, monitoring, training, and technical assistance activities; a study of their bacteriological and chemical analytical capability; and field evaluations of selected water supply systems supported by bacteriological and chemical analysis of water quality.

Evaluations have been completed or are in progress in the following states:

Connecticut	New Jersey	Maryland
Idaho	New Mexico	Wyoming
Kansas	Ohio	Kentucky
Tennessee		

Results of the evaluations are used by the States to improve their program.

Specialized Assistance

To the limit of staff availability, EPA personnel are available to provide specialized technical assistance through its Regional Offices. Regional staff receives back-up support from EPA Headquarters and laboratory personnel.

Publications

The EPA has available a series of publications providing information on water supply systems and related areas. They are available through the Government Printing Office or the Environmental Protection Agency. A partial listing is as follows:

Community Water Supply Study, Analysis of National Survey Findings (EPA)

Community Water Supply Study, Significance of National Findings (EPA)

Public Health Service Drinking Water Standards (PHS 956)

A Guide to the Interstate Carrier Water Supply Certification Program (EPA)

Manual for Evaluating Public Drinking Water Supplies (PHS 1820)

Individual Water Supply Systems (PHS 24)*

Water Supply and Plumbing Cross-Connections (PHS 957)

Evaluation of Water Laboratories (PHS 999-EE-1)

Health Guidelines for Water and Related Land Resources Planning, Development, and Management (EPA)

*Under Revision

TRAINING

As the need for water treatment becomes more necessary to insure safe drinking water, and as treatment methods and monitoring requirements become more complex, the need for training increases. Presently, EPA offers three types of training for water supply personnel:

Specialized Short Courses presented at EPA's National
Training Center in Cincinnati, Ohio:

Ground Water Technology	Oct. 16-20, 1972
Fluoride Determinations in Water	Nov. 6-8, 1972
Operation and Control of Water Systems Supplied from Wells	Dec. 4-8, 1972
Unit Processes – Water Treatment Plant Operation	Jan. 15-19, 1973
Special Analytical Techniques – Thin Layer Chromatography	Feb. 12-14, 1973
Water Supply Sanitary Survey	Mar. 19-21, 1973
Chemical Examination of Drinking Water	Apr. 16-20, 1973
Bacteriological examination of Drinking Water	Apr. 23-27, 1973
Special Analytical Techniques – Atomic Absorption	June 4-6, 1973

Specialized Courses presented at field locations:

In recognition of the difficulties that many of the smaller water supply systems and some states have in sending their personnel to Cincinnati for training, EPA has recently increased the number of courses that it presents at various field locations. The following courses have been presented in the field.

Fluoride Determinations in Water

Ground Water Technology

Operation and Control of Water Systems Supplied from Wells

Short Course for Water Treatment Plant Operators

EPA, in cooperation with the Department of Labor, is providing funds and technical assistance to governmental and educational institutions for the purpose of presenting basic training for water treatment plant operators. These courses combine classroom instruction with on-the-job training. In FY 72, grants have been awarded to the States of Vermont, Maine, and West Virginia, and to the Indiana Vocational Technical College.

Packaged training courses and training aids are currently under development. These will be made available to State and local governments and the water supply industry to assist them sponsor training programs.

EPA POLICY STATEMENT ON WATER REUSE

The demand for water is increasing both through population growth and changing life styles brought about by advancing technology, while the supply of water from nature remains basically constant from year to year. This is not to imply that we are or will shortly be out of water, although water shortages are of great concern in some regions. Rather, we must recognize the need to use and reuse wastewater whenever possible. Therefore,

1. EPA supports and encourages the development and practices of successive wastewater reclamation, reuse, recycling and recharge as a major element in water quality management, providing the reclamation systems are designed and operated so as to avoid health hazards to the people or damage to the environment.
2. EPA recognizes and supports the potential for wastewater reuse in agriculture, industrial, municipal, recreational, and groundwater recharge applications.
3. EPA does not support the *direct* interconnection of wastewater reclamation plants with municipal water treatment plants.
4. EPA will continue to support reuse research and demonstration projects.

USE OF WASTEWATER AS A POTABLE WATER SOURCE

The concurrent use of the Nation's rivers and lakes for both municipal water supply and waste disposal has been practiced for many years in many areas of the country. It is estimated that 50% of the Nation's population now derives their water supply from surface sources which have also received a variety of industrial wastes, untreated sewage, urban runoff and effluent from a variety of sewage treatment plants. Public health officials have relied upon time of travel or storage and treatment to protect the public against infectious diseases and toxic substances. Water quality standards and treatment requirements applicable to surface sources used for water supply permit the discharge of relatively high quantities of wastes.

Indirect reuse for municipal public water supply is a fact of life; however, direct reuse is a new matter requiring careful research and investigation before introduction.

Health problems in a direct interconnection or in a recycling situation relate to viruses, bacterial build-up, chemical build-up, the possibility of accidental spills or sabotage and a questionable record of reliability in the operation of wastewater treatment plants. Viruses are difficult to identify and measure and are more resistant to disinfection than bacteria. Carbon columns and other possible advanced waste treatment elements may harbor bacteria and contribute to the development of unhealthful levels of bacteria in a recycling situation.

The direct introduction of chemicals from a waste-stream and their build-up through potable system-waste system recycling can present increased long-term chronic hazards, presently undefined. Accidental spills or sabotage present an acute threat which cannot be disregarded, as anyone can throw anything down the drain; some system of holding and dilution reservoirs may need to be provided between the reclamation plant and the potable water intake together with biological and chemical monitoring. With regard to the reliability of reclamation plant operation, studies in California have shown that 60% of wastewater treatment plants studied had some breakdown during the year. Observations of engineers and others confirm that reliability is a common problem in wastewater treatment plants; safeguards must be provided to prevent the introduction of non-treated or poorly treated wastes into a potable water system.

For the above reasons, EPA does not support the *direct* interconnection of waste-water reclamation plants with municipal water treatment plants.

**UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460**

Regional Offices	Phone	States Covered
Boston, Massachusetts 02203	617-223-7210	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
New York, New York 10007	212-264-2525	New Jersey, New York, Puerto Rico, Virgin Islands
Philadelphia, Pa. 19106	215-597-9800	Delaware, Maryland, Pennsylvania, Virginia, West Virginia, D.C.
Atlanta, Georgia 30309	404-526-5727	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
Chicago, Illinois 60606	312-353-5250	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
Dallas, Texas 75202	214-749-1962	Arkansas, Louisiana, New Mexico, Oklahoma, Texas
Kansas City, Missouri 64106	816-374-5493	Iowa, Kansas, Missouri, Nebraska
Denver, Colorado 80203	303-837-3895	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
San Francisco, Calif. 94102	415-556-2320	Arizona, California, Hawaii, Nevada, American Samoa, Guam, Trust Territories of Pacific Islands, Wake Island
Seattle, Washington 98101	206-442-1220	Alaska, Idaho, Oregon, Washington