FEDERAL SAFE DRINKING WATER ACT—OVERSIGHT

HEARINGS

BEFORE THE

SUBCOMMITTEE ON
HEALTH AND THE ENVIRONMENT

OF THE

COMMITTEE ON
INTERSTATE AND FOREIGN COMMERCE
HOUSE OF REPRESENTATIVES

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

OVERSIGHT ON THE FEDERAL SAFE
DRINKING WATER ACT

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ROBERT W. MAHER, *Director of Research and Planning*
FRANCES DE PEYSTER, *Minority Staff Associate*

CONTENTS

ORGANIZATIONS REPRESENTED AT HEARINGS

American Bottled Water Association:
- Bailey, William, president.
- Harker, Timothy L., Washington counsel.
- Hutton, Jerry T., technical adviser.

American Water Works Association, Jerome B. Gilbert, vice president.

Clean Water Action Project, David R. Zwich, director.

Coalition for Safe Drinking Water:
- Burba, Foster S., on behalf of.
- Pendygraft, George, counsel.

Conference of State Sanitary Engineers, Robert G. McCall, chairman, water supply committee.

Environmental Action, A. Blakeman Early, on behalf of.

Environmental Defense Fund:
- Harris, Robert, Ph. D., on behalf of.
- Warren, Jacquelin, staff attorney.

Environmental Protection Agency:
- Costle, Hon. Douglas M., Administrator.
- Jorling, Thomas C., Assistant Administrator for Water and Waste Management.
- Kimm, Victor J., Deputy Assistant Administrator for Drinking Water.
- Warren, Charles, Director, Office of Legislative Affairs.

Health, Education, and Welfare Department:
- Gardner, Sherwin, Deputy Commissioner for Food and Drugs, Food and Drug Administration, Public Health Service.
- Quinn, Taylor, Associate Director for Compliance, Bureau of Foods, Food and Drug Administration, Public Health Service.

National Association of Counties, Robert C. Weaver, associate director.

National Association of Water Companies:
- Patterson, Henry S., II, on behalf of.
- Ring, Chester, executive vice president.

Upper Trinity Basin Compact:
- Browning, Richard, Trinity River Authority.
- Rice, I. M., director, Utilities of Dallas.
- Riehn, Carl, on behalf of.
- Robertson, Les, director, Fort Worth Utilities.
- Vance, Dan, northern manager, Trinity River Authority.

Urban Environmental Conference, Inc., George Coling, coordinator.

Water Quality Association:
- Brower, Dan C., board of directors.
- Doyle, Robert H., Washington counsel.
- Oberhamer, Douglas R., executive director.

FEDERAL SAFE DRINKING WATER ACT—OVERSIGHT

MONDAY, SEPTEMBER 25, 1978

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:50 a.m., in room 2123, Rayburn House Office Building, Hon. Paul G. Rogers, chairman, presiding.

Mr. ROGERS. The subcommittee will come to order, please.

The committee this morning is conducting oversight hearings on the Federal Safe Drinking Water Act.

I don't believe our colleague, Dave Evans of Indiana, is going to be able to be here this morning. He will be permitted to put in a statement, without objection.

Without objection, the Chair wishes to place in the record, as though read, the statement of Congressman James T. Broyhill of North Carolina.

STATEMENT OF HON. JAMES T. BROYHILL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NORTH CAROLINA

Mr. BROYHILL. I thank the chairman for affording the subcommittee an opportunity to review the Environmental Protection Agency's proceedings with respect to the proposed regulations for the control of organic chemical contaminants in drinking water.

I am sure that all of us share the concern and common goal of keeping America's drinking water clean and safe of potential health contaminants. I recognize that there is considerable controversy between the EPA and the Nation's water industry over the justification, administration, and costs of these proposed regulations. Accordingly, I hope that these oversight hearings will serve to more clearly delineate areas of concern as well as areas of understanding by both parties in an effort to find a reasonable ground of agreement.

I am hopeful that the Safe Drinking Water Act of 1974 can and will be implemented based on substantive, scientific evidence taking costs to the consumer and the industry into consideration. I believe there are many critical unanswered questions concerning these and other problems associated with this rulemaking process. I trust these hearings will afford us answers to many of these questions, and look forward to the testimony presented to us this morning.

Mr. ROGERS. We will begin the hearing this morning with a panel of water utility associations. If members of the panel would like to take seats at the table as I call their name, we will be pleased to hear from you.

Henry S. Patterson II, president of the Elizabethtown Water Co., on behalf of the National Association of Water Companies.

Foster Burba, president, Louisville Water Co., on behalf of the Coalition for Safe Drinking Water.

Carl Riehn, executive director, North Texas Municipal Water District, on behalf of the Upper Trinity Basin Compact.

Jerome B. Gilbert, vice president, Brown & Caldwell Consulting Engineers, on behalf of the American Water Works Association.

I might say I have particular pleasure in welcoming Henry S. Patterson, who was with me. We were together in World War II. That is why we won, I guess.

Mr. PATTERSON. That is what they say.

Mr. ROGERS. He was an artilleryman and forward observer in planes. We both remember his being shot at many times when he was in the air, but we are glad he came through and now is performing great functions. We are pleased to welcome you.

Mr. PATTERSON. Thank you, Mr. Rogers. We did win the war in spite of us.

Mr. CARTER. I am sure that is true, Mr. Chairman. Kilroy was there too.

Mr. Chairman, I commend the chairman for holding these oversight hearings on the Safe Drinking Water Act. I believe we should do more oversight in all areas of our subcommittee's jurisdiction.

Today we will hear testimony regarding EPA's proposed regulations for the control of organic chemical contaminants in drinking water.

Based on evidence from animal and epidemiological research, EPA believes that these organic chemicals may have an adverse effect on human health and, therefore, they have proposed these regulations.

We have been told there are at least 22 known or suspected carcinogens in our drinking water. On the other hand, representatives of the water systems have expressed concern that there is not enough evidence to justify EPA's proposed requirements.

For example, the cost estimates of implementing GAC systems vary greatly and are a matter of serious concern to the industry and ultimately to the consumer.

I have already had a chance to discuss this matter with representatives from my State and with officials from EPA. In my view, if it is apparent that these chemicals pose a clear risk to human health, then we must proceed to protect the public in the most cost efficient manner possible.

However, if the risks are really insignificant, then we should reconsider our approach.

In any event, I submit, Mr. Chairman, we should be doing much more in the way of prevention. We should keep the effluent upstream out of our water supplies to minimize the need for costly treatments.

Thank you, Mr. Chairman.

Mr. ROGERS. Thank you.

All right, I think we will begin.

Mr. Patterson, we will be pleased to hear from you.

I might say that all of your statements will be made part of the record in full without objection. If you can highlight the points, it would be helpful to the committee.

Mr. Patterson.

STATEMENTS OF HENRY S. PATTERSON II, ON BEHALF OF NATIONAL ASSOCIATION OF WATER COMPANIES, ACCOMPANIED BY CHESTER RING, EXECUTIVE VICE PRESIDENT; FOSTER S. BURBA, ON BEHALF OF COALITION FOR SAFE DRINKING WATER, ACCOMPANIED BY GEORGE PENDYGRAFT, COUNSEL; CARL RIEHN, ON BEHALF OF UPPER TRINITY BASIN COMPACT, ACCOMPANIED BY I. M. RICE, DIRECTOR, UTILITIES OF DALLAS; LES ROBERTSON, DIRECTOR, FORT WORTH UTILITIES; DAN VANCE, NORTHERN MANAGER, TRINITY RIVER AUTHORITY; RICHARD BROWNING, TRINITY RIVER AUTHORITY; AND JEROME B. GILBERT, VICE PRESIDENT, AMERICAN WATER WORKS ASSOCIATION

Mr. PATTERSON. Thank you, Mr. Rogers.

My name is Henry Patterson. I am president of the Elizabethtown Water Co. and a vice president of the National Association of Water Companies.

With me on my right today is Chester Ring, executive vice president of the Elizabethtown Water Co. and former president of the American Water Works Association.

Mr. ROGERS. We welcome you.

Mr. PATTERSON. I am pleased to be here today to present this statement on behalf of our association.

The National Association of Water Companies, based in Washington, D.C., is a nonprofit association founded in 1895. It represents the investor-owned water companies that supply more than 2 billion gallons of water per day to 35 million people in 32 States. This is about 20 percent of the Nation's water supply. Many NAWC member companies have provided water service for more than 100 years.

NAWC and its members share with the Environmental Protection Agency a common goal of keeping drinking water clean and safe. In 1974, representing NAWC, I testified before this subcommittee and advocated the passage of the proposed Safe Drinking Water Act. The association has supported all of EPA's efforts to implement the act.

EPA proposed a maximum contaminant level of 100 parts per billion for trihalomethanes (THM's) in drinking water and to limit other organic substances in drinking water by mandating the use of a specific treatment technique—granular activated carbon (GAC).

EPA has received contrary scientific evidence from its own consultants and from others as to whether organic contaminants are cancer producing. Some suggest that the trace amounts of some organic substances, while not inducing cancer, may actually prolong life.

Doubt exists about the health hazard. It is also uncertain whether GAC will be effective in reducing synthetic organics in drinking water. As a matter of fact, there is evidence that GAC itself may present new health hazards.

The Council on Wage and Price Stability concludes that the dangers posed by the use of GAC have been too lightly treated by EPA. Many dangers which may be posed by the new GAC technology deserve more serious analysis by EPA.

NAWC believes that EPA's present proposal is unnecessary, unjustified, excessively costly, quite possibly harmful to human health, and perhaps beyond EPA's statutory authority. It is not NAWC's contention that the Safe Drinking Water Act requires or should require that EPA prove beyond any doubt that organic substances in drinking water do in fact cause cancer and that GAC will beyond doubt solve this problem before it proposes its regulations.

On the other hand, neither should the simple existence of some evidence, no matter how slight, and no matter how contradicted, be taken to justify Federal Government requirements placing substantial financial burdens on the public. As the report of the House Interstate and Foreign Commerce Committee said of the Safe Drinking Water Act, it is "required," before EPA acts, "that the Administrator make a reasoned and plausible judgment" that the organic substances may cause "adverse health effects." In that light it ill behooves EPA to accept some scientists' opinions while rejecting others unless the Agency can articulate sound reasons why its "judgment" in doing so is "reasoned and plausible."

At this stage, the issue seems to us to be whether the evidence that there is a risk, factored by the degree of risk, and the sufficiency of evidence that GAC will work taken together justify the imposition of cost burdens of the magnitude involved.

If the risk were reasonably clear, NAWC would stand in the frontlines to demand strict standards. But where, as here, the risk is so minuscule and so poorly proven, and the technology is so uncertain, out of consideration to our customers, the public, NAWC must strongly object.

After all, the costs of complying with these EPA proposals would be substantial, to say the least, and they will inevitably be borne by our customers, which is the public.

The NAWC believes that even EPA's revised cost estimates still grossly understate the eventual cost. Black and Veatch have projected that compliance with the proposed regulations would require capital expenditures of more than $5.4 billion, and annual operation and maintenance costs would total more than $500 million. This would result in a rise in the annual costs per customer of between $57.41 and $94.22, depending on the size of the system. NAWC believes, in light of presently available evidence, that the proposed regulations simply will not produce any benefits which would justify hitting our customers with these staggering costs.

Industry representatives are not alone in questioning the wisdom of requiring immediate large investment in granulated activated carbon systems. So have the House and Senate Appropriations Committees. EPA's own National Drinking Water Advisory Council and the Council on Wage and Price Stability recently added their voices to the mounting criticism of EPA's proposed GAC program.

By way of conclusion, NAWC's position is as follows:

As to THM's, we simply cannot agree that the case has been made out for a MCL at any level. While other witnesses here today would support 300 parts per billion as a limit on THM or on chloroform, we do not believe that the evidence supports this level or any other at this time.

The research now being done for EPA and the National Cancer Institute may shed further light on the health issues. NAWC believes EPA should await the results of that research.

Second, NAWC urges that a number of what appears to be the very worst water systems should be designated for testing the GAC treatment on a plant scale basis. If the research with these systems bears out EPA's contentions, fine. If not, this proposal would avoid premature commitment of resources and the placement of unjustified cost burdens on the American public.

Thank you, Mr. Chairman.

Mr. ROGERS. Thank you very much for your statement that brings the attention of the committee to your concerns.

Mr. Burba.

STATEMENT OF FOSTER S. BURBA

Mr. BURBA. Mr. Chairman and members of the subcommittee, I am Foster S. Burba, president of the Louisville Water Co. and cochairman of the Coalition for Safe Drinking Water.

To my right is Mr. George Pendygraft, our counsel.

The Coalition for Safe Drinking Water was formed to particpate in EPA's rulemaking proceeding regarding synthetic organic chemicals in drinking water. It brings together approximately 90 water systems representing a wide spectrum of urban water suppliers. As public water suppliers, we are dedicated to providing drinking water that is safe and at rates no higher than necessary.

EPA's proposed regulations represent an approach to a perceived problem that is not in accordance with the Safe Drinking Water Act. This is evidenced by the overwhelming number of comments from State health agencies, professional engineering groups, public water suppliers and other knowledgeable groups and persons critical of the proposed regulation.

Indeed, the National Drinking Water Advisory Council established by Congress to advise EPA has concluded that the GAC treatment requirement should not be imposed before adequate research into the health effects of synthetic organic chemicals has been undertaken and the efficacy of various treatment techniques to deal with them has been studied.

EPA contends that some synthetic organics may be present in drinking waters and may constitute a potential health risk despite extreme uncertainties as to whether synthetic organics are present and whether or not the levels of such chemicals constitute a potential health risk. EPA proposes to mandate nationally the use of a radically different, enormously expensive, water treatment known as GAC. GAC is untested on a plant size scale for EPA's intended purpose. Only recently have a few preliminary laboratory studies been undertaken. The results from those studies are either sketchy or not available.

There are no large-scale demonstration plants. The agency is thus leapfrogging over a demonstration plant phase which could tell us whether GAC's proposal is feasible and effective.

EPA is proposing that the larger systems foot the multibillion-dollar cost of this nationwide experiment, oblivious to whether the costs justify the benefits, if any, as well as how these entities, already hard pressed for funds, will raise the vast sums required.

The Council on Wage and Price Stability agrees with us. The Council points out that EPA has not performed any benefit analysis on this proposal. The Council concludes that, "It is possible that there will be hundreds of millions of dollars in sunk costs which will not have been beneficially spent."

While the act permits EPA more discretion than is desirable, even the few restraints that do appear in the act have been ignored in proposing these regulations.

EPA has given only lipservice to the requirement that it take costs into consideration. The GAC mandate initially will require $2 to $5 billion capital investment nationally—not the $830 million EPA estimates.

In Louisville alone, we are faced with a capital cost of more than $100 million and an 80 percent rate increase. Rate increases in excess of 50 percent will be common. Some rates will double.

Clearly, inconsistent conclusions by EPA on costs demonstrate that it is disregarding the statutory requirement that costs be taken into consideration.

For example, EPA maintains its revised estimated costs are acceptable for systems serving over 75,000 persons, even though these costs are above those projected earlier and judged by EPA as being too costly for small systems.

The per capita estimated cost for systems in the 50,000 to 75,000 category was $8.45. Six months later, EPA doubled its capital cost estimates for systems serving more than 75,000 population. They now range up to $17.40 per capita. Yet, EPA now finds such costs acceptable.

The act has been ignored in other ways. Interim regulations were to be adopted quickly. Revised regulations based on a congressionally mandated study by the National Academy of Sciences were to follow.

After considerable study, however, the National Academy of Sciences recommended more research in connection with synthetic organics. EPA attempts to skirt this prerequisite for revised regulations by amending its interim regulations, thereby postponing indefinitely the need for revised regulations and the requirement that NAS be consulted.

As a result, EPA is rendering meaningless the part of the act detailing the procedures for revised regulations.

Under the EPA proposed interim regulations, entities are to finance with long-term securities a technique based on technology not generally available today. This is a gamble cities and water companies can ill afford. Forcing these entities to make long-term financial commitments to GAC is clearly incongruous with any notion of an interim requirement.

Moreover, Congress specifically limited interim regulations to technology generally available on the date the act was enacted. EPA has ignored this limitation.

I would like to mention what is the most fundamental EPA error. Maximum contaminant levels, not treatment techniques, are the primary means of regulation under the act. Indeed the National Drinking Water Advisory Council has recommended that maximum contaminant levels instead of GAC be used for the control of synthetic organics in drinking water. We think EPA should heed this advice.

Another concern we have is jurisdiction over health effects research. We feel strongly that such research should be directed by an independent scientific body such as the National Academy of Sciences. The intermediacy of an independent scientific body will assure that research objectives are sound and not done primarily to support proposed regulation. It also may remove the threat of loss of future grants if the researchers' findings and interpretations are counter to the theories upon which the proposed regulations are based.

This is what we think Congress intended by requiring revised regulations to be based upon the Academy of Sciences studies and recommendations. As noted earlier, this aspect of the act has been ignored so far by EPA.

You may ask why we are bringing these problems to you? Throughout the comment period, EPA has evidenced a reluctance to address the failings of this regulation. We think that amendatory legislation may be in order later.

And last, but not least, we certainly agree with Dr. Carter, that point source control should be implemented.

Thank you for this opportunity to express to you our concerns. Mr. Pendygraft and I shall be pleased to answer any questions.

Mr. Rogers. Thank you very much for a very helpful statement. Now we will hear from Mr. Riehn.

STATEMENT OF CARL RIEHN

Mr. Riehn. Thank you for the opportunity to present my testimony.

My name is Carl Riehn and I am speaking on behalf of the Upper Trinity Basin Compact.

This is an association of the four major water suppliers in north central Texas. These are the cities of Dallas and Fort Worth, the Trinity River Authority and the North Texas Municipal Water District. Representatives from each member agency are here with me today. Mr. I. M. Rice, director of Utilities of Dallas; Mr. Les Robertson, director of Fort Worth Utilities; Mr. Dan Vance, northern manager, Trinity River Authority; and Mr. Richard Browning of the Trinity River Authority are here.

Mr. Rogers. We welcome these gentlemen to the committee.

Mr. Riehn. Thank you.

Collectively we serve more than 2½ million customers, comprising the fifth largest standard metropolitan statistical area in the country.

In this presentation I will skip around in the prepared text as submitted to conserve time [see p. 10.]

Mr. ROGERS. Thank you.

Mr. RIEHN. The EPA has published a proposed regulation for the control of organic chemical contaminants in drinking water. On what did the EPA base its proposed regulations? Not upon the recommendation of the National Academy of Sciences as required by Public Law 93-523; not upon recommendation of the National Drinking Water Advisory Council; not upon any list of harmful organic chemicals found in drinking water; not upon the recommendations of the American Water Works Association or the Conference of State Sanitary Engineers.

Some of the major disagreements focus on these issues.

No. 1, the Safe Drinking Water Act in section 1412(E)(2)(e) specifically requires the Administrator of the EPA to arrange for the National Academy of Sciences to prepare and publish a list of contaminants, the level of which in drinking water cannot be determined but which may have an adverse effect on the health of persons. These requirements in the law are not discretionary. They are each in the language of "the Administrator shall." They are mandatory.

We have examined the material made available by the EPA and could not find this list. Therefore we inquired of Dr. Cotruvo, Director of the EPA Criteria and Standards Division, Office of Drinking Water, by letter on June 12 where the required list of contaminants could be located. By return letter of June 21, he acknowledged "The National Academy of Sciences did not prepare any list of contaminants or recommend maximum contaminant level as directed by section 1412(E)(2) of the Safe Drinking Water Act."

Another major issue is cost. Under intense pressure, the EPA recently backed down and doubled their initial cost estimates for the provision of GAC filtration. However, our costs are almost three times as much as EPA's revised estimates, showing that GAC will cost our area $275 million in initial capital cost and $33 million annually in operating cost. This will result in our local water rates virtually being doubled.

We know our costs, and we have not included land cost, site preparation, loading facilities or future expansion, plus no cost was included for the unknown.

One of the reasons the cost estimates vary so widely is the lack of adequate performance data from actual operations on a significant scale. Much has been said about that so we are going to skip it.

Therefore, we now come before you, seeking to convince you, that EPA is proposing too far and too fast on insufficient evidence in imposing very burdensome and unnecessary requirements on local governments.

Specifically we recommend:

The proposed regulations be held in abeyance until research is completed and the results analyzed.

The present research programs are reviewed to insure adequacy.

We have been at two of the major hearings that EPA has held. We have submitted large volumes of data and information on our costs and on various other factors as we see it. We also think that because of that, it is time to consider clarifications and revisions to the Safe Drinking Water Act.

Specific areas to us appear to be:

First, too much responsibility imposed on the EPA Administrator to unilaterally make decisions of profound economic importance to the water industry by specifying costly treatment methods. We believe results should be specified, not the means of achieving them.

Second, too much authority placed on the Federal agencies to make nationwide standards, disregarding State and local views as to which areas the limited resources of funds—and here I wish to stop and say local funds we are talking about, gentlemen—should be concentrated on and disregarding different environmental conditions.

Again we appreciate the opportunity to be here and we will be happy to answer any questions you might have.

[Testimony resumes on p. 18.]

[Mr. Riehn's prepared statement follows:]

STATEMENT OF THE
UPPER TRINITY BASIN COMPACT
TO THE
HOUSE SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT
CONCERNING
PROPOSED REGULATIONS CONCERNING CONTROL OF
ORGANIC CHEMICAL CONTAMINANTS IN DRINKING WATER

SEPTEMBER 18, 1978
WASHINGTON, D.C.

Thank you for this opportunity to present testimony at this public hearing concerning implementation of the Safe Drinking Water Act. My name is   and I am speaking on behalf of the Upper Trinity Basin Compact. This is an association of the four major water suppliers in North Central Texas. These are the cities of Dallas and Fort Worth, the Trinity River Authority and the North Texas Municipal Water District. Representatives from each member agency are here with me today. Collectively we serve more than 2-½ million customers, comprising the fifth largest standard metropolitan statistical area in the country.

In 1974, Congress enacted the Safe Drinking Water Act that directed the Environmental Protection Agency Administrator to establish standards to ensure that high quality drinking water was provided to the citizens of the United States. However, we feel that the EPA Administrator is now going beyond the intent of the Congress in attempting to administer Public Law 93-523.

EPA's authority in this case hinges on the interpretation of Section 1401 of P. L. 93-523, specifically, the word "may":

1401(1)(B): "specifies contaminants which, in the judgment of the Administrator, <u>may</u> have any adverse effect on the health of persons:"

TO THOSE OF US IN THE WATER SUPPLY BUSINESS, THE DISTINCTION BETWEEN SAFETY AND RISK IS A FUNDAMENTAL PART OF OUR PROFESSIONAL CONSCIOUSNESS. IT IS USEFUL TO STRESS THE DISTINCTION TO THOSE OUTSIDE THE PROFESSION BECAUSE IT UNDERLIES EXPERT DISAGREEMENTS RELATING TO THE REMOVAL OF SPECIFIED CONTAMINANTS FROM DRINKING WATER. THE ANSWER TO THE QUESTION, TO REMOVE OR NOT TO REMOVE?, DOES NOT SPRING FROM ULTIMATE TRUTH, BUT IS RATHER A REFLECTION OF A DOMINANT PROFESSIONAL CONSENSUS AT SOME POINT IN TIME.

HOWEVER, THE EPA, NO DOUBT COMPELLED BY A COURT ORDER, HAS PUBLISHED A PROPOSED REGULATION FOR THE CONTROL OF ORGANIC CHEMICAL CONTAMINANTS IN DRINKING WATER. THE PROPOSED REGULATION IS IN TWO PARTS, THE FIRST SPECIFYING A MAXIMUM CONTAMINANT LEVEL (MCL) OF 100 MICROGRAMS PER LITER (PPB) FOR A GROUP OF SYNTHETIC ORGANIC CHEMICALS KNOWN AS TRIHALOMETHANES. THE SECOND PART OF THE PROPOSED REGULATION MANDATES A TREATMENT TECHNIQUE FOR ALL CITIES WITH MORE THAN 75,000 POPULATION WHO CANNOT OBTAIN A VARIANCE. THE TREATMENT TECHNIQUE SPECIFIED IS GRANULAR ACTIVATED CARBON (GAC) FILTRATION, OR ANY ALTERNATIVE. CRITERIA FOR OBTAINING A VARIANCE HAVE NOT EVEN BEEN DEFINED.

AND WHAT DID THE EPA BASE IT'S PROPOSED REGULATION UPON? NOT UPON A RECOMMENDATION OF THE NATIONAL ACADEMY OF SCIENCES, AS REQUIRED BY PUBLIC LAW 93-523. NOT UPON A RECOMMENDATION OF THE NATIONAL DRINKING WATER ADVISORY COUNCIL. NOT UPON ANY LIST OF HARMFUL ORGANIC CHEMICALS FOUND IN DRINKING WATER. NOT UPON THE RECOMMENDATIONS OF THE AMERICAN WATER WORKS ASSOCAITION OR THE CONFERENCE OF STATE SANITARY ENGINEERS.

AGGRAVATING THE INSTABILITY CAUSED BY THE LACK OF A RATIONAL BASIS FOR ACTION ARE FOUR SERIOUS CONCEPTUAL WEAKNESSES IN THE PROPOSED REGULATION. BRIEFLY, THESE ARE THAT:

1. EVIDENCE LINKING CANCER MORBIDITY/MORTALITY AND DRINKING WATER IS ADMITTEDLY SUPPOSITIVE RATHER THAN CONCLUSIVE.
2. THE ASSUMPTION IS MADE THAT ANIMAL EFFECTS ARE APPLICABLE TO MAN.

3. THE ASSUMPTION IS MADE THAT THRESHOLD LEVELS FOR TOXIC AGENTS CANNOT BE ESTABLISHED.
4. THE ASSUMPTION IS MADE THAT ADMINISTERING MASSIVE DOSES OF TOXIC AGENTS TO ANIMALS IS A VALID TEST PROCEDURE TO DETERMINE HUMAN EFFECTS.

THESE THREE ASSUMPTIONS CAN <u>AND HAVE BEEN</u> REPUDIATED BY NATIONALLY AND INTERNATIONALLY ACCLAIMED CANCER EXPERTS WITH HIGHLY PRESTIGIOUS CREDENTIALS. THE LAST ASSUMPTION, CONCERNING THE ADMINISTRATION OF MASSIVE DOSES OF TOXIC AGENTS TO ANIMALS, IS PARTICULARLY REMINDFUL OF THE RECENT SACCHARIN SCARE.

ANY OF THE ABOVE-MENTIONED WEAKNESSES WOULD PROVIDE AMPLE GROUNDS TO POSTPONE PROMULGATION OF THE PROPOSED REGULATIONS, BUT THEIR CUMULATIVE EFFECT RENDERS EPA'S PROPOSAL UNTENABLE, IN OUR JUDGEMENT. BUT EVEN IF ONE WERE WILLING TO OVERLOOK THE FACT THAT THE PROPOSED REGULATIONS HAVE NO FACTUALLY SUPPORTED BASIS, AND THAT THEY ARE STRUCTURED AROUND QUITE TENUOUS ASSUMPTIONS, ONE WOULD STILL ENCOUNTER SOME VERY FORMIDABLE DIFFICULTIES WITH WHAT IS PROPOSED. SOME OF THE MAJOR DISAGREEMENTS FOCUS ON THE FOLLOWING ISSUES.

<u>BURDEN OF PROOF</u>

EVEN THOUGHT THE NATIONAL ACADEMY OF SCIENCES WAS UNABEL TO PRODUCE A LIST OF ORGANIC CHEMICALS IN WATER FOR WHICH NO MCL COULD BE ESTABLISHED, THE EPA HAS PORPOSED THAT GAC FILTRATION BE INSTALLED IN CITIES WITH MORE THAN 75,000 POPULATION TO REMOVE THESE UNDEFINED CHEMICALS. WHAT CHEMICALS ARE THESE? WE DON'T KNOW. THE EPA DOESN'T KNOW. THE NAS DOESN'T KNOW. YET THE BURDEN OF PROOF IS ON THE WATER SUPPLY OPERATOR TO PROVE TO THE EPA THAT HE DOESN'T NEED TO INSTALL GAC. WE ASK, QUITE SIMPLY, "HOW?".

<u>COSTS</u>

UNDER INTENSE PRESSURE, THE EPA RECENTLY BACKED DOWN AND DOUBLED THEIR INITIAL COST ESTIMATES FOR THE PROVISION OF GAC FILTRATION. HOWEVER, OUR COST ESTIMATES ARE ALMOST

THREE TIMES AS MUCH AS EPA'S REVISED ESTIMATE, SHOWING THAT GAC WILL COST OUR AREA $275 MILLION IN INITIAL CAPITAL COSTS, AND AN ADDITIONAL $33 MILLION ANNUALLY IN OPERATING COSTS. THIS WILL RESULT IN OUR LOCAL WATER RATES VIRTUALLY BEING DOUBLED.

OBVIOUSLY, COST IS A FACTOR IN DECISION MAKING, ELSE THE PROPOSED REGULATION WOULD NOT DWELL SO EXTENSIVELY ON COSTS. SUCH AN IMPORTANT DECISION AS REQUIRING INSTALLATION OF AN EXPENSIVE TREATMENT SYSTEM REQUIRES ACCURATE COST DATA.

RELIABILITY

ONE REASON THAT COST ESTIMATES VARY SO WIDELY IS THE LACK OF ADEQUATE PERFORMANCE DATA FROM ACTUAL OPERATIONS ON A SIGNIFICANT SCALE. ALTHOUGH THE EPA POINTS TO PLANTS THAT HAVE BEEN USING GAC, THE FACT REMAINS THAT THESE PLANTS ARE SMALL, THE LARGEST BEING 33.5 MGD AND PRIMARILY HAVE BEEN USING GAC FOR TASTE AND ODOR CONTROL, NOT FOR THE REMOVAL OF ORGANIC CHEMICALS. WE FEEL IT IS OVERLY SIMPLISTIC TO EQUATE THESE EXISTING OPERATIONS WITH THOSE THAT WOULD BE REQUIRED UNDER THE PROPOSED REGULATIONS. THERE ARE MANY PRESENTLY UNEVALUATED POTENTIAL PROBLEMS WHICH MUST BE RESOLVED BEFORE GAC FILTRATION IS MANDATED.

ALTERNATIVES

THERE ARE ALTERNATIVES IN THE FORM OF DIFFERENT OPERATIONAL ADJUSTMENTS OF PRESENT FACILITIES, RELOCATION OF CHLORINE APPLICATION, USE OF DIFFERENT DISINFECTANTS, AND EVEN USE OF HOME PURIFIERS OF SUFFICIENT SIZE AND EFFECTIVENESS, AND BOTTLED WATER, TO NAME A FEW, THAT WARRANT CONSIDERATION. THERE IS AN OLD PRINCIPLE, "GIVE US THE REQUIREMENT BUT DON'T ATTEMPT TO TELL US HOW TO DO IT."

BUT WE KNOW ONLY AS MUCH ABOUT SOME OF THESE ALTERNATIVES AS WE DO ABOUT GAC, AND THAT ISN'T ENOUGH. ALL SHOULD BE THE SUBJECT OF RESEARCH, DEVELOPMENT, AND, THE CHOICE AND IN THE JUDGEMENT OF THE RESPONSIBLE STATE AND LOCAL AUTHORITY, APPLICATION.

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HOWEVER, ONE ALTERNATIVE DISINFECTANT WHICH GREATLY REDUCES THM FORMATION HAS A LONG AND WELL-DOCUMENTED HISTORY AS AN EFFECTIVE PRIMARY DISINFECTANT--THAT IS, CHLORAMINES. WE HAVE STRONGLY URGED THAT THE EPA NOT EXCLUDE CHLORAMINES FROM CONSIDERATION, FOR GIVEN ADEQUATE CONTACT TIME, AND WE HAVE THIS IN OUR LARGE PLANTS, CHLORAMINES ARE VERY EFFECTIVE. OF COURSE, ENSURING THAT PROPER CONTACT TIME IS AFFORDED REQUIRES RPOPER OPERATIONAL CONTROL OF THE TREATMENT PLANT--BUT SO DO ALL THE OTHER PROCESSES INVOLVED IN TREATMENT.

CHANGING OBJECTIVES

THIS PHASE SYMBOLIZES WHAT WATER TREATMENT PLANT OPERATORS FACE WITH THE PROSPECT OF CHANGING STANDARDS. THE PROPOSED REGULATION WILL SET AN INITIAL MCL ON THM'S OF 100 PPB, BUT GOES ON TO SAY, AN I QUOTE:

> "AS ADDITIONAL OPERATING AND TECHNICAL EXPERIENCE IS GAINED WITH RESPECT TO THE USE OF ALTERNATIVE DISINFECTANTS AND THE USE OF GAC IN THE TREATMENT OF DRINKING WATER, THE SCOPE OF THESE REGULATIONS <u>WILL</u> BE EXPANDED TO INCLUDE SMALLER COMMUNITY WATER SYSTEMS. IN ACCORDANCE WITH THE REQUIREMENTS OF THE SDWA, REVISED PRIMARY DRINKING WATER REGULATIONS WILL BE FORTHCOMING WHICH <u>WILL</u> IMPOSE ADDITIONAL MCL'S ON ORGANIC CHEMICALS <u>AS</u> WELL AS REQUIRE FURTHER REDUCTIONS IN THE LEVELS OF THM AS ADDITIONAL TOXICOLOGICAL, TECHNOLOGICAL AND ANALYTICAL INFORMATION BECOMES AVAILABLE."

HOW CAN A MUNICIPALITY SPEND MILLIONS OF DOLLARS TO DESIGN AND CONSTRUCT TREATMENT FACILITIES WHICH MAY WELL BE OBSOLETE BEFORE THEY ARE COMPLETED? IF NO ONE KNOWS WHAT CONSTITUTES AN ACCEPTABLE LEVEL OF THM'S, THEN NO TREATMENT STANDARD SHOULD BE ESTABLISHED AT THIS TIME. UNTIL RESEARCH IS COMPLETED TO DETERMINE IF A THRESHOLD LEVEL EXISTS FOR THM'S, ALL FEDERAL GUIDANCE SHOULD BE EXPRESSED AS GUIDELINES, OR GOALS, RATHER THAN MANDATED MCL'S.

STATUTORY PREREQUISTITES

THE SAFE DRINKING WATER ACT, IN SECTION 1412 (E) (2) (E) SPECIFICALLY REQUIRES THE ADMINISTRATOR OF EPA TO ARRANGE FOR THE NATIONAL ACADEMY OF SCIENCES TO PREPARE AND PUBLISH A LIST OF CONTAMINANTS, THE LEVEL OF WHICH IN DRINKING WATER CANNOT BE DETERMINED BUT WHICH MAY HAVE AN ADVERSE EFFECT ON THE HEALTH OF PERSONS.

THESE REQUIREMENTS IN THE LAW ARE NOT DISCRETIONARY. THEY ARE EACH IN THE LANGUAGE OF "THE ADMINISTRATOR SHALL..." THEY ARE MANDATORY. WE HAVE EXAMINED THE MATERIAL MADE AVAILABLE BY THE EPA AND COULD NOT FIND THIS LIST. WE INQUIRED OF DR. COTRUVO, DIRECTOR OF THE EPA CRITERIA AND STANDARDS DIVISION, OFFICE OF DRINKING WATER, BY LETTER ON JUNE 12 WHERE THE REQUIRED LISTS OF CONTAMINANTS COULD BE LOCATED. BY RETURN LETTER OF JUNE 21, HE ACKNOWLEDGED, "THE NATIONAL ACADEMY OF SCIENCES DID NOT PREPARE EITHER LISTS OF CONTAMINANTS OR RECOMMENDED MAXIMUM CONTAMINANT LEVELS, AS DIRECTED BY SECTION 1412 (E) (2) OF THE SAFE DRINKING WATER ACT."

THESE LISTS ARE NOT IRRELEVANT TECHNICALITIES. TO THE CONTRARY, THEY ARE LOGICALLY AND SCIENTIFICALLY, AS WELL AS LEGALLY, VITAL AND NECESSARY TO THE PROPOSED REGULATION OF SYNTHETIC ORGANIC CHEMICALS IN QUESTION AT THIS HEARING. THESE LISTS WOULD CONTAIN THE CONTAMINANTS WHICH THE REGULATIONS WOULD HAVE US REMOVE. WITHOUT THE LIST, WE HAVE NO PRACTICAL, NOT TO MENTION LEGAL, GOAL.

* * * * *

THE STRONG OPPOSITION ENCOUNTERED IN PUBLIC HEARINGS AROUND THE COUNTRY HAS APPARENTLY CAUSED THE EPA SOME DOUBT OR UNEASINESS. EPA POSTPONED THE HEARING SET FOR MAY UNTIL JULY, AND PUBLISHED A "WHTIE PAPER" SUPPORTING THEIR POSITION WHICH WAS FIRST EXPOSED TO PUBLIC VIEW BY MR. THOMAS C. JORLING, EPA ASSISTANT ADMINISTRATOR FOR WATER AND HAZARDOUS MATERIALS, AT THE AMERICAN WATER WORKS ASSOCIATION

Annual Confernece in Atlantic City, N. J., on June 26, 1978. In his comments concerning the proposed regulations on organics, Mr. Jorling said:

"We are convinced that the health effects data and the requirements of the law give us no choice but to act. In no way does this mean that the proposed regulation is beyond change. I am merely emphasizing that, for the Agency, the question is not whether or not to regulate organics; it is how to do so reasonably and effectively."

However, our perception is that the EPA has been influenced little, if any, by comments received during the public participation process in amending the proposed regulations. To date, the only modificaiton of their original proposal was to double their original cost estimate when it was shown to be patently defective.

Our perception is that the presentation of evidence to the EPA has not been effective in ameliorating the proposed regulation. Accordingly, we now come before this body, seeking to convince you that EPA is proposing to go too far and too fast on insufficient evidence in imposing very burdensome and unnecessary requirements on local governments. Specifically, we recommend that:

*Congress advise the EPA of it's intent as embodied in the Safe Drinking Water Act.

*The proposed regulations be held in abeyance until research is completed and the results analyzed.

*The present research programs be reviewed to ensure adequacy.

*After results of research are received EPA will work with state and local governments and with the water works industry in the development of appropriate proposed regulations.

WE ALSO THINK THAT IT IS TIME TO CONSIDER CLARIFICATIONS AND REVISIONS TO THE SAFE DRINKING WATER ACT. SPECIFIC PROBLEM AREAS APPEAR TO BE:

*TOO MUCH RESPONSIBILITY IMPOSED ON EPA ADMINISTRATOR TO UNILATERALLY MAKE DECISIONS OF PROFOUND ECONOMIC IMPORTANCE TO THE WATER INDUSTRY BY SPECIFYING COSTLY TREATMENT METHODS. RESULTS SHOULD BE SPECIFIED, NOT THE MEANS OF ACHIEVING THEM.

*TOO MUCH AUTHORITY PLACED ON FEDERAL GOVERNMENT TO MAKE NATIONWIDE STANDARDS - DISREGARDING STATE AND LOCAL VIEWS AS TO WHICH AREAS THE LIMITED RESOURCES OF FUNDS SHOULD BE CONCENTRATED ON, AND DISREGARDING DIFFERENT ENVIRONMENTAL CONDITIONS.

*THE PUBLIC NOTIFICAITON PROCEDURES NEED TO BE MODIFIED TO REQUIRE THAT NOTIFICATIION OF VIOLATIONS BE MADE TO THE STATE REGULATORY AGENCY RATHER THAN DIRECTLY TO THE PUBLIC.

ALL INVOLVED SHOULD RECOGNIZE THAT THIS PROCESS OF REGULATING THE LIMITS OF PERMISSIBLE IMPURITY IN WATER DID NOT BEGIN, NOR WILL IT END WITH THE SAFE DRINKING WATER ACT. THIS IS BUT ANOTHER STEP TO ACHIEVE THE GOALS SET BY THE FIRST COMMISSION OF FEDERAL DRINKING WATER STANDARDS IN 1914, NAMELY, TO PROVIDE WATER THAT IS "FREE FROM INJURIOUS EFFECTS... AND ... OFFENSIVENESS;" AND THAT IS OBTAINED "WITHOUT PROHIBITIVE EXPENSE".

THANK YOU FOR THIS OPPORTUNITY TO EXPRESS OUR CONCERNS. WE WILL BE HAPPY TO WORK WITH THE SUBCOMMITTEE MEMBERS AND STAFF, AND TO PROVIDE ANY INFORMATION YOU MAY DESIRE.

Mr. ROGERS. Thank you very much, Mr. Riehn.

Mr. Gilbert.

STATEMENT OF JEROME B. GILBERT

Mr. GILBERT. Mr. Chairman, members of the committee, my name is Jerome B. Gilbert. I am here today representing the American Water Works Association as its vice president.

The association represents a diverse group of utilities, public and investor owned, scientists and regulators.

By the way, my own background reflects this diversity, having been manager of a utility in California, director of the State regulatory program on Water Pollution, and now consultant to cities and districts.

The association is working on implementing the act. We currently have underway training programs in 10 States under an EPA grant, and this reflects our long history of contributions to improving the health aspects of our water supply systems.

The Safe Drinking Water Act itself and the court decision have led EPA to an unreasonable position with regard to organic contaminants. Our response on these issues is detailed in our contribution to the Drinking Water Advisory Council and to the Senate committee in a hearing statement presented earlier by President Curt Stanton.

In summary, the standards are based on limited information, and the treatment technique on very limited practical experience, but as previous speakers have indicated, it is important that these contaminants be addressed in a comprehensive way.

This is not now being done. We have three different acts that address them, Public Law 92-500, the Toxic Substances Control Act, and the Safe Drinking Water Act.

EPA should be directed to coordinate its attack upon these contaminants through use of all three acts, with emphasis on source control.

EPA should not be required to set contaminant levels unless the risk is commensurate with the dollars invested. Contaminants can be reduced and in many cases eliminated by limited changes in existing treatment facilities. But major additions should only be required in vulnerable areas and then only after testing. Specifically we suggest that new legislation be enacted that would require an evaluation by EPA of the public health risk of any contaminant levels set, the benefits associated with risk reduction, and the feasibility and costs of contaminant control including source control, pretreatment, waste water treatment and, finally, water supply treatment.

The law should not mandate a uniform treatment technique. Instead control of synthetic organic contaminants and trihalomethanes should be achieved in the following steps: Expanded research which has been identified, regulatory agency designation of areas vulnerable to synthetic organics, and regional demonstration programs. These should be followed by utility plans. For small utilities, these plans would be prepared by the regulatory agencies. Treatment modifications or additions would only be made where effective source control cannot be achieved. Finally, there would be a schedule for implementation.

Mr. Chairman, we thank you for this opportunity and would like permission to submit a detailed statement by the end of the week.

Mr. ROGERS. Certainly, Mr. Gilbert.

Without objection, it is so ordered.

[Testimony resumes on p. 29.]

[The following statement was subsequently received for the record:]

STATEMENT OF JEROME B. GILBERT

VICE PRESIDENT, AMERICAN WATER WORKS ASSOCIATION

Thank you for the opportunity to appear before you today to present our views on the current status of the Safe Drinking Water Legislation. Our Association is the largest single organization representing the water industry of this country. Actually, our membership includes sections in Canada, Mexico, Puerto Rico, as well as individual members round the world. The Association is a diverse group of water utility administrators (public and private), engineers, scientists, educators, and public regulatory officials. We believe that we have a unique opportunity to develop balanced positions on issues of water policy.

Any assessment of the status of our national water supply legislation must be based on an appreciation of the unexcelled national record of water supply safety. The nations of the world have benefited from our leadership in water utility technology; and the United States has a fine record for the safety of our drinking water. Nevertheless, our Association is concerned that the discharge of increasing amount of pollutants into the environment, particularly those pollutants resulting from new and complex industrial processes, may threaten public health.

We share everyone's concern with public health and, as you know, supported the safe drinnking water legislation and have worked closely with EPA in their efforts to develop and implement this legislation.

Our comments today will review some of the Association's activities and experiences in carrying out the provisions of the Act, along with some of the problems encountered, but with the main emphasis on EPA's proposed regulations on organic chemical contaminants in drinking water.

Association Activities

First some of the Association's activities:

> The Association's nationwide program of workshops conducted in cooperation with its 34 regional sections provided the basic informational programs in the early stages of Act implementation.
>
> To provide updated and continuing information, the Association is developing new materials to be used at presentations at more than 100 Association-managed workshops in 10 states as part of an EPA-sponsored program.
>
> The Association, through its Research Foundation, is conducting several projects designed to improve treatment processes as well as other aspects of water supply. One project is on removal of trace organics from water using activated carbon and polymeric adsorbents. Others are on reuse.

Safe Drinking Water Act Implementation

During the three and one half years since the Act's passage, many water systems have come into full compliance. Some 37 states and territories have accepted primary enforcement responsibility. However, despite much effort on the part of all, the small systems that comprise more than 90 percent of all community water systems must be brought up to standard. Training of personnel in all aspects of water supply, improvements in water quality, system facilities, bacteriological monitoring, sanitary surveys, and cross connection control all need attention.

The Association believes correction of these deficiencies will have the greatest impact on improving water service to people, and, therefore, deserves the highest priority.

The basic literature on these subjects has been developed by the American Water Works Association during its nearly 100 years of activity in the field.

In general, we believe the Act has been administered well, is improving the nation's water supply, but additional efforts are needed, particularly on small systems to improve them.

Public Notification

As you know, the Association opposed the public notification procedures in the Act. They require the water supplier to notify the public each time his system is not meeting the standards in some respect. This is done through his billing and the news media. Quite often notification occurs well after the fact. It has caused some confusion. We have a reported case where the local newspaper charged the water supplier for placing the announcement in the paper. This was a very small private system and the owner was very upset.

We think a better procedure would be to require the water supplier to report to the local or state health authorities and let them decide whether the public needs to be notified.

Further study of this matter by EPA is recommended.

Proposed Regulation on Organic Contaminants

Perhaps no single issue related to water supply and the Safe Drinking Water Act specifically has created more public controversy than the recently proposed rules regulating organic contaminants in drinking water. Taken as a whole, the Act, the recent Court decision, and the proposed regulations require a significant change in treatment technique and a related investment based on an incomplete assessment of public health risk. The Court has said that the present requirement of the Act gives EPA little discretion in balancing the demonstrated or reasonably conjectured risk to the public with the cost of programs associated with reducing the risk.

Actually, there are three recent Acts designed to reduce the risk to public health associated with water supply. Public Law 92-500 is being implemented through a whole host of regulations, the latest of which covers the subject of pretreatment and source control of toxic pollutants. The 1976 Toxic Substances Control Act provides for source control of toxic pollutants generally, and finally there is the Safe Drinking Water Act. EPA's control of toxic pollutants must be done in a balanced system primarily designed to control pollutants at the source, because this approach has many benefits to the environment, including conservation of resources. Only when source control is not likely to do the job should the national program require significant investment in additional water supply treatment. In the meantime, most available water utility capital is much better spent for upgrading distribution systems.

The following is a summary of our concerns about the regulations on organic contaminants with the specific objective of aiding your committee in recommending changes to the Act. Our comments are in three categories: (1) public health risk, (2) contaminant levels, and (3) treatment processes.

Public Health Risk

I refer you to testimony sponsored by the Association which indicates that much additional information is needed to determine the actual risk associated with organic contaminants. The present legislative requirement that any contaminant that may cause a risk to public health be subject to establishment of a maximum level and, if this is not possible, a treatment technique, effectively requires EPA to establish standards for contaminants if there is any risk at all. With advanced statistical techniques, and the great increase in the number of risky contaminants, I'm sure we can determine statistically that every substance present in our public water supplies may create some risk. This is not a reasonable approach, given the risk associated with all sorts of foods that are commonly consumed and air that is commonly inhaled. The Law should be based on a comprehensive evaluation of relative risk so that public investments in longevity will achieve the maximum effectiveness. For instance, investments in transportation safety could be improved.

We believe that risk related to organic contaminant should be considered in perspective with other target areas such as improvements to small community systems, and a reduction of concentrations of certain minerals that may be far more significant in terms of public health.

Nevertheless, we believe that the subject of organic contaminants must be addressed.

Maximum Contaminant Levels

The Association recently testified at the hearing of the Safe Drinking Water Act Advisory Committee that a maximum contaminant level should be established for chloroform instead of trihalomethanes generally, and that that level be set at 300 micrograms per liter, since chloroform is the only demonstrated carcinogen and the level of 300 provides a prudent margin of safety. (See attached statement to Drinking Water Advisory Council).

Treatment and Quality Assurance

The Association advocates the establishment of a maximum contaminant level for all known carcinogens with each utility developing the necessary treatment procedures to meet the standards. EPA originally said that it did not have adequate information to establish those standards for all contaminants; but, suspecting there were many contaminants in our systems, felt that carbon treatment was a logical method of removal. The industry believes that simpler and less expensive techniques can in many instances reduce not only trihalomethanes, but synthetic organic contaminants. Commonly, treatment of surface water supplies is provided by coagulation (by addition of chemicals), sedimentation (removal of coagulated particles by settling), followed by a variety of types of filters which remove additional suspended particulate matter but do not remove dissolved materials. Water supplies are disinfected before and/or after this process.

The requirement for carbon treatment results in most cases in the addition of a new set of filters and storage facilities.

Our conclusions about carbon treatment are that it may be the desirable system in areas where the risk of exposure to synthetic organics is significant, but its appropriateness must be determined after evaluating the potential exposure in each watershed. We are not facing the pollution crises that led to PL 92-500 and its uniform national standard. Therefore, we have recommended that the States make an assessment of risk areas and the utilities so identified conduct the necessary studies to determine the best method of protecting their supply against these contaminants. This is a more rapid and efficient method than the case by case variance procedure. Even so, this will require more time than EPA has allowed for correction. Experience in the implementation of PL 92-500 emphasizes that the practical requirements associated with engineering studies, environmental evaluations, financing bidding and construction procedures must be considered in adopting time schedules.

In summary, our evaluation of these regulations has led us to recommend the following changes in the Safe Drinking Water Act.

1. The language describing the establishment of maximum contaminant levels be revised to require an evaluation by EPA of:

   a. The public health risk

   b. The benefits associated with risk reduction

   c. The feasibility and costs of contaminant control including source control, pretreatment, wastewater treatment, and water supply treatment.

2. The Law should not mandate a uniform treatment technique. Instead, control of synthetic organic contaminants and trihalomethanes should be achieved in the following steps:

   a. Expanded research, regulatory agency designation of areas vulnerable to synthetic organics, and regional demonstration programs.

   b. Utility plans (by regulatory agency for small utilities) for treatment modifications or additions where effective source control cannot be achieved.

   c. Schedule for implementation

We appreciate this opportunity to appear before you today and will be glad to answer any questions.

BEFORE THE
NATIONAL DRINKING WATER ADVISORY COUNCIL

STATEMENT

on behalf of the

AMERICAN WATER WORKS ASSOCIATION

August 22, 1978

My name is Fred Eidsness. I am a registered professional engineer. I have practiced for the past 35 years in the field of water supply and treatment. I earned the degree of Doctor of Philosophy in Chemistry at the University of Florida. During the 1940's, I served as Chief of the Water and Sewerage Division, Bureau of Sanitary Engineering, Florida State Board of Health. Today, I am representing the American Water Works Association as Chairman of its Technical and Professional Council.

There are 50,000 community water systems in the United States serving 190 million people. About 99 per cent of the systems serve populations of 75,000 or less. The industry is composed predominantly of very small systems more than 90 per cent of which serve populations of 10,000 or less. The proposed regulations will at the outset have an impact on only a small fraction of the community water systems and approximately half the population served.

AWWA shares EPA's concern for public health and has vigorously supported the agency's efforts to develop and implement the Safe Drinking Water Act. AWWA has not objected to EPA's recently proposed regulations in an adversary sense, but rather as seriously concerned colleagues --concerned that the proposed regulations are premature and will not produce significant health benefits. They thus will place a financial obligation on the American people without demonstrable benefit.

AWWA's basic position can be summarized very briefly:

1. AWWA accepts the hypothesis that chloroform at high dosages (1) is an animal carcinogen which may be harmful to man. However, there is serious question that the proposed maximum contaminant level of 0.10 mg/l is justified (1-7). We know that changes in treatment processes can result in a decrease of the chloroform formation potential and that changes in points of chlorine application can result in lower chloroform levels (8).

2. There is substantial data to support the use of chloramines as primary disinfectant agents for drinking water (9-11). As an example, the Philadelphia Suburban Water Company, using chloramine treatment on surface water at one of its plants, has over a period of 40 years delivered water meeting federal drinking water standards. Acceptance of the use of chloramine treatment for disinfection will have a substantial effect in reducing chloroform concentrations.

3. Concentrations of synthetic organics in drinking water are minimal with only one of the synthetics (vinyl chloride) known to be carcinogenic to man. (1)(12).

4. The specified treatment by GAC is not only costly,--estimated at $ 4.7 billion capital expenditure and $400 million per year in operation and maintenance costs for 154 water utilities,(13,14),--but there is serious question as to its effectiveness.(2,6) Also secondary effects relating to desorption (15) and introduction of known carcinogens in drinking water due to regeneration processes (3,7) may pose health problems that are still unsolved but which could produce harmful effects greater than those that the treatment is intended to control.

AWWA, after reviewing testimony to EPA, makes the following recommendations:

1. <u>Chloroform</u>

(a) A maximum contaminant level should be promulgated for chloroform rather than for total trihalomethanes(1,8), as chloroform is the only known animal carcinogen (1) among the trihalomethanes.

(b) Based on toxicity studies and risk assessments by several scientists (4,7), the maximum contaminant level for chloroform should be established at 0.30 mg/l. This standard should apply to all public water supplies, preferably on a phased implementation schedule based on risk.

(c) EPA, AWWA, water utilities, and others should study and implement improvements to reduce chloroform to the lowest practicable level. (12)

(d) EPA, NAS, and other agencies should continue health-effects research to provide a scientific basis for establishing maximum contaminant levels for all trihalomethanes individually relating to their carcinogenic effects.

2. <u>Chloramine</u>

Chloramine practice should be accepted, provided the water utility can demonstrate that it is effective in disinfecting water to meet the requirements of the Primary Drinking Water Regulations.

3. <u>Synthetic Organics and GAC</u>

(a) No single treatment technique should be specified for synthetic organic removal.

(b) EPA should follow the directives of PL 93-523 and have maximum contaminant levels set for organics selected from the 23 suspect carcinogenic compounds listed in the NAS report (1) based on risk assessment of the total environment (food, air, and water). The specific numbers should be established after considering NAS recommendations.

(c) Health effects and risk assessment research on synthetic organics should be continued to provide a basis for maximum contaminant levels to be recommended by NAS.

(d) The states and EPA should make a national survey to determine vulnerable areas. Monitoring programs should be established on a regional basis or by individual utilities in vulnerable areas to determine presence and quantity of synthetic organics. Organics for which an MCL has been established should preferably be eliminated at the source (EPA has authority under the NPDES permit system and the Toxic Substances Control Act). If elimination of point and non-point source discharges are not cost effective, the water utility should provide the means of meeting the regulation.

4. Research and Demonstration Programs

EPA should fund research programs (basic technology, pilot plants to determine design criteria, and full-scale demonstration plants) to demonstrate synthetic organic removal by GAC and other processes, and to demonstrate the use of disinfectants for chloroform reduction. These programs would allow accumulation of better data on costs and reliability of processes. Side-effect carcinogenicity produced by disinfectants such as ozone, chlorine dioxide, and others should be studied.

AWWA sincerely appreciates the opportunity of making this presentation and hopes that these points will be weighed by the Council--and subsequently be endorsed in principle and communicated to EPA.

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13. Haney, Paul. Proposed Amendment to National Interim Primary Drinking Water Regulations. Comments presented July 12, 1978 in Washington, D.C. on behalf of Coalition for Safe Drinking Water.

14. Baxter, Samuel S., P.E. Statement...to Environmental Protection Agency on Proposed Regulations for Control of Organic Contaminants. July 1978.

15. Crittenden, John C., Ph.D. Proposed Amendment to National Interim Primary Drinking Water Regulations. Comments presented July 12, 1978 in Washington, D.C. on behalf of Coalition for Safe Drinking Water.

Mr. ROGERS. Mr. Florio.

Mr. FLORIO. Mr. Gilbert, you have advocated new legislation to achieve all of these things.

I am of the opinion that no new legislation is required; that within the scope of existing legislation, EPA is able to do all of those things under existing law, if they are so inclined, and perhaps Congress can do something to insure that they would be so inclined.

Is that your understanding, or do you feel that it is essential that there be new legislation to do cost benefits and things of that sort?

Mr. GILBERT. Mr. Florio, we are giving EPA the benefit of the doubt and asking for new legislation. What our association would like is that those things be done. If they can be done within the framework of existing law, so much the better.

Mr. FLORIO. Thank you.

I have a couple of questions to whoever feels inclined to answer them.

Two of the speakers, at least, made the point that their feeling was that the maximum contaminant levels should be the priority control mechanism. In other words, the results, as opposed to specifying what type of technique to achieve those results, should be the major point of emphasis that EPA should follow in terms of enforcing.

What, if anything, is the industry doing to come up with some alternative systems, alternate to the GAC proposal, that is to say, let's assume that EPA's research ultimately does prove that there is concern and that the levels that are specific are appropriate levels.

If in fact the industry is not enthused, as I perceive that it is not, over the GAC system, is the industry doing research into alternative systems?

Mr. GILBERT. Very much so, Mr. Florio.

Recently, in fact, several weeks ago, the association helped sponsor a symposium in Florida that illustrated alternative types of materials that could be used, other than GAC, to remove organic contaminants. There was other technical testimony at that symposium which should have been part of the EPA record in its regulations. Unfortunately the time period was closed. We hope EPA will consider that evidence as it acts on the final regulations, but we believe there are alternatives, and as we move down the road on this thing, other effective methods will be developed.

Mr. FLORIO. One of the points that has been made through the course of the testimony here and in prior hearings is that the GAC system is unproven. EPA counters by saying, well, it may be the case in this country, but there is a long history of successful utilization of the system in other countries.

May I ask for someone to respond on that point?

Mr. PENDYGRAFT. I am George Pendygraft, counsel for the Coalition for Safe Drinking Water.

First of all, as to experience in the United States, just to make that clear, there are abount 40 plants that use GAC in the United States, but they use it strictly for taste and odor control, and they do not use it for the purposes intended by the proposed regulation.

As to the experience abroad, our expert witnesses tell us that in the United Kingdom, there is no use of GAC but for taste and odor control. On the continent in Europe and West Germany, there is use of GAC but it is used for different purposes than the EPA proposed regulation would require. One point that makes that clear is that the carbon usage rate in West Germany is usually about one-twentieth of the amount of carbon usage that would be required by the EPA proposed regulation.

As an example, the average dosage of activated carbon in Europe is something like 5 grams per cubic meter, whereas the EPA proposed regulation is going to require something like 100 grams per cubic meter. That twentyfold increase in carbon usage also translates into much, much greater costs. In fact, it is almost directly proportional to increased costs. It might be something on the order of 10 to 20 times more costly than the cost of GAC in Europe. So the GAC as used in Europe is not the same as what EPA is proposing here.

I think it is also important to know that there are no criteria in Europe that are comparable to the criteria EPA is proposing. So you are really not trying to do the same thing over there, and you really can't translate the experience in Europe to the experience that is going to be required by the EPA proposed regulation. I think that point was brought out at this recent activated carbon symposium that was held on September 10 through 15 in Miami.

Mr. Burba. May I add, Mr. Pendygraft has a Ph. D. in chemistry, in addition to being a lawyer, so he is experienced and has the background for commenting on technical aspects.

Mr. Florio. The last point I would make is that the suggestion has been made that over and above demonstration projects for purpose of monitoring or testing the contaminant levels, that there may be some desirability in having some demonstration projects to provide some financial assistance to test the effectiveness of the GAC systems.

Is that something that the industry would favor?

Mr. Patterson. Yes.

Mr. Florio. Would it look just as favorably upon it if the Government didn't have to pick up the entire tab for the project; that is, a contributing arrangement whereby industry as well as the Government would share in the cost of such demonstration project?

Mr. Patterson. Certainly if our regulatory authorities would allow an investor-owned water company to contribute to such a project, we would. I would say, yes, definitely, if we are allowed to.

Mr. Florio. I will ask you this, Mr. Patterson, I am sure you are familiar with it.

In the Jersey City area, there is a publicly owned system, if I recall, that has already reached out and expressed some interest in having such a demonstration project utilized in that area.

Would that be the type of project, do you think, could most effectively be used as a demonstration project?

Mr. Patterson. I am not too familiar with what Jersey City wants to do, but generally the answer is again yes. It doesn't make any difference to me whether it is being done by Jersey City or Omaha. I think that somebody has to try it.

Mr. FLORIO. The point I am trying to make was a publicly owned facility versus an investor-owned facility?

Mr. PATTERSON. I wouldn't make any distinction.

Mr. GILBERT. If I could speak to the publicly owned issue, there are a group of major utilities in California that have been considering just the project that you have been mentioning, and I would think that in the absence of Federal funding, there would be local funding available for a limited number of demonstration projects.

The problem would be that Federal funding may help, at least in that limited sense, to get the job done faster.

One of the positions the association has taken is that these demonstration projects should be sufficiently large in number, something in the order of, say, 10 or something, so that you can reflect conditions that may vary in different watershed situations.

Mr. FLORIO. Thank you, Mr. Chairman

Mr. ROGERS. Dr. Carter.

Mr. CARTER. Thank you, Mr. Chairman.

Mr. Patterson, since you were in Europe during World War II, I am sure that you drank plenty of chlorinated water; is that correct?

Mr. PATTERSON. I did, sir. It was my job to make sure the chlorine was put in. I was the junior lieutenant.

Mr. CARTER. Yes, sir, and that water came right out of moving streams in most cases; is that not true?

Mr. PATTERSON. I am not sure where it came from, and I am not sure I really looked too hard.

Mr. CARTER. I watched this process being done many times. A tank truck would be used to pump up the water from streams or even lakes, and a regular component of this water would be humic acid; is that not correct?

Mr. PATTERSON. I believe so, yes, sir.

Mr. CARTER. And what does this the combination of chlorine and humic acid form?

Mr. PATTERSON. Trihalomethane.

Mr. CARTER. I suppose then that you consumed a great deal of trihalomethanes as did most soldiers during World War II?

Mr. PATTERSON. Yes, sir.

Mr. CARTER. Even though you won the war?

Mr. PATTERSON. Yes, sir, even though I was sent to the air section, where we got a ration of whisky every 10 missions by Mr. Rogers.

Mr. CARTER. We are eternally grateful for the fact that you won the war.

Mr. PATTERSON. He did, sir, not me.

Mr. CARTER. And thus far you haven't developed cancer of the esophagus, stomach, colon as a result of drinking this combination of chlorine and humic acid; is that correct?

Mr. PATTERSON. As far as I know.

Mr. CARTER. Your health remains relatively good, even though it has been some 33 years, I guess.

Mr. PATTERSON. Thirty four.

Mr. CARTER. Sir?

Mr. PATTERSON. Thirty four.

Mr. CARTER. 1945 is when the war ended, wasn't it?

Mr. PATTERSON. Yes. I was thinking of the first time.

Mr. CARTER. Yes, sir.

Well, this is one of the things that I have thought about a great deal.

Last year when we considered this bill, we required that a study be done to see what the health effects of trihalomethanes would be. Specifically our report said:

> The Administrator shall carry out a study of the reaction of chlorine and humic acid and the effects of contaminants which result from such reaction on public health and on the safety of drinking water, including any carcinogenic effect.

As yet we really don't have a complete study, according to material which was delivered to me last week by EPA.

Thus no final determination has been made, although there are ongoing studies. We are trying to find out if there really is a carcinogenic or toxic effect, and at what level, if it does occur.

What do you estimate would be the additional cost per family for the cost of drinking water treated with GAC as a result of these regulations?

I would ask the gentleman from Louisville.

Mr. BURBA. Dr. Carter, in our case the additional cost per year per family would be around $50, perhaps $60.

Mr. CARTER. $60 per family.

Mr. BURBA. Per family per year, yes, sir. But may I add that we can handle the trihalomethane problem with some means other than GAC.

Mr. CARTER. What are these means?

Mr. BURBA. We have been experimenting, in conjunction with the University of Louisville since 1975 or 1976, primarily through revision of disinfection. You can use chlorine. You can change your paint of adding the disinfectant chlorine.

Right now we are experimenting on a plant scale with chlorine dioxide. This looks very good to us, as do some other things. We are experimenting with drilling a test well to take advantage of the so-called river bank filtration so that we eliminate certain of the organics in the water. That would be another process.

Also we are trying aeration, experimenting on a plant scale basis. So we are trying many means. But right now the chlorine dioxide looks very good.

Mr. CARTER. What do you think is the main reason for the large differences between EPA's cost estimates and those of the industry?

Mr. BURBA. Well, I think you must recognize, first, that EPA has revised its cost upward to about two times. We think that that should be redoubled to be realistic. We met, we, our enginerring staff, met with the engineers employed by EPA, discussed our differences, and we still maintain that our estimates are more correct and are proper based upon the information available, rather than EPA's revised estimates. I will answer your question in a minute. Also, the coalition employed an engineering firm, Black & Veatch, which came up after studying 190 systems or so with about the same costs that the Lousiville Water Co. did.

There are a number of factors. First, no one really knows what regeneration will cost, but based upon the best information we can obtain, we think we are right, and we disagree considerably on what the energy costs will be, both electricity and fuel oil.

The other primary thing is a matter of sizing the plants. EPA's estimate was for the average day on the maximum month, as I recall, and we based our costs upon the present plant capacity. In other words, we would provide GAC for the existing plant. And also we have two plants, and when you do construction at two plants, the per units cost is higher than if you have a single larger plant.

We will have to obtain a site to build this GAC plant, and that was not reflected nearly enough in EPA's estimate. The repumping cost to put water through GAC are much higher in our case than EPA's estimate.

We used a higher cost for the carbon. We used 60 cents per pound. EPA used 53 cents. But the manufacturers tell us that it will be at least 60 cents. Also the carbon density is a factor. We figured the amount of carbon in place after you backwash it, and after it settles. EPA's estimate was based upon shipping density. Also we have a greater difference in the amount of carbon that will be lost in the regeneration process. I hate to go into this detail but I want you to know that we have looked at it very carefully, and we strongly believe that our figures are right. In fact, I am appalled even on estimating engineering jobs, that we know a great deal about, such as pipelines, we are never overestimated. So I feel like that we are proper in this and we may have underestimated. I think history bears that out, that we tend to underestimate what it will cost 5 years down the line.

Mr. Carter. Do the factories upstream which put toxic chemicals into the Ohio cause you many problems?

Mr. Burba. Dr. Carter, this is interesting. One of the things that is really needed is monitoring to determine what is in the river, and through the Ohio River Sanitation Commission, we are doing that for the entire river basin. We think that is urgently needed, and so far we are simply not finding the great amount of chemicals that people seem to believe are in the river. We think it is vital to determine what is really in the river.

I don't think it has been done adequately, and that is very important.

Mr. Carter. You feel, as I do, then that such methods and efforts as are necessary to protect the public health should be taken in your case; is that correct?

Mr. Burba. Yes, sir, Dr. Carter. We recognize our responsibility in the public health field.

Mr. Carter. Thank you very kindly.

Mr. Rogers. Mr. Waxman.

Mr. Waxman. Thank you, Mr. Chairman.

Just to follow up on Dr. Carter's questions, if you are going to have to incur an additional cost, what amount of cost would you consider reasonable to meet more stringent levels should these levels indicate that it is going to control a potential carcinogen? How much do you think your customers would find reasonable?

You say it would cost them $50 a year per household additional to what they are now paying if you had to meet the EPA standards.

Would that be acceptable to the consumer if they knew that a carcinogen was being regulated?

Mr. BURBA. Mr. Waxman, our customers want the assurance that the water is safe, and the thing that we have to guarantee is that they are getting something for their money, and we feel like they are not in this case, that there is a better approach to this, rather than a shotgun approach.

Mr. WAXMAN. Is EPA requiring only one method to meet the standards they are asking to meet?

Mr. BURBA. Well, there are two parts to the regulations, one on the trihalomethanes, and it is established tentatively at 100 parts per billion. We are right on the ragged edge of that now, and we know that we can meet that requirement by adapting our disinfection procedures.

The other is the one-treatment technique, granular activated carbon, to take care of all of the other synthetic organic chemicals, and this is what bothers us.

Mr. WAXMAN. In order to meet that second part of the regulation, you would have to go to CAG technology?

Mr. BURBA. Yes, sir, that is our understanding, and this is what we have been told.

Mr. WAXMAN. Is that a similar complaint of some of the other witnesses, that you are not concerned about the THM's study but you are concerned about using a certain technology to meet regulations that may come about in the future as to other pollutants?

Mr. PATTERSON. Yes, but I also would add the first part, it isn't the money. I think again that our customers, and certainly we, would want to spend the money if there is evidence that in spending the money, evidence that there is something wrong, and evidence, proof that when we spend the money, we will cure the wrong, that we won't have a system that won't work and money down the drain.

Mr. BURBA. Mr. Waxman, may I add one thing?

We are not saying that the 100 parts per billion is right for the trihalomethanes. We think that should be based upon scientific data, and we are glad that this committee had the foresight to fund research, and I think that is being done now by Stanford Research Institute.

What we are saying is get the facts, and then act upon them. Right now, EPA is acting upon presumption and some preliminary tests, not intended for the purpose that they have been used.

Mr. CARTER. Would the distinguished gentleman yield for an observation?

Mr. WAXMAN. Yes.

Mr. CARTER. Because of the chemical dumping problem in Louisville last year we included an authorization of $8 million a year to take care of incidents such as this that might occur throughout the country, when the cause was unknown.

Is that correct, Mr. Chairman?

Mr. ROGERS. That is correct.

Mr. CARTER. Thank you.

Mr. WAXMAN. To what contaminant level of THM's could you or would you obtain within the next 2 to 5 years if you had your choice, if you had a determination of that issue?

Mr. BURBA. We think it should be based upon fact.

Mr. WAXMAN. And these facts have not been indicated to you at this point?

Mr. GILBERT. The American Water Works Association has taken a position that a 300 parts per billion on chloroform should be the only standard established at this time, rather than the 100 parts per billion total trihalomethane limit, and that testimony was made before the Drinking Water Advisory Council.

Mr. FLORIO. Will the gentleman yield?

Mr. WAXMAN. I will be pleased to yield.

Mr. FLORIO. Upon what do you base your conclusion? What research have you done?

Mr. GILBERT. I can provide the committee with the details, but I think in summary, our opinion is that the scientific evidence supports the fact that of the four trihalomethanes, only chloroform has been demonstrated to be carcinogenic, and on that basis it should be the only one that is subject to standard setting.

Mr. FLORIO. Does anyone in the Government agree with you, such as the National Institutes of Health, National Cancer Institute? Has anyone looked at your studies and verified the conclusions?

Mr. GILBERT. I think there is evidence in testimony before the groups you indicated, and their reports, that would support that conclusion.

Mr. FLORIO. Thank you.

Mr. WAXMAN. Do you find no evidence at all to support the Government's conclusion, Mr. Gilbert?

Mr. GILBERT. I think there is such evidence also—it depends on how you interpret the data. The data is mixed and confused and I think that is what we are dealing with here today.

Mr. WAXMAN. If we are going to interpret the data, shouldn't we, because of the fact that we are dealing with a monopoly and also due to the fact that public health is a great concern, shouldn't we, if we are going to make a determination, be approaching it with a great deal of caution and try not to err on the side of protecting public health?

Mr. GILBERT. Yes; I think we should and I think we have. However, you want to err on the side of safety if you know that safety will produce a safe water supply. I think what we are saying here today is that we do not know that. We haven't got the evidence to indicate that granular activated carbon will produce the results we want, and we would like to have more evidence.

I think what we are also saying is that the industry is prepared to make all kinds of investments in existing process changes to reduce THM. The Louisville experience is an indication of that. The problem comes when you talk about major investment, talking about billions of dollars, based upon very limited scientific information.

Mr. PENDYGRAFT. I would like to add, as to the coalition's position, we have taken the position that 300 parts per billion total trihalomethane would be appropriate. The only data we have found that EPA has used to derive its 100 parts per billion is a preliminary study by the National Cancer Institute in 1976. Further study on that same bioassay procedure is now being undertaken at the Stanford Research Institute.

Other studies do exist, however, that it appears EPA has not used. The study which we thought particularly useful was by Dr. Francis Roe who has studied chloroform exposure to rats, mice, and dogs. Based on his data, we find that a 300-parts-per-billion level for chloroform would provide a margin of safety of 2,000.

We think that an appropriate margin of safety, because for the other MCL's that EPA has proposed for the six pesticides, they have used a margin of safety of 500. So our approach was, based on the best scientific data, what MCL would you come up with? We came up with 300 parts per billion. Conservatively, we applied that to all trihalomethanes, not just chloroform, despite the fact there are no cancer studies on the other trihalomethanes.

Mr. WAXMAN. We have the National Academy of Sciences saying that the strictest criteria for these compounds should be adopted. The National Cancer Institute, the National Institute of Environmental Health Sciences believes pollutants should be controlled to the extent feasible. None of you, I gather, dispute the fact that these have to be controlled.

Is it a question, then, to what level the controls should be imposed, or does anyone dispute whether they should be controlled at all?

Mr. PENDYGRAFT. Speaking on the part of the coalition, I would say, as to the total trihalomethanes, we have proposed a maximum contaminant level of 300 parts per billion. That MCL would effectively control the total trihalomethanes.

Mr. WAXMAN. You do that because you realize that there is a health danger from THM's?

Mr. PENDYGRAFT. We do that because we realize that there are some data that would say that if you want a margin of safety of as much as 2,000, then you ought to have an MCL of 300 parts per billion. If you used a margin of safety of 500, then you would have an MCL of 1,200 parts per billion. I don't think any water system in the United States has 1,200 parts per billion trihalomethanes. You could impose such an MCL but I don't think it will effectively result in any removal or decrease.

Mr. WAXMAN. The margin of safety is given the potential of harm to the public health and you want to make sure that the level of THM's is low enough so that that margin is there, so you are not getting right up to the edge where public health may well, in fact, be in danger.

Mr. PENDYGRAFT. The margin of——

Mr. WAXMAN. Is that what you mean by margin of safety?

Mr. PENDYGRAFT [continuing]. Safety that we used took the level of chloroform exposure to animals for which there was no observed effect, and that was reported by Dr. Francis Roe as 17 milligrams per kilogram per day. What that indicates for a 70 kilogram human being, approximately a 154-pound human being, is a level of 300 parts per billion. That was the coalition's approach.

Mr. WAXMAN. EPA evidently disagrees with you. They have come up with another level.

Do you find that their level is not based on any evidence whatsoever, or evidence that you dispute?

Mr. PENDYGRAFT. The difference occurs from the way you approach the problem. EPA approaches the problem essentially assuming there is no safe level of any compound that has been shown to be carcinogenic at any level.

Mr. WAXMAN. Isn't that scientifically correct?

Mr. PENDYGRAFT. Based on the best evidence that we have, no. What it essentially involves is the question of whether or not there is a threshold. Our scientific experts, which I am not a toxicologist and this is the area we are getting into, but the toxicologists we have talked to, most of them accept the existence of a threshold.

Mr. WAXMAN. I always understood, have been led to believe and understood to believe, that we just don't know any threshold level for carcinogens. Our scientific information is not sufficient. We may well find that there is a threshold, but at the present time the scientific thinking that I have heard in many hearings in the past is that there may be some compounding of the impact of carcinogens when they are combined in all the carcinogens to which we are exposed, that has a cumulative effect.

If you accept that scientific theory, isn't it then worthwhile to try to recognize carcinogens not with a threshold that can't be measured but a potential threshold that is nonexistent?

Mr. PENDYGRAFT. Again I apologize. I think this is in an area of expertise I don't have. But the person I recall who has testified on this that was probably one of the most knowledgeable people—two people I can recall. One is Dr. Frank Lyman who was a member of the Safe Drinking Water Committee, Subcommittee on Organics, which is the National Academy of Sciences Committee which dealt with the question of organics in drinking water. He concluded that there were thresholds, and that the 100-parts-per-billion level proposed by EPA was a more strict criterion than recommended by the NAS. He thought a level much higher, perhaps twice as high or so, would be an appropriate level. And I think Dr. Robinson, who is from Purdue University, was also on that NAS Committee and has the same opinion. I think their opinions are reflected in our fuller comments that have been filed with you.

Mr. ROGERS. Would the gentleman yield?

Mr. WAXMAN. Yes.

Mr. ROGERS. I believe the majority opinion of the National Academy of Sciences, National Research Council, was that methods do not now exist to establish a threshold for long-term effect of toxic agents; isn't that correct?

Mr. PENDYGRAFT. Yes, Mr. Chairman, and the interesting thing we have is that the NAS Subcommittee on Organics, which is primarily composed of toxicologists, and I would have to report based on the talks that I have had with members of that Committee, they do not agree with that position; that position really was derived from an input from another NAS Subcommittee which really deals with extrapolation of cancer data. I don't have that information with me, but I could provide you with a list of the members on that Committee.

But I think it is important to realize that the toxicologists, the people who really have the most knowledge in this area, really had only 1 member from their 15-member Subcommittee group that participated in the final determination, and if it had been decided that that approach was inappropriate, then an entire Subcommittee of the National Academy of Sciences would have nothing to do. So I think that when you go and talk to the toxicologists, you really don't find that there is a majority opinion that believes in the so-called no-threshold theory. I think you find the majority of toxicologists believe that there are thresholds.

Mr. ROGERS. I am not sure that that was the testimony that the committee has heard in other carcinogenic hearings. I think, as a matter of fact, in some of the other material, the overwhelming scientific viewpoint as of this date is that there is no threshold level.

Mr. PENDYGRAFT. I think the problem you have is that it seems to be that it is difficult to establish a threshold. You have a statistical problem that when you go down to extremely low levels of carcinogens, it is going to take quite a bit of animals in order to establish whether or not there is a cancer effect at that level. So it is difficult to establish whether or not a threshold exists.

But I think as to the question, whether or not most toxicologists have the opinion that thresholds exist, at least based on my experience of the toxicologists I have spoken with, they do believe that thresholds exist.

Mr. ROGERS. I think the committee can make a judgment on that from the materials we have before us.

I thank the gentleman.

Mr. WAXMAN. Thank you.

As I understand the testimony that we are receiving from this panel, you gentlemen think that the requirement that EPA is seeking to impose by way of regulation is not necessary to protect the public health, and that the cost will be exorbitant because of the requirements, changes of technology that you will have to undertake.

Is that a correct statement?

Mr. PATTERSON. I would say, not quite. The proof hasn't been provided. EPA hasn't convinced us that what they want us to do is going to achieve the objective that they want to achieve.

Mr. GILBERT. If I could supplement that answer, Mr. Waxman, I think this goes back to an earlier comment I made. There is a relationship between the ease of control and the contaminant level. If you get involved in discussions of threshold or no threshold, you also have to consider those things that are easy to do and those things that are expensive to do, and you can draw curves that will relate those both with regard to the THM's and with regard to carbon or some other form of treatment, and we can come to some reasonable objective. You cannot eliminate the risk. There will always be some risk. The question is, how much should society spend to reduce that risk to a reasonable level?

Today, we are spending $45 billion on the water pollution control side and we will not eliminate the risk of water pollution. We will reduce it substantially. I think that is what we are talking about here.

Mr. WAXMAN. Thank you.

Thank you, Mr. Chairman.

Mr. ROGERS. Mr. Broyhill.

Mr. BROYHILL. I think what the gentleman has said is basically the same conclusion I reach, that based on my experience with several acts that have passed in recent years, what the Congress is trying to do is to reduce health risks. I think we have had testimony before this committee and other committees of the House regarding the Toxic Substances Act.

I was on the subcommittee that wrote that bill. I know we have had other bills from other committees, such as the Clean Water Act. Of course, the allegation has been made that there are serious long-term health risks that come from the intake of certain potential harmful chemicals or from various organic compounds, and that human exposure to these substances should be reduced to the extent economically and technically feasible.

Of course, these decisions should be based on scientific research. I am not qualified to really address the research aspect, but there are apparent differences over various techniques.

I also note that there are some differences in the estimates as to how much it is going to cost to achieve these standards that have been set by EPA.

I wonder if the panel could either get together or individually submit to the committee the figures that you are quoting us. Your figures are substantially different from those that have been quoted by EPA, and I do think that we can and should analyze this data to determine what those differences are as to the cost of complying with the proposed regulation.

Mr. Chairman, I think that what should be made available are some comparisons of the allegations by the coalition over costs as compared to those made by the EPA.

Mr. BURBA. Mr. Broyhill, we would be glad to furnish that information. The coalition has retained a consulting firm to make a comparison with the EPA estimates and we will certainly furnish that to your committee.

Mr. BROYHILL. I am not saying that that should be in the record but at least it should be made available for study by the members and the staff to give some basis of comparison.

Mr. BURBA. Yes, sir, and it contains a summary which I think is quite pertinent.

Mr. ROGERS. We will have that for the committee staff.

Mr. BURBA. Mr. Chairman, may I come back to Mr. Waxman's question, because I think it is very important, and it pertains to the tests that have been done, the chloroform and so forth.

The thing that concerns us, and NCI has acknowledged this, that their tests on chloroform are very preliminary. They were made to determine whether or not additional studies should be made. They were never intended for hypothesizing the effects, carcinogenic effects, of chloroform. They were merely made to determine toxicity and see if further studies should be done.

The dosage levels were at two points only, as I recall, and they were quite high. Again they did not step down those dosages as you would expect to make on a pertinent study and have perhaps a minimum of four dosage levels approaching somewhat the level that you would have in water, not saying it should be that, but something so that the toxic effects of the chloroform will not overwhelm the animals being studied.

So the information that was used certainly is not applicable to hypothesizing on the cancer effects of chloroform, and that work is being done. The best information available is by Dr. Roe. But again the NCI has a standard procedure and, as I recall, it is for several dosage levels, at least four different dosage levels, rather than the two used in the initial preliminary study.

Mr. ROGERS. Thank you.

Mr. Broyhill?

Mr. BROYHILL. Yes; I still have some questions.

I would like to ask Mr. Burba this: What I don't understand is why the group is concerned at this time? The EPA, as I understand it, has just finished the comment period and is presently considering the regulations. It is my understanding that the views that you have expressed have been expressed to the EPA, and they, of course, must take those into consideration in issuing their final rules. We don't even know what the final rules will be as yet.

Mr. BURBA. Mr. Broyhill, I guess our concern, and it is the concern of every one of us, and I would say the concern of 90 or 95 percent of the people who have participated in the five or six public hearings, is that we think EPA has a closed mind on this matter and is simply not listening and not hearing what the industry has to say.

Mr. BROYHILL. What I am thinking is that these congressional hearings may not be timely, that we haven't given EPA time to act yet, and we really don't know what they are going to propose. I think it is hard to make a rational judgment at this time.

Mr. BURBA. Yes, sir, but we pointed out in our position that we think EPA has deviated greatly from the intent of the act.

Now when do you address that? Do you wait until regulations are proposed? We think it is a matter of concern.

Mr. BROYHILL. Where do you say they have deviated from the act? Will you point that out?

Mr. BURBA. The interim regulation. Acting upon interim regulations at this time rather than revised regulations and thereby circumventing the need, or Congress direction, for a National Academy of Sciences study upon which to base the regulations.

Mr. PENDYGRAFT. I just might add we think the technique, the technology, has to be one that is generally available on the date of enactment which was December 17, 1974, and we think GAC as being proposed wasn't available then.

Mr. BROYHILL. Are you saying that GAC is not readily available?

Mr. PENDYGRAFT. I am saying GAC, as EPA has proposed it, we don't think is available even today. In order to develop a GAC treatment that would meet the EPA proposed criteria, that treatment technology isn't available today and certainly wasn't available on the date of enactment.

Mr. BROYHILL. How many cities do you estimate would be required to put in the GAC treatment facility under the proposed regulation?

Mr. PENDYGRAFT. It is difficult to estimate because GAC will be required for every city that serves more than 75,000. There is a variance procedure, but there really is no definition of how one will obtain that variance. So it is unclear to us and we have raised that point many times with EPA. EPA I think has suggested that 61 systems total would be affected by the proposed regulation, and I think 50, and I may be incorrect on that, but I believe at least 50 will have to use GAC, perhaps the 61.

Mr. Broyhill. I understood it was something less than 100. I wasn't quite clear as to how many.

Are you saying that the GAC technology is not available to the less than 100 cities?

Mr. Pendygraft. I am saying GAC treatment generally isn't available to anyone. It is not a technology available for use in treating drinking water today. I am saying that the proposed regulation according to EPA will affect something like 61 water systems. We don't know how many it will affect. We think more will be affected than the 61.

Mr. Burba. May I add, Mr. Broyhill, GAC is not in effect today; that is, the deep bed filtration for the purpose proposed. It is available in the shallow bed as the primary filter for taste and odor removal but not for the removal of the trace organics, under the operating criteria proposed, it isn't available or proven. This is our concern.

Mr. Florio. Will the gentleman yield?

Mr. Broyhill. Yes.

Mr. Florio. It is my understanding that there are 390 systems in the country that will be required under the proposed rules to adopt the GAC system and that some 61 would probably be the number that would be ultimately required if the variance procedure was to be employed.

Has industry done anything about costing out the expense of applying for a variance and having a variance granted for those number of systems that would be required, the 390 that probably would not have to go into the final system?

Mr. Gilbert. I don't think that specific cost estimates have been made, but I could give you a comparison in the water pollution control field.

Many communities are currently applying for waivers from secondary treatment requirements. Those are complex applications and would be similar to the ones here which would have to look into watershed conditions and so forth. I think you could estimate the cost at somewhere between $50,000 and $500,000 depending upon the complexity of the situation and the rules that would be adopted by EPA for applications. We haven't seen those yet.

Mr. Florio. Could you give us just a single sentence response as to what the major point would be in allowing a variance to be granted?

Mr. Gilbert. Whether the water supply source was at risk with regard to synthetic organic contaminants, and this would require a study of upstream pollution sources in the case of surface water, and I would assume that study would have to be conducted in great detail.

Mr. Burba. Mr. Florio, this is one of the problems. We, as individual utilities, have to identify every upstream contributor to the watershed and we think that should have already been done under the NPDES program or the Toxic Substances Control Act, and that information should be available. But we are having to go upstream and identify, every point source contributor.

Mr. FLORIO. A lot of reference has been made to the point source contributor. It is my understanding in a different field that it is the nonpoint source contributors that are, for the most part, responsible for contamination in our water supplies.

Is that your understanding?

Mr. GILBERT. It is actual——

Mr. FLORIO. Agricultural runoff, things of that sort?

Mr. GILBERT. It is actually both. In some watersheds it would be point sources, mine drainage, other types of industrial activities. In other areas, it could be nonpoint sources. But I would like to say also that this has been addressed in the 208 planning programs under 92-500, and that is why we have recommended that the variance procedure be abandoned, and that the State regulatory agencies, or in those areas where they do not have authority, EPA identify vulnerable areas from information already at hand.

Mr. ROGERS. Let me just ask a couple of things.

As I understand it, the Academy of Sciences has stated, page 717 of that statement, "It is suggested that strict criteria be applied when limits for chloroform in drinking water are established."

Are you aware of that position of the Academy?

Also I am sure there must be a misunderstanding about saying that technology should be limited to that which was available in 1974. This is not the intent of the committee. That is not the intent of the law, and that would be an erroneous interpretation. Certainly I would presume EPA is not trying to administer the law with that effect, are they?

Mr. PENDYGRAFT. I hope I haven't misled anyone. Under the interim primary drinking water regulations, the statute, to my recollection, limits the treatment techniques to those generally available on the date of the enactment. Under the revised regulations, which would be regulations that follow the required National Academy of Sciences study those treatment techniques are to be based on the best technology generally available when said regulations are adopted.

Mr. ROGERS. Otherwise you are limiting the industry to existing technology and would never advance.

Mr. PENDYGRAFT. Yes, sir.

Mr. ROGERS. I just wanted to try to clear that up. It is my understanding that GAC is used in about 44 systems presently. Would that be correct?

Mr. PENDYGRAFT. There are approximately 40 systems in the United States, we understand, that use granular activated carbon for taste and odor control.

Mr. ROGERS. I think I have a list here of 44.

Mr. PENDYGRAFT. Forty-four.

Mr. ROGERS. Yes.

Is there any problem with that, with them?

Mr. PENDYGRAFT. The thing to keep in mind here is that they are used for taste and odor control.

Mr. ROGERS. Taste and odor control.

Mr. PENDYGRAFT. Taste and odor, yes, sir, and that really is not at all what the EPA is proposing here. When you use granular activated carbon for taste and odor control, you may not have to replace the granular activated carbon for as much as 2 to 4 years, and that really means then that you won't need regeneration because it is cheaper just to buy the virgin material. You won't have to worry about taking the carbon out every 2 months and getting it back into the sand filters. So it is a vastly different type of technology when it is used for taste and odor control.

Mr. ROGERS. Is there any evidence from these companies that are using this system of extra health hazards?

Mr. PENDYGRAFT. I can't say that there is. This I can say, and this is in our comments that we submitted to you. Dick Moser who is, I think, director of system water quality with the American Water Works Service Co. has gone on record, and his letter is with our comments that we are filing, that the use of granulated activated carbon for taste and odor control, and his company has approximately 20 of those plants, is not at all indicative that granulated activated carbon can be used to meet the EPA-proposed criteria.

Mr. ROGERS. No. What I am saying, are there any health hazards that are brought about by the use of GAC technology? Do you know of any?

Mr. BURBA. There are some concerns. But the thing that really has not been proven, as far as we know, is what happens when you regenerate GAC, re-regenerate, and so forth, and we think this is something that should be studied.

Mr. ROGERS. If there is any evidence of any health hazards, I think it would be helpful to the committee to have you present that for the committee record.

Could that be done?

Mr. PENDYGRAFT. Yes.

Mr. ROGERS. Thank you. I did want to bring out that the law actually does permit variance and different approaches rather than the one technology GAC in section 15(A)(3).

Mr. BURBA. Mr. Rogers, may I respond to that?

This is one of the quandaries that we are in. We have been told that this is really being required to deal with the unknown. The requirement is to remove what you can't measure, and what you can't identify. How can you provide something that might be comparable to GAC when there are no criteria for fully establishing that something will be comparable? We need some ground rules.

Mr. ROGERS. It says in the regulations "Pursuant to section" so and so, "the Administrator may grant a variance to the treatment techniques specified in this part upon a showing by any person that an alternative treatment technique is at least as efficient, lowering the levels of a broad spectrum of synthetic chemicals as that specified in that subpart."

Mr. BURBA. Our concern is that if we are dealing with a health problem it is not caused by a broad spectrum. It is caused by the item or items of concern that may be a health risk. We think that rather than using a shotgun and hoping maybe something good will happen, you ought to use a rifle and go after those contaminants that are a problem, that may be a health risk. We think if you compare alternative techniques on just organics removal, in general, you really may not be getting the ones that are the health problem.

Mr. ROGERS. But do you have any other alternative technology you would prefer to use that will do that?

Mr. BURBA. We think the ones that are a health risk should be identified.

Mr. ROGERS. No, I am saying, do you have any technology that you prefer to use as an alternative to what has been proposed to GAC technology?

Mr. BURBA. We are doing the research on it in Louisville, and by that I mean we are going to river bank filtration, wells and so forth, but I don't know how we can use EPA's criteria to evaluate comparability. We will attempt that but it should be from a health point of view rather than just a broad spectrum point of view.

Mr. PENDYGRAFT. I just might add, Mr. Chairman, that there are some technologies that appear promising, and recently at this activated carbon symposium held on September 10 to 15 that we referred to before, reference was made to an adsorbent called Ambersorb XE-340. I think I am giving somebody a plug. From the papers presented, that particular resin appears very promising in treating things like low molecular weight halogen needed hydrocarbons like carbon tetrachloride, chloroform. These are the compounds that I think are of greatest concern to EPA. I think there are technologies like that that may be available, and what is important is I think that economically they may be more feasible.

Mr. ROGERS. Yes. Well, under the law, that is permitted, and even under EPA regulation, that is permitted in carrying out the law.

Mr. PENDYGRAFT. As the criteria are proposed now, for instance, you have to effect a 50-percent reduction in total organic carbon. That is one criterion of three. Ambersorb XE-340 is purported to be very good for removing volatile halogenated organics but it doesn't take out total organics. So that couldn't be substituted in lieu of GAC because it is not taking out total organic carbon, but yet it might be the best treatment technique.

Mr. ROGERS. I assume you have to have a technology that does the work. I would think that would be the requirement for an alternative. That is what the law envisioned, that we would not crank in a specific technology but would accept any alternative that would accomplish the result. As I understood it, that was the approach you desire, to get the results rather than specifying the means.

Mr. PENDYGRAFT. Yes, sir.

Mr. ROGERS. That is permitted under the law.

Mr. PENDYGRAFT. Yes. I think with maximum contaminant levels where you would actually pinpoint the compound of concern, you would have quite a variety of treatment techniques, based on each individual water systems need, to meet that, and that flexibility is very important.

Mr. ROGERS. It is in the law.

Thank you very much. Your testimony has been most helpful. We will go into some of these problems with EPA when they appear before the committee. We thank you for bringing your concerns to the committee, and the committee will look into it. Thank you.

It is my understanding that our distinguished colleague, David Evans, is here.

Mr. Evans, we will be glad to have you come to the table. Your statement will be made a part of the record in full at this point, and we would be pleased to have you proceed as you may desire.

Thank you for your continued interest in this subcommittee.

STATEMENT OF HON. DAVID W. EVANS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF INDIANA

Mr. EVANS. Thank you, Mr. Chairman.

Your subcommittee members are to be congratulated for holding these hearings and for being interested in the concerns that have been expressed in regards to these proposed regulations.

EPA's proposed amendment to the interim primary drinking water regulations may potentially have a severe financial impact on my constituents. I am not at all convinced that such an impact is warranted. The so-called "benefits" of the proposed regulations are perhaps, at best, illusory and the costs will be enormous.

The so-called potential health risks which the proposed regulation attempts to address are based on two mice and rat studies in which the animals were virtually overwhelmed with high doses of chloroform. I understand that there are contradictory results from other studies involving chloroform and animals. This seems to be an extremely weak basis on which to require revolutionary and costly water treatment techniques which are untested in this country on anything remotely approaching a plant-size scale.

I strongly suggest that before the constituents in my district and many others throughout the country are required to pay the rates required to finance this program—which may have an initial capital cost of up to $45 million and raise water rates by, some have suggested, up to 60 percent—we be sure that there is, in fact, a problem. If there is a problem, we should be convinced that it can be remedied by the means proposed. This requires not only research into the health effects of the synthetic organic chemicals in drinking water, but, as a minimum, large-scale pilot plant projects utilizing the proposed techniques.

To require the water utility industry—and ultimately the Nation's ratepayers—to finance a massive nationwide research and development project to solve a problem which may not exist is premature. Massive increases in water rates will surely be inflationary—and contrary to the President's policy to curb inflation.

A recent release by the Council on Wage and Price Stability estimated that compliance would impose capital costs of $616 to $831 million on water systems serving 75,000 or more people. The council was critical of EPA's supporting analysis, which most importantly does not address the benefits of alternative standards, that could possibly provide equal or greater benefits at less cost to the consumer.

In summation, I ask the distinguished members of this subcommittee to urge EPA, before finally promulgating regulations in the near future, to complete the necessary investigations and studies, so that their final actions will inspire compliance by the individuals who must meet the requirements and pay the costs rather than creating skepticism and outrage over more ill-conceived government regulations.

I think certainly there are a great deal of misconceptions and perhaps ill-conceived concerns in this whole area at the present time, and I know certainly many people in the Indianapolis area are concerned and, rightfully so, in some instances. In some instances these concerns are perhaps ill-founded.

But I do congratulate the subcommittee for having these hearings, to try and shed some light in this area, to bring forth more of a factual basis upon which we can all make judgments.

Mr. ROGERS. Thank you very much for the very helpful points you have brought out.

The committee will try to look at this carefully.

Are there any questions?

Mr. EVANS. If not, I appreciate the opportunity to testify before you this morning.

Mr. ROGERS. Thank you so much for your presence here today, and we will go into this question very carefully.

Mr. EVANS. I know you will. You are to be congratulated for that.

Thank you, Mr. Chairman.

Mr. ROGERS. Our next panel will be a panel of environmental groups: Robert Harris, representing the Environmental Defense Fund; George Coling of the Urban Environment Conference; David Zwick, the Clean Water Action Project; and Blake Early, Environmental Action.

We welcome each of you to the committee.

If you would like to take seats at the table.

Your statements will be part of the record in full without objection.

You may start in whatever way you desire.

Mr. Harris, perhaps you would go first.

STATEMENTS OF ROBERT HARRIS, PH. D., ON BEHALF OF ENVIRONMENTAL DEFENSE FUND, ACCOMPANIED BY JACQUELIN WARREN, STAFF ATTORNEY; DAVID R. ZWICH, DIRECTOR, CLEAN WATER ACTION PROJECT; A. BLAKEMAN EARLY, ON BEHALF OF ENVIRONMENTAL ACTION; AND GEORGE COLING, COORDINATOR, URBAN ENVIRONMENTAL CONFERENCE, INC.

Mr. HARRIS. My name is Robert Harris. I am now visiting associate research biochemist at the University of California at Berkeley. I am on leave from the Environmental Defense Fund.

On my right is Jacqueline Warren, attorney for EDF, who accompanies me today.

Perhaps it is nothing new for a scientist to come before a congressional committee and express his disappointment that a regulatory agency has delayed well beyond the evidence in implementing health legislation. I am sure members of this committee will remember well 4 years ago when the Safe Drinking Water Act was debated in Congress; the disclosures in New Orleans added much to see the bill through. This was shortly followed by similar findings in 80 cities nationwide.

Residents in Cincinnati, Miami, Philadelphia, and New Orleans all learned that they were imbibing a myriad of toxic and potentially carcinogenic chemicals.

At that time, I thought this evidence was enough to act. The evidence of a myriad of chemicals known to cause cancer in laboratory animals, evidence that fish that swim in these waters have high rates of tumors, and preliminary evidence from epidemiologic studies in Louisiana that humans may also be getting cancer from drinking such water.

But the cries of the water works community was at that time—4 years ago—"there is no problem." Their honor was at stake. They weren't about to give up their decades old motto: The United States has the best drinking water in the world. So the water works community at that time lobbied for delay, and now after 4 years of delay, they are still lobbying even harder for more delay, this time for roughly 10 more years so that the Federal Government can build several demonstration plants to demonstrate a technology that has already been demonstrated.

There seems to be a curious phenomenon that has occurred. The more the evidence builds up that drinking water is causing human cancer, the harder the opponents dig in their heels.

A coalition of cities under the guise of the Coalition for Safe Drinking Water have hauled out witness after witness from the ranks of those scientists whose lifetime has been devoted to defending the chemical industry against government regulations of its products. It would take too long to go through all of their arguments in detail here, but I would like to mention one, and that is the suggestion that the evidence on chloroform is mixed or at best inconclusive.

In point of fact, the evidence is consistent among all of the studies that have been conducted on the carcinogenicity of chloroform. There were early studies in the 1940's that were positive. There were studies by the National Cancer Institute that were adequate and were positive and served as the basis for the Food and Drug Administration to successfully ban chloroform in cosmetics and in drugs.

Furthermore, Dr. Roe's own studies demonstrate that chloroform is carcinogenic in one strain of mouse, and that, in general, his dose levels were too low to observe a statistically significant effect. In other words, had the National Cancer Institute used his dose levels, they would have seen no effect. Therefore, his studies, by and large, were inappropriate.

Furthmore, his studies on dogs were not for the lifetime of the animal, and every scientist that I am aware of in this field agrees that the only valid carcinogencity study is for the lifetime of the animals.

Now the coalition has successfully lobbied an uncomplimentary report out of the Council on Wage and Price Stability. The Council seems to be making a habit of issuing reports after the public comment period which embarrasses and undercuts a regulatory agency that is trying to implement President Carter's policies. But this time the Council has erred seriously in its technical analysis.

Although the misrepresentations are too numerous to discuss all of them, let me point out the most serious:

One. The Council on Wage and Price Stability's entire risk analysis is based on the single contaminant chloroform. But chloroform, I would remind you, is the tip of the iceberg. When you add chlorine to drinking water, you produce a myriad of chlorinated organic chemicals. Ninety percent of those chlorinated organics have yet to be identified. Only 10 percent of those chemicals are represented by the so-called trihalomethanes of which chloroform is usually the one present in highest concentration. But let me caution that simply because it is present in the highest concentration does not mean that it is of the greatest health significance.

It was said earlier, and this is incorrect, that there had been no dose response studies on the other trihalomethanes; namely, the brominated compounds, the other three besides chloroform. This is wrong. There have been mutagenicity studies using the Ames test, a highly regarded system for detecting chemical carcinogens, and these brominated trihalomethanes are all strongly mutagenic, suggesting their carcinogenicity.

Furthermore, a short-term cancer test of these four trihalomethanes demonstrated unambiguously positive results for bromoform, and, in general brominated analogs of chlorinated carcinogens are generally 10 to 100 times more potent than the chlorinated analogs.

Two. Of the several risk estimates available to the Council on Wage and Price Stability on chloroform, they chose the lowest. Had they chosen the estimate provided by the National Academy of Sciences Drinking Water Committee, their estimate would have been about 10 times higher. Had they used the estimate derived by a method suggested by another National Academy of Sciences Committee, this time Donald Kennedy's Pesticide Committee, the risk estimate for chloroform would have been 20 times higher. And had they considered the epidemiologic evidence, which was provided in part by the National Cancer Institute, their estimate on the cancer risk of chloroform would have been 100 times greater than what they used.

We must not forget that the epidemiology is extensive. There is more than one study. There are about a dozen studies. And while conducting epidemiology on this problem is exceedingly difficult and probably we will never have unanimity among the epidemiologic community because of these methodological problems, nevertheless, these studies provide a consistent association between drinking water and gastrointestinal and urinary tract cancers. In fact this led the National Cancer Institute to issue a policy statement on these regulations in which they recommended that the epidemiologic evidence be considered and, indeed, provided one set of risk estimates for chloroform to which I just alluded.

In addition, the Council also calculated their benefits as if a utility that exceeds the proposed EPA standard of 100 would use GAC to reduce its THM levels only to 100, not recognizing that once the plant is constructed, costs of going well below 100 are justified and are considerably smaller, the incremental costs are smaller than reducing the levels to just 100. These limitations are serious limitations to drawing conclusions from their analysis.

Three. The Council on Wage and Price Stability assumes that there are serious problems with activated carbon, stating: "The data on GAC are extremely sparse and many questions still remain, especially with regard to bacterial growth, the leaching of heavy metals, and adsorption of materials." But the Council provides no documentation of this, probably because there isn't any. To the contrary, the 40 water treatment plants in this country that already use carbon successfully for taste and odor control, the 20 in Europe that use it for controlling carcinogens, the food and beverage industry in this country that routinely use it, from all of this experience and from EPA's research in Cincinnati, there is absolutely no scientific basis for these so-called hazards.

Also it has been said that the European experience is not applicable. I don't know what evidence the coalition lawyer and Ph. D. in chemistry has, but I have the same evidence, I believe, and it looks to me as if the European experience is quite comparable to what EPA is proposing. European plants are regenerating their carbon, for example, roughly every 3 months in some cases, and I would doubt that the EPA regulations would require much more stringent operating conditions.

Therefore, concluding my comments on the Council on Wage and Price Stability analysis, had they considered all of the risk evidence and done their calculations correctly, they would have come to a very different conclusion. Had they just used the risk estimate suggested by the National Academy of Sciences Pesticide Committee or the Drinking Water Committee, for that matter, for chloroform, they would have found that the EPA standards were economically efficient, with a favorable benefit/cost ratio.

I would remind you that this would be the case even neglecting the epidemiologic evidence, and, of course, considering the epidemiologic evidence strenghtens the EPA's proposed regulations.

This comports with our own cost-benefit study, which we are releasing today and which I have provided to the committee. [See p. 51.] This study was conducted by Dr. Talbot Page, myself, and a graduate student at the University of California. It is published as a working paper by the California Institute of Technology, Division of Humanities and Social Sciences. Indeed, we find that analysis based on the available risk estimates—the animal, in addition to the epidemiologic evidence—demonstrates that the cost; that is, the activated carbon construction, operation, and maintenance costs associated with reducing cancer deaths, well justifies the EPA regulations; that these costs are between $30,000 per cancer life saved and $700,000, well within the range of the value of the human life implicit in other regulatory decisions, court cases, and the willingness to pay criterion of workers accepting higher wages for increased risks of death.

Finally, the Council on Wage and Price Stability and the coalition make a point of the possibility that if the risks ultimately turn out to be low, then there will be hundreds of millions of dollars in sunk costs which would not have been efficiently spent.

But what about the cost of doing nothing, and it turns out that drinking water does cause cancer at the levels that the evidence suggests? What about those costs to society? Why hasn't the Council considered this side of the uncertainty coin?

In conclusion, it may be useful to consider this issue historically. We are lagging behind the Europeans in installing activated carbon for health reasons, just as we lagged behind the Europeans in installing technology to control waterborne diseases 100 years ago. It was John Snow's classic epidemiologic studies in England that demonstrated that drinking polluted water caused cholera. The Europeans acted quickly to move their intakes upstream from sewage discharges and installed other treatment facilities to reduce the levels of these pollutants and to reduce the amount of cholera and typhoid fever. It was nearly 50 years later that the Americans began doing the same thing, and it appears that history is now repeating itself with respect to carcinogens in drinking water.

Finally, I believe that the evidence clearly justifies these regulations. Indeed, if the Safe Drinking Water Act has any meaning at all, it would be unconscionable for the EPA to delay any longer.

Mr. Chairman, I am not sure who is chairman at this point.

[Testimony resumes on p. 61.]

[The cost-benefit study mentioned by Mr. Harris follows:]

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91109

ENVIRONMENTAL QUALITY LABORATORY

22 September 1978

Mr. Barry Bosworth
Council on Wage and Price Stability
726 Jackson Place
Washington, D.C. 20506

Dear Mr. Bosworth:

The President in his Environmental Message has emphasized his strong support for cancer prevention programs. Four years after the passage of the Safe Drinking Water Act, EPA has now proposed to implement such a program, by proposing granular activated carbon to filter toxic chemicals from drinking water, and alternative controls. The National Cancer Institute has found carcinogenic hazards in drinking water and has supported the EPA proposal for preventative treatment of drinking water. We appreciate that your role as a fighter against inflation is an unenviable one here, to count costs and cut them where possible. But in dealing with cancer, it is imperative that your recommendation to further delay the implementation of the Safe Drinking Water Act, in favor of further research and monitoring, be soundly based.

While there are a number of useful contributions in your analysis, in several respects we believe the CWPS analysis to be misleading, and it seriously undervalues the benefits associated with preventative treatment. In the attachment, we discuss the problems, in detail, and here we briefly summarize a few of the most important of them.

1. Of the several estimates available of the risk of cancer from drinking water, CWPS has chosen, without giving supporting reasons, the lowest of the estimates. By its own analysis, if CWPS had used the NAS recommended accumulated lifetime dose estimate, the CWPS estimate of the effectiveness of treatment of drinking water for carcinogens would increase more than ten-fold. When there is a large range in the estimated risk of cancer, varying by a factor of several hundred, it is highly non-conservative to adopt a single estimate at the lowest end of the range.

2. CWPS entire risk assessment is based on the single chemical chloroform. CWPS does not include risk assessments of other chemicals, such as dieldrin, which at lower concentrations are more potent than chloroform.

3. CWPS erroneously assumes that granular activated carbon (GAC) will lower the concentrations of organic chemicals only to the EPA standards. As GAC effectiveness greatly exceeds the standards, its benefits are substantially underestimated.

4. CWPS does not consider the effects of chemicals in combination and interaction, even though it is known that chemical interactions can increase cancer potency hundreds of times. (There are now over 700 organic chemicals identified in drinking water, 23 of which are carcinogens or mutagens. These 700 still only represent about 15 percent of the organic matter in drinking water.) There are about a dozen epidemiologic studies which, while admittedly imperfect, incorporate effects from many chemicals in combination. CWPS dismisses the epidemiologic studies, which indicate much higher risks than the CWPS estimate, even though Dr. Upton, director of the National Cancer Institute, recommended to EPA that these studies be taken into consideration.

For the above reasons, we conclude that the CWPS analysis is sufficiently biased against preventative treatment for toxics in drinking water, so that its estimated costs and benefits should not be used for decision purposes. However, we are not entirely negative about the report and we find considerable merit in the report's treatment of the distribution of costs.

Dealing with very long run risks is especially difficult, and a number of economists have counseled against the simple procedure of discounting expected future costs, when the costs are in lives and distributed over scores of years, as they are in the problem of toxics in drinking water. Sometimes economists have ignored the problem of fairness to the future altogether, and sometimes they have recommended a reduction in the rate in which costs and benefits are discounted as a way of weighing the future's interests more equally with those of the present. CWPS has chosen to use another approach, one of "steady state" comparisons (also used by NAS in its analysis of carcinogenic hazard in drinking water). We believe this to be a far better approach than the one which adjusts the discount rate for problems of long delayed latent risk to life.

Assessing the risks of cancer, from toxic chemicals in drinking water and from other sources, is extremely difficult. Carcinogenic hazards surround us, even as virus and bacterial hazards are ubiquitous. Carcinogenic risks cannot be reduced to zero, but some steps can be taken as preventative measures to limit exposure, just as steps are taken to limit exposure to viruses and bacteria. It is very difficult to know how conservative society should be toward the risk of cancer and mutagenic disease.

In offering our critique of the CWPS report we do not wish to convey the impression that we know the answers to the question of the appropriate amount of preventative treatment. We hope that our comments will contribute, at least in a small way, to a better understanding of the nature of cancer risk and we would welcome an improved dialog among the various governmental agencies and independent scientists.

Sincerely,

Talbot Page

Talbot Page
Research Associate in Economics
California Institute of Technology

Robert H. Harris

Robert Harris
Visiting Associate Research Biochemist
University of California, Berkeley

ATTACHMENT

1. The entire risk analysis is built upon the single estimate of a lifetime risk of 0.2 in a million for an oral dose of chloroform of 1 μg/liter. CWPS neglects to mention that this estimate is at the low end of the range of existing risk estimates. The CWPS estimate is derived from the NAS recommended surface-area extrapolation technique. 1/ Using the same technique the NAS panel on drinking water, 2/developed its own estimate of risk 85 percent higher. Under another NAS recommended technique 3/, lifetime accumulated dose, the risk estimate for chloroform is about 20 times the CWPS estimate. And the estimate from direct epidemiologic studies is about 100 times the CWPS estimate 4/. What is to be said about this large range of estimates? Clearly risk estimation of cancer hazards is not a precise art, and a balanced approach would consider a reasonable range of estimates. Something can be said in favor of the accumulated-dose technique: it has been calibrated against three human carcinogens for which there are comparable animal and human dosage levels. Something can be said in favor of the epidemiologic studies: they include the effects of many chemicals, not just a single one (while chloroform is in higher concentration than other carcinogens, some of the others are vastly more potent and it is known that interactions among chemicals can greatly increase potency as well 5/. Dr. John Cumberland, a member of the NAS panel from which CWPS'risk estimate was taken, recommended that the epidemiologic evidence be incorporated into a risk assessment 6/. Dr. Arthur Upton, director of NCI, also recommended that the epidemiologic evidence be incorporated into the evaluation of benefits of GAC, and as a part of its comments on the proposed drinking water regulations, NCI provided its own estimate of risk based upon epidemiologic evidence. Does CWPS believe it knows more about the assessment of cancer risk than the National Cancer Institute?

It is possible that the CWPS estimate is the correct one, but it is highly non-conservative to rely on a single estimate that is at the extreme low end of the existing range of estimates. In the CWPS analysis, its estimate of risk translates directly into a "cost per life saved." Thus if the lifetime accumulated dose is the correct measure of risk, the CWPS estimated cost per life saved is reduced by an order of magnitude; if the epidemiological studies describe the true risk, the cost per life is reduced by two orders of magnitude.

2. In developing its risk assessment, CWPS lists three assumptions which it states are conservative. In light of point 1, we consider it misleading to believe at least two of

the assumptions are conservative (p.14 and footnote 3). The assumptions are: a linear dose-response relationship, an extrapolation from animal to human responses, and the usefulness of sensitive animal strains for bioassay procedures. Surface area adjustment and lifetime accumulated dose are both linear dose-response models; of the two, CWPS chose the less conservative one. Both are extrapolations from animal to human responses, and both are much less conservative, in the drinking water case, than assessments based on epidemiological data. The third assumption is often considered conservative, and is defended by NCI on statistical grounds relating to the small number of animals tested. But it is also worth pointing out that humans are also a sensitive species, with a 25% lifetime rate of "spontaneous" cancer. Dr. Sugimura from Japan has recently suggested to us that the high "spontaneous" rate of cancer for test animals can be greatly lowered by elimination of chemical carcinogens and mutagens from their "control" diet.

3. Clearly much depends upon which risk estimate is correct, or what is believed to be more correct and how conservative is our society toward the risk of cancer. Under such a wide range of uncertainty it is useful to consider the costs of the wrong decisions either way. If the lowest estimate of risk is correct, the GAC treatment plants are constructed anyway then we may have built unnecessarily expensive means of providing clean tasting water, which incidentally saves a few from cancer. While CWPS develops cost estimates for this possible wrong decision, in the hundreds of millions of dollars, it neglects to consider the other alternative. If the high estimate of risk is correct and GAC is not implemented there will be thousands of people dying unnecessarily of cancer, who could have been saved from cancer at far less than the average cost of medical treatment for cancer and other direct costs of cancer.

Direct calculation from the range of risk assessments indicates that society has more to lose from unnecessary underprotection (not installing GAC when the true risk is high) than it has from unnecessary overprotection (installing GAC when the true risk is low). Instead of the balanced approach of considering the potential costs of wrong decisions either way, CWPS considered only the possible cost of overprotection. And by looking at only one side of the problem, CWPS has failed to consider the insurance aspect of GAC which arises because of the difference in potential costs from over- and underprotection.

4. Somewhat indirectly, CWPS suggests that chloroform may not be a human carcinogen at all. CWPS says the results of

animal studies are "mixed" (p.10), cites a criticism by Potrepka, and then approvingly cites a study by Roe, which found "one type of tumor in the male animals in one out of four strains of mice." To CWPS the evidence appears weak and CPCS concludes that "it appears that chloroform may be an animal carcinogen and that there is some evidence to suggest it may be a human carcinogen." (p.11). On the contrary, we believe that there is virtual unanimity in the scientific community that chloroform is an animal carcinogen and a strong presumption that it is a human carcinogen as well. Roe's study came at the time of the hearings to cancel the use of chloroform in cosmetics, and it would have provided a little more balance if CWPS had cited the extensive testimony from independent scientists and from scientists at the National Cancer Institute and the Food and Drug Administration concluding that chloroform is a carcinogen.*

5. We find the CWPS development of incremental costs a constructive extension, and realize that CWPS views the policy prescriptions which follow from incremental cost comparisons as preliminary (p.2 "Comments"). But CWPS recommends that EPA follow this approach and offers numerical estimates. It appears (the working assumptions are not explicitly stated so that this is not clear) that the working assumption is that installation of GAC would just meet the THM standard. For example, if the pretreatment concentration of THMs were 250 μg/l and if the standard were 100 μg/l, installation of GAC would improve the water quality from 250 μg/l to 100 μg/l; and if the standard were 50 μg/l installation would improve the quality from 250 μg/l to 50 μg/l. As GAC is expensive and involves economies of scale, it is not surprising to find CWPS's policy judgment is in the direction of fewer plants concentrated in bigger cities with stricter standards. However, this assumption neglects the fact that once installed GAC removes virtually all the THMs regardless of the standard. Thus about 100/250 or 40% of the benefits of GAC are neglected by this assumption with the standard of 100; with the standard of 50, about 50/250 or 20% of the benefits are neglected. The situation is different with controls other than GAC for meeting

* As pointed out by scientists from the National Cancer Institute at the last meeting of the National Drinking Water Advisory Council, Dr. Roe's studies of chloroform were largely inadequate because his observations on dogs were for less than the lifetime of the animals, and his doses in the rodent studies were generally too low for the number of animals used to provide statistically significant results when compared to an earlier positive study and to the bioassay by the National Cancer Institute.

the THM standard. For other alternatives, such as changing the point of disinfection, the standard is not likely to be exceeded by much. Thus the benefits of GAC are underassessed compared with the alternatives, and the difference in underassessment compared with other alternatives is greater for the higher (100 μg/1) standard.

In footnote 2, p.15 CWPS notes that GAC may remove all the THMs. CWPS says that the resulting underassessment is slight, but 20 and 40 percent underassessments of the relative benefits of GAC do not appear slight. In the same footnote, CWPS continues by noting that the benefits of control may be overassessed if other THMs than chloroform are not as potent as chloroform. But if non-chloroform THMs were not as potent as chloroform, this would reduce the benefits associated with the removal of THM by GAC and other control alternatives proportionately, and thus would not change the relative underassessment of benefits of GAC compared with other control stategies.

CWPS mentions only the possibility that non-chloroform THMs may be less potent that chloroform, neglecting evidence which strongly suggests the reverse. A short-term cancer test (lung adenoma assay) for several drinking water contaminants, including all four THMs, showed unambiguously positive results only for bromoform, while chloroform yielded negative results 7/. This is consistent with the general observation that brominated analogues are usually more potent carcinogens than the chlorinated species. (The negative result on chloroform cannot be interpreted to mean that chloroform is not carcinogenic, since the lung adenoma assay is a relatively insensitive test for chemical carcinogens.) Short-term mutagenicity tests 8/ (Ames test) demonstrated that all THMs except chloroform were mutagenic and therefore probably carcinogenic.*

Therefore, correction of CWPS' erroneous assumption that GAC only removes THM down to the standard would lead to a higher measure of cost effectiveness for the EPA standard of 100 ug/l. Nevertheless, this correction would probably still leave intact CWPS policy direction of concentrating GAC in larger cities with stricter standards. However, this does not mean that small communities should be abandoned. Small communities with THM values of about 150-200 ug/l could still probably meet EPA's standard of 100 at very low cost without the use of GAC by changes in the method of disinfection. For small communities with exceptionally polluted water (say a THM of 1000 or more), installation of GAC may be cost effective.

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*It must be noted that the Ames test does not yield positive results for several heavily chlorinated compounds known to be carcinogenic in animal tests, including chloroform, carbon tetrachloride and dieldrin 9/.

6. On page 3 of the summary comments CWPS suggests that the THM standard (to be met with both GAC and non-GAC alternatives) is inconsistent with the synthetic organic standard requiring GAC because the CWPS estimated benefits of GAC are less than the estimated benefits of the THM standard, per dollar of control. This is based on the calculation that the combined risk of the synthetic organics would have to be 33 times higher than the risk from chloroform for the two standards to be "efficient" with respect to incremental cost per case of cancer avoided. Although it is true that the THMs are likely to be present at several times the combined concentration of other carcinogenics, several carcinogens found in drinking water are orders of magnitude more potent as carcinogens than chloroform (e.g., dieldrin, 1,2-dichloroethane). TCDD (dioxin), a contaminant of the herbicide 2,4,5-T and the preservative pentachlorophenol, is about a million times more potent than chloroform. Not very much of these chemicals need be present in drinking water to produce 33 times the risk of chloroform.

Furthermore, it is misleading for CWPS to imply that GAC is designed for only 129 chemicals. The vast majority of the organic fraction in drinking water has yet to be adequately characterized, and several important classes of chemical carcinogens have not yet been identified in water, not because they are absent, but because adequate analytic techniques have not yet been employed.

In 1974 when we first started looking at the carcinogenic hazards in drinking water, there were less than 50 organics identified of which 2 were identified as carcinogens and 2 as suspected carcinogens. Now there are 700 organics identified, 23 of which are identified as carcinogens or mutagens. When we began, only 2 percent, by weight, of the total organic matter of drinking water had been identified; even though 700 contaminants have now been identified, they still only represent 15 percent of the total organic matter. 2/

7. CWPS states that a risk of 66.7×10^{-7} "...seems quite high. If the average risk were really that great, it would seem probable that these organics would have been identified as carcinogenic by now." (p 23). In fact a number of non-THM organics have been identified as carcinogens.

The CWPS statement appears incorrect from a statistical point of view as well. For a given statistical technique the chance that an effect will be detected by the technique can be calculated. It appears that CWPS did not attempt such a calculation. In "Carcinogenic Hazards of Organic Chemicals in Drinking Water" 10/, we calculated this probability (statistical power), and observed that a risk as small as 66.7×10^{-7} would be unlikely to be detected by multivariate regression analysis. Since most of the epidemiological studies have found effects, analysis of statistical power suggests the risk to be larger than 66.7×10^{-7}, instead of the other way around, as CWPS has it.

8. CWPS is incorrect in stating that the performance data on GAC "are extremely sparce and many questions still remain, especially with regard to bacterial growth, the leaching of heavy metals, and desorption of materials" (p.20). In fact there is extensive Europen experience in the use of GAC to remove carcinogens from drinking water and a large scientific literature on the performance of GAC. Several American companies use GAC to adsorb heavy metals and there is a literature on that as well.

9. CWPS bases part of its case for delay on the grounds of uncertainty and the possibility "that there will be hundreds of millions of dollars in sunk costs which would not have been efficiently spent" (p.26). This indeed is possible if the true risk of toxic chemicals in drinking water is small. And with accumulating information as to the extent of the hazard, it may at first seem desirable to wait for the further resolution of uncertainty. However, to do so appears to us to mistake the nature of the irreversibilities involved. CWPS mentions the irreversibility involved in constructing a GAC plant, which is about forty years, the life of the plant. Balanced against this are the irreversibilities of cancer, which are on the order of forty years as well (or more depending on the chemical life of the carcinogen) and mutagenic disorders, which are on the order of generational time. At the higher end of the estimated risk range these irreversibilities are not only longer but more severe in cost. Thus, the greatest potential irreversibility is on the cancer side. A well known principle is that when there is increasing information and irreversibilities, efficiency requires more conservatism toward risk than would be indicated by a straightforward calculation of expected value, the approach taken by CWPS. Taking this principle into account would increase the benefits assigned to GAC, as a precautionary measure against irreversibility.

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Mr. FLORIO [presiding]. I am.

Mr. HARRIS. I know it is customary that you question witnesses after the entire panel has been heard, but I must leave in about 15 or 20 minutes to give a talk at an NCI conference, so I would be more than happy to answer questions if you so wish. Otherwise, Jacqueline Warren would be staying and she would be more than happy to answer questions.

Mr. FLORIO. The latter approach would be fine.

Mr. Zwick.

STATEMENT OF DAVID R. ZWICK

Mr. ZWICK. We are pleased to testify on the implementation of a Safe Drinking Water Act. I am going to summarize my comments and submit them for the record. [See p. 65.]

We strongly support the proposed EPA regulations. In drafting the Safe Drinking Water Act, this subcommittee recognized that this problem has gone largely unchecked for over 30 years.

Now it is 4 years later and EPA is still catching up with Congress and the American people.

There are still no safeguards to protect consumers from one of the principal problems the law is intended to address, cancer-causing chemicals in our drinking water. How much longer do we have to wait watching the rising cancer rates before taking these relatively inexpensive preventive measures against the most dread disease of our time, a disease for which we have already spent billions searching for a cure.

Quite simply, we need these protections now and we need to get started. This subcommittee recognized wisely in drafting the law 4 years ago that the most effective force for safe drinking water would not be Federal enforcement but informed local consumers, and that is why I think it is especially unfortunate that organizations representing water utilities have spread so much misinformation about this subject. This misinformation has confused not only the public but their own utility members around the country as well.

Their opposition to these requirements has been especially out of touch with extensive evidence of health risk. I might add to Dr. Harris' comments, that at the EPA hearings, Dr. Roe, the expert of the utility coalition, admitted he had not even reviewed the epidemiological studies on health risk.

More important, I think, the opposition has been out of touch with what the public wants, and that is really what I would like to focus on. Every time the public has had a chance to register its opinion, it has given very strong support for safe drinking water. Polls in New Orleans, for example, show strong support despite the years of confusion with the utility people claiming there is no cause for concern. Here in the D.C. metropolitan area, 77 percent in a large poll said they favored spending more money for drinking water safety. That is significantly stronger support, as you know, than even the much heralded proposition 13, which I think says that one thing the public likes less than high and wasteful taxes is needless cancer-causing chemicals in their drinking water.

These results and many others confirm our clean water action project's own direct contact with people in this area every day, more than 50,000 people in this metropolitan area alone, who have financially contributed to our efforts to work for safe drinking water. More than 120,000 have signed statements of support for strong safe drinking water standards. I think it is just pretty clear that when hard-pressed consumers want a break from higher costs, they don't want to do it at the expense of their life and their health.

Failure to put these controls into effect puts the heaviest penalty on the average- and low-income family, the family that can least afford $120 to $300 a year or more for home treatment devices that don't work and for bottled water that is often just water put in a bottle with the contaminants fully intact.

If a water utility really wants to cut costs to the consumer, and they should want to, there are several things that can be done. For example, a serious water conservation can save many times more than the safety improvements will cost in many cases. I think none of the costs of these improvements in many places should be passed on to the ordinary ratepayers at all.

With many of the rate structures presently in effect, increased costs should be borne by the greatest water users. WSSC in this area and in Tucson, Ariz., are two water utilities which have experience with this kind of rate structure.

Finally, retrieving the cost from the polluters who are causing the problem in the first place should be another option in some places. What all this means is that the water utilities are very much at odds with the wishes and financial and physical well-being of their customers, and I think this reflects a long history of complacency and the fact that, in general, they are out of touch in unaccountable positions, unaccountable structures.

It is interesting that among the comments that EPA has received on these regulations, the water and waste water utility professionals have been the only interest group consistently opposing the standards. The water and sewer professionals, the long-term unaccountable technicans, have been resisting these needed changes from the beginning. And if they had been making these changes on their own, the law would not have been necessary in the first place.

Among public officials that have to be more in tune with the public needs and concerns, officials, for example, closer to the electoral process at the local levels, officials who don't have to depend on the water works lobby for their expert information, there has been considerable support. The League of Cities has supported the standards, New York State supported the standards. Mayor Morial of New Orleans has supported the standards and asked that his city be chosen by EPA to demonstrate the new controls.

I think it is clear that public support for this program is going to increase. The program you set in motion 4 years ago is going to continue to grow, provided EPA persists in going ahead with these standards. That is because the water utilities have capitalized on, indeed have contributed to, the public's ignorance of these problems. That is, I, think probably the most important reason to have these regulations put into effect immediately.

If there are no organic standards under the law, then there is no monitoring and no public notification requirements in case of violation.

I think these public notification requirements are really the heart of the Safe Drinking Water Act, as the law said, as the committee's report said. Without that needed information, the organized consumer and taxpayer support that it is going to take to get the funding to put safeguards into effect labors under even a larger handicap.

Finally, I would like to switch to a different subject and say that it looks like EPA is repeating many of the errors of its organics proposals in its development of underground water protection requirements. They are long over due, nearly 4 years after the act's passage. There still are no Federal regulations for protecting underground water. The law originally required that they be proposed in 180 days and promulgated 180 days after that. The first proposals were published August 31, 1976, nearly 2 years after enactment, and the final regulations were never promulgated.

Instead, faced with the predictable barrage of opposition from the oil and gas industry, EPA has let another 2 years pass in protracted discussions with the fuel producers.

The long gestation period poses another problem. The process I think has turned over the last 2 years into largely one of negotiation with the oil and gas industry to the exclusion of other interests, less well endowed but no less effected.

Well, I think that the subcommittee could help by urging EPA to begin aggressive circulation prior to the publication of its drafts to representatives of other interests, including farmers, cities, consumers, and those affected.

Third, there are some major omissions and weaknesses in the circulating drafts at last look. One of them I will mention is the failure to explicitly cover underground public works projects for waste disposal, such as the massive tunnel and reservoir plan, TARP, now being constructed in Chicago. This TARP promises to be the largest and most expensive waste injection well in the world. It is aimed at controlling polluted storm water overflows, and the impact statements on TARP point to the possibility of leaks that could send slugs of highly polluted storm water from the city streets into underground aquifers that supply more than a quarter of the Chicago metropolitan areas population.

We obviously can ill-afford to poison our underground water supplies with lead, cadmium, or the other contaminants that concentrate in our storm water in an attempt to keep them out of surface streams. So we need to be sure we are not making a mistake in that regard. This is just the kind of danger the Safe Drinking Water Act underground water protection was aimed at preventing. Nothing in the proposed regulations previously prepared or apparently now being prepared appears to preclude that application. But specific consideration of this kind of project, since it is so massive, is needed to be safe rather than sorry.

I think the subcommittee would be performing a public service by raising this question as well with EPA.

Submitted for the subcommittee record, along with my written testimony, are formal comments on this proposed underground water regulation prepared by the Better Government Association of Chicago, and we agree with those comments.

In conclusion, anything the subcommittee can do to encourage rapid fulfillment of Safe Drinking Water Act's farsighted requirements, with the widest education and involvement of the public, will be a needed boost in the direction you have staked out in drafting this law 4 years ago, and I think we are going to find that it is one of the best bargains in prevention of cancer and other health problems that the American people can get.

Thank you.

[Testimony resumes on p. 77.]

[Mr. Zwick's prepared statement and attachment follow:]

Testimony of David R. Zwick,

Director, Clean Water Action Project

before the

Subcommittee on Health and the Environment

of the

House Committee on Interstate and Foreign Commerce

September 25, 1978

Mr. Chairman and Members of the Subcommittee, my name is David Zwick, Director of Clean Water Action Project. The Project is a national public interest organization working for safe drinking water and for the elimination of water pollution. We worked with hundreds of citizens groups around the country for passage of the Safe Drinking Water Act of 1974. We appreciate this opportunity to testify on its implementation.

We strongly support the proposed EPA regulations to control cancer-causing chemicals in our drinking water. In drafting the Safe Drinking Water Act, this Subcommittee recognized that this problem has gone largely unchecked for over thirty years.

Now it is four years later, and EPA is still catching up with Congress and the American people. There are still no safeguards to protect consumers from one of the principal problems the law was intended to address -- cancer-causing chemicals in drinking water. How much longer do we have to wait, watching the rising cancer rates, before taking relatively inexpensive preventive measures against the most dread disease of our time, a disease for which we have already spent billions searching for a cure? How much longer must we wait? We need these protections now. The EPA proposals are really as modest as they can possibly be. Anything less would not even be getting started. But EPA does need to get started.

This Subcommittee wisely recognized, in drafting the law, that the most effective force for safe drinking water would not be federal enforcement but informed local consumers. That is why it is especially unfortunate that organizations representing water utilities, the American Water Works Association (AWWA) and the misnamed Coalition for Safe Drinking Water, have a waged a campaign of misinformation -- misinformation that has confused not only the public but their own utility members around the country.

Their opposition to these requirements has been out of touch with the extensive evidence of health risk. But most important, it has been out of touch with what the public wants. Every time the public has had a chance to express an opinion on the question, it has registered strong support for doing what it takes to get safe drinking water.

In New Orleans, for example, 68% of the people polled there have favored spending more money to remove carcinogens from drinking water. Instead, their utility director Stuart Brehm has been spending their money lobbying against EPA's proposed standards. The people's support for additional safety measures is especially noteworthy in light of the confusion spread there over the years by utility officials, proclaiming there is no cause for concern.

In a poll here in the D. C. metropolitan area, the Washington Suburban Sanitary Commission found that 77% of its consumers support spending more money for drinking water safety. That is significantly stronger support than the vote for "Proposition 13" -- which says that one thing the public likes less than high and wasteful taxes is needless cancer-causing chemicals in the drinking water.

These results and many others confirm Clean Water Action Project's own direct contact with people in this area every day. More than 50,000 people in this metropolitan area, ordinary water drinkers, have financially contributed to our efforts to work for safer drinking water. More than 120,000 have signed statements of support for strong safe drinking water standards. And people are voting for safe drinking water every day with their dollars, buying bottled water and ineffective home treatment "gimmicks" in record numbers. We get calls from people every day asking what they should do about these end-of-tap devices and bottled water.

When hard-pressed consumers demand a break from higher costs, they really do not want to do it at the expense of their life or their health. The cost of repairing health is where the truly staggering cost increases are really taking place in our economy. By that measure, cancer is very inflationary.

These proposed controls are a bargain even if the price should add up to, say, the $26 per year per family that have been estimated as the extreme upper limits in some places. Failure to put these controls into effect puts the heaviest penalty on the average and low-income family, the family that can least afford the $120-300 a year for home treatment devices that don't work and for bottled water that is often just that -- water put in a bottle with contaminants fully intact. The Clean Water Action Project took a telephone survey of bottled water distributers in this metropolitan area and found that the cost of bottled water for a family of four for a year is around $300. These costs come on top of the water bill which the family still has to pay for water they consider too dirty to drink.

If a water utility really wants to cut costs to the consumer, and it should, there are several things that can be done. For example:

1. A serious water conservation effort can save many times more than the safety improvements will cost.

2. None of the costs of these improvements should be passed on to the ordinary ratepayer at all in many places. With most of the rate structures currently in effect, the costs should be borne by the biggest water users, whose excessive use places the greatest demands for costly expansion of the systems. Changes in water utility rate structures could combine safer water with costs that are actually lower for the ordinary consumer, with substantial water conservation benefits as well.

3. Retrieving the cost from the polluters who are causing the problem in the first place should be another option in some places. There is precedent for this. For example, in early 1976 in northern Minnesota, Reserve Mining was ordered by a District Court judge up there to pay the costs of supplying emergency drinking water for Northeast Minnesota communities whose drinking water had been contaminated by taconite tailings from that company.

What all this means is that the water utilities are very much at odds with the wishes, and the physical and financial well-being of their customers. I think those positions reflect years of complacency and freedom from scrutiny, stemming in many cases from the fact that they are monopolies with very unaccountable structures. I think they have capitalized on , and contributed to, the customers' ignorance about what is in the drinking water. This is one of the most important reasons to have these regulations put into effect immediately.

If there are no organics standards, then there are no monitoring and public notification requirements in case of violation. These public notice requirements are the very heart of the Safe Drinking Water Act. As your Committee's report on the bill said: "The purpose of this notice requirement is to educate the public as to the extent to which public water systems serving them are performing inadequately in light of the objectives and requirements of this bill. Such public education is deemed essential by the Committee in order to develop public awareness of the problems facing public water systems, to encourage a willingness to support greater expenditure at all levels of government to assist in solving these problems, and to advise the public of potential or actual health hazards."

Without that needed information, organized consumer and taxpayer support for strong drinking water controls -- the kind of support it takes to get the funding to put them into effect -- labors under an even larger handicap.

The proposed regulations are deficient in this respect. They should require that communities of 10,000 to 75,000 people both monitor periodically for both trihalomethanes (THM) and organic chemicals and also send reports of excessive levels directly to their customers as well as to the authorities. We think even smaller communities, particularly those likely to be experiencing contamination, should get periodic monitoring requirements and consumer notification. Support for extending the protections to the smallest communities will come from the people themselves when they are no longer kept isolated with misinformation, and no information, about the quality of their water.

There are other problems as well. Allowing THM at 100 micrograms per liter, at the average concentration in the country, is too high we think. A 75,000 population cutoff, we also think, is arbitrarily high. But EPA should keep in mind the larger task ahead while getting started right away.

Finally, it looks like EPA is repeating many of the errors of its organics proposals in its development of underground water protection requirements. First, the reqirements are long overdue. Nearly four years after the Act's passage, there are still no federal regulations for protecting underground water. The law originally required that proposed regulations be published 180 days after its enactment; the regulations were to be promulgated within 180 days after that. But the first proposals were not published until August 31, 1976, nearly two years after enactment. The final regulations were never promulgated.

Instead, faced with the predictable barrage of opposition from the oil and gas industry, EPA has let another two years slip past in protracted discussions with the fuel producers. At oversight hearings in April of 1977, expections were raised that the regulations might soon appear. EPA's Deputy Assistant Administrator Victor Kimm told this Subcommittee that he hoped to "have these regs in shape to move forward within the next few months." The next few months came and went. The promised new proposals to protect underground water remain, to this day, somewhere "underground".

themselves -- still circulating within EPA, awaiting another publication, comments on the proposals, and then final promulgation. This leaves the nation's precious and vulnerable underground water -- supplying 50% of our population -- without needed federal protections.

The long gestation period poses another problem. The process has turned largely into one of negotiation with the oil and gas industry, to the exclusion of some of the other interests, less well-endowed but no less affected. The Subcommittee could help by urging EPA to begin aggressive circulation, prior to publication, of its drafts to representatives of other interests, including farmers, cities, and consumers.

Thirdly, there are some major omissions and weaknesses in the circulating drafts, at last look. For example, provisions for public participation in developing local underground water protections are grossly inadequate. Another serious weakness of the drafts is their failure to explicitly cover underground public works projects for waste disposal, such as the massive Tunnel and Reservoir Plan (TARP), now being constructed in Chicago.

TARP promises to be the largest and most expensive waste "injection well" in the world. Aimed at controlling polluted stormwater overflows, TARP's 132 miles of underground tunnels and caverns will store up to 9,200 acre-feet of contaminated water for periods of up to several days. Impact statements on TARP point to the possibility of leaks that could send slugs of highly polluted stormwater from the cities' streets into underground aquifers supplying more than a quarter of the Chicago metropolitan area's population. We can ill afford to poison our underground drinking water supplies with lead or cadmium or other concentrated contaminants in an attempt to keep them out of our surface streams. Safeguard requirements are needed.

This is just the kind of danger the Safe Drinking Water Act was aimed at preventing. Nothing in the proposed regulations previously prepared, or the drafts now being circulated, appears to preclude this application. But specific consideration of this kind of project, massive as it is, is needed. To be safe rather than sorry, the proposed rules should explicitly apply to underground wastewater storage projects like TARP. The Subcommittee would be performing a public service by urging this change upon EPA.

Submitted for the Subcommittee record, along with my written testimony, are formal comments on the proposed underground water regulations prepared by the Better Government Association of Chicago. BGA's comments explain the need and the statutory basis for such a change and suggest language to accomplish it. Clean Water Action Project agrees with these comments.

In conclusion, anything the Subcommittee can do to encourage rapid fulfillment of the Safe Drinking Water Act's farsighted requirements, with the widest education and involvement of the public, will be a needed boost in the direction you staked out in drafting the law four year's ago. Safe drinking water is a bargain, one of the best bargains in prevention of cancer and other health problems the American people can get.

BGA
BETTER GOVERNMENT ASSOCIATION
Ridgely Bldg. / Springfield, Illinois 62701 / 217 789-8961
230 N. Michigan Ave., Suite 1710 / Chicago, Illinois 60601 / 312 641-1181

August 30, 1978

Comment Clerk
Underground Injection Control Grant Program
Office of Water Supply WH-550
Environmental Protection Agency
Washington, D. C. 20460

Dear Sir:

Attached are the formal comments of the Better Government Association on the Environmental Protection Agency's proposed regulations, published in 41 Fed. Reg. 36730, August 31, 1976, relating to the Safe Drinking Water Act.

Our comments are specifically designed to clarify the meaning of the term "well injection". We strongly believe that the definition of that term must be broad enough to include underground waste disposal systems such as the Chicago area's Tunnel and Reservoir Plan (TARP). TARP, which is one of the nation's largest public works projects, presents a serious threat to the region's underground source of drinking water. To exclude a project of this magnitude from the purview of the Safe Drinking Water Act would call into question the nation's commitment to provide the public with a safe drinking water supply.

The following national and local organizations join with us in submitting these comments: Clean Water Fund, Citizens for a Better Environment, TARP Impacts Projects (TIPS), Center for Neighborhood Technology.

Sincerely,

Peter M. Manikas
Research Coordinator

I. Introduction

The comments which follow reflect the interest of the Better Government Association and the other signatories of this letter in protecting the Chicago region's underground drinking water supply from contamination resulting from the operation of the Tunnel and Reservoir Plan (TARP).

TARP is a project initiated by the Metropolitan Sanitary District of Greater Chicago (MSDGC), which is designed to prevent combined sewer overflows. The TARP system includes 132 miles of underground tunnels, drop shafts, collecting structures and reservoirs which capture, convey and store waste water during peak overflow periods. The General Accounting Office (GAO) has identified TARP as "one of the largest and most expensive public works programs in the country" and has estimated its cost to be $7.9 billion. The United States Environmental Protection Agency (USEPA) contributes 75 percent of the ~~projects'~~ funding for the first phase of the project. USEPA grants are expected to total about $1.6 billion.

The Environmental Impact Statements filed by USEPA on this project, as well as other technical reports, strongly suggest that the TARP tunnel system presents a serious threat to the region's aquifer. TARP's underground tunnels, which contain a storage capacity of 9,200 ac. ft., will store polluted water 150 to 325 feet below the ground for periods ranging from a few hours to several days. Because the tunnels are coextensive with aquifers that supply drinking water to 25 percent of the six county region surrounding Cook County, polluted water which exfiltrates through the tunnel walls may contaminate the ground water. According to the Impact Statements filed on TARP, if proper steps are not taken to protect the aquifers, its usability as a source of drinking water may be destroyed.

The danger to the aquifer presented by TARP is growing increasingly acute. In April of this year the Army Corps of Engineers issued a regulation precluding its funding of the TARP reservoirs. If the reservoirs are not built, the polluted waste water will remain in the underground tunnels for a longer period of time, exacerbating the exfiltration problem.

The danger to the Chicago area's ground water that will result from TARP is precisely the type of harm the Safe Drinking Water Act is designed to prevent. Moreover, a proper construction of the statute compels application of the Act to the TARP system and USEPA's proposed regulations appear to permit this application. However, USEPA's proposed definition of "well injection" is unclear. Consequently, we have proposed additional language to remedy the definition's ambiguity.

Part II of the following briefly examines the Act's legislative history and explains our reasoning concerning the statute's application to TARP. Part III discusses USEPA's proposed definition of "well injection" and recommends additional language to clarify the meaning of that term. Part IV states our conclusion.

II. The Safe Drinking Water Act Applies to TARP and Similar Projects That Endanger Ground Water

A review of the legislative history of the Act indicates that it was the intent of Congress to extensively protect public health against various underground injections that endanger the quality of present and potential underground sources of drinking water. A federal-state system of regulation to assure that actual and potential drinking water sources be protected from contamination is established in Part C of the Act. According to the House Report on the bill, those regulations "are to apply to public water systems and are to protect health to the maximum extent feasible." 1974 U.S. Cong. & Admin. NEWS 6465 at 6483.

The regulations apply to underground injections from both public and private sources that endanger underground water supplies. Chicago's Metropolitan Sanitary District as well as federal, state and local government officials across the nation clearly fall within the purview of the statute. Indeed, the underground injection of waste by municipalities, which will occur with TARP, was specifically considered by the House Committee that drafted the Act. The House Report notes that,

> "underground injection of contaminants is clearly an increasing problem. Municipalities are increasingly engaging in underground injection of sewage, sludge, and other wastes.... Even government agencies, including the military, are getting rid of difficult to manage waste problems by underground disposal methods. <u>Part C is intended to deal with all of the foregoing situations insofar as they may endanger underground drinking water sources</u>."
>
> 1974 U.S. Cong. & Admin. NEWS 6454 at 6481. (Emphasis added.)

Additionally, TARP is a regional waste disposal system specifically covered by the Act. In discussing the definition of the term "underground injection" the Report states:

> While the committee does not intend this definition to apply to septic tanks or other residential waste disposal systems, it does intend that the definition apply to a multiple dwelling, community, or regional system of injection of waste.
>
> U.S. Cong. & Admin. NEWS 6454 at 6483.

The Act's legislative history leaves no doubt then that TARP's threatened injury to the aquifer is precisely the type of harm the statute is meant to prevent. The Act also specifically applies to regional systems of waste disposal. The question which remains is the applicability of the Act to the means of disposal used in the TARP system. Are the TARP tunnels an "underground injection" for purposes of this Act? A reasonable construction of the statute's definition of "underground injection" allows application of the statute to the TARP tunnels. Moreover, the Act's legislative history requires this result. The statute defines the term "underground injection" as follows:

> (1) The term "underground injection" means the subsurface emplacement of fluids by well injection.
> (2) Underground injection endangers drinking water sources if such injection may result in the presence in underground water which supplies or can reasonably be expected to supply any public water systems of any contaminant, and if the presence of such contaminant may result in such system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.
>
> 42 USCA §300h(d)(1) and (2)

The term "underground injection" is defined as a "well injection" which is not further defined in the statute. A well, however, is generally thought of as a hole or shaft drilled or bored into the earth. TARP's tunnel system certainly is comprised of such holes and shafts into which fluids are emplaced.

The Act's legislative history requires this broad definition of "underground injection." The House Report states that the term

> is intended to be broad enough to cover any contaminant which might be put below ground level and which flows or moves, whether the contaminant is a semi-solid, liquid, sludge, or any other form or state.
>
> 1974 U.S. Cong. & Admin. NEWS 6454 at 6483.

A broad definiton of "underground injection" is also required by the policies which underlie the Act. The legislative history of the statute repeatedly emphasizes that the purpose of the Act is to protect underground sources of drinking water from contamination. Hence, the controlling factor in determining the applicability of the regulations is the endangerment of ground water. The report states:

> "the injection is to be subject to regulation or prohibition if the injected substance may cause or contribute to non-compliance with national primary drinking water regulations or if it may otherwise adversely affect the public health, including causing or contribution to the water's unfitness for human consumption."
>
> 1974 U.S. Cong. & Admin. NEWS 6451 at 6481.

It should be noted that USEPA's proposed regulations specifically exclude leaky sewer systems from the Act's coverage. We need not disagree with that exclusion to still find that the Act applies to TARP. TARP tunnels do not constitute a conventional sewer system. The tunnels are designed not merely to convey excess waste water to treatment facilities but to capture raw sewage from a 375 sq. mi. area and store the sewage and rainfall runoff for several days over 200 feet below the ground. The tunnels were to eventually transport the contaminated waste to larger storage reservoirs. However, as indicated above, it is now highly uncertain that the reservoirs will be built. Consequently, the tunnels themselves will to an even greater extent function as underground storage facilities for the contaminated waste load.

III. <u>Additional Language Is Needed To Define The Term "Well Injection"</u>

On August 31, 1976, USEPA published proposed regulations defining for the first time the term "well injection." The proposed regulation states that:

> Well injection means subsurface emplacement through a bored, drilled or driven well, or through a dug well where the depth is greater than the largest surface dimension whenever a principal function of the well is the subsurface emplacement of fluids.
>
> 41 Fed. Reg. 36730, Aug. 21, 1976.

A reasonable construction of the proposed regulation would allow the TARP tunnels to be included in the statute's regulatory scheme. The tunnels are drilled beneath the ground and are connected to the surface through a system of pipes and shafts. Fluids are emplaced into the tunnels from above the ground. The depth of the tunnels is greater than the longest surface dimension.

Nevertheless, the proposed regulation is unnecessarily ambiguous. The term "well injection" is defined through the use of the word "well" which is, in turn, undefined. It is unclear as to whether the "well" must be a simple shaft extending from the surface to a point below the ground, or if a system of shafts, pipes or other conveyances would constitute a single "well." Moreover, the variety and functions of wells has proliferated with the development of engineering design. Consequently, there no longer appears to be one single type of well that can be conceived as a prototype for purposes of the Act. Therefore, the following additional language is offered to clarify the meaning of "well injection."

The term "well injection" means either:

> (a) the subsurface emplacement through a bored, drilled or driven well, or through a dug well where the depth is greater than the largest surface dimension whenever a principal function of the well is the subsurface emplacement of fluids, or
>
> (b) the subsurface emplacement of any contaminant through or into any shaft pipe, tunnel, or system of shaft, pipes or tunnels, for the purpose of storing or otherwise disposing of any liquid, semi-solid, sludge or any other form of contaminant either permanently

IV. Conclusion

The legislative history and statutory language of the Safe Drinking Water Act support the conclusion that the Act applies to the Chicago area's TARP project and similiar underground waste disposal programs. The regulations promulgated by USEPA to implement the Act should clearly reflect both the purpose and wording of the statute. Therefore we have proposed additional language defining the term "well injection" to ensure that the purpose of the Act can be effectuated.

The objective of the Safe Drinking Water Act is plain and direct. In the words of the House Report, the purpose of the Act is "to assure that water supply systems serving the public meet minimum national standards for protection of public health." 1974 U.S. Cong. & Asmin. NEWS 6454. The clear purpose of the Act cannot be fulfilled if major underground public works projects which endanger water supplies escape the purview of the statute. The Act's regulatory scheme must apply to the United States Environmental Protection Agency and all other governmental agencies if the public is to be truly assured that it is being supplied with water that is safe to drink.

Mr. FLORIO. Thank you very much.

Mr. Waxman.

Mr. WAXMAN. Before Mr. Harris leaves, I had a specific question for him, and then I have questions for other members of the panel.

You stated that the cost of controlling pollution below 100 parts per billion is marginal once GAC has been implemented. I always thought that the classic pollution control economics theory held that the cost of reducing the last 10-percent excess pollution is much more than reducing the first 90 percent. Your comments vary from this general rule and I wanted to have you explain your reasoning.

Mr. HARRIS. Not in this particular case. If indeed, let's say, a water supply had a THM level of 200, then it would be certainly beneficial for them to operate that to the maximum efficiency of the plant, and that is to reduce the levels down below 100; that is, once you invest in all this capital, then you should operate the plant to remove THM down to the level at which marginal benefits equal marginal costs. For example, lets assume that the THM level was 110 and the standard was 100. If you constructed the capital and only went down by 10 to 100, you could understand that the incremental cost associated with going below would be justified in that particular case, because you already have all of that capital and everything already invested.

Now indeed the Council on Wage and Price Stability admits that that is a shortcoming in their analysis but counters that by suggesting that the other trihalomethanes, other than chloroform, may in fact not be as potent carcinogens as chloroform, therefore, counterbalancing that problem. But as I indicated, the evidence ovewhelmingly goes in the opposite direction, that the non-chloroform trihalomethanes, namely, the brominated species, which are very similar to the breakdown products of tris if you remember that episode, are probably 10 to 100 times more potent than chloroform.

Mr. WAXMAN. Thank you.

Mr. FLORIO. Just on that point, to make sure I understand, what you are saying is that presupposing that you put the capital expenditures into the establishment of a GAC system to get down to 100-parts-per-million level is no difficulty. But isn't the point that is being raised by the opposition, that you can get to reasonable levels, whatever it is that defines reasonable, 200 parts, without the capital investment, and that their feeling is, rightly or wrongly, that that is sufficient?

Mr. HARRIS. Well, it is sufficient if the benefits to be gained by going lower with GAC are less than the costs of using GAC, and our analysis shows that the benefits associated with using GAC to go lower than 200 or 150 or 300 or whatever it is, well justifies the investment, because assuming that the only benefits of GAC are cancer-prevention benefits, no taste and odor benefits, no birth defect or gene pool damage problems or anything like that, that the cost of GAC at, say, a typical level of 200 to 300, which would probably necessitate putting in GAC to meet the standard of 100, that the cost per life saved of installing GAC to get well below 100 would be approximately in the range of the value of the human life that we impute from other situations that I mentioned. Therefore, if indeed those benefits as I indicate are higher than the cost, then GAC should be installed. The only reason it shouldn't be required is that if you could take that amount of money and invest it in air pollution control or something else in the community and get even higher benefits in lives saved. This assumes, of course, that you do not have the money to do both.

Mr. FLORIO. Then aren't you espousing a cobenefit theory as to the utilization of the capital? I mean I don't think anyone is discussing a Delaney amendment approach to this.

Mr. HARRIS. Right.

Mr. FLORIO. That in fact, really, the essence is the respective cost/benefit ratio and whose input we are going to take into acount——

Mr. HARRIS. Yes.

Mr. FLORIO [continuing]. In making that cost/benefit ratio. There are some who I assume would say that the cost is far in excess of what the benefit is. You just even injected another aspect, that the cost of the capital involved may very well be better put into other areas, if we are dealing with carcinogenic materials, which is an interesting thought.

Thank you.

Mr. HARRIS. I suspect not, but that is absolutely right, that that is an aspect that neither the Council on Wage and Price Stability or we have addressed. The reason is we probably can't do that. We probably don't know what the health benefits would be of taking that money if in fact we could do it institutionally, from water bills and use it to clean up air pollution or something else.

Mr. WAXMAN. Mr. Chairman, on that point further, we have no government policy that would allow, at least as I understand it, that kind of overall view of protection of the public from carcinogenic substances which may lead to cancer. You are suggesting that perhaps we ought to look at that, that we ought to look at the possibility, or do you think that we ought to place such a burden on the water supplies, that if you look at it from the overall perspective would not be reasonable if you talk about that sum of money being used for air pollution control or protection of carcinogens in food.

Mr. HARRIS. I believe in today's economy, we, and this is where I agree with the Council on Wage and Price Stability, really should look seriously at these questions, as hard as it may be, to apply a value to the human life. That is why we shy away from doing this because we don't know how to place a value on the human life very well. But I believe that we still should determine just implicitly at least what value we are placing on the human life by the various regulatory decisions that are being made, and I believe this is incumbent upon the regulatory agency, environmental groups, and water utilities.

So within that broad context, I agree with you. I think we should look at alternative ways of saving lives. If we only have one pile of money, we must do that. If we have a big pile of money, then we should do everything, as long as the benefits exceed the costs, and that is what the economists tell us.

Mr. WAXMAN. In weighing that risk and benefits, as far as drinking water is concerned, you feel that it is important, given that the benefit ratio is greater than the risk side of it, to go ahead and require GAC technology.

Mr. HARRIS. Well, if you believe the epidemiologic studies which give you the highest risk, then the implied value on the human life, assuming that you are only saving cancer lives, and that there are no other benefits of GAC, is $30,000. Are you willing to spend $30,000 to save a cancer life?

If you believe that the risk is at the low end of the range that is suggested by the National Academy of Sciences drinking water estimate on just chloroform, assuming that is all that is there, then the implicit value on the human life is $700,000, and one could argue clearly that is within the range of values of human lives calculated from willingness to pay criterion and court settlements on automobile and airplane accidents and so forth and so on.

Mr. FLORIO. Thank you very much.

Mr. Coling.

Mr. COLING. I wonder if I could suggest the continued questioning of Dr. Harris, as he brings extraordinary expertise to this area.

Mr. FLORIO. Do other members have questions?

Mr. CARTER. How would you describe the risk that organic chemicals pose to human health? Is it a significant risk? Is it a potential long-term risk?

Mr. HARRIS. It is both of those, and I define "significant" in the context of the costs of reducing that risk. As I have indicated, that must be taken into account. If it costs $200 million to save a human life, then I might be willing to conclude that the risk is not significant.

Mr. CARTER. Personally, I think a human life is priceless. However, some groups have suggested that it would be better to conduct pilot tests of proposed GAC systems on some of the large water systems before actually applying the treatment for all systems that may be needed.

What is your reaction?

Mr. HARRIS. Well, I can read the literature, and most of it that was in German has now been translated into English, and all of the research that has been done at universities in this country over the past two or three decades is available to all of us, and indeed if granular activated carbon cannot be described as generally available technology, then I don't know what technology anywhere for anything is.

It has been used for decades, as I indicated, by the beverage industry. Every Coca-Cola, every Pepsi, every bottle of Jamaican rum, every piece of sugar we eat has been processed with activated carbon. It has been used quite successfully in 20 European communities to address exactly the problem that EPA is proposing to address. They didn't have regulations there. They didn't have environmental groups that were shouting. I think there is plenty of evidence to design and to implement these regulations as EPA envisions.

Mr. CARTER. What countries in Europe use GAC?

Mr. HARRIS. The countries are primarily West Germany, the Netherlands, and Switzerland.

Mr. CARTER. It is not used in England?

Mr. HARRIS. To my knowledge, it is not used for what we could describe as purposes of removing health hazards.

Mr. CARTER. What is the action of granular activated carbon?

Mr. HARRIS. I am sorry.

Mr. CARTER. Could you describe the action of granular activated carbon?

Mr. HARRIS. How does it work?

Mr. CARTER. Yes.

Mr. HARRIS. It works by adsorbing, which means that chemicals physically, perhaps partially chemically attached to the surface of the carbon, and that the porosity, structure of the carbon, is such that it has enormous surface area per gram of carbon. That is why it is used and has been used in filter tip cigarettes, gas masks, where noxious gases are attempted to be removed, because it does have such cleaning abilities and such a large surface area.

Mr. CARTER. Are you aware of any studies that indicate that GAC treatment itself can produce adverse health effects?

Mr. HARRIS. I am aware of absolutely none. There have been questions raised in New Orleans, for example, about leaching heavy metals. I find that particularly curious because certain industries, particularly the lead industry, uses activated carbon to remove mercury and other metals from their waste streams. Indeed the experience of the advanced waste treatment research that has been conducted in this country is that activated carbon removes heavy metals. So I find it hard to believe that it could contaminate water with heavy metals.

Mr. CARTER. It has been found that in cooking steak, in carbonizing the steak, sometimes carcinogens are produced.

Mr. HARRIS. Not by producing activated carbon on the steak. What you do is you form polynuclear aeromatic hydrocarbons. The relationship between that process and activated carbon is night and day. It is entirely different circumstances. The temperature, the conditions under which those are produced are different, and there is no similiarity between the two.

Mr. CARTER. Is the GAC treatment approach adequate to protect the public health?

Mr. HARRIS. It is the best that we have, and I don't know how to define adequacy any other way. That is why I believe the Safe Drinking Water Act is a masterful piece of legislation, because it recognizes that if we can't get to absolute protection, we should do the best we can under the economic constraints placed upon us, and the realities of what is available technologically.

Mr. CARTER. Do you know of any other current technologies that are as good or better?

Mr. HARRIS. I know of none. There has been some research on resins. I believe there was some mention of that. I talked to those who have conducted some of that research from universities. They estimate that at least 10 years will be needed of operational experience and research before that could be used. It is inconceivable to me that any new technology would be used within a decade considering the fact that activated carbon has been used for 2,000 years, and we are still not ready to use it in a practical sense, at least the waterworks industry is not.

Mr. Carter. Were you the gentleman who spoke of brominated hydrocarbons? Do these come from a reaction between trihalomethanes or between chlorine and humic acid and bromine? Where do you get the bromine?

Mr. Harris. As I understand it, and some of the scientists from EPA can elaborate on this further, that bromide ion is usually naturally present in water. In some waters, particularly salty waters, such as from the San Francisco Delta, bromide ion is present in far higher concentrations than it nominally is. Chlorine reacts with the bromide to produce hypobromus acid which then reacts with the humic acids in the same way that the chlorine does to form a combination product of bromine and the organic material.

As you imply, it is the interaction between chlorine, bromide ion in the water and the humic acids that form the brominated species.

Mr. Carter. You weren't relating it to polychlorinated biphenyls?

Mr. Harris. PCB's?

Mr. Carter. Yes.

Mr. Harris. You mean PBB's?

Mr. Carter. Yes, PBB's and PCB's too.

Mr. Harris. Well, they are related in the sense that some studies have shown that in water, particularly certain industrial wastes that contain biphenols, that chlorination of those wastes can produce PCB's.

Mr. Carter. Polychlorinated?

Mr. Harris. Polychlorinated. But I do not know of any evidence that may exist that the polybrominated biphenols are produced in this manner as well.

Mr. Carter. Of course, bromine and chlorine all belong to the same halogen family generally considered as rather aciditic in nature under some circumstances.

Mr. Harris. That is right.

Mr. Carter. That contributes to the same deleterious effects as chlorine and bromine.

Mr. Harris. If it were perhaps added in the same oxidation state, but fluorinating drinking water is usually done with flouride ion, and that would be analogous to adding chloride ion, say, table salt to water; that is, the chloride ion would be in a form which would not react with the organic material, and so adding fluoride——

Mr. Carter. So there is no situation when chlorine will not react with humic acid to cause trihalomethanes if they are both present?

Mr. Harris. That is right. If the chlorine is in the presence or is in the form of Cl2 or hypoclorus acid, but if it is reduced to chloride ion, which is the ground state, if you will, table salt is sodium chloride, then the chloride does not react with the organics, and, of course, ultimately that is where the chlorine ends up if you wait long enough, or if you cause the chlorine to be dissipated in water, the chlorine——

Mr. Carter. Sodium chloride is not used. You use chlorine itself.

Mr. Harris. That is right, chlorine.

Mr. Carter. And it does react with humic acid——

Mr. Harris. That is right.

Mr. Carter [continuing]. To form trihalomethanes.

Mr. HARRIS. That is right.

Mr. CARTER. We hope not to too great an extent. Since you also say that bromines, or bromides, if you will, cause the same dangerous effects. If you take another member of the halogen family, you don't attribute to it these same bad effects, do you?

Mr. HARRIS. Which member?

Mr. CARTER. Chlorine or fluorine.

Mr. HARRIS. Fluoride?

Mr. CARTER. Yes, sir.

Mr. HARRIS. That is right. Fluoride would not react in the same way as chlorine.

Mr. CARTER. Are you sure of that?

Mr. HARRIS. Well, I am pretty sure.

Mr. CARTER. Thank you very kindly.

Mr. HARRIS. I have been wrong before.

Mr. ROGERS. Mr. Early.

STATEMENT OF A. BLAKEMAN EARLY

Mr. EARLY. I thank you.

I am happy to be here to present the view of Environmental Action. I am going to try to summarize some of my testimony and skip around a little bit [see p. 87]. Some of it is repetitive with the two previous witnesses.

The legislative history of the Safe Drinking Water Act clearly shows that the Congress intended that EPA should take a preventive approach to the implementation of the act, that EPA issue maximum contaminant levels for contaminants where the evidence developed by the NAC could support an MCL, that EPA require the use of best technology feasible to control contaminants which may cause harm to human health but for which the information developed by the NAS study was inadequate to set an MCL, and that this best technology be affordable.

I think that EPA in its proposed regulations has clearly met the intent of the Congress.

Furthermore, the public clearly supports the approach which has been set forth by the EPA. To supplement some of the evidence that has already been presented by Mr. Zwick, I would point out that sales have been growing for bottled water at an annual rate of over 15 percent and will reach well over $200 million by the end of 1978.

Another impressive indicator of public concern for the safety of their drinking water is reflected in the emergence of the home carbon filtration systems that are installed directly on the tap or the tapline. Home filter sales are predicted to reach in excess of 4 million units annually in 1978. This is truly a remarkable figure when one considers that there were approximately 75 million households in 1977.

Assuming approximately 3 million households per year are acquiring these devices, about 4 percent of all households per year care enough about their drinking water quality to purchase these systems for roughly $20 to $30 per unit and annual filter replacement cost of half that figure. Clearly, the concern of drinking water supply officials, that the costs of the proposed EPA regulations are excessive, is not reflected in the figures I just cited.

Environmental Action feels very strongly that cost efficiency must not supplant health protection. In this regard we are very concerned with respect to the Council on Wages and Price Stability's comments on EPA's proposed regulations. The comments on the proposed regulations appear to be designed to first discredit EPA and, second, to alter the express intent of this committee and the Congress.

The EPA is in an unenviable position regarding nearly all of its regulation writing activities. The Agency must make controversial decisions that are often costly to implement and require difficult judgments concerning the appropriate measures needed to protect public health in the absence of data regarding cause-effect, long-term health impacts and long-term costs and benefits.

EPA carries out these functions on a clearly inadequate budget. In order for the Agency to succeed in carrying out its many mandates, it must maintain a modicum of public support or it does not have the means to support its regulations in the face of widespread resistance.

Rather than consulting with the sister administrative agencies concerning questions it has about EPA's regulatory approach, the Council released its analysis on the last day of the public comment period, together with a press release and comments, clearly designed to raise public concern with EPA's reasonableness and competence. Such an approach might have been understandable had the Council recommendations been offered to EPA informally and rejected earlier in their rulemaking process.

This does not appear to be the case.

EPA by proposing the subject regulations is attempting to do the minimum necessary to meet the statutory mandate of this committee and the Congress. It is setting an MCL for contaminants which every major Federal health agency acknowledges poses a health risk and where EPA judges the data support an MCL.

EPA requiring the use of what it judges to be the best technology feasible to control contaminants where it deems the data inadquate to set an MCL. The Council is basically demanding that statutory mandates should be ignored where they cannot be shown that such mandates will be economically efficient such that the cost per life saved approximates that which can be achieved by the use of other health-related regulatory actions.

While we do not oppose the economic efficiency, we cannot condone the council's use of cost-benefit analysis procedures, especially those that are defective, as Dr. Harris has already described, in order to justify the abandonment of statutory mandates. The implications of such an approach are staggering. Our laws are worked out through a complicated political process which may not always yield the most cost effective solution to the problems addressed. However, it is a system which has worked moderately well for the last 200 years.

If the committee agrees with our views in this matter, we urge the committee to communicate them to the Council in order to help maintain public confidence in the basic competence of EPA and the forward momentum which is finally underway to take effective action to protect the Nation's drinking water.

Finally, I would like to address one of the arguments that was offered earlier this morning regarding the alternatives to the use of GAC by the American Water Works Association. They propose that what might be a more appropriate approach would be the use of the Federal Water Pollution Control Act, also known as the Clean Water Act, to control the introduction of organics at the source.

First, I would like to point out that section 141.54 of the EPA proposed regulations allow a variance precisely for such a purpose if the community can use this alternative approach, the regulations certainly allow it.

Second, the agency is currently in the process of rewriting its NPDES, national pollution discharge elimination system, regulations regarding all discharges into our waters.

During those proceedings, many industries are claiming that they cannot even identify the pollutants they are discharging to the waters much less establish the quantity in which they are being discharged. It seems very unlikely under those circumstances that we are going to be able to use this approach on a widespread basis.

Furthermore, the Environmental Protection Agency currently 18 months behind in the consent decree, which was designed to require EPA to issue best available technology requirements on 129 toxic water pollutants. Bear in mind there have been identified some 1,700 organic pollutants in drinking water. It seems like it is going to be a long haul before EPA goes beyond the 129 to attack and issue standards, best available technology standards, for the remaining.

I would like to turn now for just a moment to the underground injection regulations previously addressed by Mr. Zwick. I can't stress—

Mr. CARTER. We are going to have to go in just a minute. As you know, we have some legislation coming up and won't be able to come back.

I would like to ask the panel what you consider a safe level for trihalomethanes including chloroform?

Mr. EARLY. There has been no level that has been established as safe, as you know, Dr. Carter.

Mr. CARTER. Yes.

Mr. EARLY. Basically, we feel that EPA should go as far as possible to eliminate trihalomethanes.

Mr. CARTER. How far is possible; 50 parts per billion, 100 parts per billion or what?

Mr. EARLY. The agency has selected 1,200 parts per billion, as I understand it——

Mr. CARTER. Yes.

Mr. EARLY [continuing]. As what they consider to be a realistic goal. Certainly, the use of GAC——

Mr. CARTER. Do you agree with that?

Mr. EARLY. We are willing to accept that at this time. We sincerely hope that the Agency will take such additional steps as is possible to reduce trihalomethanes further.

Mr. CARTER. How much would GAC reduce the parts per billion?

Mr. EARLY. You mean what is the lowest?

Mr. CARTER. Yes.

Mr. EARLY. I don't know. I would defer to Dr. Harris on that.

Ms. WARREN. May I say a word on that question?

We are not in agreement on the hundred-parts-per-billion level because 100 parts per billion is approximately the average concentration of chloroform, trihalomethane has been measured in studies taken by EPA around the country. All the 100-parts-per-billion standard is doing is enshrining the average concentration without really any clear relationship to the health effect of that level.

Mr. CARTER. Usually they take the amount which causes cancer in rats and then go below that level and take one one-hundredth part of it?

Ms. WARREN. I think in conventional toxicology, they use 100-to-1 standard, but I don't believe that any like that——

Mr. CARTER. One one-hundredth of the level that has caused cancer in animals.

Ms. WARREN. I have never seen a 100-to-1 ratio used for carcinogenicity in trying to establish a margin of safety.

Mr. CARTER. You don't accept the 100 parts per billion?

Ms. WARREN. No; but our position was that taking 100 as the average level, and assuming that activated carbon can reduce that level by somewhere between 50 or 60 percent or 80 percent when it is fresh, that the average community can do that, and that is what should be required of it, and that would bring the actual level down to somewhere between 10 and 50. I don't think EPA says 100 is a safe level. In fact in the preamble to the regulation, they specifically say it isn't.

Mr. CARTER. Do you really know what effect the activated charcoal would have?

Ms. WARREN. The most I know is that it would take it down about 60 percent, which would possibly get it to under 50 parts per billion.

Mr. CARTER. Sixty percent of what? We don't know what the level is in many places. We will need to monitor to find out, won't we, to find out what the parts per billion are?

Ms. WARREN. We do need to monitor, but there have been several studies already in doing that monitoring, and what they found is that the average community has about 100. I think the number was something like 97 or 99 parts per billion.

Mr. CARTER. One hundred parts per billion is the standard which EPA has set, as I understand it. I feel that it may be higher in certain areas, and it may be lower in others. We have found these chemicals particularly concentrated in New Orleans water systems.

Thank you very kindly.

Mr. ROGERS. The members must respond to the call to the floor.

The committee will recess for 10 minutes.

The committee stands in recess.

[Brief recess.]

Mr. FLORIO [presiding]. Ladies and gentlemen, Mr. Rogers has asked me to preside.

I suspect the representatives in the Federal agencies have already been informed it is the intention of Mr. Rogers to reconvene this committee on Wednesday afternoon for the purpose of hearing from the representatives of the Federal agencies.

We will proceed with the balance of the witnesses until it becomes necessary, until it is the appropriate time to take up a number of health measures on the floor.

We will try to complete the balance of the witnesses prior to those health measures coming on the floor that are scheduled this afternoon.

Mr. EARLY. Mr. Chairman, I have about a 30-second comment with respect to EPA's underground injection regulations that might be of particular interest to you because of your interest in the Resource Conservation Recovery Act.

One of our concerns regarding the very lengthy delay in the promulgation of the underground injection regulations is that as the Resource Conservation Recovery Act regulations that apply to hazardous waste disposal come into effect, it is obviously going to make underground injection a lot more attractive as a disposal alternative. If these regulations are not in place, and States have their programs off the ground at the time that the regulations go into effect, I think it is going to be very difficult to protect actual and potential underground drinking water sources from contamination.

And that concludes my comments.

Thank you, Mr. Chairman.

[Testimony resumes on p. 95.]

[Mr. Early's prepared statement follows:]

Statement of A. Blakeman Early of

Environmental Action, Inc.

before the

Subcommittee on Health and Environment

of the

House Interstate and Foreign Commerce Committee

Mr. Chairman, members of the Committee, my name is A. Blakeman Early and I am appearing on behalf of Environmental Action, Inc., a national citizens' environmental lobbying organization. Today's hearing, which is designed to examine the Environmental Protection Agency's administration of the Safe Drinking Water Act, must necessarily focus primarily on EPA's Proposed Interim Primary Drinking Water Regulations for Control of Organic Chemicals in Drinking Water where the program is currently directing most of its attention. My comments will primarily address these controversial proposed regulations, but I will conclude my statement with a few comments on underground injection control program regulations.

<u>The Proposed Regulations Address EPA's Statutory Mandate</u>

Environmental Action fully supports the basic thrust of the proposed regulations as an important part of the effort to reduce the dissemination of toxics, particularly cancer-causing substances, throughout the environment. In our view, the proposed regulations represent only the beginning of what must be a much greater effort. The rationale behind this effort is eminently logical. It is a rationale that was clearly expressed by this committee in 1974. The Committee is to be commended for the following clear statement of its intent, found at page 10 of the SDWA report,

> "Because of the essentially preventitive purpose of the legislation, the vast number of contaminants which may need to be regulated, and the limited amount of knowledge presently available on the health effects of various contaminants in drinking water, the Committee did not intend to require conclusive proof that any contaminant will cause adverse health effects as a condition of regulation. Rather, all that is required is that a contaminant may have an adverse effect."

This basic approach is being taken by virtually every federal agency currently struggling to control the adverse impacts on public health from the dissemination of toxics in our environment. It is no wonder, then, that EPA's approach has been endorsed by the National Cancer Institute, the National Institute of Environmental Health Sciences, the Occupational Safety and Health Administration, and the Consumer Product Safety Commission. Can anyone seriously claim that the proposed regulations do not represent a "reasoned and plausible judgment?"

Indeed, if we look more closely at the language of the statute, we find that, not-with-standing the protests of drinking water supply officials, for EPA to do any less than it has in the proposing the subject regulations would clearly violate its statutory mandate. Moreover, we submit that the Agency has not fully met the letter and spirit of the law in the proposed regulations. For instance, section 1412(b)(1)(B) states,

> "Each such recommended maximum contaminant level shall be at a level which, in the Administrator's judgment based on such report (the NAS report), no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety."

Certainly with respect to the proposed maximum contaminant level (MCL) for trihalomethanes (THMs) one must question whether 100 parts per billion (ppb) provides an adequate margin of safety. EPA acknowledges in the preamble to the proposed regulations that there is no level below which exposure to carcinogens is safe. Until a safe level can be established, which may be impossible, every effort should be made to institute additional procedures that would reduce the MCL for THMs to a greater extent.

In addition, we do not endorse limiting the application of the THM and GAC treatment requirements to cities of populations greater than 75,000.

The proposed regulations only protect approximately 52 percent of the total U.S. population. Since a variance system is being created to exempt systems from installing GAC systems, there is no reason why smaller communities should not be required to examine the potential public health problems that may exist in their drinking water and apply the necessary treatment where required unless it can be shown that a GAC system is simply not affordable. Perhaps, it would be necessary to allow smaller communities a longer period to examine the alternatives. However, though we do not support the population limit on the GAC requirement, we do find that the application of GAC treatment goes a long way toward meeting the mandate of this committee and the Congress as found in section 1412(b)(1)(B), which states,

> "...he (the Administrator) shall, on the basis of the report on the study conducted pursuant to subsection (e), lest ... any contaminant the level of which cannot be accurately enough measured in drinking water to establish a recommended contaminant level and which may have an adverse effect on the health of persons."

The Act further specifies in section 1412(b)(3),

> "A required treatment technique for a contaminant which is listed under paragraph (1)(B) shall require treatment necessary in the Administrator's judgment to prevent known or anticipated adverse effects on the health of persons to the extent feasible. For purposes of this paragraph the term 'feasible' means feasible with the use of the best technology, treatment techniques, and other means, which the Administrator finds are generally available (taking cost into consideration)."

Most of the arguments offered by the drinking water supply officials are premised on the belief that the risk to human health is not sufficiently well proven and that in view of this belief, GAC has not been used widely enough to warrant the expense and difficulty of installation and operation. We think that EPA has met the requirements quoted above: that adverse effects from organic contaminants in drinking water can be anticipated (though not proven), that GAC treatment is the best technology to reduce these contaminants, and that GAC is sufficiently in use to be both available and affordable (though not inexpensive).

The Public Supports the Proposed Regulations

It is clear that the public concern for the safety of its drinking water which the Committee responded to in 1974 has not abated. Public support for more stringent measures to protect and enhance the envircnment has been high. Indeed, a February 1977 Opinion Research Corporation poll indicated that a large majority (68 percent) of the public is still willing to pay higher prices and taxes for environmental protection. Moreover, there is ample evidence that this willingness to pay extneds to the protection of drinking water. Recent sales of bottled water have risen impressively over the last few years. Sales have been growing at an annual rate of over 15 percent and will reach well over $200 million in 1978. Another impressive indicator of public concern for the safety of their drinking water is reflected in the emergence of the home carbon filtration systems that are installed directly on the tap or the tap line. Home filter sales are predicted to reach an excess of 4 million units annually in 1978. This is a truly remarkable figure when one considers that there were approximately 75 million households in 1977. Assuming approximately 3 million households per year are acquiring these devices, about 4 percent of all households per year care enough about their drinking water quality to purchase these systems for roughly $20 to $30 per unit, with annual filter replacement costs at half that figure. Clearly, the concern of drinking water supply officials that the cost of the proposed regulations are excessive is not reflected in the figures I just cited. These costs are well within the range of costs EPA recalculated and published in July. Water treatment systems should have little trouble recovering the cost of implementing the treatment requirements under the proposed regulations, particularly after the public has been informed that the treatment technology applied will provide more effective protection for their drinking water than the tap systems can provide. We think this attitude will be sustained not-with-standing the view reflected in the vote on Proposition 13 in California. Voters in California were protesting the increase of peroperty taxes vastly greater than any increase of public services provided to them. In paying for the treatemnt systems necessary to comply with the proposed regulations, the public will receive improved drinking water quality in return.

Cost Efficiency Must Not Supplant Health Protection

The controvery regarding these proposed regulations has been fueled recently by the analysis and accompanying press release of the Council on Wage and Price Stability (COWPS). The Council has been participating in EPA rulemaking in recent months as part of an effort to make government regulation more economically efficient, in order to reduce the cost of government and the pressure such cost places on the inflation rate. While this is a worthy goal, we have grown increasingly more antagonistic toward the inflexibility of the Council regarding environmental regulations which have benefits that are difficult to quantify both because they are long-term and because they are difficult to translate into economic terms. This is particularly true of legislation such as the Safe Drinking Water Act which has a preventative approach rather than a compensatory one. Dr. Harris has already refuted the cost effectiveness questions raised by COWPS in its analysis. However, I think that the Committee should consider other aspects of the Council's participation in the rulemaking proceedings on this particular proposed rule.

The COWPS comments on the proposed regulations appear to be designed to first, discredit EPA and second, to alter the express intent of this committee and the Congress. The EPA is in an unenviable position regarding nearly all its regulation writing activities. The Agency must make controversial decisions that are often costly to implement and require difficult judgments concerning the appropriate measures needed to protect public health in the absence of data regarding cause-effect, long-term health impacts, and long-term costs and benefits. EPA carries out these functions on a clearly inadequate budget. In order for the Agency to succeed in carrying out its many mandates, it must maintain a modicum of public support, for it does not have the means to enforce its regulations in the face of widespread resistance. Rather than consulting with a sister administrative agency concerning questions it had about EPA's regulatory approach, COWPS released its analysis on the last day of the public comment period together with a press release and comments clearly designed to raise public concern with EPA's "reasonableness" and competence. Such an approach might have been understandable had COWPS recommendations been offered to EPA informally and rejected earlier in the rulemaking process. This does not appear to be the case.

In addition, the COWPS analysis endorses arguments advanced by opponents of the proposed regulations with little representation of differing viewpoints. For instance, while raising a long list of problems with the use of GAC treatment technologies asserted by opponents of the proposed regulations, EPA's studies and responses to the problems are dismissed with the phrase, " ... the data are extremely sparse and many questions still remain." The basis for this opinion is not elaborated upon further. COWPS conveniently iegnores the fact that EPA is under a mandate to identify the "best technology" for treatment of contaminants, as I have reviewed earlier in my testimony.

The COWPS analysis concludes by criticizing EPA for not investigating monitoring as an alternative to GAC treatment for the control of synthetic organic chemicals. This proposal seems preposterous in view of the acknowledgement earlier in the COWPS analysis that the data regarding the carcinogenicity of THMs are virtually non-existant and a recitation about the limitations of risk extrapolation regarding chloroform. It is truly odd that COWPS would suggest that EPA set an MCL for other organics to be enforced through a monitoring system when the NAS study on which COWPS relies estimated that no more than 10 percent to 15 percent of the organic chemicals in drinking water have been identified and less than 10 percent have adequate cancer data. We suggest that the argument was propounded by COWPS to further discredit EPA competence in the eyes of a public that would fail to grasp the subtleties of the issue. Similarly, the COWPS analysis suggests that the incremental cost-benefit ratio of the GAC requirement is grossly higher than that calculated for the THM requirement because the cancer risk for synthetic organics would have to be 33 times higher than the risk for chloroform. COWPS dismisses this possibility out-of-hand. Yet a substantial body of scientific evidence, already reviewed today by Dr. Harris, indicates that the difference in risk between chloroform and a mixture of synthetic organics could easily exceed 33 times. COWPS must have been familiar with this evidence to have prepared the analysis it released.

The point is, that EPA by proposing the subject regulations, is attempting to do the minimum necessary to meet the statutory mandate of this committee and the Congress. It is setting an MCL for contaminants which

36-566 O - 79 - 7

every major federal health agency acknowledges pose a health risk and where EPA judges the data support an MCL. EPA is requiring the use of what it judges to be the "best technology" feasible to control contaminants where it deems the data inadequate to set an MCL. COWPS is basically demanding that statutory mandates should be ignored where it can not be shown that such nadates will be economically efficient such that the cost per life saved approximates that which can be achieved by the use of other health-related regulatory actions. While we do not oppose economic efficiency, we can not condone the Council's use of cost benefit analysis procedures to justify the abandonment of statutory mandates. The implications of such an approach are staggering. Our laws are worked out though a complicated political process which may not always yield the most cost effective solution to the problems addressed. However, it is a system which has worked moderately well for the last two hundred years.

If the Committee agrees with our views on this matter, we urge the Committee to communicate them to the Council in order to help maintain public confidence in the basic competence of EPA and the forward momentum which is finally underway to take effective action to protect the Nation's drinking water.

EPA Should Promulgate Underground Injection Regulations Without Delay

EPA regulations for state underground injection control programs were due in December, 1975. These long-awaited regulations will be delayed still longer as EPA re-proposes them, shortly. As time drags on, a new dynamic intensifies the need for these regulations. When EPA promulgates regulations that will govern the land disposal of hazardous chemical waste under the Resource Conservation and Recovery Act, the underground injection of such wastes becomes an even more attractive alternative. It is important that states have their programs for the control of underground injection in place and operating to ensure that increased disposal of hazardous chemical wastes does not threaten actual or potential drinking water supplies.

Thank you for providing me the opportunity of presenting the views of Environmental Action, Inc. on the implementation of the Safe Drinking Water Act.

Mr. FLORIO. Thank you.

STATEMENT OF GEORGE COLING

Mr. COLING. Thank you, Mr. Florio.

I am George Coling, coordinator of the Urban Environment Conference, UEC.

We are pleased to be testifying before the subcommittee this morning. UEC is an alliance of national environmental, minority, and labor organizations. The top priority for the work of these groups, through our organization, is environmental and occupational health. The Safe Drinking Water Act is, of course, one of the most important pieces of environmental health legislation. It particularly concerns two of our principal constituency groups, workers and minorities.

We lobbied for the passage of the act 4 years ago and we have a strong interest in its vitality today. We strongly support a fully funded and vigorously enforced Safe Drinking Water Act. There are a number of concerns that UEC has with the implementation of the act: Delegation of State primacy programs under section 1413 of the act, coordination with other EPA water and toxic substances control programs, the regulations for deep well injections of hazardous wastes and use of section 1424 to prohibit new underground injections in certain acquifers. However, I will confine my remarks to the issue of primary drinking water standards for carcinogens.

We view these standards as a part of a meshwork of health protections issued under the Clean Air Act, Clean Water Act, and Occupational Safety and Health Act, Toxic Substances Control Act and other legislation. While this meshwork should be regarded as a keystone of a national preventive health policy, it is too often attacked as inflationary, burdensome, or nitpicking. The recent EPA hearings on the primary drinking water standards for carcinogens sadly demonstrated that this negative mentality extends to the Safe Drinking Water Act.

The other panel members have presented some new arguments and suggestions for combating some of these negative attitudes, and we wish to endorse their statements.

Workers suffer disproportionately from cancer. Indeed, HEW Secretary Califano pointed out 2 weeks ago that one in five cancer cases is occupationally caused. With exceptions like asbestos and vinyl chloride, researchers can seldom trace specific cancers to specific exposures. Much cancer is a result of multiple exposures to the same or multiple carcinogens. Therefore, EPA's policy must be to limit non-workplace exposures to carcinogens as far as possible for this high-risk group of workers.

Congress and this subcommittee recognized these important health principles in both the act and the accompanying House Report 93-1185. The report, for example, is quite clear in directing:

> * * * proposals for recommended maximum contaiminant levels so as to protect susceptible groups in the population; so as to take account of long-term exposures, exposures to contaminants in other media, and synergistic effects of multiple contaminants; so as to prevent body changes which are reasonably suspect of increasing the risk or severity of illness; and so as to incorporate an adequate margin of safety.

This language is particularly important for workers who drink more than the mythical 2 quarts of water per day which is used by EPA in setting primary health standards.

This situation applies to the other interim regulations, as well as the carcinogen regulations.

There is no good evidence that the "average" American drinks 2 quarts of water per day. On the other hand, there is moderately good evidence that a substantial number of workers, 1 to 2 million, regularly drink 8 quarts per day. Thus, it is a structural defect of EPA's primary drinking water standards that American workers in hot and moderately hot environments may have four times the cancer risk from drinking water than the "average" American. Many of these workers also have "exposure to carcinogens in other media,"—namely, the workplace—about which Congress was concerned in passing the act in 1974.

Workers are not the only high-risk group of heavy water drinkers. Diabetics suffer from chronic severe thirst. There is no data on excess water consumption of diabetics, but the size of this high-risk group is about 5 million. Likewise, sufferers of certain renal diseases and heavy consumers of alcohol are noted for their very high water consumption.

The point of all this is that for millions of Americans, the margin of safety for carcinogen exposure in drinking water is severalfold less than for others. EPA, under the legislative history of the act, must strive to protect the health of these people as well. Without discussing the technical aspects of the proposed regulations, UEC submits that promulgation of regulations weaker than those proposed would disregard those millions of people at high risk which EPA is specifically required to protect.

Workers are at high risk not only from relatively high water consumption, but from multiple exposures. Likewise, minorities and urban dwellers are at high risk, as well. Cancer is clearly an urban disease. For example, data from the National Cancer Institute, show that cancer of the organs for intake and excretion have much higher rates among urbanites than among rural dwellers.

Cancer reaps a particularly terrible burden on minorities. Black men have generally the highest cancer rates in the country. Blacks and other minorities have generally the worst community and workplace environments. They also have the least income, little ability to avoid exposures, and poorest access to medical care. Minorities also have the worst disease experience, with both communicable and other chronic diseases, a factor which compounds the impact of cancer. Thus, minorities are at higher risk to exposures and synergism and suffer the greatest impact of cancer. EPA must recognize that ineffective regulation will affect minorities first.

Finally, and with particular reference to the question of the cost of EPA drinking water regulations, we note that many of the waterborne carcinogens are the same chemicals produced by industries along waterways and on aquifers. They are also many of the same chemicals to which so many workers have occupational exposures. No discussion of the cost of removing these chemicals from public water supplies is complete without a thorough assessment of the responsibilities of industrial polluters in paying for cleanup.

We urge EPA and the subcommittee to examine this question in great detail.

In sum, lack of strong drinking water standards for carcinogens will have the worst effects on minorities and workers due to their high risk. The Environmental Protection Agency must not forget its primary responsibility to protect the health of these and other people.

Mr. FLORIO. Thank you very much.

I am going to ask questions of the entire panel.

Is it your understanding that EPA is required to regulate all potentially adverse effects of drinking water or merely that they have the discretion to so regulate?

Ms. WARREN. I think it is clear that it is a discretionary action. I think that the law is written in such a way that the Administrator is authorized to establish maximum contaminant levels for any contaminant that may have any adverse effect on human health or the environment. And in that wording alone, it is clear that you are not required to, although I think the whole thrust of the act and the legislative history clearly would put on him the burden of acting in the face of evidence that would indicate that there would be some adverse effect, particularly in the case of carcinogens.

Mr. ZWICK. I would like to comment on that. I think it is pretty clear that it is mandatory that the Administrator act when a contaminant may have an adverse effect.

Mr. FLORIO. Rather than imposing the Delaney amendment.

Mr. ZWICK. No; it doesn't say that you can't drink the water. In fact it says explicitly that no community is to have its drinking water system shut off. What it says is that when a contaminant may have an adverse effect, when there is some health risk or unknowns about the health risk which lead us to believe that there may be a health risk, that a goal should be set that assures us a margin of safety, and then that the maximum contaminant level or the regulation which communities actually have to follow be set at that place which is achievable using generally available affordable technology.

So what the act says is the Administrator does not have discretion to not use the best generally available affordable technology to reduce these health risks to a minimum.

Mr. FLORIO. I have a question with regard to variance of the procedure. I assume you are all familiar with what has been put forth so far. I am just asking if there are suggestions that could be made as to the desirability of the variance procedure. The procedure has been criticized as being very vague.

Do you have any apprehensions about the existing variance procedure that is being discussed at this point?

Mr. ZWICK. I would be happy to take a look at that and comment. I don't have a response right now.

Mr. EARLY. I would like to respond also in writing, Mr. Chairman, except to say that I think it probably could be tightened up. We are very concerned more about regarding the exceptions, those requirements that exclude communities of 75,000 or lower from the application of the regulations as opposed to—our focus has not been on the variance procedures as much.

Mr. ZWICK. Could I make one comment on that, too?

I think ultimately that these requirements will have to include the smallest communities but then provide, in the way that the act does, that they can come in for a variance, and I think it is a later phase where they can even have some time to do it. But otherwise those communities won't even know what they have got in their drinking water. They will not even have the option of thinking about whether or not they want to control these things until the standards are applicable to them as well.

Mr. FLORIO. Thank you very much.

Mr. EARLY. Thank you, Mr. Chairman.

Mr. FLORIO. Our next panel consists of Mr. Dan Brower, president of the Water Refining Co. of Middletown, Ohio; and Mr. William Bailey, president of the American Bottled Water Association.

Gentlemen, your statements will be accepted as part of the record and you may proceed as you see fit.

I would ask that you perhaps introduce your colleagues.

STATEMENTS OF WILLIAM BAILEY, PRESIDENT, AMERICAN BOTTLED WATER ASSOCIATION, ACCOMPANIED BY JERRY T. HUTTON, TECHNICAL ADVISER; TIMOTHY L. HARKER, WASHINGTON COUNSEL; AND DAN C. BROWER, BOARD OF DIRECTORS, WATER QUALITY ASSOCIATION, ACCOMPANIED BY DOUGLAS R. OBERHAMER, EXECUTIVE DIRECTOR; ROBERT H. DOYLE, WASHINGTON COUNSEL

Mr. BAILEY. On my right is Mr. Timothy Harker, Washington legal counsel for the American Bottled Water Association, and on my left, Dr. Jerry Hutton, technical adviser of our member company.

Mr. Chairman, I want to thank you for allowing us to offer testimony on the important role that bottled water has played and must continue to play in assuring the public of an adequate supply of safe drinking water.

I am William C. Bailey, president of the American Bottled Water Association.

Our association represents 125 members who represent 90 percent of the total bottled water distributed in the United States.

As architects of the Safe Drinking Water Act, Mr. Chairman, you and the members of this subcommittee are to be commended for bringing focus and direction to our national goal of a safe supply of water for all Americans. Safety, together with taste, odor, and appearance have long been watchwords and major concerns of the membership of the American Bottled Water Association.

Notwithstanding the progress that has been made by our industry, by others within the private sector, and by public agencies, much remains to be done. We are faced with major questions as to the safety of safe drinking water, and we are aware of local reaction to recently proposed cost additions to our municipal water bills.

The public appears to expect safe drinking water as American given. The political reality of this situation wherein the public takes for granted safe drinking water was aptly stated in the Resources for the Future's recent National Drinking Water Conference by Mayor Moody when he said "Very few elected officials come into office by promising clean drinking water. That is expected of us, but many of us might leave office soon after we enclose the first noncompliance notification in our water bills to the public."

In view of the public attitude favoring fiscal constraint, it appears reasonable to assume that a new governmental approach capable of mobilizing greater public support and a larger portion of the Nation's technical, industrial, and financial resources must be found, if both support is to be obtained for the goals of the Safe Drinking Water Act. To this end, we seriously question the public need for an economic feasibility of treating 100 percent of municipal, community, and private water supplies to a level meeting drinking water standards when less than one-half of 1 percent of the total water supply is used for food and drink.

It is our conviction that alternative sources of drinking water already available within the private sector must receive greater public attention. Such alternatives include bottled water, point of use treatment. Although we do not suggest that any one or combination of these approaches can replace appropriate municipal treatment, we believe that these alternative sources of drinking water can be a vital part of a public solution.

Unfortunately certain factors have tended to block serious consideration of bottled water as an alternative source of drinking water. One is the fact that the Safe Drinking Water Act places singular emphasis on central treatment and distribution of public water supplies. A second factor is uncertainty as to what quality standards and treatment techniques will be accepted and by what regulatory agencies that will be governed once operating facilities are designed, funded, and built. This uncertainty has served as a disincentive to investment in private drinking water systems including those having to do with the production and distribution of bottled water.

The problem arises in the overlapping jurisdiction of several congressional mandates. As you well know, Mr. Chairman, Chairman Rogers was involved in this statutory confusion and was the subject of a House floor colloquy between Congressman Rogers and Congressman Sisk last fall. Similar concern has been expressed by Senators Cranston and Muskie.

Given the nature of the differences between the statutes in question, together with the facts that EPA and FDA have tried unsuccessfully to resolve these differences, we seek threshold clarification as the only satisfactory solution. The agencies have themselves admitted to the likely need for legislative alteration of the act.

Finally, it seems clear that a broadened approach is needed if the goals envisioned by the subcommittee as architects of the Safe Drinking Water Act are to be achieved.

In conclusion, Mr. Chairman, we offer five recommendations to the committee:

First: Expand provisions of the Safe Drinking Water Act to include consideration of all water treatment and delivery systems, including bottle water.

Second: Authorize appropriate economic studies to establish the relative cost advantages of treating the total municipal community or private water supply versus treating to achieve drinking water quality only that portion to be used for human consumption.

Third: Encourage full consideration of bottled water as a drinking water supply alternative by directing the appropriate authorities to seek and place an industry expert on the National Drinking Water Advisory Council.

Fourth: Resolve those interstatutory and interagency uncertainties which now serve as an investment disincentive and barrier to private sector participation in the Nation's safe drinking water programs.

Fifth: Educate the public as to:

(*a*) the uncertainties surrounding the safety of public community and private water supplies; and

(*b*) inform the public of dependable water supply alternatives.

Mr. Chairman, we appreciate and want to assure you that our association and its members are ready to assist the Congress, EPA, and FDA in carrying out these recommendations.

[Testimony resumes on p. 108.]

[Mr. Bailey's prepared statement follows:]

AMERICAN BOTTLED WATER ASSOCIATION
PRESENTATION TO THE UNITED STATES HOUSE OF REPRESENTATIVES

OVERSIGHT HEARINGS ON SAFE DRINKING WATER
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT:
SEPTEMBER 18, 1978

Introduction

Mr. Chairman, on behalf of the American Bottled Water Association, I want to thank you for allowing us to offer testimony on the important role that bottled water has played, and must continue to play, in assuring the public of an adequate supply of safe drinking water.

I am William C. Bailey, President of the American Bottled Water Association ("ABWA"). Our Association represents over 125 bottler members, who annually distribute an estimated 90 percent of the total bottled water distributed in the United States.

I want to commend the Chairman and members of the Subcommittee on Health and the Environment, first, for leadership in focusing attention on problems concerning the safety of the nation's drinking water supply and secondly, for creating the Safe Drinking Water Act in order to establish uniform water quality and treatment standards based on scientific, industrial, and public comment.

It is a matter of record that the American Bottled Water Association has long valued the goal of safe drinking water, as has the Subcommittee. In view of our mutual concern, I would like to: (1) highlight some of the more significant accomplishments of ABWA, (2) examine certain barriers to further progress toward a safe and affordable supply of drinking water for all Americans, and (3) recommend several specific actions that would encourage valuable private resources that have the capacity to assist in accomplishing the goal of affordable, safe drinking water for all.

Even prior to enactment of the Safe Drinking Water Act, the bottled water industry actively sought uniform standards and regulation of drinking water. As a result of a cooperative effort between the bottled water industry and the federal government, the Food and Drug Administration has enforced Quality Standards for bottled water since 1975. In 1975 FDA also adopted Good Manufacturing Practices for the processing of bottled water.

Today, I am pleased to report that the membership of the American Bottled Water Association is already capable of meeting all established and proposed criteria for safety, taste, and appearance; including EPA's Interim Primary and Secondary Drinking Water Standards. And bottled water provides the consumer with additional safeguards in that the integrity of the bottle used for packaging drinking water also is regulated by the FDA. In effect, both the product and the distribution system are under federal control.

The quality of bottled water is further assured by an Association sponsored self-monitoring program in which the operating facilities of member companies are regularly inspected by an independent federally recognized laboratory; the American Sanitation Institute.

In a continuing effort to upgrade the quality of the nation's drinking water, ABWA has been working as an associated member with the Water Quality Improvement Standards and Certification Council in order to establish quality standards and a certification program covering point-of-use water treatment devices.

Notwithstanding these programs and actions of our industry and of public agencies, we realize that much remains to be done. Questions as to the necessity for and cost of additional safeguards in water treatment at the Municipal level stand as a major barrier to progress toward high quality, safe drinking water. The American public appears to expect safe drinking water while assuming that it is a given fact. Indeed, the experience of the point of use industry, including bottled water, is that consumers purchase such alternative sources of drinking water largely because of esthetic reasons of taste, appearance and quality rather than for reasons of safety.

The political reality of this situation wherein the public takes for granted safe drinking water was aptly stated at Resource for the Future's recent National Drinking Water Conference by Mayor Moody when he said: "Very few elected officials come into office by promising clean drinking water. That's expected of us. But many of us might leave office soon after we enclose the first noncompliance notification in our water bills to the public."

In view of the apparent public attitude favoring fiscal constraint, it appears reasonable to assume that a new government approach, capable of mobilizing greater public support and a larger portion of the nation's technical, industrial, and financial resources must be found if full support is to be attained for the goals of the Safe Drinking Water Act. To this end, we seriously question the public need for and economic feasibility of treating 100% of municipal, community, and private water supplies to a level meeting drinking water standards when less than 0.5% of the total water supply is used for food and drink. Alternative sources of drinking water must receive greater public attention.

To date, only one such alternative has received meaningful study by the Federal Government; namely, the dual community water distribution system. Obviously, this approach is far too expensive for serious consideration in other than certain new communities and in other limited situations.

A number of additional alternatives such as bottled water, point-of-use treatment, and vended water are available within the private sector. Although we don't suggest that any one or a combination of these approaches can replace appropriate municipal treatment, we believe that these alternative sources of drinking water can be a vital part of a public solution.

Our conviction is based on the following considerations:

(a) Because only that quantity of water used for human consumption is treated, bottled water is cost effective;

(b) Because of its package, bottled water is protected against risks of contamination (e.g., lead, copper, asbestos, cadmium, vinyl chloride, etc.) in the distribution system;

(c) Industry use of ozone rather than chloride as a bacterial control agent, avoids any possible formation of chlorinated hydrocarbons as a result of water treatment;

(d) Bottled water can and does meet a public need for special drinking waters. Examples include: waters which may be fluoride fortified or completely free of minerals and nitrates;

(e) Bottled water can and does provide a dependable supply of drinking water in times of natural or man-made disasters.

In brief, it is our conviction that bottled water is a viable alternative either as a sole or a supplementary source to a safe public water supply.

Unfortunately, certain factors have tended to block serious consideration of bottled water as an alternative source of drinking water. One is the fact that the Safe Drinking Water Act places singular emphasis on central treatment and distribution of public water supplies. A second factor is uncertainty as to what quality standards and treatment techniques will be accepted by which regulatory agencies once operating facilities are designed, funded, and built. This uncertainty has served as a disincentive to investment in private drinking water systems, including those having to do with the production and distribution of bottled water. The problem arises in the overlapping jurisdictions of several Congressional mandates such as the FDCA, SDWA, TSCA, FIFRA, etc. A particularly troublesome question is whether drinking water may be eventually regulated as a food and therefore become subject to all regulatory requirements of both EPA and FDA. This question was brought to the attention of the Subcommittee at its Oversight Hearings last year, and was discussed by Timothy Harker at the National Drinking Water Conference, sponsored by Resources for the Future in March 1978. The areas of statutory overlap and confusion also were the subject of a House floor colloquy between Chairman Rogers and Congressman Sisk, last Fall. Similar concern has been expressed in the U.S. Senate by Senators Cranston and Muskie.

Given the nature of the differences between the statutes in question together with the fact that EPA and FDA have tried unsuccessfully to resolve these differences, we see Congressional clarification as the only satisfactory solution. The agencies have themselves admitted to the likely need for legislative alteration of the Act.

Finally, it seems clear that a broadened approach is needed if the goals envisioned by the Subcommittee, as architects of the Safe Drinking Water Act, are to be achieved. We recommend that the Congress:

1) Expand provisions of the SDWA to include consideration of all water treatment and delivery systems, including bottled water.

2) Authorize appropriate economic studies to establish the relative cost advantages of treating the total municipal, community or private water supply <u>versus</u> treating to achieve drinking water quality only that portion (0.5%) to be used for human consumption.

3) Encourage full consideration of bottled water as a drinking water supply alternative by directing the approriate authorities to seek and place an industry expert on the National Drinking Water Advisory Council.

4) Resolve those inter-statutory and inter-agency uncertainties which now serve as an investment disincentive and barrier to private sector participation in the nation's safe drinking water programs.

5) Educate the public so as to: a) correct the now prevalent false sense of security regarding safety of public, community and private water supplies, and b) inform the public of dependable water supply alternatives.

Mr. Chairman, I want to assure you that our Association and its members stand ready to assist the Congress, EPA and FDA in carrying out these recommendations.

Mr. FLORIO. Thank you very much.

STATEMENT OF DAN C. BROWER

Mr. BROWER. My name is Dan Brower, and I am president of Water Refining Co. I am a member of the board of directors of the Water Quality Association.

I am accompanied this afternoon by Robert H. Doyle, our Washington counsel, and by Douglas R. Oberhamer, our executive director.

I appear this afternoon in a representative capacity on behalf of the Water Quality Association.

Mr. Chairman, the Water Quality Association appreciates the opportunity to present this committee with the views of its members on the very significant contributions which the point-of-use water treatment industry makes toward the attainment of the Safe Drinking Water Act's objectives. It is a contribution perhaps not widely enough understood by the public generally, and apparently not seriously enough appreciated by the Government regulators specifically.

Our association is a nonprofit organization headquartered at 477 East Butterfield Road in Lombard, Ill., consisting of some 1,200 members who are engaged in the manufacture and in the wholesale and retail distribution of onsite—point of use—water treatment equipment. This equipment is used all across the land to improve the quality of water available from all sources—used in millions of homes as well as in industry, in health care and other types of institutions, and in commercial establishments.

We, along with local and State government officials, as well as all Americans who, in the final analysis must foot the cost of regulatory requirements, are vitally concerned with implementation of the Safe Drinking Water Act. These concerns relate not only to the safety of water for human consumption, but to the impact of its control as evidenced in the form of increased taxation, increased product prices, increased inflation, decreased productivity, and erosion of the dollar's value in both domestic and international markets.

The issue is not whether our public supplies of drinking water should be safe. The issue is, rather, whether in fact they are unsafe; and, if so, how, in the most responsible manner, to make them better.

We emphasize the vital need to avoid single method, single-minded regulations in the goal attainment mechanism.

Respecting the treatment of water to drinking quality standards, in a phrase: treatment at the central level is not the only way.

Water used for human consumption, for drinking and cooking, amounts to only about one-half of 1 percent of the total used in the typical household. Does it make sense, economic or otherwise, to regulate by Federal edict that 100 percent of all water be treated for things like flushing toilets, putting out fires, irrigating lawns, beautifying cars, cleaning clothes, mopping floors, bathing dogs, et cetera, et cetera, not to mention the manifold nonconsumptive uses to which water is put by industries, institutions, and commercial establishments?

It is not as though there exists no alternative. Not as though we have no choice other than to treat all the water in order to provide an increased factor of safety for the one-half of 1 percent. There is an alternative.

As a matter of fact, there are several alternatives. And they relate directly to the "feasibility" and "cost" concerns which troubled both the Congress and the President back in 1974. Some communities, in truth, are taking steps to adopt these alternatives as a substitute for construction of costly central treatment plants. One of these alternatives is the point-of-use treatment facility.

Point-of-use industry treatment capabilities are almost across the whole board. Our industry can provide water at the point of use treated to the quality desired for human consumption or for any variety of greater or lesser sophistication, in the amounts actually needed for the particular requirement, and at an acceptable price.

The point-of-use alternative, furthermore, has the present day capability of providing quality water to that 55 percent of the American population living in those smaller communities of less than 100,000 where central treatment is a serious burden in terms of investment, operation, and maintenance costs, and technical expertise presence. More than half of all community water systems serve fewer than 500 people, and we can provide them with quality water also.

The Council on Wage and Price Stability in a report released September 5, 1978, notes that EPA compliance cost estimates now range from $616 million to $831 million for community water systems serving 75,000 or more people. The council's comments, moreover, point out that EPA studies contain no analysis of the benefits alternative, performance standards or alternative population size cutoffs, in analysis of either the costs or the benefits of alternative standards and shed no light on the cost effectiveness of these decisions and no information about the consistency of these regulatory decisions with each other or with other EPA regulations.

Meanwhile, in the private sector, independent studies, such as the one done for the Coalition for Safe Drinking Water, estimate capital costs at from $4 billion to $5 billion. Admittedly, there may be some difference in the bases for these various studies and estimates, but the fact remains that with such disparity, confusion, and dispute—expensive regardless of whose estimate is used—the flagging confidence of the American public in their Government can hardly be expected to dramatically increase.

All of this to treat the one-half of 1 percent. What's more, no mention has yet been made, nor do these figures take into account, the estimated 40 million Americans, about 10 million families all across the land, who have their own water supplies and are wholly outside the protective effect of the Federal law on drinking water.

Providing this alternative is the purpose and function of the point-of-use water treatment industry. Our products, manufactured and distributed by over 5,000 American enterprises which employ 50,000 American men and women in the private sector, treat water to meet individual, institutional, industrial, and commercial needs, as well as drinking standards under government regulations. This alternative can provide quality-prescribed water for private systems, small community supplies, noncommunity supplies, and for very special uses. Most important, only that water which must be of drinking quality is treated to that quality.

We respectfully submit that the first task of government is determination, on a factually proven basis, that need actually exists for support of more specific drinking water regulation. To be publicly acceptable, such finding must also include analysis of proven potential risk plus a detailed, valid cost and benefit demonstration attesting to the feasibility and practicability of all various and alternative methods of providing agreeable results, including State and local priorities, and the impact on economic, social, energy, environmental, and other vital considerations. Anything less is simply unacceptable to the public who, at all levels of our complex society, must pay the costs of regulations one way or another.

In conclusion, we would repeat the sense of our testimony's introduction—no one is recommending that the Safe Drinking Water Act be repealed—or that it be administered in any way other than intended by its sponsors. The quality of our drinking water supplies is too closely associated with our health, welfare, safety, and comfort to ignore the responsibility which all levels of government have to insure protection in such an extremely vital area. But this does not mean free rein for the issuance of inflexible, non-cost-effective, or lopsided risk-benefit edicts. It does mean, to be publicly acceptable, consideration of all factors, following findings of need, and inclusion of available alternatives such as onsite treatment technique utilization.

The tide of environmental idealism of the last decade, at least insofar as excessiveness resulted, is being replaced by the practical realities of this decade. The people will continue to support programs aimed at purity, but only to the extent that they can be demonstrated clearly to be necessary, responsible, and acceptable in a risk-benefit framework. In the context of providing aid in meeting contemporary standards for the regulation of drinking water, the point of use water treatment industry is available for implementing the act's goals.

We are available—and we are ready, we are willing, and we are able. We ask only for the opportunity to work with the regulators in the national interest.

Mr. Chairman, to you, and if you would expresss to the other members, we appreciate a great deal having the opportunity to appear before you this afternoon.

[Mr. Brower's prepared statement follows:]

STATEMENT
of
WATER QUALITY ASSOCIATION
to the
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES
on
SAFE DRINKING WATER ACT (PUBLIC LAW 93-523) IMPLEMENTATION

September 25, 1978

The Water Quality Association appreciates the opportunity to present this Committee with the views of its members on the very significant contributions which the point of use water treatment industry makes toward the attainment of the Safe Drinking Water Act's objectives. It is a contribution perhaps not widely-enough understood by the public generally, and apparently not seriously-enough appreciated by the government regulators specifically.

Our Association is a nonprofit organization headquartered at 477 East Butterfield Road in Lombard, Illinois, consisting of some 1,200 members who are engaged in the manufacture and in the wholesale and retail distribution of on-site (point of use) water treatment equipment. This equipment is used all across the land to improve the quality of water available from all sources -- used in millions of homes as well as in industry, in health care and other types of institutions, and in commercial establishments.

We, along with local and state government officials, as well as all Americans who, in the final analysis must foot the cost of regulatory requirements, are vitally concerned with implementation of the Safe Drinking Water Act. These concerns relate not only to the safety of water for human consumption, but to the impact of its control as evidenced in the form of increased taxation, increased product prices, increased inflation, decreased productivity, and erosion of the dollar's value in both domestic and international markets.

The issue is not whether our public supplies of drinking water should be safe. The issue is, rather, whether in fact they are unsafe; and, if so, how, in the most responsible manner, to make them better.

In signing Public Law 93-523, the President of the United States said that "Nothing is more essential to the life of every single American than clean air, pure food, and safe drinking water." At the same time, he also said it was his intent "that it be administered so as to minimize both Federal involvement and costs."

The Law itself echoes this reservation, conditioning maximum contaminant level regulatory treatment requirements on the standard of "feasibility" Sec. 1412 (b) (1) (B) (3) which, in the words of the Statute: "means feasible with the use of the best technology, treatment techniques, and other means, which the Administration finds are generally available (taking cost into consideration)."

Our industry, the water improvement equipment manufacturers and dealers, have long been dedicated to this simple, yet complex legislative scheme. We fully and wholeheartedly support its achievement.

At the same time, however, mindful of statutory standards, Executive intentions, congressional reservations, cost-benefit-risk admonitions, and affected national objectives in other and equally important areas, including the destructive effects of inflation which is fueled in large measure by nonproductive expenses, accompanied by the painful awakening of officialdom at all levels that tax supported budgets are not infinite in their capacities, we emphasize the vital need to avoid single-method, single-minded regulation in the goal attainment mechanism.

Respecting the treatment of water to drinking quality standards, in a phrase: treatment at the central level is <u>not</u> the only way.

Water used for human consumption, for drinking and cooking, amounts to only about 1/2 of 1% of the total used in the typical household. Does it make sense, economic or otherwise, to require by Federal ukase that 100% of all water be treated to drinking quality when 99-1/2% of the water thus treated is used for things like flushing toilets, putting out fires, irrigating lawns, beautifying cars, cleaning clothes, mopping floors, bathing dogs, etc., etc., not to mention the manifold nonconsumptive uses to which water is put by industries, institutions, and commercial establishments?

It's not as though there exists no alternative. Not as though we have no choice other than to treat all the water in order to provide an increased factor of safety for the 1/2 of 1%. There is an alternative!

As a matter of fact, there are several alternatives. And they relate directly to the "feasibility" and "cost" concerns which troubled both the Congress and the President back in 1974. Some communities, in truth, are taking steps to adopt these alternatives as a substitute for construction of costly central treatment plants. One of these alternatives is the point of use treatment facility.

What is the point of use industry capable of providing -- and providing now -- today? What is the present state of the art in this industry -- without bond issues -- without huge construction projects -- without inflationary impact --without delay -- and without obsolescence?

The treatment capabilities are almost across the whole board. And the technology presently exists. If Bostonians want lead removed from their water, it can be done now. If Nevadans want arsenic removed from their water, we can do it today. If the people in Iowa or Illinois want radioactivity removed from their water, they don't have to wait any longer.

Our industry can provide water, at the point of use, treated to the quality desired for human consumption, or for any variety of greater or lesser sophistication, in the amounts actually needed for the particular requirement, and at an acceptable price. The point of use alternative, furthermore, has the present day capability of providing quality water to that 55% of the American population living in those smaller communities of less than 100,000 where central treatment is a serious burden in terms of investment, operation and maintenance costs, and technical expertise presence. More than half of all community water systems serve fewer than 500 people, and we can provide them with quality water also.

The point of use alternative, moreover, is available today in those 6,000 areas where community systems serve fewer than 100 people each -- the areas where costs required to bring the 6,000 systems up to present standards are not merely huge, but prohibitory for such low-resource populations.

On the subject of cost, moreover, there exists more than a modicum of uncertainty, confusion, and outright dispute -- hardly the most desirable conditions in which to make informed and intelligent decisions, not to mention imposition of long-term financial burdens on the citizenry.

A March, 1978 article in the "EPA Journal," for example, indicates that the Agency's estimate of the cost for modifying treatment practices of 75 public water systems will amount to $350 to $450 million in capital expenditure over a three to five year period, with subsequent expenditure on the order of $50 to $60 million per year. In criticizing as inadequate the EPA's economic impact analysis of the proposed regulations to control organic chemical contamination in drinking water, however, the Council on Wage and Price Stability, in a report released on September 5, 1978, notes that EPA compliance cost estimates now range from $616 to $831 million for community water systems serving 75,000 or more people.

The Council's Comments, moreover, point out that EPA studies contain no analysis of the benefits of alternative performance standards or of alternative population-size cut-offs, no analysis of either the costs or the benefits of alternative design standards, and shed no light on the cost-effectiveness of these decisions, and no information about the consistency of these regulatory decisions with each other or with other EPA regulations.

Meanwhile, in the private sector, independent studies, such as the one done for the Coalition for Safe Drinking Water, estimate capital costs at from $4 to $5 billion. Admittedly, there may be some difference in the bases for these various studies and estimates, but the fact remains that with such disparity, confusion, and dispute -- expensive regardless of whose estimate is used -- the flagging confidence of the American public in their Government can hardly be expected to dramatically increase.

All of this to treat the 1/2 of 1%! What's more, no mention has yet been made, nor do these figures take into account, the estimated 40 million Americans, about 10 million families all across the land, who have their own water supplies and are wholly outside the protective effect of the Federal law on drinking water.

Providing this alternative is the purpose and function of the point of use water treatment industry. Our products, manufactured and distributed by over 5,000 American enterprises which employ 50,000 American men and women in the private sector, treat water to meet individual, institutional, industrial, and commercial needs, as well as drinking standards under Government regulations. This alternative can provide quality-prescribed water for private systems, small community supplies, non-community supplies, and for very special uses. Most important, only that water which must be of drinking quality is treated to that quality.

We respectfully submit that the first task of Government is determination, on a factually proven basis, that need actually exists for support of more specific drinking water regulation. To be publicly acceptable, such finding must also include analyses of proven potential risk plus a detailed, valid cost and benefit demonstration attesting to the feasibility and practicability of all various and alternative methods of providing agreeable results, including state and local priorities, and the impact on economic, social, energy, environmental, and other vital considerations. Anything less is simply unacceptable to the public who, at all levels of our complex society, must pay the costs of regulation one way or another. The public will not tolerate regulation for regulation's sake, nor will it allow further growth of Government without convincing demonstration of need. And it is the Government official representing the public, not the unelected bureaucrat, who must bear the ultimate responsibility, and who must answer to the frustrated and angry taxpayer.

In conclusion, we would repeat the sense of our testimony's introduction: no one is recommending that the Safe Drinking Water Act be repealed -- or that it be administered in any way other than intended by its sponsors. The quality of our drinking water supplies is too closely associated with our health, welfare, safety, and comfort to ignore the responsibility which all levels of Government have to insure protection in such a vital area. But this does not mean free rein for the issuance of inflexible, non-cost effective, or lopsided risk-benefit edicts. It does mean, to be publicly acceptable, consideration of all factors, following findings of need, and inclusion of available alternatives such as on-site treatment technique utilization.

The tide of environmental idealism of the last decade, at least insofar as excessiveness resulted, is being replaced by the practical realities of this decade. The people will continue to support programs aimed at purity, but only to the extent that they can be demonstrated clearly to be necessary, responsible, and acceptable in a risk-benefit framework. In the context of providing aid in meeting contemporary standards for the regulation of drinking water, the point of use water treatment industry is available for implementing the Act's goals.

We're available -- and we're ready, we're willing, and we're able. We ask only for the opportunity to work with the regulators in the National interest.

Thank you, Mr. Chairman, and members of this Committee for considering this presentation.

Mr. FLORIO. Thank you very much.

Mr. Brower, I am interested in whether various devices that your constituent companies employ would be able to meet the standards that are currently being discussed by EPA, that is to say, if the standards were to go into operation and some way we were to eliminate central treatment, would the various devices that you use, whether on the tap, the spigot or whatever, are they in a position to meet the standards that are being discussed?

Mr. BROWER. I shall attempt to answer it this way, Mr. Chairman: There are devices to do that. There is a whole range of devices, if you look at point of use treatment, there are concepts that will allow you to treat water to any level of desired result. One might foresee in the future that in fact a home would be treated differently depending on the end use of the water.

Mr. FLORIO. I assume some of those devices employ granular activated carbon; is that correct?

Mr. BROWER. Some do.

Mr. FLORIO. What has been your experience with those devices in terms of improving the quality of water?

Mr. BROWER. I would like to do this, if I may, I would like to have that submitted as additional information. The only reason I say that, I do not feel technically qualified to answer that. Carbon-treated devices have been used and have shown good results.

Mr. FLORIO. To what degree? Do you have any idea to what degree?

Mr. BROWER. I personally do not know, and we will submit that as a part of our record.

[The following information was received for the record:]

Water Quality

Douglas R. Oberhamer, CAE
Executive Director

October 4, 1978

Honorable James Florio
Subcommittee on Health and the Environment
Committee on Interstate and Foreign Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Sirs:

At the September 25, 1978 hearings on implementation of the Safe Drinking Water Act, Mr. Florio presented us with a question indicating that he was seeking further information for the record.

Mr. Florio mentioned home water treatment devices which use granular activated carbon (GAC). He asked us about the degree of capability these devices have in the home. Our recollection is that Mr. Florio followed this question with another regarding how our Industry would propose to provide uniform quality water to all Americans when the quality of the raw water to be treated varies from one locality to the next.

Water is essential to life and to the quality of life. Our health, prosperity, and well-being depend on it. Water, we have been slow to realize, is not one thing, but many. For each special use and purpose, a special kind, or quality, of water may be demanded or preferred. Because of different geographical, climatic, and other conditions, the quality of available raw water differs from region to region all over the world, as well as from region to region within the United States. Thus, the matter of treating raw water to different qualities for different purposes is not a simple matter. As we pointed out in previous presentations to other Congressional Committees respecting the implementation of other federal laws, such as the Water Pollution Control Act, for example, differences in the quality of both water available for consumptive use as well as water available for the receipt of effluent discharges requires a difference in approach. And these varying uses and conditions require also a certain degree of flexibility in the implementation of federal laws, each intending to determine standards of national application.

In the case of drinking water, for example, available untreated water in Duluth is high in asbestos but not in arsenic. On the other hand, available raw water in Reno is high in arsenic but not asbestos. Boston's raw water, however, is high in lead but not asbestos or arsenic. There are, of course, many other examples illustrative of this problem's breadth and the need for flexibility. It's a problem, moreover, which

Water Quality Association 477 East Butterfield Road Lombard, Illinois 60148 Tel: 312 969-6400

affects not only our Industry, but the central water treatment industry as well. In fact, this is the very reason why we so painstakingly suggested during the hearings that the on-site treatment Industry is really more capable of treating individual problems, especially in a cost/benefit framework.

In order to aid in a more detailed understanding, we feel it is important to briefly explain that the various point of use or on-site treatment techniques include the following technologies:

FILTERING -- to remove cloudiness, unwanted tastes and odors, and undesirable or noxious elements. Used in the food and beverage industries, and wherever an improved water is desired for drinking, cooking, ice-making, etc.

SOFTENING -- to remove calcium and magnesium, two minerals which seriously impair water's cleaning capabilities and which deposit a damaging scale in heaters, boilers, plumbing pipes, fixtures, and water-using appliances.

Besides its use in homes, where it is essential for bathing, personal grooming and cleaning and washing purposes of all kinds, softened water is required by commercial laundries, car washes, restaurants, dairies, beauty salons, and in manufacturing processes, especially those involving cleaning and steam production.

DEIONIZATION -- to produce water virtually free of minerals, required in metal plating, electronics manufacture, jet engine operation, ice-making, etc. Deionization (DI) is often used as part of a purification system which prepares water for use in pharmaceuticals, body injection, dialyses, and wherever water of extremely high quality is required.

REVERSE OSMOSIS -- to remove substantially all suspended or dissolved matter from water. A process involving a permeable membrane, it may be used alone or as part of a system to prepare water of extremely high quality where water is difficult or impossible to improve by other processes.

Reverse osmosis (RO) removes salt, asbestos particles, submicron contaminants of all kinds, even viruses and radioactivity.

AND MANY OTHERS -- including distillation, electrodialysis, and a variety of chemical feeders and filters to disinfect, remove iron, sulfur, neutralize acidity, add or remove fluorine, or tailor-make water to any specifications.

Private enterprise is conducting research for the development of equipment to function specifically as a remover of trihalomethanes (THM's). A combination reverse osmosis and carbon system, for example, has been shown to obtain removal to a 10% breakthrough for over 2,000 gallons of water (against a challenge of 900 ppb of mixed THM's with chloroform at 400 ppb and a 2,000 ppb background of humic acids using cellulose acetate membrane and a 9" x 2" bed of carbon).

This is an example of the combination effects of this total system which reduces <u>both</u> particulate and dissolved high molecular weight organics and removes them from competition in adsorption of low molecular weight substances on the carbon.

Still another example is kidney dialysis. Kidney dialysis centers across the nation waste as much as $284,000,000 in federal funds annually on in-center treatment when home dialysis -- utilizing life-sustaining high quality water treated in the home -- is just as effective and much cheaper. In Indiana, for example, some 52% of the state's 700-odd dialysis patients treat themselves, saving the U.S. Government 2.9 million dollars annually. Nephrologists prescribe treated water to insure that elements sometimes found in tap water which would be harmful in the blood -- such as copper, lead, arsenic and nitrates -- are not present in the artificial kidney's dialysate. This example thus provides the basis for several important conclusions: first, the ability of the individual to maintain sophisticated water treatment equipment in the home; second, the ability to treat high quality water prescribed by the medical profession at the point of use; and, third, precedence for government aid to provide point of use water treatment for kidney patients.

Your question during the recent hearings related to the problem of achieving standardized quality water for the utilization of on-site treatment facilities where available raw water differs in quality from area to area. We think the foregoing discussion, intentionally lengthy to provide adequate detail, will serve to assist your judgment.

We would be delighted -- indeed anxious -- to provide whatever amount of additional information might be required by you or your staff. And in this regard, we are available to consult with you personally at your convenience, or to furnish you with all sorts of research documentation. And we hope you will call on us.

As you probably know, our Industry, the point of use water treatment equipment distributors and manufacturers of America, is not what you would call an old-line American enterprise. Our technology dates back only to the immediate post World War II years. All of it has been developed with private resources, and developed so as to serve the individual needs of individual consumers in the home, in the manufacturing process, in the health care field, in the institutional area, as well as in all sorts of commerical undertakings. In addition, we serve vital defense and space exploration needs.

In order to emphasize, it is important to repeat that this technology and these products have been developed solely with private resources.

The National Legislature, in its wisdom, has determined that the public interest requires broad gauge national activity respecting the attainment of quality drinking water. We are firmly in favor of this Policy. We have participated in and observed the debates in Washington and all around the country concerning technological capabilities, cost implications, state and local government resource capacities, and public reactions. In consequence, our Industry is convinced that it is in a prime position to aid in the attainment of this national goal. At the same time, however, we reluctantly find ourselves in the position of questioning the possibility of going forward solely on the basis of private resources -- especially in the matter of researching, developing, and demonstrating new and/or refined products and processes. In addition, we also feel that the National Government, before requiring more expensive municipal undertakings, ought to embark on a program aimed at determining the most appropriate and feasible technological procedures.

In sum, we would suggest that the Congress give serious consideration to Federal support for research and development as well as feasibility demonstration programs, particularly in the area of widely applying our Industry's expertise on a national basis.

The Water Quality Association would be pleased to work with the Subcommittee and its staff in any way which might be deemed useful.

Sincerely,

WATER QUALITY ASSOCIATION

Mr. FLORIO. You can appreciate that is a very important point.

Mr. BROWER. Indeed it is.

Mr. FLORIO. That is very much in discussion this morning, and to the extent that in your particular trade that the use of GAC has been successful, that would go a long way to help the committee in making a determination as to whether EPA's position employing, in a sense talking about mandating such devices, is viable or not.

Mr. BROWER. Mr. Chairman, recognizing that, and realizing the importance of that answer, I think I can give you very specific information, and I would like for it to be recorded in that manner because I think it is a key point.

Mr. FLORIO. We appreciate that.

The onsite mechanisms you are talking about for the most part have been designed to improve color, appearance and the mineral content.

Have they been specifically designed to deal with some of the exotic minerals that people are becoming concerned about now, in terms of those that are potentially capable of causing cancer?

Mr. BROWER. That is an extremely broad question. I shall attempt to make a very limited and short answer. In the history of the industry, there was initially equipment developed to take out iron and other related minerals.

In recent years, there have been developments such as reverse osmosis, such as small DI-type equipment as well as carbon-treated equipment that will scale it down to finer and finer ultrapure water.

So the only point I wish to make in this regard is that it is a changing environment in which we are working as an industry, and American industry is responding to what is perceived to be the need, in developing equipment to get the finer use.

Mr. FLORIO. If there were no centralized treatment that was available, I am just wondering how you would ultimately achieve standardized quality for the consumer by selling standardized equipment, that is to say, that a manufacturer manufactures *x* device. That device is then installed in a home, in two homes, in one home in a municipality that provides some degree of treatment, say, the treatment that is required, that would be required by EPA, and in another home in a community that does not get that centralized treatment.

How in fact can we expect that the onsite device, that is, the in-home device, is going to be able to treat each quality of water equally? Is that something that has been thought through?

To be perfectly frank, I am very enthused about decentralized treatment in a lot of areas as opposed to centralization, and yet at the same time I have some difficulties appreciating how an onsite treatment facility, through a spigot or however, is going to provide us with the minimum quality, minimum standards that we would expect of it when you are dealing with two potentially different raw material sources.

Mr. BROWER. I will try to answer it in a couple of ways.

First of all, there is an attempt, and an active one by our industry, National Sanitation Foundation and, I believe Environmental Protection Agency has been in attendance, to effect standards that would in part answer the question that you are asking, as well as it is recognized that, depending upon the source water, there is a different type of equipment potentially needed, and our industry has been conditioned to look at the source water supply and identify the type of equipment that might be needed.

So there can be varying conditions, and in fact in practical real life, Mr. Chairman, as you go into the rural part of our land, you will find well water that is totally different than private water supply and municipal water supply, so it is a consideration that is being worked with and has been for some time.

Mr. FLORIO. As I understand it, FDA currently regulates the standards for bottled water; is that right?

Mr. BAILEY. That is correct.

Mr. FLORIO. And FDA regulates those standards in rough similarity with HEW standards for nonbottled water?

Mr. BAILEY. There is confusion in those areas, and they are not the same, and we think they ought to be the same. There ought to be one voice that speaks for all drinking water so that there is a uniform standard that we might respond to.

Mr. FLORIO. It would be your hope that if EPA imposes the standards that are currently being discussed, that at that point FDA would adopt those standards for bottled water quality as well?

Mr. BAILEY. Well, we would be pleased if that happened from the uniformity issue. However, it is interesting to observe, Mr. Chairman, that bottled water presently meets or exceeds all existing or proposed legislation, and in the point of the trihalomethane situation, we are much below the 100 parts per billion that has been discussed.

Mr. FLORIO. How did you get there?

Mr. BAILEY. We get there by advanced processing treatment. We get there because many of our members use well protected private sources that are not subject to the contamination that perhaps the public system is. We also in the industry make use of ozone as opposed to chlorine as a bacterial control agent. The ozone is a very effective bacteria side but it does not mix with any organic chemicals to create the trihalomethane problem.

Mr. FLORIO. Why is it that the water companies do not use ozone, a cost factor?

Mr. BAILEY. Cost factor. We would have to ask them. I do not know. I guess it mostly is a cost factor, and the fact that chlorine has so long been established as the standard of their industry.

Mr. FLORIO. Do any of your constituent organizations use the granular activated carbon?

Mr. BAILEY. Yes, Mr. Chairman, many do in a variety of ways. We use it, of course, as has been indicated sometimes for taste and odor removal, and many other times we use it for a deep bed situation to provide organic control.

Mr. FLORIO. I assume that the experience has been beneficial and favorable?

Mr. BAILEY. It is indeed very beneficial and effective both on private sources as well as public water supply.

Mr. FLORIO. It is my understanding that ozone is used in European drinking water supplies.

Mr. BAILEY. That is correct.

Mr. FLORIO. Thank you very much.

Mr. BAILEY. Thank you.

Mr. FLORIO. Our next panel will be made up of Mr. Robert G. McCall of the West Virginia Department of Health, and Mr. Robert Weaver, Associate Director for Environment and Energy of the National Association of Counties.

As an aside, if any of the representatives from the utility associations who were here this morning are still here, we would be pleased to receive from them just a statement with regard to the question of ozone versus chlorine.

Mr. McCall, will you proceed?

STATEMENTS OF ROBERT G. McCALL, CHAIRMAN, WATER SUPPLY COMMITTEE, CONFERENCE OF STATE SANITARY ENGINEERS; AND ROBERT C. WEAVER, ASSOCIATE DIRECTOR, NATIONAL ASSOCIATION OF COUNTIES

Mr. McCALL. Thank you, Mr. Chairman.

I am Robert G. McCall, Chairman of the Water Supply Committee, of the Conference of State Sanitary Engineers, and as such, I have been designated by the CSSE executive board to speak to you on behalf of the conference at this oversight hearing.

In my position with the West Virginia State Health Department, I am responsible for the conduct of the West Virginia drinking water program, and in addition, I am the sole State water supply official on the National Drinking Water Advisory Council.

The conference welcomes this opportunity to meet with you and discuss the progress that has been made under the Safe Drinking Water Act.

The conference is comprised of the chief State officials or their designees who have responsibility for State environmental programs, whether they be in health departments, EPA's or Departments of Natural Resources. It is particularly noteworthy that the conference membership represents 48 of the 50 State water supply programs. Hence our interest in the implementation of the Safe Drinking Water Act is intimate, and its successes or failures in respect to State implementation fall upon our shoulders.

It is now becoming possible to address the successes, limitations, and impacts of the Safe Drinking Water Act.

Due to the allotted time permitted at this hearing, I am requesting permission to enter into the record a more complete statement of CSSE. [See p. 125.]

Mr. FLORIO. We will be pleased to accept it.

Mr. McCALL. Thank you, sir.

It is sufficient to say that at this stage of the program development better progress has been made than was anticipated. Excepting a dark cloud here and there, this may well be the most effective Federal-State coordination on implementing a Federal environmental act that we have encountered.

What appeared to be a grim picture in the summer of 1977 has now been reversed, and State primacy is moving forward at a most satisfactory pace. This can be attributed to changes made in the Safe Drinking Water Act of last October, which extended the time period for States to assume primacy and still enable them to continue receiving State program grants if they were making satisfactory progress.

With the passage of the amendments, the program began to gain momentum, and at this time, there are a total of 40 States that have assumed primacy or are in the hearing stage for the same. It now appears that the only hard core States remaining are Indiana, Pennsylvania, Oregon, Wyoming, South Dakota, and Utah. All other States and territories should assume primacy within the next year.

An extremely encouraging aspect of the implementation of the Safe Drinking Water Act is the fine State-Federal liaison that has been a major consideration in the implementation of the act since its passage.

With the exception of the organic regulations that are now under fire by so many people, there has been excellent input by the States in regulations and guidelines prior to their publication for public hearings.

I am very pleased to advise you of a recent agreement with the EPA for significant strengthening of Federal-State liaison. This is being accomplished by having the States in each of the EPA's regions select one individual to represent all the States in that region. These 10 individuals will then serve on the Water Supply Committee, Conference of State Sanitary Engineers, and provide a strong three-cornered liaison between the States, EPA, and the National Drinking Water Advisory Council.

Giving particular emphasis to this endeavor has been the decision of the National Drinking Water Advisory Council to meet twice a year away from Washington, and to invite State water supply program directors of the States in that region to meet with them and discuss mutual problems.

Time today does not permit a detailed discussion of changes that the Conference considers are needed in the Safe Drinking Water Act. Items that the Conference considers necessary to address when the committee considers the extension of the act would include the following:

One: Some modification to the public notification procedures.

Two: Change of the mandate placed on the Administrator which requires him to regulate and establish standards when he does not have an adequate data base.

Three: Provide an increasing level of State program grants.

Four: Clarify the definition of public water supply to more effectively approach the problem of noncommunity water systems.

Five: Obtain increased funding for EPA to greatly expand their research and development effort needed to meet the requirements of the act.

Six: Provide States more time to promulgate new regulations and still retain primacy.

Seven: Authorize the phasing of new requirements, taking into consideration treatment requirements, population, system size, economics, source of water, geographical and geological differences, and other relevant factors requisite to adequately protecting the health of people.

Eight: Modify the exemption and variance times to face up to the fact that both interim and revised primary regulations are behind schedule.

Nine: Provide funds for operator training.

Ten: Require the appointment of at least two individuals to the National Drinking Water Advisory Council who are actively engaged in directing State water supply programs.

In our invitation to testify, we were asked to comment briefly on the proposed regulations on the control of organic contaminants in water. In this respect I have included in our written presentation the position paper of the conference on this item [see p. 132], and also our supplementary statement that was presented at the organics hearing held in Washington, D.C. on July 18, 1978. I believe that you will find these statements which represent the overwhelming concensus of the States addresses the limitations in the regulations, including an inadequate data base on health effects, and recommends alternative approaches that are worthy of consideration.

It is indeed unfortunate that the organic regulations have created polarization between EPA and the water works industry and the State regulatory agencies.

Over the past few months there has been considerable progress made on addressing these differences, and I am confident that both EPA, the water works industry, and the State regulatory agencies can now sit down and rationalize these differences and develop a regulation that meets the intent of the law and still has a good cost/benefit ratio. If such effort fails, EPA's credibility will be damaged irreparably in the eyes of the States, and the future success of the Safe Drinking Water Act will be in question.

I was also very pleased to note the actions of the National Drinking Water Advisory Council, in their last meeting, at which time they developed their recommendations on the organic regulations to Administrator Costell. I would recommend very highly to you that this committee request a copy of those recommendations from Administrator Costell.

That is the end of my oral presentation. I will be happy to answer questions at the appropriate time.

[Testimony resumes on p. 137.]

[Mr. McCall's prepared statement and attachments follow:]

CONFERENCE OF STATE SANITARY ENGINEERS

Meredith H. Thompson, Executive Secretary
1 Deerfield Drive
Troy, New York Telephone 518-273-7917

STATEMENT
CONFERENCE OF STATE SANITARY ENGINEERS
OVERSIGHT HEARING ON SAFE DRINKING WATER ACT
SUB-COMMITTEE ON PUBLIC HEALTH AND ENVIRONMENT
HOUSE OF REPRESENTATIVES
September 18, 1978

I am Robert G. McCall, Chairman, Water Supply Committee, Conference of State Sanitary Engineers, and as such I have been designated by the CSSE Executive Board to speak on behalf of the Conference at this oversight hearing. I am a professional sanitary engineer and I am employed by the West Virginia State Health Department as Director, Environmental Health Services. In this position, I am responsible for the conduct of West Virginia's Drinking Water Program under the provisions of the Safe Drinking Water Act. In addition, I am the sole state water supply official on the National Drinking Water Advisory Council.

The Conference of State Sanitary Engineers welcomes this opportunity to meet with you and discuss the progress that has been made in implementing the Safe Drinking Water Act, some of the problems that face state agencies, and to provide a few observations on the controversial Organics Regulations. Representatives of our Conference have met with this committee on many occasions since the Safe Drinking Water Act was just an idea and I believe that the record will show that our testimony has been constructive, helpful and highly motivated.

The Conference of State Sanitary Engineers is comprised of the chief state officials or their designees who have responsibility for state environmental programs, whether these be in state health departments, EPA's or departments of natural resources. It is particularly noteworthy that the Conference membership represents forty-eight of the fifty state water supply programs. Hence our interest in the implementation of the Safe Drinking Water Act is intimate, and its successes or failures in respect to state implementation fall upon our shoulders.

It has now been forty-five months since the enactment of the Safe Drinking Water Act and fifteen months since the Interim Primary Drinking Water Regulations went into effect. It is now becoming possible to address the successes, limitations and impact of the Safe Drinking Water

Act. It is suffice to say that at this stage of program development better progress has been made than was anticipated and, excepting for a dark cloud here and there, this may well be the most effective federal-state coordination on implementing a federal environmental act that we have encountered. The inability of EPA to meet schedules established by Congress in respect to promulgating both Interim and Revised Primary Drinking Water Regulations resulted from a combination of obstacles including the recognition that the time restraints were entirely too tight.

What appeared to be a grim picture in the summer of 1977 has now been reversed and state primacy is moving forward at a most satisfactory pace. This can be attributed to changes made in the Safe Drinking Water Act last October which extended the time period for states to assume primacy and still enable them to continue receiving state program grants if they were making satisfactory progress. Contributing also to the excellent progress made during the past year was the realization by EPA that taking over a state program such as was done in Pennsylvania, Indiana, Oregon and Missouri was most difficult and that they really did not have enough resources to carry these out. The problems they have experienced in trying to operate a program in the non-primacy states contributed greatly to the rather sympathetic response that has been obtained on state applications for primacy.

The initial state to assume primacy was Oklahoma in April, 1977. Progress moved quite slowly and in September, 1977 time was about to run out on states being eligible for federal program grants. There were only seven states that had already been granted primacy at that time. With the passage of the amendments to the Safe Drinking Water Act, the program began to gain momentum and at this time there are a total of forty states that have assumed primacy or are in the hearing stage for the same. It now appears that the only hard core states remaining are Indiana, Pennsylvania, Oregon, Wyoming, South Dakota and Utah. All other states and territories should assume primacy in the next year.

The principal obstacle to the states obtaining primacy has been the time required to enact suitable state laws and promulgate interim primary regulations. Some of the difficulty was due to the fact that some of the legislatures meet only once every two years. In other cases, the states' administrative procedures require a legislative review of any regulations before they are effective. In some instances, this may require a total of eighteen months before that state can promulgate a new regulation. Another factor was the reluctance on the part of some state governments to engage in another federal program when the continued financing was unclear or not assured. It is interesting to note in the Congressional Record on the amendment to the Safe Drinking Water Act that it was strongly emphasized by Congressman Rogers that this was indeed a program that Congress fully intended to continue funding.

We wish to commend Congress for the actions they took in the 1977 Amendments to the Safe Drinking Water Act in increasing the authorization for state program grants from \$25 million to \$35 and \$45 million for the next two fiscal years. It is indeed unfortunate, however, that EPA has never requested adequate appropriations as the actual money appropriated is about fifty percent of the authorization. This becomes a particularly vexing problem as one realizes that federal funding on these programs started from zero against an estimated federal requirement at that time of $75 million. While Congress has been generous in its authorizations, full recognition needs to be made that the $75 million federal cost estimated in 1973 will have risen to $150 million by 1981 if the annual increase in cost of program operations continues to increase at the rate of eight percent per annum. The Conference will have a more detailed report and specific recommendations to make to Congress when amendments to the Safe Drinking Water Act are considered next winter. It may be of interest to you to note that the states' funding of their own programs was $10 million in 1970 and has now increased to $21 million. From all indications, it appears that the states will also have to raise their sights in providing state funds to provide their matching twenty-five percent under the Safe Drinking Water Act.

The states have done reasonably well in staffing for implementation of the Act and have increased their staffs from 676 in 1975 to 1,450 at this time. However, this is far short of meeting program requirements and can be attributed to the difficulty in finding and retaining trained personnel. It is interesting to note that many states use less than their federal grant money for a number of reasons including:

1. The uncertainty that federal funding was going to continue in a manner to support increased staff.

2. The failure of EPA to provide grants early enough in each fiscal year. For example, fiscal year 1978 grants were made in March and April, 1978.

3. The stiff competition in the job market provided by consulting engineers, the federal government, industry and other new programs. In this respect, coming into play during the past two years and addressing us now are such programs as the Resource, Conservation and Recovery Act, the Strip Mine Reclamation Act, and the amendments to the Clean Water Act. Frankly, the water supply program manpower requirement is small compared to the considerably increased manpower requirements placed upon state agencies by these three other acts. There just are not enough trained people to go around and I sincerely believe that program development is going to be seriously delayed by this situation.

An extremely encouraging aspect of the Safe Drinking Water Act is the fine state-federal liaison that has been a major consideration in the implementation of the Act since its passage. With the exception of the Organics Regulations that are now under fire by so many people, there has been excellent input by the states into regulations and guidelines prior to their publication for public hearings. States find it absolutely necessary to keep up with the rapidly flowing new material in the form of regulations, guidelines, white papers, research studies, training and other actions of EPA. I am very pleased to advise you of a recent agreement by EPA for significant strengthening of EPA/State liaison. This is being accomplished by having the states in each of EPA's regions select one individual to represent all the states in that region. These ten individuals will then serve on the Water Supply Committee of the Conference of State Sanitary Engineers and provide a strong three-cornered liaison between the states, EPA and the National Drinking Water Advisory Council. The ten individuals selected by the states will serve as sub-committee chairmen for the Conference of State Sanitary Engineers and address the ten major issues facing both EPA and the states. These sub-committees will be rounded out by other members of the Conference of State Sanitary Engineers and their employees. Giving particular emphasis to this endeavor has been the decision of the National Drinking Water Advisory Council to meet twice a year away from Washington and to invite state water supply program directors of the states in that region to meet with and discuss mutual problems with the Council.

Particularly significant impacts have been made on state programs by the public notification provisions of the Act, the need for automatic data processing to meet report and program control requirements, addressing a larger than expected state input into the laboratory aspect of the monitoring program, the various concerns with small water systems and inability to promulgate regulations as rapidly as EPA requires.

I am also pleased to advise you that much progress is being made in all the impact areas, principally through the various task forces of state personnel working on either research projects or advisory groups with EPA. It is very likely that as a result of these we will be seeing changes in the bacteriological and turbidity standards for small systems, problems of nitrates and fluorides more vigorously addressed and a more realistic approach to the problems of organics in water. Time today does not permit a detailed discussion of changes that are needed in the Safe Drinking Water Act but we will address these if you will be kind enough to send us an invitation to appear before the Committee when you are considering changes in the law. Under the items that the Conference considers necessary to address are:

1. Some modification to the public notification procedure to eliminate problem areas.

2. Change of mandate placed on the administrator which more or less requires him to regulate and establish standards when he does not have an adequate data base.

3. Provide an increasing level of state program grants to enable the states and EPA combined to reach the needed level expenditure.

4. Clarify the definition of public water supply and more effectively approach the problem of non-community water systems.

5. Obtain increased funding for EPA to carry out its mandate in non-primacy states, to expand their training program and to greatly expand the research development effort needed to meet the requirements of the Act.

6. Provide states more time to promulgate new regulations and still retain primacy.

7. Authorize the phasing of new requirements taking into consideration treatment requirements, population and system size, economics, source of water, geographical and geological differences, and other relevant factors requisite to adequately protecting the health of persons.

8. Modify the exemptions and variance times to face up to the fact that both interim and primary regulations are behind schedule.

9. Provide funds for operator training and graduate training for professional staff.

In our invitation to testify, we were asked to comment briefly on the proposed regulations on the control of organic contaminants in water. In this respect, I would like to enter into the record the position paper of the Conference of State Sanitary Engineers on this item and also our supplementary statement that was presented at the Organic Hearings held in Washington, D. C., on July 18, 1978. I believe you will find that these statements which represent the overwhelming consensus of the states represented by the Conference addresses the extreme limitations in the regulations and recommends alternative approaches that are worthy of consideration.

It is indeed unfortunate that the Organics Regulations have created an extreme polarization between EPA and the water works industry and the state regulatory agencies over the merits and contents of the regulations. I am very pleased to note over the past few months that there has been considerable progress made on addressing these differences and I am confident that both EPA, the water works industry and the state regulatory agencies are more than willing to sit down and rationalize these differences and develop a regulation that meets the intent of the law and still has a good cost-benefit ratio. I was very pleased to note the actions of the National Drinking Water Advisory Council in their last meeting at which time they developed their recommendations to Administrator Costle. I regret their position has not been placed in final form at this time. I would recommend very highly to you that this Committee request a copy of those recommendations from Administrator Costle.

Gentlemen, I appreciate the opportunity of appearing before you and if you have any questions that I can answer I would be pleased to respond.

CONFERENCE
OF
STATE SANITARY ENGINEERS

July 12, 1978

CSSE STATEMENT
PUBLIC HEARING
PROPOSED REGULATION

"Control of Organic Chemical Contaminants in Drinking Water"

The Conference of State Sanitary Engineers welcomes this opportunity to appear at this hearing and present its observations and recommendations in respect to the proposed Interim Primary Drinking Water Regulations, "Control of Organic Chemical Contaminants in Drinking Water".

I am Oscar H. Adams, Past Chairman, Conference of State Sanitary Engineers. I have been designated by the CSSE Executive Board to speak on behalf of the Conference. I am a professional sanitary engineer, and I am employed as Acting Deputy Assistant Commissioner for the Environment, Virginia State Department of Health. Public water supply surveillance is one of the programs under my supervision. Virginia is a primacy state for the purposes of the Safe Drinking Water Act.

The Conference of State Sanitary Engineers is comprised of the officials of each state who have responsibility for environmental health programs. It is particularly noteworthy that the conference membership represents 48 of the 50 state water supply programs. Hence our interest in the implementation of the Safe Drinking Water Act is of the highest order and our experiences in its implementation are germane to our presentation today.

The Conference has already submitted in writing to Mr. Victor Kimm, Deputy Administrator of the Drinking Water Programs, triplicate copies of its position paper dated May 9, 1978 on this subject. I am requesting that copies of that position paper also be made a matter of record at this hearing. That position paper is based on a survey of the 50 states in respect to this regulation and represents the written statements of 40 of the states.

The introduction to that position paper presents the general philosophical approach of the Conference of State Sanitary Engineers and speaks for itself. Suffice to say that the Conference is very much concerned about the chemical contamination of our environment including air, water and soil, and its impact on the air we breathe, the food we consume, and the water we drink. No one should conclude from the observations that we have and are making on this regulation that we are not concerned, for we are. We are concerned that man's ability to cope with chemical contamination of the environment be vastly improved.

If, for example, our ability to determine the adverse affect upon man of extremely low concentrations of chemicals that exist in the environment matched our laboratory technology, we would be in a much better posture today to address the issues. There is a continuing need to concern ourselves with organics in drinking water as well as other environmental contamination. We urge Congress, Federal Agencies, State Agenc'.s, private industry, and others to accelerate their efforts at addressing this issue, better defining it and developing national policies that are attainable and achieve sound cost-benefit relations.

Our position paper in essence presented an overwhelming consensus (over 85 percent) of the states that the proposed regulations are indeed premature and contain many limitations that need further study. The Conference presented a number of alternatives to the Administrator including full recognition that he was under considerable restraint due to the provisions of the law and the action of the courts.

We had the pleasure of having Victor Kimm on our program at our annual conference in Jackson, Mississippi, at which time he advised us on some forthcoming documents they expected to receive and the fact that a white paper addressing the issues posed in previous public hearings would be published before this hearing. The Conference voted to give its Executive Board the authority to modify our position paper May 9, 1978 if the white paper and other information justified such a change.

We had the pleasure of hearing Mr. Tom Jorling, Deputy Administrator, EPA, make his presentation to the annual conference of the American Water Works Association and recognize that EPA considers they are under very severe legislative and court mandates to publish this regulation and that the major question at this time is what the content of these regulations will be. The conference after reviewing the white paper and hearing Mr. Jorling and other presenters at the AWWA Conference considers that the most important thing that needs to be done today is to go back to Congress and remove the handcuffs from the Administrator so that this matter can be more adequately and more satisfactorily addressed. We intend to testify at the oversight hearings in the Senate on July 18 and in the House on July 25 in respect to this as well as other matters that need correction in the Safe Drinking Water Act.

In respect to the white paper we wish to commend EPA on the corrective action they took on cost estimates and the additional information they added on air pollution and desorption problems on GAC. We modify our comments accordingly.

In respect to health aspects, the white paper articulated the case much better than EPA had done previously and included the positions statements of the National Cancer Institute and the National Environmental Health Institute. These provided no real solid additional information that would change the Conference's position relative to the inadequacy of the data base on health effects. With respect to the positions of Dr. Upton and Dr. Rall, I submit to you that they presented judgmental considerations rather than adding to the knowledge in the field. We are in complete agreement that prudent action should be taken on health matters but such needs to be in full recognition of cost-benefit considerations.

With full knowledge that the Administrator considers it mandatory that a regulation be promulgated the Conference would welcome the opportunity to sit in conference with EPA in addressing substantive changes that are needed.

CONFERENCE
OF
STATE SANITARY ENGINEERS

Meredith H. Thompson, Executive Secretary
1 Deerfield Drive
Troy, New York Telephone 518-273-7917

May 9, 1978

POSITION PAPER
PROPOSED INTERIM PRIMARY DRINKING WATER REGULATION
"CONTROL OF ORGANIC CHEMICAL CONTAMINANTS IN DRINKING WATER"

The Conference of State Sanitary Engineers in its fifty-eight years of existence has always, as its principal objective, directed its attention to the effects of the environment upon the health and well-being of man. It has been a responsible professional organization which has impacted greatly on the recognition of the need for federal legislation to bring about national programs directed at environmental control measures. The members of this organization have provided the leadership in this country on these issues long before the era of the environmentalist and federalism. The record will show it was the Conference of State Sanitary Engineers that first stimulated the interest in the need for a national drinking water program, gave strong support to the Safe Drinking Water Act, and aided EPA to a great degree in providing practical interim primary drinking water regulations.

The Conference has observed and studied the growing concern in this country with the impact of the growing chemical industry, the use of pesticides, the beginning of the atomic era and other influences which have affected the quality of our environment and its impact on man's health and well-being. The rather dramatic improvement in analytical technology have enabled scientists to quantify extremely low levels of contaminants in water, food, air and soils. This ability has far outstripped other technologies including man's ability to determine adverse effects upon man of such low concentrations and has amplified the problems in controlling these substances in the environment. Man's concern with one of our leading killers, cancer, has caused considerable overreaction in many circles.

The Conference recognizes that all parties concerned must give careful attention to chemical contamination in the environment, including drinking water. There is a continuing need to concern ourselves with organics in drinking water, but the Conference does submit that the proposed regulation on organics is premature and that EPA should immediately direct its attention to expanding the data base, the technology and the information that is needed to more properly address this situation. The American Water Works Association, individual states, other organizations, and individuals have made proposals for alternate actions. Since these are a matter of record with EPA this position paper will not attempt to repeat in any great depth the obvious needs for research, demonstration projects with various treatment methods, and continuation and even expansion of monitoring for organics.

This Conference has full membership from state agencies conducting the states' water supply programs in forty-eight states. Upon the publication of the proposed regulations on organics in water, the Conference undertook to survey the responses of the various states. Written comments on these regulations have been received from thirty-eight states and their observations and recommendations are most revealing.

The Conference recognizes that the USEPA is indeed seeking additional information on sixteen specific questions that would further guide the administrator in making a final determination on this regulation. The records of the National Drinking Water Advisory Council indicate that august body is still considering the ramifications of this regulation and has sent observers to each of the public hearings to elicit further information prior to their providing final recommendations to the administrator.

Most important of the observations made by the member states is that all of them have some objection to the regulation with over 90% reaching the position that USEPA has been premature in proposing these regulations. This observation is predicated on the states' considerations that:

(1) At this time, there is an insufficient data base on health effects to establish an appropriate MCL for trihalomethanes or to support the proposed treatment requirement for synthetic organics.

(2) Technology regarding removal of dissolved organics is not sufficiently advanced to support GAC as the best, the only, or even a satisfactory answer to synthetic organic removal.

(3) The compliance schedules specified by the proposed regulations are impossible for the states and the utilities to implement.

(4) The concept of phased implementation based on population is unacceptable from a health viewpoint. If, indeed, there is a significant adverse health effect from low levels of organics in drinking water then all persons served by public water supplies should be provided equal protection.

(5) Based on the present knowledge, the states consider that there are higher priority problems to be solved in the water supply field and that implementation of these regulations would divert limited resources from areas with well defined health effects.

(6) There is substantial reason to believe that EPA cost estimates for monitoring and treatment requirements are grossly underestimated.

(7) In the preamble to the proposed regulation, the threat is made that this is just the beginning, and that progressively more stringent requirements will be imposed. This demonstrates uncertainty of information. If implemented, they would present serious funding

problems for water supply systems. This situation would compromise state credibility with the water supply systems and the public as well as water supply systems' credibility with their customers in justifying the accompanying rate increases.

(8) The use of chloramines as a primary disinfectant for public water supplies has a long and successful history. Its prohibition, therefore, is not warranted.

Position papers and questionnaire responses from the member states dealt specifically with the direct impact of the proposed organic regulations on issues related to water supply. The Conference, in its comprehensive participation in the field of Environmental Health, also believes that additional attention must be given to the following:

(1) Air quality deterioration and the emission of radioactive materials which can result from the generation and regeneration of GAC.

(2) The inability of some public water systems to obtain on a timely basis the required air pollution permits because of their location in "non-attainment" or "significant deterioration" areas.

(3) The probable reappearance of nematodes and other undesirable organisms within the treatment unit processes and carbon adsorbers as a result of major changes in disinfection procedures.

(4) The effect of heavy metals and radioactive materials naturally present in the coal from which the GAC is made.

(5) The build-up of heavy metals and radioactive materials due to adsorption from the water, reactivation of the carbon, replacement of lost carbon, and subsequent return to the finished water.

(6) The allocation, distribution, and consumption of large quantities of energy, both in the manufacture of GAC and its regeneration, at a time when our nation is vitally concerned with energy conservation.

(7) The impact on the transportation systems through the increase in the movement of large quantities of raw materials used in the production of GAC and the finished product.

(8) The inflationary effect of the great expense for capital equipment and the maintenance and operation of GAC plants.

(9) Since the Act requires that costs must be taken into consideration, the use of GAC is considered unacceptable. Regeneration frequency of GAC for both THM's and synthetic organics has been grossly underestimated by EPA and may well be the governing cost criterion. Furthermore, the criteria for determining when GAC is to be regenerated are considered to be totally inadequate.

Keeping in mind the above factors, the Conference sees four alternative courses of action for the Administrator to follow at this time.

Alternative 1. Recognizing the extremely high costs of compliance with the proposed regulations to the rate payers of the water suppliers of this nation, with the tenuous basis for benefit to public health; the grave possibility that compliance with the regulations may prove to be more hazardous to the health of people; and the constraints placed on the Administrator by the definition of a primary drinking water regulation in the Safe Drinking Water Act; the Administrator should delay at this time the promulgation of any regulations on organics. He should go to the Congress with a full and complete explanation of these problems and the need to modify the law to the end that, for any contaminant to be regulated, there must be more than a suspicion that it will cause an adverse health effect as currently required. The Administrator must have the flexibility not to proceed with regulations on a contaminant when the preponderance of evidence suggests a regulation under consideration is unwise or inappropriate.

Alternative 2. In lieu of the proposed regulations, provide technology advisory documents to assist both regulatory agencies and public water suppliers in addressing this matter by reducing THM's by treatment processes on a case-by-case basis.

Alternative 3. Postpone regulation and conduct a two-year comprehensive monitoring program to determine the effect of variables such as temperature, season, rainfall, stream flow, nature of watershed, etc., on the concentration of synthetic organic chemicals and the precursors of THM's. The information gained from this study would then be used to modify the monitoring, treatment, and variance requirements to conform with actual data. Federal assistance must be available to develop nationwide the necessary analytic capability.

Much more information is also needed on health effects, the effectiveness of GAC and other organic removal processes in safely removing all types of organics, and in finding better ways of addressing the question of organics in drinking water. Demonstration projects on GAC and other processes under various operating conditions are urgently needed to better define design, operating and monitoring parameters.

Alternative 4. Modify the proposed regulations as follows:

(a) The monitoring schedule for groundwaters should be entirely an option of the states.

(b) Delete the requirement for the use of standard plate count. The insistence of EPA in requiring the use of standard plate count is contrary to the decisions made in developing the Interim Primary Drinking Water Regulations. (The EPA again is invited to readdress the CSSE position on standard plate counts.)

(c) Replace variance requirements with criteria which define those public water systems which must apply any treatment technique.

(d) Delete the interim procedure of replacing sand with GAC. This is ill-conceived, provides little benefit, would be costly, and may actually lead to the deterioration of the water quality.

(e) The frequency and locations of sampling should be determined on a case-by-case basis. The concept of averaging the THM results in acceptable.

(f) Do not require the use of GAC as a treatment technique. Leave the question of treatment techniques open until methods, demonstrated to be satisfactory, are available.

(g) The use of GAC should not be required in order to obtain a variance when the use of the best available technology does not allow reduction of THM's to a value within the MCL.

Giving full consideration to all facets of this issue and the above courses of action open to the Administrator, the Conference of State Sanitary Engineers recommends that the Administrator follow one or more of the following courses of action in order of preference.

(1) Delay any regulation at this time, and recommend to the Congress a change in the law as discussed in Alternative 1, on Page 4.

(2) Issue technology advisory documents rather than a regulation.

(3) Postpone regulation and inaugurate the monitoring programs, investigations, and demonstration projects discussed in Alternative 3, on Page 4.

(4) Modify the proposed regulations as outlined in Alternative 4 on Page 4.

Mr. FLORIO. Thank you very much.

Mr. Weaver.

STATEMENT OF ROBERT C. WEAVER

Mr. WEAVER. Thank you, Mr. Chairman.

I am Robert Weaver, associate director of the National Association of Counties (NACo).

The National Association of Counties has long advocated actions which would assure safe, dependable drinking water. The American County Platform supports minimum Federal standards, increased research, and Federal assistance for construction of upgraded facilities. This policy was recently affirmed during NACo's annual conference in July.

Our statement today, will discuss county government activity in water supply, will recommend a stronger local role and closer coordination between the safe drinking water program and water quality management, and will support approval of Federal assistance for construction of water treament facilities.

COUNTY WATER SUPPLY ACTIVITIES

County governments play a major role in providing domestic water supply throughout the Nation. A 1976 survey of county government functions revealed that for all respondents 40 percent exercised some responsibility for water supply on a countywide basis and 55 percent in some or all portions of the county. For respondents over 500,000 population, 56 percent exercised countywide responsibilities and 73 percent possessed program responsibility in all or some portions of their jurisdiction. This includes responsibility as water supplier, and, through county health departments, authority to enforce State programs predating the Safe Drinking Water Act.

In anticipation of the adoption of the Safe Drinking Water Act Amendments of 1977, NACo conducted a survey of counties to determine what the likely impact of Federal standards would be and how the act should be implemented.

The results of this 1977 survey are interesting in a number of respects when compared with the implementation of the safe drinking water program. We learned that one of the greatest concerns of county officials was the issue of primacy. A significant majority of the survey respondents, 88 percent, indicated that they wished to see the States assume responsibility for enforcement of the act rather than the Federal Government.

To date, 38 States have assumed primacy and a number of others are moving in that direction. However, survey respondents indicated that while over half of their States have been working closely with local governments, less than 10 percent of the counties responding had received any of the Federal financial assistance provided to States. While there are great differences from State to State in many cases local governments are being asked to assume a large measure of responsibility without being provided resources necessary to do the job.

For example, in New Jersey, the revised minimum standards of performance for local boards of health include as a core activity participation upon request of the State in its statutory sampling program of public water supply systems.

When New Jersey assumes primacy, counties will undoubtedly be participating in surveillance activities with no additional funding provided.

As a result of these types of activities, a growing number of counties have expressed interest in having local governments assume primacy rather than either the State or the Environmental Protection Agency. The main reason for this view is that it would extend enforcement resources by awarding primacy, and presumably Federal assistance, to entities already engaged in drinking water inspection and surveillance.

ROLE OF LOCAL GOVERNMENTS

Currently, States which assume primacy are under little direction to involve local governments in the development or implementation of the State programs. In many States, counties bear responsibility for monitoring water supplies, especially for small and noncommunity systems, and for enforcing health requirements. In those States where primacy has been assumed, counties and perhaps other local agencies could act in partnership with the State to enforce health standards.

In those States which will not assume primacy, counties and other local governments should be given the opportunity to assume primacy in cooperation with EPA and be recipients of Federal program grants now available only to States.

Under the current law, the safe drinking water program is viewed in isolation from other local, State, and Federal programs dealing with water resources and pollution control. Local governments are responsible for meeting Federal health standards using essentially their own resources. There is no incentive for coordinating water supply with water pollution control programs.

In addition, Mr. Chairman, we recommend that the Safe Drinking Water Act provide financial and technical assistance which would improve the coordination between water quality management planning at the local and areawide level under section 208 of the Clean Water Act. Such a link is already informally underway in some areas and is important for solving groundwater and rural and urban runoff pollution now threatening domestic water supplies.

TREATMENT FACILITIES

The principal impact of the Federal drinking water program to county governments will be increased costs to meet primary standards and the requirements for organic contaminants.

While over three-fourths of responding counties indicated in our survey that they felt that the act would help improve drinking water, 63 percent indicated that Federal funds would be needed to build and upgrade water supply systems in their communities.

While NACo has no technical basis for commenting on the specific standards and other requirements, we do believe that the Congress should authorize a needs survey similar to that of the water pollution control program to determine the additional costs involved in meeting each of these health requirements.

At our annual conference in July, the membership of the association again called for a Federal sharing of the burden for upgrading water supply treatment facilities. While local officials recognize and support fulfillment of the public health objectives of the drinking water program, they are also concerned about the capital and operating costs to their constituents and they believe that the Federal Government should help meet costs mandated by the Federal standards.

The National Association of Counties supports the enactment of the Federal construction grant program which would help to meet capital costs. Priority for such a program should be judged against needs and priorities for water resource development projects. Such an effort would present the opportunity to develop and introduce water-saving and reclamation technology for treatment of domestic supplies.

An example of the potential costs faced by counties is the expense of granular activated carbon treatment. EPA originally estimated the costs of the filter system to be on the order of from $350 million to $450 million with annual operating expenses running at $60 million. Subsequently, EPA has revised is cost estimates upward by 30 percent to 70 percent in a move some have called the worst underestimation of costs in EPA's history. Despite this large increase, many counties facing the prospect of installing these filtration systems project costs to be higher still.

These new costs will obviously, be very significant. One county has estimated that a 50 percent increase in water rates will be necessary to meet the costs of approximately $50 million associated with granular activated carbon filters.

That concludes our formal statement, Mr. Chairman. I would be glad to respond to any questions you and the committee might have.

Mr. Chairman, I would also ask that at this point in the record, correspondence to the National Association of Counties from Pulaski County, Ventura County, Kent County, the Health Department of Grand Rapids, Mich., and the City-County Health Department of Eau Claire, Wis., be entered into the record. I think it provides some significant observations about the impact of this program and the administration on county government.

Mr. FLORIO. Without objection, the documents submitted will be made part of the record.

[Testimony resumes on p. 148.]

[Attachments to Mr. Weaver's prepared statement follow:]

Pulaski County Board of Supervisors
PHONE 980-8888 - EXT. 201 • 143 THIRD STREET, N. W.
Pulaski, Virginia 24301

ROBERT McNICHOLS
COUNTY ADMINISTRATOR

September 6, 1978

Mr. Mark Croke
Legislative Representative
for Environment & Energy
National Association of Counties
1735 New York Avenue
Washington, D. C.

Dear Mr. Croke:

The County of Pulaski recently has had experience with the Safe Water Drinking Standards Act as enacted by the Congress. The County of Pulaski has found that there are heavy metals being placed into the ground water supplies and in turn being picked up by the wells. The State Health Department refuses to do detailed analysis or survey of the matter and, therefore, does not enforce the Safe Water Drinking Standards Act requirements; however, the County of Pulaski will be expected, in the near future, to put up additional local money for this local health officer to make graph samples of private wells in community systems.

In addition, the County of Pulaski, which operates a 3 million gallon per day water filtration plant, will be expected to incur additional costs to meet the organic safety levels as proposed by the EPA. It is respectfully requested that the proposed standards should be sent to all the counties involved prior to adoption rather than merely publishing in order that the implementation costs can be considered.

If I may come to Washington and assist you in testimony, please do not hesitate to call upon me.

Sincerely,

Robert McNichols

Robert McNichols
County Administrator

ENVIRONMENTAL RESOURCE AGENCY
county of ventura

Environmental Services
Wm. H. Anderman
Director

September 13, 1978

NACOR's Water Project
National Association of Counties
1735 New York Ave., N.W.
Washington, D.C. 20006

Dear Sirs:

We have read a request for comment on the Federal Safe Drinking Water Act in the August 21, 1978 issue of COUNTY NEWS and we have the following observations to report, after working within the framework of the Act.

The definition of "Public System" should delete the phrase, "to the public", as this is not only redundant but also confusing. Many of the mutual water supplies do not consider their service as "to the public" even though they may have 50 to 100 service connections because all of those consumers served are members of the company, which is similar to a co-op, and therefore not considered public.

The daily turbidity monitoring requirement is a very expensive one for a small system. Not only is the instrumentation expensive to purchase, but most of the smaller systems do not have a full-time operator. This would also be an additional labor requirement, which may or may not be significant. The reason for monitoring the turbidity is that a high turbidity may interfere with disinfection. Some waters have a normally low turbidity, and the daily requirement for turbidity monitoring should be left to the discretion of the local authority.

The County government structure has not experienced increased costs because we already had a high level of service to the purveyor. However, several of the smaller mutual systems have incurred additional indebtedness due to requirements for installation of chlorinators and filters.

Environmental Health Division
MAIN OFFICE
800 South Victoria Avenue, Ventura, CA 93009 (805) 648-6131
BRANCH OFFICES
Oxnard/Camarillo: 520 West Fifth Street, Suite D, Oxnard, CA 93030 (805) 487-7711, Extension 4361
Simi: 2003 Royal Avenue, Simi, CA 93065 (805) 527-6430, Extension 1395
Thousand Oaks: 401 Hillcrest, Thousand Oaks, CA 91360 (805) 497-8611, Extension 246

The Ventura County domestic water supply program, as administered through the Environmental Health Division of the Environmental Resource Agency is not reimbursed by the state for the water program activities. A local permit fee, which is assessed on all purveyors, does not even approach being able to offset program costs. The nature of the business with a small water system is such that it does not make a profit, and sometimes has difficulty making ends meet. Most of the smaller systems have no capital improvements program and operate on a patch and repair basis.

The State of California's existing laws were already more stringent in some areas than the Federal laws, and the State's water program was already well developed. The counties have, for several years, had the responsibility for the small water systems with fewer than 200 connections. By nature of the fact that these systems are so small they have their own peculiar set of problems which the State Inspectors often do not comprehend. The current system in California is functioning at an adequate level. The small systems would benefit more by remaining under the jurisdiction of the county government.

The new public notification requirements are not appreciated by purveyors, the media, or the consumers. They feel, for the most part that the time frames are too long, and that one positive tube on an MPN test is not hardly significant enough to bother with notification for.

We appreciate the opportunities to comment in this matter, and we will be awaiting the results of the oversight hearings.

Very truly yours,

ENVIRONMENTAL RESOURCE AGENCY

Donald W. Koepp, R.S.
Principal Sanitarian

DWK:H40c

KENT COUNTY HEALTH DEPARTMENT

COUNTY KENT MICHIGAN

1619 WALKER, N.W.
GRAND RAPIDS, MICHIGAN 49504

DOUGLAS A. MACK, M.D., M.P.H.
PUBLIC HEALTH DIRECTOR

September 1, 1978

ADMINISTRATION
774-3021

ADULT HEALTH & DISEASE CONTROL
774-3013

COMMUNITY CENTERS
774-3037

ENVIRONMENTAL HEALTH
774-3089

HEALTH EDUCATION
774-3030

MATERNAL, CHILD & SCHOOL HEALTH
774-3001

NURSING
City Area
774-3040
County Area
774-3050

SUBSTANCE ABUSE
774-3079

Mr. Mark Croke
Legislative Representative for
Environment and Energy
National Association of Counties
1735 New York Avenue, N.W.
Washington, D.C. 20006

Dear Mr. Croke:

This letter is in response to the article, with regard to the experience of our County pertaining to the Safe Drinking Water Act, on page three of the August 21, 1978, issue of County News. I will respond to the questions in the order in which you have them in the article:

1. Our County, along with almost all counties in the State of Michigan, performed an initially required inventory of noncommunity public water supplies. We were given a grant of $5,000.00 through the Michigan Department of Public Health from federal funds allocated for this purpose. We were able to perform this inventory at a time when we had a slack period in our work demands and consequently did not experience an increase in cost to the County in the performance of this inventory.

2. At the present time, the Michigan Department of Public Health proposes to utilize federal funds to contract with county health departments to make the initial surveys of the "noncommunity public supplies" to determine their level of compliance. We have estimated, for example, that this will cost $13,000.00 for our County, which involves approximately 400 supplies.

   We cannot estimate the cost of enforcement at the present time nor do we have any indications at this time whether or not the Federal Government will fund enforcement operations. We would estimate that inspection and enforcement would probably take approximately the time of one-half man in our County.

Our Environmental Health Director, Mr. W.L. Ettesvold, informs me that while serving as a member of the Environmental Health Advisory Committee to the State Health Director, he and others made representations to the State that they should utilize the local health departments in this part of the program. He was also a member of a committee of the Conference of Local Environmental Health Administrators (a national organization) that made representations to the enforcing agency in Washington that the local health departments should be a part of this enforcement effort.

3. It is our opinion that the responsibility of enforcement should lie with the Michigan Department of Public Health in order to gain uniformity. However, we believe that the county health departments could perform a valuable service in this program and could do the enforcement of noncommunity water supplies effectively and more economically than it could be done by the State officials.

4. We have not seen any notifications of noncompliance, as required by the act, but wish to state that we doubt that it was a very effective method of making improvements in the water supplies. In the first place, many of the smaller "community" supplies and all of the "noncommunity" supplies are not operated by technically qualified people. If they then would be required to notify the public that their water supply is in nonconformance, this could frighten the users of the water unnecessarily. This is especially true inasmuch as the Environmental Protection Agency has not yet determined the standards or the level of chemical contaminants that cannot be tolerated.

   It is our opinion that this portion of the act is not good legislation and should be deleted or changed in some manner so that we do not scare the public into not utilizing the water supply that they have. When a water supply is found to be highly contaminated then that matter can be handled much as we do in our other environmental programs by persuasion, correction, alterations and, when necessary, court action but not immediately notifying the public that the water supply is contaminated before the agency operating the water supply has had an opportunity to make corrections.

I trust that this will assist you in evaluating the position that the National Association of Counties should take in this matter.

Sincerely yours,

Douglas A. Mack

Douglas A. Mack, M.D., M.P.H.
Public Health Director

DAM/pat

CC: Mr. W.L. Ettesvold, R.S., Director of Environmental Health
Mr. George E. Pio, R.S., Assistant Director of Environmental Health

CITY-COUNTY HEALTH DEPARTMENT

720 Second Avenue
EAU CLAIRE, WISCONSIN 54701
Telephone 839-4718

September 1, 1978

Mark Croke
Legislative Representative for Environment & Energy
National Association of Counties
1735 New York Avenue,N.W.
Washington D.C. 20006

Dear Mr. Croke:

In reference to the article appearing in County News, I would like to share with you some of the problems that we have had in Wisconsin. (1) Since 1974, we have been sampling all municipal water supplies for heavy metals with our own equipment. (2) On March 14 of this year, the State of Wisconsin was given primary enforcement responsibility by EPA. (3) No attempt has been made to utilize existing resources or certify the testing being done at the local level. The enclosed letter from Mr. Baumeister indicates that the supplier of water obtain a chemical analysis of the water at specified intervals, including the determinations for inorganic and organic chemicals and natural and man-made radio activity. The law makes it the responsibility of the water supplier but the State of Wisconsin as a service will collect the chemicals samples and analyze them without charge as long as our budget allows. This implies it is a limited program. (4) Under the bacteriological testing which many of us have done for many years, the State simply offers the alternative that all samples can be sent to the State for testing unless the local people do not wish to do this. It appears that the State has established and received approval for its monitoring and has received money to do it and now is duplicating services that already exist in local communities. (5) The various testing and monitoring is being paid for out of property taxes. (6) The Safe Drinking Water Act will undoubtedly increase the work-load for local departments because of the numerous newly classified public water supplies, such as mobile home parks, apartment complexes and other parks not previously covered. (7) The issue of enforcement is best done at the local level since most people who have unsafe water want someone to come and tell them what they can do to correct the situation as soon as possible. The State does not have the staff nor are they close enough to accommodate these kinds of requests and the burden of advising people on how corrections can be made will fall on the local counties. We have no objections to the State having enforcement over what power counties do not do. For the State to assume priary responsibilities at the local level for enforcement would require massive increased expenditures for staff. How public notification will be enforced is yet to be seen. We have not yet heard or read about an unsafe water supply.

In a related area, effluent from treatment plants in need of testing for heavy metals are coming to the Department from various county municipalities because DNR is not providing any laboratory testing for them and each community has to find a testing source. Obviously, they have not been given any money for that purpose. On the other hand, there has been no certification for the program for heavy metals, although we have repeatedly requested it. The coordination between those enforcing the drinking water standards and effluent standards seems to be completely unrelated.

Another issue which has been of considerable concern to us is the requirement for testing for organic substances in drinking water. Although, the Safe Drinking Water Act includes organics the State of Wisconsin evidently is going to test only twenty-two surface waters that are used for drinking purposes. We feel rather strongly that there are ample documented cases including the EPA survey to demonstrate that organic substances do get into drinking water of public and private wells.

Testing should be carried out on water, food, air and occupational problems and basic equipment can serve a number of purposes. This is being impeded by the segregated State decisions and serving to restrain public health agencies interested in the health aspects of all these areas for fear of being accused with duplication. Our request for a gas chromatograph this past month was turned down. One reason was duplication of what DNR and OSHA were doing which is hardly the case.

I hope that this information will be of help to you.

Sincerely,

John A. Bacharach, MPH
Director, Eau Claire City-County Health Department

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Anthony S. Earl
Secretary

BOX 7921
MADISON, WISCONSIN 53707

April, 1978

IN REPLY REFER TO: 3310

TO: Operators of Community Water Systems in Wisconsin

Enclosed are copies of Chapters NR 108 and NR 109, Wisconsin Administrative Code.

Chapter NR 109 contains the State of Wisconsin drinking water standards; monitoring requirements; reporting, public notification and record-keeping provisions; and variance and exemption requirements. Parts I, IV and V of Chapter NR 109 are requirements of the federal Safe Drinking Water Act. On March 14, 1978, the State of Wisconsin was officially given primary enforcement responsibility for the Safe Drinking Water Act. This means that the State of Wisconsin, rather than the U. S. Environmental Protection Agency, will be enforcing these requirements in our state. As of March 1, 1978, all of the requirements of Chapter NR 109 with regard to community water systems are being enforced.

The Safe Drinking Water Act and Part I of Chapter NR 109, Wisconsin Administrative Code, require that the supplier of water obtain a chemical analysis of the water at specified intervals, including determinations for inorganic and organic chemicals, and natural and man-made radioactivity. Even though the law makes it the responsibility of the water supplier, the State of Wisconsin, as a service, will collect the chemical and radioactivity samples and have them analyzed without charge as long as our budget allows. The State, when requested, will also provide the required number of bacteriological sample bottles and analyze samples submitted to the State Laboratory of Hygiene without charge. You may wish to review carefully Section NR 109.31(4) on pages 32-7 and 32-8 so that you know what to do if a bacteriologically unsafe sample is obtained.

The requirements for submission of plans for water system improvements are contained in Chapter NR 108, Wisconsin Administrative Code. When Wisconsin changed its definition of a "public water system" to match the federal definition, the applicability of plan submission requirements was also adjusted somewhat. For municipalities, the requirements are unchanged. If you are responsible for a mobile home park, subdivision, apartment building or condominium water system, however, you may wish to more carefully review the requirements of NR 108. The definition of a "reviewable project" and the note following the definition of a "waterworks" are particularly important for determining whether plans for system improvements must be submitted to this agency.

Please do not hesitate to contact us if you have any questions or problems.

Sincerely,
Bureau of Water Quality

Robert A. Baumeister

Robert A. Baumeister, P.E., Chief
Public Water Supply Section

Mr. FLORIO. I might ask either of you gentlemen with perhaps help from the audience, I would like a rough approximation.

What is the percentage of American citizens who were supplied public water facilities versus private water facilities, have you any idea?

Mr. McCALL. You mean publicly owned?

Mr. FLORIO. Publicly-owned water facilities.

Mr. McCALL. That is a difficult one to answer. I know in our State over 50 percent are private. I think nationally it probably won't deviate too much from that. It depends on what you are talking about, numbers of systems or populations served.

Mr. FLORIO. I am talking about populations served.

Mr. McCALL. In populations served, probably a higher percentage are publicly owned.

Mr. FLORIO. The suggestion has been made, as a matter of fact, the regulations provide that only systems in excess of or that serve 75,000 people would be required to adopt the mechanism that is being put forth, the activated carbon mechanism. I have difficulty accepting that number. I assume the number is somewhat arbitrary in that you had to pick a number at some point, and yet it is clear that the absolute number has no relevance to the degree of need for treatment that a system that services 60,000 people could be in much greater need for treatment and system over 75,000.

I suppose what I am looking for is for some reinforcement of that basic premise.

Do either of you gentlemen have any idea or thoughts on that?

Mr. McCALL. Yes. This question has been addressed by a number of groups, and you will find in my written testimony the position paper of the Conference of State Sanitary Engineers, which states in so many words that if indeed there is a health problem, then the conference cannot accept the premise that this should be restricted to populations greater than 75,000, but instead all people should be given the same protection.

Mr. FLORIO. Mr. Weaver, in my own area we don't have too many county water supply systems. They are more local, that is, municipally owned.

Is that a pattern through the country, or is there a large number of county water systems?

Mr. WEAVER. Mr. Chairman, our survey did not do a comprehensive review of that question. We are unable to go beyond what my testimony suggested, to what extent other parts of the country have that. We do know, as I mentioned, that of all respondents to our survey, which we feel is fairly representative but was not comprehensive, 40 percent exercised some responsibility, that is 40 percent of the counties represented some responsibility for water quality on a countywide basis, and 55 percent in some or all portions of the county.

Now that can go all the way from being the supplier to providing the monitoring or the surveillance enforcement function at the health department level, and my comments and our testimony is designed to cover both issues.

Mr. FLORIO. Gentlemen, thank you very much. We appreciate your testimony.

Mr. WEAVER. May I say, Mr. Chairman, on your question before the last one, we have no policy on that either. Basically, we would support the idea of not differentiating based on population served, and in fact many counties, where they do supply or do have publicly-owned systems, do serve smaller populations.

Mr. FLORIO. Thank you.

This committee will stand adjourned, to the call of the Chair. The committee stands adjourned.

[Whereupon, at 1:25 p.m., the subcommittee was adjourned, to the call of the Chair.]

FEDERAL SAFE DRINKING WATER ACT—OVERSIGHT

FRIDAY, SEPTEMBER 29, 1978

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT,
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE,
Washington, D.C.

The committee met, pursuant to notice, at 10 a.m., in room 2123, Rayburn House Office Building, Hon. Paul G. Rogers, chairman, presiding.

Mr. ROGERS. The subcommittee will come to order, please.

We are continuing our oversight hearings. We are pleased to have the Administrator of the Environmental Protection Agency with us this morning, Hon. Douglas M. Costle. We are delighted to have you with us. We are pleased to receive your statement.

We have been watching the birth of EPA and all of the difficult decisions that it has faced. We will be pleased to hear from you this morning. Your statement will be made a part of the record in full, without objection.

You may proceed.

STATEMENTS OF HON. DOUGLAS M. COSTLE, ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY; AND THOMAS C. JORLING, ASSISTANT ADMINISTRATOR FOR WATER AND WASTE MANAGEMENT, ACCOMPANIED BY VICTOR J. KIMM, DEPUTY ASSISTANT ADMINISTRATOR FOR DRINKING WATER; CHARLES WARREN, DIRECTOR, OFFICE OF LEGISLATION AFFAIRS

Mr. COSTLE. Mr. Chairman, with your permission, and before we formally start the testimony on drinking water, I would like to take advantage of this last hearing that you will be holding as the chairman of the Subcommittee on Health and the Environment and dealing with the Environmental Protection Agency, to let you know how much we have appreciated your efforts and how much we are going to miss you.

Mr. ROGERS. Thank you.

Mr. COSTLE. It is no overstatement to say that the entire EPA regulatory structure will stand really as a monument to your service in Congress. Whether we look at the air pollution control laws or the Safe Drinking Water Act, your initiatives in solid waste, noise control or energy questions, we see the mark of your very special influence and concern.

We have been as you know extraordinarily grateful for your thoughtful counsel and indispensable aid in steering not only this vital legislation through the House, but in giving us patience and understanding as we attempt to implement these laws as you intended, and I might add we have also admired your very special skills and energy in pursuit of your goals. You have given us a very solid base to build on, and that is a proud and a lasting legacy. In fact, we have given serious consideration to asking you to prepare an EIS on your departure, because after all it is obviously a significant Federal action that will have an adverse impact on the environment.

Mr. ROGERS. That is very kind.

Mr. COSTLE. Mr. Chairman, we are going to miss you very much, and we hope that your future career will be as rewarding as your career to date has been, and most of all, that it will allow us to continue to have the opportunity to work together. And please accept from the entire staff of the Environmental Protection Agency and a lot of people outside that agency that would share in the sentiments that I express this morning our admiration and gratitude.

We have a very special tradition at EPA. We have a way in which we recognize people within the organization that have been very special to us, and really by unanimous acclamation I have been asked to honor you as we would honor our own, and with your permission, I would like to come forward and present you with something.

Mr. ROGERS. Thank you very much.

Thank you very much for that thoughtful gesture and those kind remarks, overgenerous as they were, and may I say you will probably have a very easy hearing today. Thank you for your thoughtfulness and for the indulgence of my colleagues who have contributed so much to this committee.

Thank you, you may proceed.

Mr. COSTLE. Mr. Chairman, we are pleased to have the opportunity to attend these oversight hearings today and talk about drinking water. I would just like to say a few initial words. Here with me this morning, of course, is Vic Kimm, the Deputy Assistant Administrator for Drinking Water. He serves under Tom Jorling, who is to my immediate right, who is the Assistant Administrator for Water and Waste Management. And to my left is Charles Warren, the Director of our Office of Legislation.

Mr. ROGERS. We welcome each of you gentlemen to the committee.

Mr. COSTLE. The drinking water standards which have been the subject of much debate in recent months represent in my mind one of the most significant steps EPA has taken in the 7 years of its existence. The reason I say that is that it is one of the first major instance where EPA is attempting to correct a problem before it becomes a catastrophe. It is the first instance where we have attempted to fulfill the preventive health mandate that you have seen as a part of EPA's role since its inception, where we are trying to intercept a problem at its incipient stage before it becomes serious.

It is very controversial. We move in an area where our health data is not as complete as we would like, but we cannot ignore what is in fact very real evidence of the mounting nature of this problem, and we have attempted to respond in a responsible way.

It is I think fair to say that no one in this country expects, nor would they countenance, turning back the industrial revolution, or the fact that we live in a chemical era, nor would people wish or sanction the repeal of the chemical age. But those two phenomena present us with some very special problems in the public health field, and we have to manage the way we handle chemicals and the way we handle our industrial wastes in a way that we do not sacrifice public health goals, and that is going to mean taking controversial actions and trying to act in a timely fashion.

I have heard a lot recently from numerous people on the drinking water standard, and frankly we have received some very, very constructive comments. I am pleased that the agency is now moving on this standard, and I think it is probably as significant a preventive health measure as this agency will take under my administration, and it is one to which I am deeply committed.

I would also like to parenthetically say, Mr. Chairman, that with your forebearance I may have to leave a little bit early, because I have to go back to announce the first ambient air standard to have been set by EPA since 1971. Today we are going to announce the standard for lead, and I think that the timing was fortuitous, and that this is an appropriate thing that we can do today, particularly in light of the fact that this is the last hearing that you will be chairing with us.

Mr. ROGERS. Dr. Carter.

Mr. CARTER. Mr. Chairman, since I understand that Mr. Costle is going to have to leave before long, and since I understand you too will be called to the Energy Committee, I would like to say at this time, as I have said before, that it has been my pleasure and my honor to serve with you for 14 years. I have never met a more honorable man, a more dedicated man, a more foresighted man. You are a man of infinite patience. It is difficult to understand how you can put up with all of us, particularly me on this subcommittee. You know that you have our respect, our admiration, and our strong brotherly feeling. As I have said many times before:

> If with pleasure you are viewing
> Any work a man is doing
> And you like him, or you love him, say it now!
> Don't withhold your approbation
> Till the parson makes oration
> And he lies with snowy lilies o'er his brow.
> For no matter how you shout it
> He won't really care about it
> He won't know how many teardrops you have shed.
> If you think some praise is due him.
> Now's the time to hand it to him

Mr. ROGERS. Well, I must say this is overwhelming. I look forward to working with everyone in the future in the private sector, but it has been a great experience, of course, and with my colleagues and with those with whom we have dealt in the executive branch. I do not know of any better friends I have than those who are sitting with me, Dr. Carter and other members of the committee. We have had a great relationship in trying to put out legislation to advance the cause of the Nation, and I must say particularly, Dr. Carter, every time we have a hearing, he has been there, and we have had a pretty good partnership that we look forward to continuing in the future. Your friendship has been great.

Mr. CARTER. Thank you.

Mr. ROGERS. Thank you, and we do understand if you have to leave.

Mr. COSTLE. Thank you. Mr. Chairman, at this point I would like to ask Mr. Jorling if he would proceed.

Mr. ROGERS. Thank you so much. I appreciate your thoughtfulness. I commend you for issuing those standards.

Mr. COSTLE. We wanted to get one more air standard out before you left.

Mr. ROGERS. Thank you.

Mr. JORLING.

STATEMENT OF THOMAS C. JORLING

Mr. JORLING. Thank you, Mr. Chairman. We have a prepared statement which has been delivered to the committee. Rather than proceed by reading it [see p. 159], I would like to focus on a couple of provisions.

Mr. ROGERS. Certainly, and your statement will be made a part of the record in full without objection.

Mr. JORLING. We are pleased to testify on the agency progress in implementing the Safe Drinking Water Act. Public Law 93–523 set in motion two program initiatives, one aimed at insuring the safety of the Nation's public water supplies, and the other designed to protect underground sources of drinking water from contamination through injection wells. I think it is proper to assume that the committee is familiar with the statute and the public health concerns about drinking water quality that prompted the Congress to enact it. Therefore, I shall move directly into a report of the progress and focus primarily on the issue that has generated so much controversy, especially during these oversight hearings.

Mr. CARTER. Mr. Chairman, I'd like to make a short statement, and then perhaps ask a question. As you know, around San Antonio, Tex., they have a wonderful aquifer about which I have been told by Representative Gonzalez; and of course, underground injections would absolutely ruin their water supply. I hope that in the future you will be careful to see that these wonderful underground aquifers are not destroyed, and are not damaged by water injection or any other method.

Mr. JORLING. Dr. Carter, your references are appropriately placed. That is part of the underground injection program. The Agency has designated the San Antonio aquifer as a sole-source aquifer, as one of four that we have acted upon so far. We have implemented that provision and the general regulations for the process will been issued shortly. We have, however, designated the San Antonio aquifer as a sole-source, and the protection that is afforded by the statute is now in being for San Antonio.

Mr. ROGERS. There is a call to the floor. Members will have to respond. It is a recorded quorum, so that the committee will stand in recess for 10 minutes.

[Brief recess.]

Mr. ROGERS. The subcommittee will come to order, please.

You may continue.

Mr. JORLING. Thank you, Mr. Chairman. If I might I would like to turn directly to the organics. We have supplied information on the success of the primacy effort.

Mr. ROGERS. What page is that?

Mr. JORLING. Page 4. The question of organic chemical contamination of drinking water was one of the motivating forces in the passage of the act. Since 1975 it has been a major focus of our program. About one-half of our research effort has been invested in monitoring techniques, health effects, control technology, and costs and economic impacts related to the control of organic contaminants in drinking water.

In February of this year the Agency proposed a regulation to control organic contaminants, addressing the two parts of the problem: the formation of trihalomethanes, including chloroform, during the process of disinfection with chlorine; and the presence of potentially hundreds of other harmful synthetic compounds caused by industrial pollution and agricultural runoff.

The proposed regulation is divided into two parts in response to the two problems. Trihalomethanes, which are widely prevalent, are subject to a maximum contaminant level of 100 parts per billion. This standard applies to all systems serving populations of 75,000 or more and can be met by any means available to the utilities. The second part of the regulation is directed to a wide range of synthetic organic chemicals. Communities of 75,000 or more whose water supplies are vulnerable to this sort of contamination would be required to install granular activated carbon (GAC) or some equivalent technology. This approach to controlling potentially harmful contaminants was expressly provided in the statute for situations in which it is not technically and economically feasible to monitor for the contaminants of concern.

Mr. ROGERS. May I interrupt this just to say that in testimony by some of the industry people, they seem not to be aware that you could have equivalent technology or an alternative technology to GAC. I think it is clearly written in the law and it is the intent that that may be done, and I believe it is also stated in your regulation. I think it might be well for you to make that clear to the industry, that that is true and the Agency is aware of that. Would you do that?

Mr. JORLING. Thank you, Mr. Chairman, and we will attempt to do so. We appreciate your help on that.

Mr. ROGERS. Thank you.

Mr. JORLING. This is the situation in which we find ourselves. The NAS in its report, "Drinking Water and Health," listed 22 known or suspected carcinogens that have been found in some drinking water supplies. Other carcinogens will undoubtedly be found as monitoring and toxicology studies continue. Since safe or no risks levels cannot be determined for carcinogens, we must try to reduce human exposures to those chemicals as much as possible. We have attempted to deal with this problem in our proposal by means of a treatment requirement for GAC or an equivalent technology to remove a broad spectrum of synthetic chemicals. However, this requirement will be enforced only when the required monitoring demonstrates that a given city is vulnerable to this sort of contamination. Where this is not the case, the utility will be granted a variance and will not have to introduce granular activated carbon into its treatment processes. Where substantial contamination is found, the regulations provide for a period of design and pilot studies to determine the most effective and economical treatment methods for particular local problems. Additional time is allowed for any necessary construction.

Generally speaking, water utilities and State regulatory agencies have been skeptical of the health basis of the proposals and of the new direction in water treatment technology proposed in response to the presence of synthetic compounds—the mandatory use of granular activated carbon. Considerable concern has also been expressed about the costs of introducing this new technology.

Indeed, comments on these concerns were made by both House and Senate Appropriations Committees in July and August. During that same period, the Agency prepared a white paper in response to the most common objections and published it in the Federal Register as a supplemental notice to our proposed regulations. We believe that this action was responsive to the public and congressional concerns, especially in the matter of economic impact. Additionally, we expect that the comments received toward the end of the public comment period, which closed on September 1, will further clarify the issues under discussion. I want to assure the committee that the Agency takes all such comments seriously and will include them in our review of the more than 300 oral comments presented at eight public hearings and 600 written statements received during the public comment period.

It is important to note, I think, that the motivating forces behind the proposed regulation include the legislative history of the act and congressional concerns about organic contaminants, a court order to the effect that the statute obliges us to take action, and the mandate in the President's Environmental Message of May 1977, which called for EPA "to set standards under the Safe Drinking Water Act which will limit human exposure to toxic substances in drinking water, beginning with potential carcinogens."

However, the most compelling data comes to us from the research that has been conducted in this area. It has not answered every question that might be asked. There is still much to learn, and our research effort will continue. Nevertheless, in proposing these regulations, the Agency was persuaded that there are serious long-term health risks from the ingestion of some organic compounds and that these risks call for regulatory action under the statute. Human exposure should be reduced to the extent that it is economically and technologically feasible to do so. It is noteworthy that this view is supported by the National Cancer Institute, National Institute of Environmental Health Sciences, the Food and Drug Administration, and the Occupational Safety and Health Administration.

We have now received the initial NAS review of the preliminary epidemiological studies on organics in drinking water as they relate to health risks. The report, which will be made available to the public, was consistent with EPA's position in the proposed regulation that the studies had certain hypotheses: for example, that there might be a relationship between chloroform and bladder cancer. To determine whether or not the hypothesis is valid, more detailed studies taking into account confounding factors such as smoking, occupation, or coffee consumption would have to be performed. However, even in those studies the effects might not be distinguishable from the confounding factors.

In the matter of the economic impact of these regulations, we have increased our projections by accepting certain factors and assumptions suggested by water utilities. Briefly stated, these factors included the conversion of 1976 estimates to 1978 dollars as influenced by inflation; the associated legal fees and other contingency costs; and more conservative estimates of design characteristics required. It should be noted that the annual operations and maintenance costs remain as originally projected. Our revised estimates were published on July 6, in the Federal Register notice mentioned earlier, and we are reviewing the comments on this data which were submitted during the latter part of the public comment period. Briefly, national costs are presently estimated at $616–$831 million for capital improvements. To the average residential customer in a city going to GAC treatment, this would mean an annual increase in his water bill of about $10 to $20, or say a dollar or two per month. We have compared these capital cost estimates with those produced by a number of water utilities, and find substantial agreement in a number of cases.

We estimate that some 61 cities would install GAC over a 3-to-5-year period under both parts of the proposed regulations. Of the 61, 50 cities would adopt GAC under the treatment requirement of the regulation; 11 would use it because of the severity of their trihalomethane problem. All other cities over the 75,000 population mark are expected to be granted variances. This is why the Agency believes that the economic impact of the regulations will be very well worth the health protection they provide.

Of course, the final provisions of the regulations have not yet been formulated; this will be done when we have completed our study of the comments and recommendations that have been made. It is our intention to consider every suggestion carefully and to develop a program that will reflect the best thinking of science, industry, and public health policymakers. Thus, it will be our hope that the final regulations will win the support of all involved and be recognized as an historic first step in the reduction of human exposure to the long-range threat of chemical contamination of drinking water.

In this context, it should be noted that the proposed regulations complement our other efforts to reduce human exposure to toxic pollutants under the authorities provided by the Clean Water Act of 1977, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. Additionally, the organics regulation is not the only issue in the protection of the public health through drinking water.

The future is studded with issues and questions that must be researched and responded to: the control of corrosion in distribution systems, which adds heavy metals to some water supplies; a better understanding and control of viruses and contaminants that contribute to cardiovascular disease; and the assessment and control of other potentially harmful constituents in some drinking

36-566 O - 79 - 11

water sources—asbestos, for example—and the soft water/heart disease and sodium/hypertension questions. All this means that the Safe Drinking Water program is in the early stages of a new era in water treatment standards and technology. We do not have all the answers, for the questions are only beginning to take shape. We do know that the Safe Drinking Water Act has stimulated the Nation to reflect on the complex relationship between drinking water and the public health.

Mr. Chairman, if I might I will simply submit the remainder of the testimony, and I will make a few summary comments. The remainder of the testimony goes into other elements of implementation activities of the Agency.

One of the principal concerns of many, including, I am sure, this committee, is why the underground injection program has not yet reached the full regulatory implementation stage that was anticipated by this time. I think there are several reasons for it. Among them are the tremendous complexity of almost every aspect of the problem. But we do hope now to have the underground injection program promulgated in the relatively near future, and perhaps to even benefit by that delay, because we think we are now in a position to integrate that program with similar programs under other statutes that we are trying to bring together, both chronologically and substantively, so that we can have a more comprehensive hazardous waste toxic pollutant control strategy in the Agency and in the States.

Let me complete the testimony. I know that the committee and the members are very busily engaged in a tremendously intense legislative calendar activity toward the end of the session, so I would be happy to respond to questions, perhaps submit further information to the record if desired.

[Testimony resumes on p. 173.]

[Mr. Jorling's prepared statement follows:]

TESTIMONY OF
THOMAS C. JORLING
ASSISTANT ADMINISTRATOR
FOR
WATER AND WASTE MANAGEMENT
ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES
SEPTEMBER 25, 1978

Good morning, Mr. Chairman. My name is Thomas C. Jorling, Assistant Administrator for Water and Waste Management, U.S. Environmental Protection Agency. I am pleased to testify on the Agency's progress in implementing the Safe Drinking Water Act. P.L. 93-523 set in motion two major program initiatives, one aimed at ensuring the safety of the Nation's public water supplies and the other designed to protect underground sources of drinking water from contamination through injection wells.

I think it is proper to assume that the Committee is familiar with the Statute and the public health concerns about drinking water quality that prompted the Congress to enact it. Therefore, I shall move directly into a report on the progress being made and the problems encountered in the implementation of this important legislation.

Overview of Progress

Since the Act was passed almost four years ago, the Safe Drinking Water Program has made some significant progress.

Drinking water standards have been established nationally. The first nationwide program of monitoring public water supplies is underway.

As hoped by the Congress, the States have become genuine partners in this effort. Forty of them have changed their laws and regulations to match Federal requirements, thus making them eligible for primary enforcement responsibility as provided in the legislation. Another eight are expected to achieve primary enforcement responsibility before the end of FY 79. A current listing of the primacy States is attached to the text of my remarks.

Since the program began, forty five million dollars in State program grants have been awarded. State staffs have doubled and their programs have been substantially expanded.

Tens of thousands of water plant operators have been trained in the regulatory requirements and in the skills and knowledge they need to achieve compliance. Local officials and the general public are better informed than ever before on the issues of drinking water quality. This informational and educational program has been conducted by EPA and the States with the grant-supported assistance of the American Water Works Association, Conference of State Sanitary Engineers, the League of Women Voters, and other non-profit organizations of State and Local governments.

Public Notification is a fact. Violations of the regulations are being reported to consumers. Corrections and improvements are being planned or implemented in large part due to the increased public awareness generated by the legal requirement for public notice. Evidence to date shows that the vast majority of violations are being corrected soon after public notice without the need for enforcement action. These corrections are being made as cooperative efforts between EPA, the States, local communities and the utilities. This provision has significantly increased public participation in problem solving efforts. The record shows that an informed public is a powerful force for the improvement of water quality. For EPA this provision has meant the steady improvement of water quality throughout the country with a relatively small expenditure of resources. The public notification provision is a success in innovative legislation.

The National Drinking Water Advisory Council, mandated by the Statute, has played an important role in the development of regulations and program activities, ensuring that the program moves forward with the active participation of the States, the industry, and the general public. The efforts of this group have contributed greatly to the public recognition of the fact that this program is generally responsive to outside suggestions.

In short, much has been accomplished in the few years since the Act was passed. However, the legislatively mandated research and other studies have clearly established that we are a long way from eliminating all concerns about drinking water. Much more effort will be needed to bring State staffs and program operations to their optimal levels. Upgrading utilities and operators to acceptable levels of proficiency will require an on-going program of technical assistance.

We know that the scope of the interim drinking water standards will have to be expanded to include organic chemicals and other revisions indicated by accumulated data and on-going scientific research. The Act, in fact, requires revised standards to be promulgated, based on recommendations of the National Academy of Sciences. The NAS determined that it was not scientifically possible to determine No-Adverse-Effect levels for drinking water contaminations so EPA will have to conduct additional research studies to develop more comprehensive standards.

Before moving on to a report on the groundwater protection program, let me dwell for a moment on a particularly significant current activity: our proposed regulations to limit organic

Organics

The question of organic chemical contamination of drinking water was one of the motivating forces in the passage of the Act. Since 1975 it has been a major focus of our program. About one-half of our research effort has been invested in monitoring techniques, health effects, control technology, and costs and economic impacts related to the control of organic contaminants in drinking water.

In February of this year the Agency proposed a regulation to control organic contaminants, addressing the two parts of the problem: the formation of trihalomethanes, including chloroform, during the process of disinfection with chlorine; and the presence of potentially hundreds of other harmful synthetic compounds caused by industrial pollution and agricultural and urban run-off.

The proposed regulation is divided into two parts in response to the two problems. Trihalomethanes, which are widely prevalent, are subject to a maximum contaminant level of 100 parts per billion. This standard applies to all systems serving populations of 75,000 or more and can be met by any means available to the utilities. The second part of the regulation is directed to a wide range of synthetic organic chemicals. Communities of 75,000 or more whose water supplies are vulnerable to this sort of contamination would be required to install granular activiated carbon (GAC) or some equivalent technology. This approach to controlling potential harmful contaminants was expressly provided in the Statute for situations in which it is not technically and economically feasible to monitor for the contaminants of concern.

This is the situation in which we find ourselves. The NAS in its report, Drinking Water and Health, listed 22 known or suspected carcinogens that have been seen in some drinking waters. Others carcinogens will undoubtedly be found as monitoring and toxicology studies continue. Since "safe" or "no risks" levels cannot be determined for carcinogens we must try to reduce human exposures to those chemicals as much as possible. We have attempted to deal with this problem in our proposal by means of a treatment requirement for GAC or an equivalent technology to remove a broad spectrum of synthetic chemicals. However, this requirement will be enforced only when the required monitoring demonstrates that a given city is vulnerable to this sort of contamination. Where this is not the case, the utility will be granted a variance and will not have to introduce granular activated carbon into its treatment processes. Where substantial contamination is found, the regulations provide for a period of design and pilot studies to determine the most effective and economical treatment methods for particular local problems. Additional time is allowed for any necessary construction.

Generally speaking, water utilities and State regulatory agencies have been skeptical of the health basis of the proposals and of the new direction in water treatment technology proposed in response to the presence of synthetic compounds -- the mandatory use of granular activated carbon. Considerable concern has also been expressed about the costs of introducing this new technology.

Indeed, comments on these concerns were made by both House and Senate Appropriations Committees in July and August. During that same period, the Agency prepared a "White Paper" in response to the most common objections and published it in the Federal Register as a supplemental notice to our proposed regulations. We believe that this action was responsive to the public and Congressional concerns, especially in the matter of economic impact. Additionally, we expect that the comments received toward the end of the public comment period, which closed on September first, will further clarify the issues under discussion. I want to assure the Committee that the Agency takes all such comments seriously and will include them in our review of the more than 300 oral comments presented at eight public hearings and 600 written statements received during the public comment period.

It is important to note, I think, that the motivating forces behind the proposed regulation include the legislative history of the Act and Congressional concerns about organic contaminants, a Court Order to the effect that the Statute obliges us to take action, and the mandate in the President's Environmental Message of May, 1977 which called for EPA "to set standards under the Safe Drinking Water Act which will limit human exposure to toxic substances in drinking water, beginning with potential carcinogens."

However, the most compelling data comes to us from the research that has been conducted in this area. It has not answered every question that might be asked. There is still much to learn and our research effort will continue. Nevertheless, in proposing these regulations, the Agency was persuaded that there are serious long term health risks from the ingestion of some organic compounds and that these risks call for regulatory action under the Statute. Human exposure should be reduced to the extent that it is economically and technologically feasible to do so. It is noteworthy that this view is supported by the National Cancer Institute, National Institute of Environmental Health Sciences, the Food and Drug Administration, and the Occupational Safety and Health Administration.

We have now received the initial NAS review of the preliminary epidemiological studies on organics in drinking water as they relate to health risks. The report, which will be made available to the public, was consistent with EPA's position in the proposed regulation that the studies had certain deficiencies, they did not establish causality but generated hypotheses: for example, that there might be a relationship between chloroform and bladder cancer. To determine whether or not the hypothesis is valid, more detailed studies taking into account confounding factors such as smoking, occupation, coffee consumption would have to be performed. However even in those studies the effects might not be distinguishable from the confounding factors.

In the matter of the economic impact of these regulations, we have increased our projections by accepting certain factors and assumptions suggested by water utilities. Briefly stated, these factors included the conversion of 1976 estimates to 1978 dollars as influenced by inflation; the associated legal fees and other contingency costs; and more conservative estimates of design characteristics required. It should be noted that the annual operations and maintenance costs remain as originally projected. Our revised estimates were published on July 6, in the Federal Register notice mentioned earlier and we are reviewing the comments on this data which were submitted during the latter part of the public comment period. Briefly, national costs are presently estimated at $616 - $831 million for capital improvements. To the average residential customer in a city going to GAC treatment, this would mean an annual increase in his water bill of about ten to twenty dollars, or say a dollar or two per month. We have compared these capital cost estimates with those produced by a number of water utilities and find substantial agreement in a number of cases.

We estimate that only sixty-one cities would install GAC over a three to five year period under both parts of the proposed regulations. Of the sixty one, fifty cities would adopt GAC under the treatment requirement of the regulation; eleven would use it because of the severity of their trihalomethane problem. All other cities over the 75,000 population mark are expected to be granted variances. This is why the Agency believes that the economic impact of the regulations will be well worth the health protection they provide.

Of course, the final provisions of the regulations have not and can not be formulated; this will be done when we have completed our study of the comments and recommendations that have been made. It is our intention to consider every suggestion carefully and to develop a program that will reflect the best thinking of science, industry, and public health policy-makers. Thus, it will be our hope that the final regulations will win the support of all involved and be recognized as an historic first step in the reduction of human exposure to the long range threat of chemical contamination of drinking water.

In this context, it should be noted that the proposed regulations complement our other efforts to reduce human exposure to toxic pollutants under the authorities provided by the Clean Water Act of 1977, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. Additionally, the organics regulation is not the only issue in the protection of the public health through drinking water.

The future is studded with issues and questions that must be researched and responded to: the control of corrosion in distribution systems, which adds heavy metals to some water supplies; a better understanding and control of viruses and contaminants that contribute to cardio-vascular disease; and the assessment and control of other potentially harmful constituents in some drinking water sources, asbestos for example, and the soft water/heart disease and sodium/hypertension questions. All this means that the Safe Drinking Water program is in the early stages of a new era in water treatment standards and technology. We do not have all the answers, for the questions are only beginning to take shape. We do know that the Safe Drinking Water Act has stimulated the Nation to reflect on the complex relationship between drinking water and the public health.

Groundwater Protection

Launching the Groundwater Protection Program has been more difficult and time-consuming than anticipated at the time the legislation was enacted. The major obstacles have been:

- a lack of basic data on almost every aspect of the problem;
- the complexity of coordination with other environmental statutes, most recently the 1977 Clean Water Act Amendments and the Resource Conservation and Recovery Act; and
- finally, because there are literally hundreds of thousands of wells, surface impoundments and land fills used by industry, agriculture, and municipalities, we must exercise great care in regulating controls and projecting probable social and economic impacts.

Three actions in the Groundwater Protection Program merit your attention.

First, regulations to control the underground injection of contaminants were proposed in August, 1976. Based on extensive public comment, they are being substantially revised, especially in relation to oil and gas injection practices and shallow wells. We expect to re-propose these regulations within a month or so.

Second, the grant regulations, required to begin the flow of Federal program grants to the States, will be promulgated shortly.

Finally, the Administrator has signed and sent to the Federal Register the list of States designated as requiring an underground injection control program. (The list is appended to this statement as Attachment II.)

We have launched a nationwide assessment of surface impoundments (pits, ponds, and lagoons) and their potential for contaminating groundwater.

The final regulations governing the designation of sole-source aquifers will be promulgated shortly. Incidentally, under the sole source aquifer provision, Section 1424(e) of the Act, four designations have already been made and three additional petitions are under review.

In short, we have now reached the threshold of a comprehensive program of action to protect the nation's groundwater resources. Getting to this point has been tedious and difficult but we believe an effective, coordinated Federal - State effort has been developed and made ready for implementation.

Program Coordination and Integration

In regard to both the groundwater protection program and the public water system supervision program, the Agency has been pursuing a vigorous policy of coordination and integration with related programs in EPA and in other agencies. A few of these initiatives warrant the Committee's attention.

For example, we have been developing an overall policy approach to groundwater protection that integrates Section 1421 of the Safe Drinking Water Act and Subtitle D of the Resource Conservation and Recovery Act. Regulations being developed under these provisions will be complimentary and non-duplicative, offering an efficient mix of authorities to control the pollution of groundwater.

Joint headquarters efforts to meet requirements of the Safe Drinking Water Act Amendments of 1977 and the Federal Water Pollution Control Act Amendments of 1977 are also underway. There will be a study to assess availability of data on water supply demand, and water supply usage, now and over the next 15 to 20 years. The study will consider conservation measures and reuse and will make recommendations on preparing facilities plans on the basis of anticipated water supply needs. This effort will also produce recommendations on new legislation or administrative actions to coordinate the planning of water supplies and waste-water treatment projects. EPA will consider such recommendations and prepare a report to Congress.

The Office of Drinking Water is also examining home water treatment units and coordinating with the Pesticide Program which has authority for regulating certain types of these units. We have contracted with Gulf South Research Institute to study the organics removal capability of some 40 home water filtration devices, most of which are commercially available. I might note in passing that the growth of this industry and the bottled water business is an indication of the public's concern about the quality of their community water supplies.

The Agency maintains close working relationships with related Federal programs and has been negotiating inter-agency agreements with the Farmers Home Administration (FmHA), the Indian Health Service (IHS), and the Food and Drug Administration (FDA). For example, a joint policy statement recently signed with FmHA assigns priority consideration to the financing of rural communities that are trying to improve or expand their drinking water systems to meet the requirements of the primary drinking water regulations.

Other interagency efforts include:

. an inter-agency agreement with the Indian Health Service signed in May, 1977 to coordinate the efforts of both agencies so that Indians receive the full benefits of the Safe Drinking Water Act and Indian Health Service programs; and

. the establishment of an EPA/FDA Task Force to work out an agreement to clarify the jurisdictional problems existing between the two agencies regarding the control of indirect additives (such as coagulant aids, paints and coatings) used in drinking water treatment and other issues. The immediate need is an interim agreement to serve the purpose until the Toxic Substances Control Act is fully operational. There are, of course, short and long range resources demands that have not been addressed and which need to be resolved if this program is to be transferred from FDA to EPA.

Research and Special Studies

It is appropriate on this occasion to report on the Agency's progress with research efforts and special studies mandated by P.L. 93-523 and the 1977 Amendments. A complete listing of completed studies is appended to this statement as Attachment III, however a few highlights are worth mentioning.

During the past year approximately $15 million has been spent on a varied research program including short- and long-range health effects studies as well studies of improved analytical methods and treatment techniques. For example, animal and epidemiological studies have been conducted to examine the relationship between diseases such as cancer and cardiovascular disease and drinking water quality.

The Agency is also in the process of completing two other studies stipulated in the Statute. The first of these is a study of viruses of drinking water; a final report is expected in the fall of 1978. Second, the Agency is completing work on the final draft of an interim report on the Rural Water Survey to be submitted to Congress by the end of this year, prior to the completion of the final report in the summer of 1979.

Several other studies were mandated in the 1977 Amendments to the Safe Drinking Water Act. Pursuant to this, the Agency has initiated the following:

. a study of water treatment costs including alternative compliance methods and the pros and cons of available financing methods;

. a study of the present and projected future availability of an adequate and dependable supply of safe drinking water;

. a study of polychlorinated biphenyl contamination of actual or potential sources of drinking water; and

. a study of the reaction of chlorine and humic acids and the effects of resulting contaminants on human health.

Issues for Consideration

Finally, there are a few issues that we wish to bring to the Committee's attention. Each of them has legislative implications. Although we are not proposing any amendments at this time, we want the Committee to be aware of certain problems that will require action at an appropriate time in the future.

Construction Grants

There appears to be a great deal of pressure for the Agency to initiate a subsidy program for utilities to defray the cost of meeting the Interim Primary Drinking Water Regulations. This interest is evidence by the introduction of HR 12131 and HR 11967 regarding the establishment of a construction grants type program for water supply systems. It is the Agency's position at this time that such a program is unnecessary. More conclusive information will be available with the completion of the subsidy study mentioned above, scheduled for completion in May, 1979.

In the interim the Agency will continue to work with the Farmers Home Administration to provide priority funding to substandard water systems from existing funds and programs.

Indirect Additives

It may prove to be necessary to provide additional authorities in the Safe Drinking Water Act to clarify EPA's responsibilities in the control of direct and indirect additives, depending upon our experience during the coming months.

Public Notification

The public notification provision in the Act, which has proven to be so effective, is considered to be too rigid in some respects. Under the current requirements any one or a combination of the following conditions may result:

- notification may occur several months after a violation
- notification may occur after remedial action to correct the problem has been taken
- notification may occur for all violations even if they are not a real danger to public health at the time of notice.

It is the Agency's position that the public notification requirements should be altered to allow more flexibility in determining the application of the requirements under specific circumstances where widespread notification would not be meaningful.

Variances and Exemptions Deadlines

Variances and exemptions are means of deferring compliance with a particular MCL in situations in which the delay will not cause an unreasonable health risk and in which there are compelling economic or technical reasons for delaying compliance. To prevent the over-utilization of the exemption provision and to avoid a delay in achieving compliance, the Act requires a final compliance date for exemptions of January 1, 1981 or January 1, 1983 if the utility is joining a regional system. However, due to the delay in promulgation of the Interim Primary Drinking Water Regulations, water supplies have less time to seek an exemption than the Act anticipated and, if granted, to make the necessary modifications. If major construction is needed and is part of the compliance schedule, more lead time is required to complete construction and place the facility in service. This provision of the Act could be made more effective and responsive to actual field conditions by extending the time limit (i.e., changing the "81" and "83" dates) to an absolute number of five years after the effective date of the regulations.

State Regulation/Statute Alterations

Any change in the provisions of the Safe Drinking Water Act and/or its associated regulations requires a concomitant alteration of the States' authority if the State is to retain primacy. Such changes at the State level require time for State procedures to be carried out. It is important that the Act reflect this problem by allowing States a sufficient amount of time to adopt new regulations in response to changes in the Federal regulations without losing primacy and their entitlement to continued Federal program grants. Specific recommendations in this matter will be developed in cooperation with the States.

Definition of a Public Water System and Coverage

There is considerable confusion caused by the Statute's lack of distinction between community and non-community water supplies. The regulations recognize the difference between the long-term exposure one has to his residential water supply and one's occasional use of a non-community supply such as a campsite or a roadside service station. It would be useful to have this distinction clarified in the Act.

Non-Community Systems

Similarly, the Act presumes that enforcement will be carried out by the States in relation to all violations as they occur. In practice, the number of non-community systems required to be regulated may require the States to set priorities in enforcement according to the seriousness of the problem, the numbers of people exposed, and other considerations. The need for such a priority-setting system should be recognized, otherwise we place the States in a position of non-compliance.

Conclusion

To conclude these summary remarks, let me emphasize to the Committee that the Agency believes the Safe Drinking Water Program has been well launched. With the cooperation of the States and the water supply industry, the door to a new dimension of environmental control and public health protection has been opened. The program is in its start-up phase. Much work must be done to bring water treatment practices throughout the country up to national standards. As I have mentioned, some difficult issues remain to be resolved. We shall do our best to keep you abreast of these developments so that you can follow the progress of this important legislation.

If there are any questions, Mr. Chairman, I would be pleased to try to answer them.

ATTACHMENT I

STATUS REPORT ON STATE ASSUMPTION OF PRIMARY ENFORCEMENT RESPONSIBILITY (PRIMACY) FOR PUBLIC WATER SYSTEM SUPERVISION PROGRAM UNDER THE SAFE DRINKING WATER ACT
as of September 8, 1978

I. Present States with Primacy - 40 States.

Oklahoma
Connecticut
Louisiana
Mississippi
Nebraska
Alabama
Arkansas
Georgia
New York
Virginia
Iowa
Minnesota
Tennessee
South Carolina
Maine
Hawaii
Kentucky
New Hampshire
Rhode Island
Guam
Arizona
Massachusetts
Texas
Michigan
Maryland
North Dakota
Florida
Wisconsin
Nevada
Kansas
Montana
Idaho
Washington
California
New Mexico
Delaware
West Virginia
Colorado
Alaska
Trust Territories of Pacific Islands

II. Following States are Expected to Assume Primacy in FY 79.

New Jersey
Virgin Islands
Puerto Rico
Illinois
Vermont
North Carolina
Ohio
American Samoa
North Mariana Islands
Missouri

III. Following States are Projected to Assume Primacy in FY 80.

South Dakota
Utah
Wyoming

IV. States Without Primacy Intentions.

Indiana	Oregon
Pennsylvania	District of Columbia

ATTACHMENT II

STATES DESIGNATED AS REQUIRING AN UNDERGROUND INJECTION CONTROL PROGRAM

TEXAS
PENNSYLVANIA
LOUISIANA
CALIFORNIA
KANSAS
MICHIGAN
ILLINOIS
WYOMING
NEW YORK
OHIO
OKLAHOMA
WEST VIRGINIA
INDIANA
NEW MEXICO
FLORIDA
KENTUCKY
UTAH
COLORADO
MISSISSIPPI
IOWA
ARIZONA
ARKANSAS

ATTACHMENT III

LISTING OF STUDIES MANDATED BY THE SAFE DRINKING WATER ACT

- Report to Congress -- Preliminary Assessment of Suspected Carcinogens in Drinking Water in December 1975.
- Impact on Underground Sources of Application of Pesticides and Fertilizers in 1976.
- Report to Congress -- Waste Disposal Practices and their Effects on Groundwater in January 1977.
- Drinking Water and Health, a study of the National Academy of Sciences, in June 1977.
- Impact of Abandoned Wells on Ground Water in August 1977.
- Underground Injection Methods Which Do Not Endanger Underground Water Sources in December 1977.
- Surface Impoundments and their Effects on Ground Water Quality in the United States -- a Preliminary Survey in August 1978.
- Identification of Potential Contaminants of Underground Water Sources from Land Spills in August 1978.

Mr. MAGUIRE [presiding]. Thank you very much. We do have a call to the floor. Dr. Carter, would you like to start the questioning or do you have any comment, or should we break and come back?

Mr. CARTER. I think we could wait until the second bell rings. I do have a question, Mr. Chairman.

Mr. MAGUIRE. Dr. Carter.

Mr. CARTER. I notice your standard for pure water is 100 parts per billion of trihalomethanes; is that correct?

Mr. JORLING. The maximum contaminant level that we have proposed, Dr. Carter, is 100 parts per billion, and that includes the four trihalomethane compounds, bromoform, chloroform—and I will stop there because I am not sure of the pronunciation of the iodine form or the other two chemicals, but those are the four that would be covered by that maximum contaminant level.

Mr. CARTER. Have these proven to be carcinogenic in animals at this level?

Mr. JORLING. Chloroform is a compound——

Mr. CARTER. At this level?

Mr. JORLING. There has been no empirical data, and it is impossible to acquire it, that ingestion of 100 parts per billion of these compounds would cause cancer in humans, since we do not investigate directly on human beings.

Mr. CARTER. I did not ask about humans, my friend. I asked about animal studies.

Mr. JORLING. The animal studies suggest that concentrations of these levels would be carcinogenic in animal tissue.

Mr. CARTER. What studies are these?

Mr. JORLING. Excuse me?

Mr. CARTER. What studies are these that suggest this?

Mr. JORLING. I think, Dr. Carter, it would be best to supply that for the record. I do not have those references immediately before me.

Mr. KIMM. If I might add to that, Dr. Carter, on all of the carcinogens, the accepted scientific procedures in the animal tests involve feeding it at higher levels, so that what you have at the lower levels are an extrapolation of the impact seen in animals at higher levels of exposure. This is the standard procedure. It is done for all carcinogens, and so the real answer to your question, do you have any hard evidence that a low-level exposure for any carcinogen produces cancer is, there is not any, and with the scientific work going on it is very unlikely that we will get a direct link of that nature. We have the animal test data on the one hand.

Mr. CARTER. I would like to see the animal test data on this at 100 parts per billion, if you have that.

Mr. JORLING. That data does not exist, and the problem is that if you were to test at those levels, since the incidence levels are quite small, it would take hundreds and hundreds of thousands of animals.

Mr. CARTER. Yes, sir, it is true that it would take perhaps hundreds and hundreds of thousands of animals, but it would show the toxic effect of trihalomethanes at such a level, would it not?

Mr. KIMM. I would be happy to submit to the record on this, but the numbers of animals are in the millions, and in fact it is just not——

Mr. CARTER. I do not believe "millions" would be necessary. As one who has studied this a great deal, too, I would say that it would not take a million animals, because you have got 100 parts per billion. It certainly does not require that many, and we should do it. We should have test data to confirm our standards, as I see it.

Mr. JORLING. Doctor, we will supply a rationale as to why we derive this figure for the record. I think what you are expressing is some frustration that all of us in this type of activity share, and that is, with the some 3,000 chemicals that are widely used in interstate commerce, it is very difficult to know the health effects of them. What we attempt to do in accordance with the standard procedure of the public health community, especially in the area of carcinogenicity is, use animal test data and epidemiological studies to indicate patterns of concern. We think that this regulation is fully in accord with those standards of procedure for these chemicals.

[The following information was received for the record:]

We are not aware of animal testing on chloroform at 100 micrograms per liter. This dose would be too low to detect a carcinogenic effect in a small number of test animals. Computations indicate that several million animals would be required to produce a statistically significant result. Acute toxicity in test animals was not detected until much higher exposure levels experienced. A thorough review of the health effects is contained in the attached "Statement of Basis and Purpose for Trihalomethanes."

Under EPA contract, the National Academy of Sciences has reviewed the current preliminary epidemiological studies on chloroform. The NAS concluded that all of the studies had deficiencies in that confounding variables like smoking and occupation were not considered, and that more complex and detailed studies would be needed for a definitive answer on the risk level.

Mr. CARTER. We just want to know whereof we speak, to be sure where we stand. If this is the correct standard, why then let it be that.

Thank you, Mr. Chairman.

Mr. MAGUIRE. Thank you. I think we had better recess briefly here. We will be back in about 10 minutes.

[Brief recess.]

Mr. MAGUIRE. Mr. Jorling, we will resume now. Thank you for your testimony. I think there are two points that need to be clarified here from the point of view of congressional intent. Paul Rogers had asked me if I would clarify these for the record. He would have said the same thing had he been here.

The first is that it is congressional intent to push the best technology, and based on the record as we have it, the scientific record, it certainly seems to be the case that GAC is regarded as the best technology.

With respect to EPA's authority to amend interim regulations to deal with synthetic organics, we do believe that you have that authority, and that it is a flexible authority.

Mr. JORLING. Thank you, Mr. Chairman. Those issues and the way you suggest it is the way we have interpreted them, that the relationship between the health protection and technology clearly indicates that the statute is technology forcing and that there was the clear statement that the Agency should continue to provide the public health protection in the interim while it continued to press forward for the revised standards. I appreciate your clarification on those matters.

Mr. MAGUIRE. Now EPA, of course, came forward with some cost estimates that have had to be revised. On the other side, those who have been critical of the proposals I think have tended to lump together various subparts of the total problem and the proposed solutions to that problem. I want you to comment, if you would, specifically on the fact that THM treatment does not always require GAC, and that there are, many systems which do not have synthetic organic problems and, therefore, would not require GAC. Criticisms have been leveled against EPA's proposed regulation's which lump together THM treatment strategies and GAC technologies to the point where it is very difficult to retain a distinction between one and the other. Would you comment on that?

Mr. JORLING. Yes, Mr. Chairman. You are correct in identifying a lingering misinterpretation of the proposed rules. With respect to trihalomethanes, there is proposed a maximum contaminant level for those pollutants. Those pollutants are generally formed as part of the disinfection process, and the regulations provide that the community that has a difficulty; namely, a contamination level greater than the 100 parts per billion, is free to bring it down through any of a number of sequences. For instance, it could change raw water supply source. It could change disinfectant technology. It could do a number of things in addition to GAC.

We anticipate GAC would only be adopted as the cost-effective solution to the problem of the high contaminant level in very few, approximately 11 cities across the country, so that the regulations should not be interpreted as requiring GAC for all cities that have contaminant levels of trihalomethanes greater than 100 parts per billion. There are a number of ways they can achieve that, some of which are extremely, in this context, cheap, so that we do not propose that.

I cannot remember the number of communities that our earlier sampling analysis showed contamination level above 100, but if I recall correctly, it was in the neighborhood of 200——

Mr. KIMM. It is 391.

Mr. JORLING. Something on the order of 390 cities that have problems with the contaminant level of trihalomethanes, but only 11 of those do we anticipate would result in the application of GAC because of the trihalomethane problem.

Mr. KIMM. Excuse me, I believe that number is about 75. We will submit it for the record; 390 is a different figure.

[The following information was received for the record:]

A list of THM values obtained in 113 cities last year is attached. Thirty-five of these locations averaged 100 μg/1 or more at that time. In the proposed regulation we estimated that 86 water systems serving 75,000 or more persons would exceed 100 μg/1.

Mr. MAGUIRE. Fine, thank you.

Now, in some of the testimony that the committee has heard from industry, the claim is made that for all of its hearings and intention to receive comment and so on, that EPA has a closed mind on the issue, and that it tends to proceed on the basis of that closed mind regardless of comment. Would you care to comment on that?

Mr. JORLING. Yes, Mr. Chairman. I think our record as an agency in all regulatory efforts is very good and that we do not have a closed mind. The issue first of all and the criticisms to the regulations fall into two very broad categories. The first category I think we can summarize by saying some criticism is directed at us for attempting to regulate at all. They are saying there is no problem in these areas that you have attempted to come up with the regulatory response. Therefore, do not act.

On that I think perhaps people could conclude that we have continued to state we think there is a serious problem, and that that option is not one available to us, and that we do have an obligation under the statute to act to protect public health.

With respect to the second category of criticisms that were directed at us during the comment period, and unfortunately there were surprisingly few which were directed to the specific elements of the regulation, we certainly do not have a closed mind there. There were many comments directed at the regulations that identified some errors and assumptions on our part, sectional as well as otherwise, which we will certainly take into account in the final rulemaking process.

Let me just see if I can summarize some of those. There were many comments directed at our requirements specific to what happens in the event disinfection does indeed change. There were comments directed at our, I think what we call a presumption against certain disinfection. There were certain comments directed at the interim step for carbon that we had proposed as a requirement that during the period of pilot studies, that the existing media be replaced with carbon as an interim step. That was a set of comments that we are taking under very serious consideration, so that where comments were specific to the regulation, both with respect to time phasing, the specific obligations on monitoring and the like, we are very much of an open mind as to how to bring together the most understandable and commonsense set of regulations. But I think the interpretation that we are closeminded is more directed at our sense that we continue to believe the question is not whether we act—on that we feel strongly—but rather how we act, and on that we do have an open mind.

Mr. MAGUIRE. I think the committee probably would like to see you implement the law with an open mind.

Mr. JORLING. Thank you.

Mr. MAGUIRE. Thank you very much for your testimony, Mr. Jorling.

Dr. Carter, do you have additional questions.

Mr. CARTER. I believe that you were to supply me with the data that you have on chlormethanes effect as a carcinogen; is that correct?

Mr. JORLING. Chloroform has been included in the original list of 26 compounds issued by the National Cancer Institute as a known human carcinogen.

Mr. CARTER. It has been. I would like to see the data, not just for chloroform, but for the other chloromethanes and for the strength of 1 part per billion. I think that we should run animal tests on them at that level, to see if it is carcinogenic at that level.

Mr. JORLING. Again, Dr. Carter, we will be supplying to you for the record a review of the methodology of derivation of the risk assessment here in this case. Again, it does relate to exposure levels over lifetimes, and the animal testing techniques are used to concentrate lifetime exposure in a short time, so that you can make prudent judgments about the carcinogenic risk. We will supply that for the record. [See p. 174.]

I should add also that the chloroform-trihalomethane area is the area where most animal testing data have been done specific to the contaminants that are now identified in drinking water. The skimming that we have done is revealing that upward of 300 synthetic chemicals are found in some drinking water systems, and some of those such as benzene and vinyl chloride have been identified as pollutants of very serious concern.

Mr. CARTER. Yes, sir.

Mr. JORLING. And the GAC is directed at preventing public health consequences from that wide area of synthetic organic chemicals.

Mr. CARTER. Yes, sir. What is the average level of trihalomethanes in the Ohio River say at Pittsburgh, at Louisville, and at New Orleans?

Mr. JORLING. We will supply that for the record for the communities.

[The following information was received for the record:]

Chloroform and THM levels in the Ohio River at Pittsburgh or Louisville are generally below detection limits and occasionally have been in the 1 or 2 $\mu g/1$ range. Chloroform and THM levels in finished drinking water are highly variable depending upon raw water quality and treatment method as well as time and temperature. Values exceeding 100 $\mu g/1$ have been obtained in Louisville and New Orleans. The limited data we have from South Pittsburgh, Pa., in the NOMS indicated 43 $\mu g/1$ but higher levels can undoubtedly occur.

Mr. CARTER. The average levels?

Mr. JORLING. The average levels?

Mr. CARTER. Yes, sir, parts per billion.

Mr. JORLING. We will supply that for the record.

Mr. CARTER. You do not know whether it is 100 parts per billion now, or do you?

Mr. KIMM. The trihalomethanes would be of course in the distribution system, not in the raw water. The raw water would have the precursor.

Mr. CARTER. I want to know what it is in the water there. They have several monitoring stations between Pittsburgh and Louisville, and that data should be readily available.

Mr. JORLING. Dr. Carter, the trihalomethanes——

Mr. CARTER. You have funded that monitoring, though not in as many places as they wanted it.

Mr. JORLING. Let me see if I can clarify the significance.

Mr. CARTER. Yes, sir.

Mr. JORLING. Trihalomethanes are formed in the treatment process. They are not just simply taken out of the raw water and then fed into the distribution system. What is necessary in the raw water for the formation of trihalomethanes is naturally occurring organic matter, decaying organic leaves and what have you.

Mr. CARTER. We call it humic acid.

Mr. JORLING. When that is taken into the drinking water system and chlorine for disinfection purposes is injected into that, that is where the trihalomethane formation occurs. We now have data which we will supply for some of the communities on the Ohio River, including Cincinnati, Louisville, and——

Mr. CARTER. Do you mean to tell me that we do not have any naturally occurring chlorides in river water?

Mr. JORLING. I am not saying that. I am saying the concentrations——

Mr. CARTER. If there are chlorides, there would be an interaction with humic acid. We know we have bromine in the water, and that it is even worse than chlorine; is that not correct?

Mr. JORLING. The quantities of chlorine and bromine in the Ohio River are of concern.

Mr. CARTER. And you do not know the levels?

Mr. JORLING. I will attempt to determine how much routine monitoring there is.

Mr. CARTER. How can we set standards if we do not know what it is now?

Mr. JORLING. We do have the information for the cities, Dr. Carter.

Mr. CARTER. What is the information for the cities, then? You will include that for the record, too?

Mr. KIMM. We would be happy to do that. The average for the 113 cities that we have run the testing on was about 100 parts per billion, with some significantly higher, some close to the hundred, and some below that level.

Mr. CARTER. If the average is 100 parts per billion, do you want GAC used or not? What if it is over that?

Mr. KIMM. As a matter of fact, a community that had a high level of trihalomethane in their drinking water would have a variety of treatment alternatives available to it. Let me cite an example to make that perhaps more understandable.

Mr. CARTER. Yes, go right ahead.

Mr. KIMM. In Cincinnati they had observed levels of the trihalomethane in the distribution system of something in the neighborhood 200 to 250. They have a treatment process in which they pump water out of the river and put it in a series of storage lakes for 3 days. By changing the point of disinfection from the beginning of those storage lakes to the beginning of the treatment plant, which enabled much of the precursory material to be removed in settling that occurred in these basins, the observed level of trihalomethanes in the distribution system dropped from about 250 to 50, and in the process the community saved money because they used less chlorine to treat the water after some of this objectionable material had settled out.

Mr. CARTER. Was it filtered, also?

Mr. KIMM. There is natural settling that occurs in these storage lakes, and that is prior to coming into the treatment plant.

Mr. CARTER. Was it filtered, also?

Mr. KIMM. It is filtered after that point.

Mr. CARTER. Was the 50 parts per billion level before or after filtration?

Mr. KIMM. The 50 parts per billion is the average observed in the distribution system, because these reactions continued.

Mr. CARTER. In the distribution system?

Mr. KIMM. Yes.

Mr. CARTER. After filtration?

Mr. KIMM. Yes, sir.

Mr. CARTER. Doesn't Cincinnati use GAC? Hasn't Cincinnati been using GAC for the past 3 years?

Mr. KIMM. Cincinnati is beginning to develop an application of GAC.

Mr. CARTER. Beginning to develop it?

Mr. KIMM. Yes.

Mr. CARTER. They have been developing it for about 3 years, have they not?

Mr. KIMM. They are in a pilot stage on that. That is largely associated with their particular concerns for spills into the Ohio River.

Mr. CARTER. Have they not been using it for 3 years?

Mr. KIMM. Not on any large scale at all.

Mr. CARTER. Not on any large scale, but they have been using it?

Mr. JORLING. We have been assisting the city of Cincinnati in doing the pilot work and in the application of some demonstrations of carbon as we have in several other cities around the country.

Mr. CARTER. Yes, sir. Well, thank you very kindly. I think that these data are very necessary for us in order that we arrive at a sensible conclusion regarding a maximum containment level. I do not know what it will be.

Thank you, Mr. Chairman.

Mr. MAGUIRE. Thank you, Dr. Carter. We will leave the record open for the submission of the material which Dr. Carter has requested, and we would also ask you to make yourselves available for responses to written questions which will be submitted by members of the subcommittee who have not had a chance to be here this morning.

Mr. JORLING. We will be happy to do so, Mr. Chairman.

Mr. MAGUIRE. Thank you very much.

Mr. JORLING. Thank you.

[Testimony resumes on p. 284.]

[The following items were submitted for the record by the Environmental Protection Agency:]

NATIONAL ORGANICS MONITORING SURVEY

TOTAL TRIHALOMETHANES

(Micrograms per liter or parts per billion)
(100 ppb equals 0.1 ppm or 0.1 mg/l)

CITY	PHASE1 ICED	PHASE2 TERMINAL	PHASE3 TERMINAL	PHASE3 QUENCHED	PHASES AVERAGED
Albuquerque, NM	ND	1.9	45	14	15
Amarillo, TX	130	160	160	52	130
Annondale, VA	89	230	340	160	200
Atlanta, GA	37	120	110	33	75
Baltimore, MD	59	87	64	48	65
Baton Rouge, LA	6.0	0.35	ND	ND	1.6
Billings, MT	9.0	17	12	15	13
Birmingham, AL	39	110	LOST	LOST	75
Bismarck, ND	82	130	160	34	100
Boise, ID	32	0.05	LOST	LOST	16
Boston, MA	3.4	7.6	4.6	4.2	5.0
Brownsville, TX	250	670	600	290	450
Buffalo, NY	LOST	32	33	5.0	23
Burlington, VT	77	150	97	39	91
Camden, AR	17	250	140	56	120
Cape Girardeau, MO	37	290	150	70	140
Casper, WY	75	38	23	27	41
Cheyenne, WY	92	93	240	83	130
Charleston, SC	180	230	220	150	200
Charlotte, NC	47	93	85	57	71
Chattanooga, TN	72	160	120	41	98
Chicago, IL	30	69	LOST	LOST	50
Cleveland, OH	16	70	79	32	49
Columbus, OH	270	250	200	110	210
Concord, CA	76	120	130	120	110
Corvallis, OR	ND	92	83	52	57
Dallas, TX	54	96	89	78	79
Davenport, IA	65	170	94	85	100
Dayton, OH	12	74	60	14	40
Denver, CO	46	49	28	32	39
Des Moines, IA	2.0	24	21	14	15
Detroit, MI	45	44	34	11	34
Duluth, MN	15	13	11	7.1	12
Elizabeth, NJ	41	190	79	32	86
Erie, PA	28	57	31	9.9	31
Eugene, OR	22	51	20	7.7	25
Fort Worth, TX	66	87	46	45	61
Fort Wayne, IN	73	110	31	20	59
Fresno, CA	ND	0.74	LOST	LOST	0.37
Greenville, MS	ND	4.1	2.8	2.8	2.4
Grand Rapids, MI	60	110	67	39	69
Hackensack, NJ	110	160	81	90	110
Hagerstown, MD	45	200	110	57	100
Hartford, CT	38	46	35	24	36
Houston, TX	210	460	190	150	250
Huntington, WV	9.2	230	140	55	110
Huron, SD	420	260	290	240	300
Illwaco, WA	250	260	230	250	250
Indianapolis, IN	35	180	61	51	82
Jackson, MS	290	270	330	70	240
Jacksonville, FL	15	4.2	9.0	6.6	8.7
Jersey City, NJ	57	84	71	42	64
Kansas City, MO	35	52	26	23	34
Lincoln, NE	34	27	21	28	28
Little Rock, AR	3.0	80	LOST	LOST	42
Los Angeles, CA	38	65	68	23	49
Las Vegas, NV	53	87	110	54	76

CITY	PHASE1 ICED	PHASE2 TERMINAL	PHASE3 TERMINAL	PHASE3 QUENCHED	PHASES AVERAGED
Louisville, KY	120	240	150	80	150
Madison, WI	ND	0.06	ND	ND	0.02
Manchester, NH	79	77	48	35	60
Melbourne, FL	460	780	680	260	550
Memphis, TN	7.0	18	40	1.1	17
Milwaukee, WI	18	20	13	12	16
Monroe, MI	54	63	78	38	58
Montgomery, AL	68	210	110	53	110
Mount Clemens, MI	23	93	53	24	48
Nashville, TN	8.0	36	23	27	24
New Haven, CT	36	63	85	13	49
Newport, RI	93	310	130	96	160
Norfolk, VA	130	250	130	86	150
Oklahoma City, OK	230	200	210	140	200
Oakland, CA	31	37	58	54	45
Omaha, NE	65	210	120	68	120
Passaic Valley, NJ	80	150	160	110	130
Phoenix, AZ	150	190	120	55	130
Portland, ME	8.2	11	6.1	4.4	7.4
Portland, OR	8.0	25	23	22	20
Poughkeepsie, NY	62	93	LOST	LOST	78
Providence, RI	5.0	14	5.3	7.8	8.0
Provo, UT	23	10	13	3.6	12
Pueblo, CO	14	8.6	6.6	9.1	9.6
Richmond, VA	25	32	47	31	34
Rockford, IL	7.0	14	8.9	1.5	7.9
Rome, GA	65	110	110	31	79
Sacramento, CA	5.6	33	47	29	29
Salt Lake City, UT	25	37	96	13	43
San Antonio, TX	ND	17	35	0.37	13
San Diego, CA	87	150	110	39	97
San Francisco, CA	76	120	87	29	78
CA Aqueduct, CA	120	160	120	59	110
Sante Fe, NM	76	110	400	130	180
Sioux Falls, SD	62	140	LOST	36	79
South Pittsburg, PA	34	120	7.5	12	43
Spokane, WA	ND	3.5	4.2	ND	1.9
Springfield, MA	18	20	31	11	20
St. Croix, VI	73	1.3	7.1	9.3	23
St. Louis County, MO	11	110	41	41	51
St. Paul, MN	59	150	80	71	90
Syracuse, NY	17	32	23	1.9	18
Tacoma, WA	7.7	10	LOST	LOST	8.9
Tampa, FL	230	340	220	120	230
Terre Bonne Parish, LA	110	230	170	69	140
Toledo, OH	29	64	51	6.1	38
Topeka, KS	210	170	250	92	180
Tulsa, OK	20	67	75	38	50
Washington, DC	67	150	130	110	110
Waterbury, CT	85	130	180	37	110
Waterford Township, NY	61	90	130	51	83
Wheeling, WV	120	310	160	45	160
Whiting, IN	LOST	3.7	7.1	ND	3.6
Wichita, KS	6.1	21	39	41	27
Wilmington Stanton, DE	60	79	73	45	64
Yuma, AZ	110	87	85	62	86

STATEMENT OF BASIS AND PURPOSE FOR AN AMENDMENT TO THE NATIONAL INTERIM PRIMARY DRINKING WATER REGULATIONS ON TRIHALOMETHANES

JANUARY 1978

OFFICE OF WATER SUPPLY
CRITERIA AND STANDARDS DIVISION
ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

TABLE OF CONTENTS

I. Introduction

The extent and significance of organic chemical contamination of drinking water or drinking water sources first came to public attention in 1972, when a report, "Industrial Pollution of the Lower Mississippi River in Louisiana" was published (EPA, 1972). While this report did not include quantification of the pollutants found, and was directed toward locating industrial discharges responsible for the pollution, the report did include analyses of finished (treated) drinking water and provided evidence of the presence of trihalomethanes (THM) in such water. Subsequently, a more thorough examination of finished drinking water in the New Orleans area was carried out, using the most sophisticated analytical methods available (EPA, 1974). This latter study confirmed the presence of trihalomethanes and many other organic chemicals in finished drinking water, and furthermore demonstrated that one of them, chloroform, was present in extremely high relative concentrations.

The findings in New Orleans promoted other studies, primarily for the purpose of determining how widespread and serious the organic chemical contamination of drinking water was. Impetus was added by the passage of the Safe Drinking Water Act (P. L. 93-523), which directed the

Environmental Protection Agency to conduct a comprehensive study of public water supplies and drinking water sources to determine the nature, extent, sources of, and means of control of contamination by chemicals or other substances suspected of being carcinogenic. The National Organics Reconnaissance Survey of Halogenated Organics (NORS) (Symons, et. al 1975), or "80 City Study", was aimed primarily at determining the extent of the presence of four trihalomethanes, chloroform, bromodichloromethane, dibromochloromethane and bromoform, along with carbon tetrachloride and 1, 2-dichloroethane, and at determining what effect raw water source and water treatment practices had on the formation of these compounds (refer to Table 1). The presence of trihalomethanes in finished drinking water was confirmed, and some trend relating non-volatile total organic carbon (NVTOC) of the raw water and the total trihalomethane concentration (TTHM) was postulated. Chloroform occurred invariably in water which had been chlorinated, while it was absent or present at lower concentrations in the raw water. Water samples were collected at the treatment plant in winter and iced for shipment but not dechlorinated. Thus, these values might approximate minima for human exposure in the areas selected. Of the various

Table 1. Analytical Results of Chloroform, Bromoform, Bromodichloromethane, and Dibromochloromethane and Trihalomethane in Water Supplies from NORS and NOMS

	Concentrations in mg/liter				
	NORS	NOMS			
		Phase I	Phase II	Phase III	
				Dechlorinated	Terminal
	Chloroform				
Median	0.021	0.027	0.059	0.022	0.044
Mean	-	0.043	0.083	0.035	0.069
Range	NF-0.311	NF-0.271	NF-0.47	NF-0.20	NF-0.540
	Bromoform				
Median	0.005	LD	LD	LD	LD
Mean	-	0.003	0.004	0.002	0.004
Range	NF-0.092	NF- 0.039	NF-0.280	NF-0.137	NF-0.190
	Dibromochloromethane				
Median	0.001	LD	0.004	0.002	0.003
Mean	-	0.008	0.012	0.006	0.011
Range	NF-0.100	NF- 0.19	NF-0.290	NF-0.114	NF-0.250
	Bromodichloromethane				
Median	0.006	0.010	0.014	0.006	0.011
Mean	-	0.018	0.018	0.009	0.017
Range	NF-0.116	NF-0.183	NF-0.180	NF-0.072	NF-0.125
Total	Trihalomethane (TTHM)				
Median	0.027	0.045	0.087	0.037	0.074
Mean	0.067	0.068	0.117	0.053	0.100
Range	NF-0.482	NF-0.457	NF-0.784	NF-0.295	NF-0.695

NF = not found
LD = less than detection limit

trihalomethanes, chloroform was found at the highest concentrations (averaging approximately 75 percent of the total THM), with progressively less bromodichloromethane, dibromochloromethane and bromoform being detected. In some cases chloroform was found at concentrations greater than 0.300 mg/l; (the highest value found was 0.540 mg/l). Carbon tetrachloride and 1, 2-dichloroethane were found at very low concentrations. The concentration of these two components did not increase after the chlorination process, therefore, it can be assumed that the presence of these compounds is not related to the disinfection process.

A Joint Federal/State Survey of Organics and Inorganics in 83 Selected Drinking Water Supplies, carried out by EPA's Region V (Chicago) provided additional evidence of the ubiquitous nature of chloroform and other trihalomethanes in chlorinated drinking water (EPA, 1975). Two conclusions reached in that study were that raw water relatively free of organic matter results in finished water that is relatively free of chloroform and related halogenated compounds, and that there is a correlation in some instances between the concentrations of chloroform, bromodichloromethane, dibromochloromethane and bromoform in finished water and the amount of organic matter found in raw water. It appeared that these compounds resulted from the chlorination of precursors in the raw water.

A more recent study, the National Organics Monitoring Study (NOMS), directed by Section 141.40 of the National Interim Primary Drinking Water Regulations (40 F.R. 59574, December 24, 1975), was aimed not only at determining the presence of trihalomethanes in additional water supplies, but also at determining the seasonal variations in concentration of these substances.

The NOMS sample size was 113 public water systems designated by the Administrator. The study also included analyses for approximately 20 specific synthetic organic chemicals deemed to be candidates of particular concern and analyses of several surrogate group chemical parameters which are indicators of the total amount of organic contamination. Three phases of this study have been completed and the mean, minimum, and maximum values of chloroform and trihalomethanes in drinking water are reported in Table 1. Phase I analyses in the NOMS were conducted similarly to the NORS. Phase II analyses were performed after the THM-producing reactions were allowed to run to completion. Phase III analyses were conducted on both dechlorinated samples and on samples that were allowed to run to completion (terminal). Again chloroform was found at the highest concentrations in most cases, however, in a few cases bromoform was found to be the highest concentration of the THM's (0.280 mg/l). The mean concentrations of chloroform were 0.043 mg/l, 0.083 mg/l, 0.035 mg/l, and 0.069 mg/l for Phase I, II, III (dechlorinated) and III (terminal), respectively;

the mean concentrations for total trihalomethanes were 0.068 mg/l, 0.117 mg/l, 0.053 mg/l and 0.100 mg/l for Phase I, II, III (dechlorinated) and III (terminal), respectively.

II. The Role of Chlorination

All evidence indicates that chlorination of drinking water containing organic chemicals is the major factor in the formation of halogenated organic chemicals, particularly the trihalomethanes in finished drinking water. Chlorinated organic compounds, however, can also be introduced into our drinking water from industrial outfalls, urban and rural runoff, rainfall, through polluted air or from the chlorination of sewage and industrial wastewater.

Several studies in addition to those mentioned above, have demonstrated increased trihalomethane concentrations in drinking water. Work by J.J. Rook (1974) in the Netherlands, and the studies by Bellar, Lichtenberg and Kroner (1974), showed that chloroform and other halogenated methanes are formed during the water chlorination process. It should be noted that these findings came as a result of the development of more sensitive and refined analytical techniques. Recent work by Rook (1974, 1977) has provided some insight as to the organic precursors which might be responsible for the formation of the trihalomethanes. Studies by Sontheimer and Kuhn (1977) indicate that the THM's may represent only a portion of the total halogenated products of chlorination of water. Bunn et al. (1975)

have demonstrated that hypochlorite in the presence of bromide and iodide ions but not fluoride will react with natural organic matter to produce all ten possible trihalogenated methanes.

It can be concluded from the above studies and others that the trihalomethanes occur in chlorinated drinking waters, and that the concentrations of the various trihalomethanes are dependent on the type and quantity of organic precursor substances, the amount of chlorine used, and the presence of other halogen ions as well as contact time, temperature and pH.

There are a number of methods available for reducing levels of THM's in drinking water. These options include modifications of current treatment practices, such as moving the point of chlorination, the use of alternative disinfectants such as chlorine dioxide or ozone, and various methods that will reduce organic precursor concentrations such as use of adsorbents like granular activated carbon (GAC).

The two chemicals most often mentioned as alternative disinfectants, chlorine dioxide and ozone, are both well known as effective disinfectants and chemical oxidants, and some history of their practical use in water treatment has been accumulated particularly in Europe.

EPA is currently involved in studying the health effects of chlorine dioxide in water, utilizing several animal species. Studies of the toxicology of chlorine dioxide and chlorite ion in drinking water reveal considerable variations. These compounds have been reported to affect the hematopoietic systems such as oxidative changes in hemoglobins and hemolysis of red blood cells. Other bioeffects observed include gastrointestinal disturbances. The preliminary results indicate species variability in biological manifestations. Cats and African green monkeys appear to lie at the extreme ends of the spectrum from among the species studied; cats are very sensitive to the hematopoietic effects whereas monkeys were apparently insensitive even at levels as high as 200 mg/l. An upper limit for chlorine dioxide usage has been set primarily because of the lack of data concerning the safety of this material, and particularly its decomposition products, at higher concentrations (Musil et al., 1963 and Fridlyand and Kagan, 1971). Studies with cats have shown that chlorite, which is an oxidant and can cause anemias, has a deleterious effect on red blood cell survival rate at chlorine dioxide concentrations above 10 mg/l. Therefore a limit of 1.0 mg/l is necessary to prevent potential adverse effects on sensitive individuals, particularly children.

A preliminary study concerning ozonation of 29 organic compounds potentially present in water supply sources indicated the formation of a number of products (Cotruvo, Simmon, Spanggord, 1976, 1977). These reaction mixtures were assayed for mutagenic activity employing 1) five strains of *Salmonella typhimurium* (Ames Salmonella/microsome assay) and 2) mitotic recombination in the yeast *Saccharomyces cerevisiae* D3. After very extensive ozonation in water some of the organic compounds exhibited mutagenic activity in these systems. Similar studies under extreme conditions with chlorine dioxide byproducts thus far have exhibited minimal mutagenic activity.

Combining ammonia with chlorine to form chloramines has been called the chloramine process, chloramination, and combined residual chlorination. The products of this process are monochloramines, dichloramines or trichloramines (nitrogen trichloride) depending on the pH and the chlorine to ammonia ratio. The production of the latter species is referred to as "breakpoint" chlorination and may contribute to taste and odor problems in the finished water.

Based on the results of numerous investigations, the comparative disinfectant efficiency of chloramines ranks last when compared to ozone, chlorine dioxide, hypochlorous acid (HOCL), and hypochlorite ion (OCl^-) (NAS, 1977). Early studies by Butterfield and Waties (1944, 1946, 1948) demonstrated that chloramines required approximately a 100 fold increase in contact time to inactivate coliform bacteria and enteric pathogens as compared to free available chlorine at pH 9.5. This work was later confirmed in 1953 by Kabler (1953) and by Clarke et al., (1962).

Results with cysts of <u>Entamoeba</u> <u>histolytica</u> and viruses also confirm the decreased effectiveness of chloramines as a disinfectant. Studies by Fair et al., (1947) showed that additional dichloramine is about 60 percent and monochloramine about 22 percent as effective as hypochlorous acid at pH 4.5 cysts of <u>E. histolytica.</u> Kelly and Sanderson (1960) found that chloramines in the concentration of 1 mg/l at 25°C required 3 hours at pH 6, or 6 to 8 hours at pH 10 to achieve a 99.7 percent inactivation of polio virus. With 0.5 mg/l free chlorine at pH 7.8, by comparison, inactivation of 99.99 percent of polio virus can be achieved in approximately 15 minutes (Liu and McGrowan, 1973).

Chloramine treatment finds its widest application in maintenance of chlorine residuals in the distributing systems. The health effects of water treatment with chloramine have not been studied in detail.

Although these disinfectants do not produce trihalomethanes, questions have also been raised on both their toxicology and the toxicology of their by-products. Studies are underway to clarify this matter and could result in the designation of maximum permissible levels for certain disinfectants when applied to drinking water. In the meantime, EPA has determined that chlorine dioxide applications should be limited to no more than one milligram per liter which is not uncommon in today's usage and that chloramines should not be used as primary disinfectants.

The use of adsorbents for trihalomethane removal has also introduced some unknown factors. Assuming that the adsorption process is effective for its intended purpose, there is always the possibility that a breakthrough of adsorbed chemicals will occur, that these substances will be adsorbed and subsequently slough off to produce contaminant concentrations intermittently, or that bacteria and/or toxins will be added to the water from growth on the adsorbent. All of these potential effects are controllable in practice, and EPA encourages the use of GAC to purify contaminated waters and to control THM precursors.

Thus, it is essential that the THM concentrations be reduced but without compromising public health from either infectious disease transmission or from the technology that is used. Outbreaks of infectious waterborne disease have been noted when there have been breakdowns in chlorination. The alternative control methods outlined previously are effective and are also being studied for their possible side effects. As soon as data becomes available EPA will make specific recommendations regarding their use. At the present time the best approach to reduce the organic precursors is to use adsorbents such as GAC. This approach has the benefit of reducing the concentrations of many of the organic chemicals in the water in addition to the precursors to THM and other cholorinated organics. Thus, once the organic chemical concentrations in the water have been reduced, the chemical demand for applied disinfectant will also be reduced, thus human exposure to all disinfectant chemicals, and their degradation products and by-products will be minimized.

III. Sources of Trihalomethane Exposure

McConnell et al. (1975) have reported that chloroform occurs in many common foods and that while some halogenated compounds in food may result from manufacturing and pest control practices, chloroform may be introduced as the result of geochemical processes. Chlorinated compounds are the halogenated species most prevalent in food, but at least one food, Limu Kohu, a seaweed or alga eaten in Hawaii, contains an essential oil which is composed largely of bromoform (Burreson, et al. 1976).

Chloroform has been widely used as an anesthetic, and until recently was a common ingredient in dentifrices and cough preparations. The Food and Drug Administration has taken action to halt the use of chloroform in drug products, cosmetic products, and food-contact articles (41 F.R. 145026, April 9, 1976). The Environmental Protection Agency has issued a notice of "rebuttable presumption" against continued registration of chloroform-containing pesticides (41 F.R. 14588, April 6, 1976). Thus, in addition to drinking water, exposure to some or all of the trihalomethanes is complicated by other environmental sources, however, exposure from some of those sources is being reduced.

The relative contribution and uptake of chloroform can be estimated for three major sources of human exposure: atmosphere, drinking water, and the food supply. The calculations of human uptake were based on the fluid intake, respiratory volume, and food consumption data for reference man as compiled by the International Commission on Radiological Protection. The combined uptake for human adults from all three sources was estimated by multiplying estimated exposure levels times estimated intakes.

Human uptake of chloroform from air, food and drinking water is given in Table 2. Chloroform and trihalomethane uptake from drinking water was estimated by multiplying the chloroform and trihalomethane concentrations found in drinking water supplies from NOMS data (Table 1) and the average consumption of 2 liters of water per day. One hundred per cent absorption of the amount of chloroform in drinking water was assumed for these calculations. The total chloroform uptake from water was estimated as a mean value of 64 mg per year and a maximum uptake value of 343 mg per year.

In order to determine human uptake of chloroform from foods, the concentrations of chloroform in various foods was multiplied by the average consumption of each food item in North American diets which was multiplied by the average consumption of each food item by human adults in the United States, and one hundred per cent absorption of ingested chloroform was assumed. A calculated maximum value of about 16 mg of chloroform uptake per year and a mean value of 9 mg per year from total food consumed was obtained.

The calculation for the uptake of chloroform by humans from air was based upon the assumption that an average of 63 per cent of chloroform present in ambient air was absorbed after inhalation; the volume of air inhaled by an average adult was taken as 8.1×10^{6} liters per year; 0.02 and 10 ppb (by volume) chloroform concentrations in urban air as minimum and maximum values, respectively. The minimum and maximum values for the

Table 2. Human Uptake of Chloroform and Trihalomethanes from Drinking Water, Food and Air

	Exposure Levels mg/year		
Chemical	Drinking Water Mean (Range)	Food Mean (Range)	Air* Mean (Range)
Chloroform	64 (0.001-0.540)	9 (2 - 15.97)	20 (0.41 - 204)
Trihalomethanes	85 (0.001-0.784)	-	-

* Calculated from data supplied by Strategies and Air Standards Division, Office of Air Quality Planning and Standards. Environmental Protection Agency, Research Triangle Park. The air samples were collected both from the rural and industrial areas during the years 1974 - 76. The mean value was derived from the concentrations obtained from urban industrialized areas, the minimum value from the rural area and the maximum value from an urban industrialized area.

uptake of chloroform by an adult were estimated as 0.41 and 204 mg per year respectively. At minimum conditions from all sources of exposure the atmosphere contributes 13 percent of the total chloroform while the drinking water contributes 23 percent and food is most significant. At maximum conditions from all sources water is the major contributor at 61 percent, with air at 36 percent. Under conditions of maximum exposure from the water and minimum exposure from the air, the major contribution by far is drinking water as a source of chloroform uptake, which is estimated to be as much as 97 per cent. Thus, relative contributions of drinking water as a source of chloroform to the total body burden may change from a moderate to a maximum contributor as the annual exposure from water ranges from nil to 343 mg/year and from 204 to 0.41 mg/year in ambient air.

IV. Metabolism

Several reports (Brown, et al., 1974: Labigne & Marchand, 1974; Fry et al., 1972 Paul and Rubinstein, 1963; Taylor et al., 1974) have indicated that chloroform is rapidly absorbed on oral and intraperitoneal administration and subsequently metabolized to carbon dixoide and unidentified metabolites in urine. Species variation in the metabolism of chloroform has been

Table 3. Uptake of Chloroform for the Adult Human from Air, Water, and Food

Source	Adult mg/yr	Percent uptake
Maximum Conditions		
Atmosphere	204	36
Water	343	61
Food Supply	16	3
Total	563	100.00
Minimum Conditions		
Atmosphere	0.41	13
Water	0.73	23
Food Supply	2.00	64
Total	3.14	100.00
Max-Water Min-Air		
Atmosphere	0.41	1
Water	343.00	97
Food Supply	9.00	2
Total	352.41	100.00

summarized in Table 4. It is noteworthy that the mouse, a species which shows greater sensitivity to the oncogenic effect of (Brown et al. 1974) chloroform (Eschenbrenner & Miller 1945), metabolized chloroform extensively to carbon dioxide (80%) and unidentified metabolites (3%) from an oral dose of 60 mg/kg. Rats also metabolize chloroform to carbon dioxide but to a lesser extent (66%). In another report, Paul and Rubinstein (1963) recovered 4 percent carbon dioxide after administering 1484 mg/kg chloroform intraduodenally to rats. The discrepancy in these two results may be dose related.

Dose related differences in the metabolism of compounds are known and have recently been reported for the carcinogen vinyl chloride. Non-human primate squirrel monkeys, when given 60 mg/kg of chloroform orally excreted 97 per cent of the dose with 17 per cent as carbon dioxide and 78 per cent as chloroform. Fry et al., (1972) recovered unmetabolized chloroform ranging from 17.8-66.6 percent of a 500 mg dose of chloroform given to human volunteers during an 8 hour time period (equivalent to about 7 mg/kg). Since the metabolism of xenobiotics is also dependent on age and sex, the widespread variation in the quantitative disposition of chloroform in human subjects may be due to the experimental protocols wherein subjects ranging from 18-50 years of age were used.

Table 4. Disposition of Chloroform - Species Variation

ANIMAL SPECIES	SEX	STRAIN	DOSE mg/kg	METABOLISM (PERCENT) $CHCl_3$	CO_2	URINE FECES	TOTAL EXCRETION	REFERENCES
MOUSE	M	CBA CF/LP C57	60 po	6	80	3	93*	Brown <u>et al</u> (1974)
RAT	M	Sprague Dawley	60 po	20	66	7	93	Brown <u>et al</u> 1974
RAT	–	—	1484 id	70				Paul & Rubstein (1963)
RAT	M	Sprague Dawley	4710 ip		0.39			
MONKEY	M	Squirrel	60 po	78	17	2	97	Brown <u>et al</u> (1974)

*Includes radioactivity in carcas.
Po = Orally
id = intradeudenally
ip = intraperitoneal

A related halogenated hydrocarbon, carbon tetrachloride (CCl_4) has been shown (NCI, 1976) to be carcinogenic in Osborne-Mendel rats and in B6C3F1 mice at dosages ranging from 57-160 mg/kg and 1250-2500 mg/kg respectively. Dosages for oncogenic effects of chloroform were 90-200 mg/kg for rats and 138-477 mg/kg for mice. Metabolic similarities between those compounds include the appearance of halide ions in urine and carbon dioxide in breath. Carbon dioxide is one of the major metabolites of chloroform in mice and rats whereas it is a minor one in carbon tetrachloride metabolism. Carbon tetrachloride also is metabolized to chloroform in trace amounts, which may in turn, be biotransformed to carbon dioxide. Carcinogenicity of carbon tetrachloride, however, has been attributed to a free radical (CCl_3) which is postulated as an intermediate in the metabolic processes.

Many carcinogens have been reported to form complexes with proteins, DNA and RNA (Miller & Miller, 1966). In some instances the first stage in chemical carcinogenesis may involve metabolism of the carcinogen to a secondary and more active compound. In the case of chloroform, Ilett et al., (1973) reported covalent bonding of chloroform metabolite(s) to tissue macromolecules of mice. The covalent bonding increased or decreased when the animals were pretreated with phenobarbital or piperonyl butoxide, agents which stimulate or inhibit the metabolism of foreign compounds by drug metabolizing enzymes. This is suggestive of the involvement of chloroform metabolism in these processes.

Information regarding the metabolism of bromoform and other haloforms is not available. However, the structural similarities of these haloforms with chloroform indicate that these compounds should also be absorbed by the oral and inhalation routes of exposure and then biotransformed into carbon dioxide and halide ions. Related halogenated hydrocarbons of the dihalomethane series, i.e. dichloromethane, dibromomethane and bromochloromethane have been reported (Kubic et al. 1974) to be metabolized to carbon monoxide; the rate of metabolism of dibromomethane was higher than that of the chloro isomer.

V. Acute and Chronic Health Effects

Biologic responses on exposure of chloroform to mammals include its effect on the central nervous system resulting in narcosis, hepatotoxicity, nephrotoxicity, teratogenicity, and carcingenicity. Reported $LD_{50's}$ are as follows: for rats 300 mg/kg administered orally (DHEW, 1978) and for mice 705 mg/kg (Plaa, et al. 1958).

Acute studies involving single dosage level in animals have been reported by several researchers. Jones et al. (1958) studied the effect of various doses of chloroform fed to mice and made the following observations after 72 hours of exposure:

35 mg/kg -- threshold hepatotoxic effect - minimal midzonal fatty changes
70 mg/kg -- minimal central fatty infiltration
140 mg/kg -- massive fatty infiltration
350 mg/kg -- centrilobular necrosis
1100 mg/kg -- minimum lethal dose

In regard to acute effects on exposure to chloroform and bromoform, species variation has been observed. Reported lethal doses for chloroform and bromoform are:

Species	Subcutaneous Lethal Dose	Values in mg/kg
Mouse	LD_{50}	704 (Chloroform) 1820 (Bromoform)
Rabbit	LD_{L0}	800 (Chloroform) 410 (Bromoform)

Data on the acute toxicity of dibromochioromethane and dichloromethane are not available.

A. Hepatotoxicity

Plaa et al. (1958) established a dose-response relationship in mice, measuring parameters indicative of hepatotoxicity. ED_{50} values of 1.4 mM/kg (166 mg/kg) were found in mice which received chloroform subcutaneously. The inhalation exposure of chloroform by mice for 4 hours at concentrations ranging from 100-800 ppm resulted in fatty infiltration of the liver at all dose levels. These changes were observed at necropsy after 1 - 3 days of exposure.

Like chloroform, bromoform exposure leads to fatty degeneration and centrilobular necrosis of the liver (von Oettingen, 1953). Dibromochloromethane and dichlorobromomethane may bring about similar responses.

B. Nephrotoxicity

Nephrotoxic effect of chloroform was studied by Plaa and Larson (1965). Median effective doses (ED_{50}) of chloroform in mice were 178 mg/kg as measured by phenolsulfophthalein excretion. Increases in urinary protein and glucose, indices of kidney damage, had an ED_{50} 104 mg/kg for chloroform. Data concerning the nephrotoxic effect of other trihalomethanes are not available.

C. Teratogenicity

Teratogenic response on oral dosing of animals to chloroform were investigated by Thompson et al. (1973). Rats and rabbits were administered chloroform at 126 and 50 mg/kg respectively. No significant fetal deformities were observed. Inhalation of chloroform by Sprague Dawley rats at 30, 100 and 300 ppm for 7 hours a day on days 6 through 15 of gestation revealed significant fetal abnormalities including: acaudia, imperforate anus, subcutaneous edema, missing ribs and delayed skull ossification (Schwetz etal. 1974).

In an attempt to explain reproductive failure in laboratory animals i.e. mice and rabbits, McKinney et al. (1976) conducted a study using CD-1 mice wherein groups of mice were given tap water and purified tap water (passed through a Corning 3508 ORC and a Corning 3508 B demineralizer). The analysis of the water indicated reduced amounts of chlorinated compounds in the purified water. The study was inconclusive in relating chloroform and other chlorinated organics in tap water to reproductive failures in laboratory animals, since the concentration of chlorinated organics in water was lowest in months when reproductive failure was highest, although there did appear to be small differences in these parameters between the highly purified and tap water. In another study involving the effect of Durham tap water and purified tap water as in the above study, Chernoff (1977) did not find striking differences in the reproductive parameters of CD-1 mice. No teratogenic studies on the haloforms other than chloroform were available.

D. Mutagenicity

The trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane and bromoform) were assayed for *in vitro* mutagenic activity using strains of *Salmonella typhimurium* (TA100 & TA1535). The assays were conducted in desiccators such that each compound was allowed to volatilize and only the vapor phase came in contact with bacteria on the petri plates. The activation system was tested and found not to be required for the bromohalomethanes since they were positive in the absence of activation. The results obtained were as follows: (a) chloroform was not mutagenic in TA100 neither with or without activation nor in TA 1535 without activation; (b) bromodichloromethane was mutagenic in TA100 without activation, with a doubling dose of approximately 25 microliters; (c) dibromochloromethane was mutagenic in TA100 without metabolic activation, with a doubling dose of approximately 3.5 microliters; (d) bromoform was mutagenic in TA100 without metabolic activation, with a doubling dose of approximately 25 microliters, and was also mutagenic in TA1535 with metabolic activation, with a doubling dose of approximately 100 microliters (Tardiff, 1976). All three compounds demonstrating mutagenic activity did so in a dose-response mode. For certain classes of compounds the Ames test which utilizes Salmonella typhimurium bacteria correlates highly (90 percent) with the *in vivo* carcinogenicity bioassay. However, for certain chlorinated hydrocarbons the test has been shown to have limitations in detecting gene mutations (Ames et al., 1973), which can be demonstrated in other test systems.

E. Carcinogenicity

Prolonged administration of chloroform at relatively high dose levels to animals, specifically mice and rats, manifested oncogenic effects. The investigation conducted by Eschenbrenner and Miller (1945) revealed hepatomas in female mice (strain A) given repeated dosages ranging from 0.145 to 2.32 mg of chloroform for a period of four months. Minimum doses of 593 mg/kg chloroform per day (total of 30 doses) produced tumors in all of the surviving animals.

In a more recent study (NCI, 1976) linking chloroform with oncogenicity, rats and mice of both sexes were fed doses of chloroform ranging from 90 to 477 mg/kg. In this study, the lowest dose for observed carcinogenic effect (kidney epithelial tumors) in male rats was 100 mg/kg and for mice 138 mg/kg administered to the animals for a total period of 78 weeks. A related halogenated hydrocarbon, carbon tetrachloride, has been shown as carcinogenic in Osborne Mendel rats and in B6C3F1 mice at dosages ranging from 47 to 160 mg/kg and 1250 to 2500 mg/kg, respectively. The incidence of hepatocellular tumors formed in these animals at both dose levels almost approached one hundred percent (Table 5). The percent survival in mice treated with chloroform and carbon tetrachloride is depicted in Table 6. Almost all the animals on treatment with carbon tetrachloride died between 91 - 92 weeks whereas with chloroform treatment at both dose levels, 73 and 46 percent of the animals survived. Miklashevskii et al. (1966) fed chloroform to rats at 0.4 mg/kg apparently for 5 months and detected no histopathological abnormalities after this treatment. A recent study on the carcinogenic effect of chloroform at dose levels of 17 mg/kg/day and 60 mg/kg/day was conducted by Roe (1976), utilizing the rat (Sprague-Dawley), the beagle dog and four strains of mice (ICC Swiss, C57Bl, CVA and CF/1). Comparison with the NCI study (1976) indicates that the number of animals and the duration of the experiment were essentially similar; the major differences

Table 5. Comparison of Hepatocellular Carcinoma Incidence in Chloroform and Carbon Tetrachloride-Treated Mice

Animal Group		Chloroform	Carbon Tetrachloride
Males	Controls	5/77	5/77
	Low Dose	18/50	49/49
	High Dose	44/45	47/48
Females	Controls	1/80	1/80
	Low Dose	36/45	40/40
	High Dose	39/41	43/45

Table 6. Comparison of Survival of Chloroform and Carbon Tetrachloride - Treated Mice

		Chloroform			Carbon Tetrachloride		
Animal Group		Initial No.	78 Weeks	90 Weeks	Initial No.	78 Weeks	91-92 Weeks
Males	Controls	77	53	38	77	53	38
	Low Dose	50	43	37	50	11	0
	High Dose	50	41	35	50	2	0
Females	Controls	80	71	65	80	71	65
	Low Dose	50	43	36	50	10	0
	High Dose	50	36	11	50	4	1

were the dosages, which were lower than in the NCI study, and the vehicle, which was toothpaste. The only finding of neoplasia was an excess of tumors of the renal cortex in the male ICI-Swiss mice at a dose level of 60 mg/kg/day. However, animals fed 17 mg/kg/day of chloroform showed no incidence of renal carcinoma.

Some renal tumors were also seen in control animals in a later study. The negative results observed in the dog experiment may be explained on the basis that either the animals were not exposed for a suitable length of time (i.e. duration of life span) or that an insufficient number of animals were tested, or that this species may not have been responsive to the oncogenic effect of chloroform. The negative results of the rat study may be explained on the basis of lack of strain sensitivity.

Much less information is available on the carcinogenicity of bromohalomethanes. Preliminary results from the strain A mouse pulmonary tumor induction technique (Theiss et al., 1977) indicated that bromoform produced a positive pulmonary adenoma response while chloroform did not. Other studies (Poirier, et. al., 1975) indicated that in several instances brominated compounds exhibited more carcinogenic activity than their chlorinated analogs in the pulmonary adenoma bioassay.

VI. Human Health Effects

A. NAS Principles of Toxicological Evaluation.

The NAS (1977) in a recent report entitled "Drinking Water and Health" identified several principles that are the basis of assessing the irreversible effects of long and continued exposure to carcinogenic substances on humans at low dose rates.

Principle 1: Effects in animals, properly qualified, are applicable to man.

Principle 2: Methods do not now exist to establish a threshold for long-term effects of toxic agents.

Principle 3: The exposure of experimental animals to toxic agents in high doses is a necessary and valid method of discovering possible carcinogenic hazards in man.

Principle 4: Material should be assessed in terms of human risk, rather than as "safe" or "unsafe".

On the basis of chloroform studies in animals and human toxicological data the NAS (1977) has recommended that strict criteria should be applied for establishing exposure limits.

The National Institute for Occupational Safety and Health has recommended that the occupational exposure to chloroform should not exceed 2 ppm determined as time-weighted average exposure for up to a 10 hour work day.

The human health effects as observed in accidental, habitual, and occupational exposures appear to indicate that the bioeffects on exposure to chloroform are similar to that found in experimental animals. These include the effects on the central nervous system, liver and kidney.

The symptoms observed (Storms, 1973) in a 14 year old patient following an accidental exposure to an unknown amount of chloroform included cyanosis, difficulty in breathing and unconsiousness. Liver function tests measured by serum enzyme levels after four days of ingestion indicated very high levels of SGOT, SGPT, and LDH. The authors also noted cerebellar damage characterized by an instability of gait and a slight tremor on finger-to-nose testing. The symptoms disappeared in two weeks.

Several cases of habitual chloroform use have also been recorded by Heilbrunn et al. (1965). A case study of interest was a 33 year old male who had habitually inhaled chloroform for 12 years. The subject showed psychiatric and neurological symptoms including restlessness, hallucinations, convulsions, dysarthria, ataxia and tremor of tongue and fingers.

Lunt (1953) reported on the delayed chloroform poisoning in obstetric patients. Laboratory findings indicated renal dysfunction including: albumin, red blood cells, and pus in the urine. Chloroform exposure to humans by inhalation was studied by Lehman and Schmidt-Kehl (1936). Ten different concentrations of chloroform were used and the chloroform concentrations were determined by the alkaline hydrolysis method. Exposure at concentrations of 7 ppm for 7 minutes and at all higher levels up to 3000 ppm caused symptoms of central nervous system depression.

Limited information is available on the controlled bio-effect studies in humans exposed to chloroform. Desalva et al. (1975) studied the effects of chloroform in humans; the subjects were given dentifrice containing 3.4% chloroform and mouthwash with 0.43% chloroform for 1 to 5 years. No hepatotoxic effects were observed at estimated daily ingestion of 0.3 to 0.96 mg/kg chloroform. Reversible hepatotoxic effects were manifested at 23 to 37 mg/kg/day chloroform ingested for 10 years in a study conducted by Wallace (1959).

B. Epidemiologic Studies.

As of July 1977 there had been 11 different epidemiological studies with additional unpublished reports that investigated the relationship between cancer mortality and morbidity and consituents in drinking water. Two of the studies have been published, three others were submitted for publication as of July 1977, and the remaining studies were unpublished. All of the studies were retrospective in design; nine were correlations using an indirect design, two used a case-control or direct design approach. Two studies utilized cancer morbidity or incidence rather than mortality as a measure of disease frequency. The studies vary in sample size, cancer sites considered, confounding factors selected as variables, parameters selected as indicators of water quality, and statistical analysis.

There are several problems peculiar to these studies which make it difficult to interpret their results: 1) there is a limited amount of water quality data on organics, and the data which exists covers less than a five year time period; and 2) the water quality data is often from geographic areas not conterminous with areas (usually counties) reporting cancer mortality data.

The water quality data on organics is of recent origin and it is not known the extent to which current levels may reflect past exposures. This is important, since the latent period for most types of cancer induction is measured in decades, not months or years. Comparison of the various study results is difficult because of the different approaches used.

In general, indirect, retrospective epidemiological studies are a useful methodological tool in hypothesis generation. A positive correlation cannot establish causal relationship. However, the results from these studies, when viewed collectively can provide some insight into associations of potential causal relationships which need to be tested further by more highly focused direct methods, such as case-control or cohort studies.

The studies do provide evidence that there is reason for concern. When the evidence from all studies is weighed, the emphasis should be placed not only on the statistical significance of single correlation coefficients but on their consistency and patterns. When more than one independent study shows positive associations for site-specific cancers, then the association may not be due to chance alone. When the association is verified by consistent results across all four sex race groups, the association may be due to the variable considered and the evidence should be viewed more seriously.

A large body of data, provides evidence (both epidemiological and experimental) that the majority of human cancers result from multifactorial causes (Weisburger, 1977)., particularly for cancers of the gastrointestinal and urinary tract. Etiologic factors, such as smoking and its association with lung cancer, that result in increased relative risk greater than 5, were the first to be discovered. The etiologic factors associated with cancers of the gastrointestinal and urinary tract are more difficult to evaluate from epidemiological studies because of the lower incidence and mortality rates and because of the mutifactorial interaction of environmental causes. The increased relative risk of most potential factors associated with gastrointestinal and urinary cancers are probably less than 3. Thus, any correlation in a sound, indirect, retrospective study between drinking water and cancer mortality would most probably be weak as is shown in the studies completed.

A number of epidemiologic studies that have been conducted did not define the water quality parameter by chemical constituents and therefore compared various sources of water supply. One investigation was performed by Page and Harris (1974). The study involved Louisiana county (parish) cancer mortality rates, 1950-69, for total cancer and selected sites in white males. The parishes were categorized by the percentage of the county population drinking Mississippi River water. The variables controlled were rural-urban characteristics, median income, population density, and proportion of employed population in the petroleum, chemical, and mining industries. An unweighted regression analysis resulted in a positive correlation between drinking water and total cancer (minus cancer of the lung, urinary tract, GI tract, and liver), gastrointestinal organs, and lung cancer mortality. These investigations suggested the possibility that there was an association between the cancer mortality rates and drinking Mississippi River water. As a result serious questions were raised as to the safety of drinking water contaminated by suspected carcinogens, particularly various organic chemicals in the water.

Tarone and Gart (1975) reviewed "The Implications of Cancer-Causing Substances in Mississippi River Water" by

Page and Harris and included an additional variable, the elevation above sea level. By using a weighted regression analysis for four race-sex groups, weak but, statistically significant, positive correlations were found between the water variable and total cancer and lung cancer mortality for white males (WM), non-white males (NWM), and non-white females (NWF). The correlations were not statistically significant for white females (WF) for the same sites. Thus, there was a lack of consistency across the four sex-race groups for the aforementioned cancer sites.

Another report by Meinhardt et al. (1975) commenting on the Page and Harris report, looked at the cancer mortality gradient and concluded that there was a random distribution of high and low cancer mortality rates among the river water consumers along the lengths of the Missouri and Mississippi River systems. From this study it was pointed out that the controls used might not be representative.

A second report by Page and Harris (1975, 1976) on the "Relation Between Cancer Mortality and Drinking Water in Louisiana" utilized independent variables and cancer sites similar to those in the first study, however, relationships for all four sex-race groups were added. Positive regression coefficients for the water variable that were statistically significant are as follows:

Total cancer sites:	WM, NWM, NWF
All other than lung:	WM
Urinary Tract:	WM, NWF
Gastrointestinal:	WM, NWM, WF, NWF

DeRouen and Diem (1975) did another analysis of the relationship of cancer mortality in Louisiana and the Mississippi River as the drinking water source. An additional variable, latitude, was included, which divided Louisiana into a northern and southern section. This variable effectively resulted in an ethnic division of the population. The variables urban-rural characterisitcs, median income, employment characteristics, and elevation above sea level included in previous studies (Page and Harris, 1974; Tarone and Gart, 1975; Page and Harris, 1975; Page et al., 1976) were omitted. The water variable was handled differently by the investigators, i.e. population groups studied either obtained none of their water from the Mississippi River, or obtained some or all or from the river. The results are in agreement with the Page and Harris results that show a positive relationship between cancer mortality and drinking water for gastrointestinal cancer. The cancer mortality rates for southern parishes of Louisiana whose source of drinking water is the Mississippi River tend to be higher than the southern parishes whose source of drinking water is not the Mississippi River water for the following:

Stomach: NWF
Rectum: WM
Large Intestine: WF, NWF
Cervix: NWF
Lung: NWF
Total Cancer: NWF

The cancer mortality rates tend to be slightly higher for the southern parishes with river water than northern parishes for cancer of the urinary tract, gastrointestinal tact, and the lung.

In another set of analyses and comments, DeRouen and Diem (1975) discuss the problems associated with interpretation of regression coefficients as they relate to the Page and Harris Report, particularly the problem of making inferences from indirect studies. They concluded that the inconsistencies in the data and failure to see the same relationships for other sex-race groups damages the credibility of the hypothesis.

An analysis was done by McCabe (1975) of EPA using 50 of the 80 cities from the NORS data. Only those cities with a 1950 population greater than 25,000 and 70 percent or more of the city's population receiving water comparable to that sampled by EPA were included in the study. The results showed a statistically significant correlation between the chloroform concentrations in the drinking water and the cancer mortality rate by city for total cancer combined.

In a second analysis done by McCabe (1977) using Region V data, correlations between $CHCl_3$ and THM's and total cancer

36-566 O - 79 - 15

mortality were not positive. When the same correlations were done using Region V plus NORS data for $CHCl_3$ and THM concentration levels, a positive statistically significant result was obtained.

Several epidemiological studies have been conducted in the Ohio River area. Buncher (1975) conducted a study of 88 counties bordering the Ohio River in which 14 of the counties used the Ohio River as a drinking water source. The results do not show a significant relationship with drinking water from the Ohio River and the higher cancer mortality rates. There was a weak positive correlation between the chloroform concentration in 23 cities and the cancer mortality rate for all cancer sites in white males. Similar results were found in 77 cities (59 surface water suppliers) between chloroform concentrations and pancreas cancer mortality in white males. For cities that accounted for more than 70 percent of the county population, there was a significant correlation between chloroform concentration and bladder cancer mortality rates for both white males and white females.

Another study by Kuzma et al. (1977) considered the 88 counties of Ohio, which were classified as either ground water or surface water counties based on the source of the drinking water used by a majority of the county residents. A two-stage analysis was performed and no statistically significant results were shown between the drinking water from the Ohio River and cancer mortality rates. Mortality rates for stomach, bladder, and total cancers were slightly higher for white males and for stomach cancer for white females in counties served by surface water supplies than in counties served by ground water supplies.

Reiches et al. (1976) treated the 88 counties of Ohio by using a different methodology. Correlations between the surface drinking water variable and cancer mortality rates of stomach cancer and total cancers for both white males and females were statistically significant. The correlations between the drinking water variable and cancer mortality rates of the pancreas, bladder, esophagus, gastrointestinal tract, and urinary organs was significant for white males only.

Although several studies defined the water quality parameter by the chlorination or levels of chloroform, only one study has done an analysis of all trihalomethanes, both collectively and separately. Cantor et al. (1976) studied the correlation of cancer mortality at sixteen anatomical sites with the presence of THM concentration levels in drinking water for whites. Counties were grouped according to the percent of the county population served by the sampled water supply. In both sexes, there was a gradient of increasing correlation between halomethane concentration and bladder cancer in going from the low to intermediate to high percent served county groups or strata. The correlation was stronger for the brominated THM's than with chloroform. There was a negative correlation in white females of stomach cancer with total THM levels. Kidney cancer in white males showed a weakly positive correlation with chloroform levels. Lung cancer in white females showed a positive correlation with THM levels. Among white males non-Hodgkins' lymphoma showed a positive correlation with the brominated trihalomethanes. A gradient of increasing association was observed between brain cancer mortality in both sexes and chloroform, but the associations were not strong.

Alavanja et al. (1976) conducted a retrospective, case-control study of female cancer mortality and its relationship to drinking water chlorination in seven selected New York counties. A statistically significant association was found between drinking from a chlorinated drinking water supply and combined gastrointestinal and urinary tract cancer mortality rates. Further, there was a higher mortality for the summed gastrointestinal and urinary cancer in urban areas served by chlorinated surface or ground drinking water supplies than in urban areas served by nonchlorinated supplies.

Kruse (1977) conducted a retrospective, case control study of white males and females in Washington County, Maryland. The relationship between mortality and morbidity from liver (including biliary passages) and kidney cancer in areas supplied by chlorinated public water supplies was analyzed. While there was a slightly higher incidence of liver cancer among the exposed group. i.e. the group which consumed chlorinated drinking water, the correlations were not statistically significant. It should be noted that the sample size was relatively small.

Salg (1977) also conducted a retrospective study of various cancer mortality rates and drinking water as defined by source of supply and type of treatment in 346 counties in seven states bordering the Ohio River Valley Basin. She looked at mortality rates for white and nonwhite males and females. With weighted regression analyses, surface water usage showed weak but statistically significant associations with the following: for white males - esophagus, lung, larynx, trachea, large intestine, rectum, bladder, other urinary organs and lymphosarcoma and reticulosarcoma; for white females - breast and rectum, and for non-white females - esophagus and larynx. Only rectal cancer showed positive correlations across all race-sex groups. It should be noted that the test of significance utilized for this study was $p > 0.10$ or less stringent than all other studies, except for Cantor's study, which used even less stringent criteria for some correlations.

Mah et al. (1977) conducted a retrospective study in the Los Angeles County area. The relationship between cancer mortality and morbidity and the chlorinated drinking water supply was analyzed for white populations only. Results did not reveal any trends and were not significant both for mortality and morbidity cancer rates. The authors point out several methodological problems, including the diluting effect of migration in the highly mobile area covered by this study.

Hogan et al. (1977) also utilized the chemical analysis of the NORS and Region V data sets and applied various statistical procedures to the data in order to determine the appropriateness of the statistical model. Thus, it is not surprising that results were similar to previous studies showing a positive correlation between rectal-intestinal and bladder cancer mortality rates and chloroform levels in drinking water when a weighted regression analysis were applied.

In summary, many but not all of the studies have found positive correlations between drinking water and various cancer mortality/morbidity rates. It is beyond the scope of this document to evaluate each study in depth, however, it is pertinent to consider the interpretations and conclusions that can be drawn from these retrospective epidemiological studies collectively.

It is also extremely important in the evaluation process to consider the results from other epidemiological studies as they develop hypotheses of potential causal associations between cancer mortality and other agents. For example, the confounding factors of diet, occupation, and smoking all have been suggested as potential causative agents of bladder cancer, Cole (1977). Therefore, any epidemiological study that investigates the possible association between bladder cancer and drinking water should either control for the aforementioned variables or analyze to avoid the problems that result in confounding of the data. None of the studies completed thus far have obtained data on or controlled for diet; several studies have attempted to control for occupational exposure: Page and Harris, (1974 and 1975), Cantor, et al. (1976); only one study by Kruse (1977) attained smoking history data. Only a few studies considered four sex-race groups (the number of non-whites is too small in some of the geographic areas) and of those studies only a few showed consistent patterns of association of specific cancer sites, i.e. Salg-rectum. Several studies which considered only white populations found positive correlation coefficients for both sexes: Buncher (1975) - bladder; Reiches (1976) - stomach; and Cantor (1976) - bladder.

A decreasing level of association from high to low levels of the water quality variable, i.e. chloroform or THM, with cancer mortality rates is an important criteria in evaluating the evidence. This pattern of association should be observed if the difference in mortality rates is due to the water variable. Only a few studies defined the water quality variable by the chloroform concentrations (McCabe, 1975; Buncher, 1975; Cantor et al., 1976; Hogan et al., 1977), and by the THM concentrations (Cantor et al., 1976).

Of particular interest are the correlations of liver and kidney cancer mortality rates with drinking water, since the animal exposure data indicate that hepatocellular carcinomas and hepatic modular hyperplasias have been observed in B6C3Fl strains of mice after life time exposure. Several of the preliminary studies grouped the cancer sites for the anatomical systems, i.e. gastrointestinal and urinary organs, in order to increase the sample size. Only one of the studies (Cantor, 1976) which considered site-specific cancer mortality showed a positive association between drinking water and cancer of the kidney in white males. The absence of any positive association between drinking water and liver cancer mortality may be due in part to small sample sizes, very low incidence of the disease, or because the exposure levels of contaminants in trace amounts over a lifetime may be below the no-effect level (Weisburger, 1977).

Thus, the evidence is incomplete and the trends and patterns of association have not been fully developed. As stated previously, a causal relationship cannot be established, nor can it be disproven. When viewed collectively, the epidemiological studies completed thus far provide sufficient evidence for maintaining a hypothesis that there may be a health risk and that the positive correlations may be due to some association between drinking water and cancer mortality. Only when viewed in conjunction with animal studies, both acute and chronic toxicity studies, is the evidence evaluated in the appropriate context for policy decision making. Additional direct epidemiological studies may provide evidence regarding the strength of the associations and the possibility of a casual relationship between drinking water and cancer mortality.

VII. Risk Assessment

The establishment of chloroform as an animal carcinogen, plus the epidemiological data and mutagenesis data on THM's, show that a potential human risk exists from the consumption of trihalomethanes, but these data do not quantify the risk. Methods have been developed to estimate quantitatively the size of the risk under the assumption that there is no threshold level for a carcinogen. The state-of-the-art at the present time is such that no experimental tools can accurately define, with any degree of certainty, the absolute numbers of excess cancer deaths attributable to chloroform in drinking water. Due to the biological variability and a number of assumptions required, each of the risk estimates reports different absolute numbers with a wide degree of variability.

It is generally agreed that it is not possible to project with accuracy risk estimates to absolute numbers of cancers in human population from exposure to a given agent, using statistical extrapolation models with animal data. Given that caveat, it may be useful to apply one or more risk estimation procedures in an attempt to estimate a possible range of impact to affected populations both in the absence of the interim proposed standard and at some alternate standard levels.

The EPA Science Advisory Board (SAB) (1975), using the highest levels of chloroform then reported in drinking water bythe NORS data (0.300 mg/l) and assuming a maximum daily intake of 4 liters of water for a 70 kg man, attempted to compute an estimated risk. The estimates were based on the Eschenbrenner and Miller (1945) animal data, which are highly speculative since the experimental protocol involved only 5 animals per sex per dose. Using a linear extrapolation of the animal data over more than 2 orders of magnitude of dose from mice to humans at the 0.300 mg/l concentration level, the lifetime incidence of liver tumors in man were estimated in the range of 0 to .001 (95% of confidence limits) or 0 to 100×10^{-5} in a lifetime. This rate may be compared with the lifetime incidence of 260×10^{-5} for malignancy of liver derived from data of the Third National Cancer Survey (1976). This estimate would range from zero to approximately 40% of the observed incidence of liver cancer in the United States that may be attributable to exposure to chloroform in drinking water at the 0.300 mg/l level. It should be noted that this value is at the upper limit of the confidence interval and the linear non-threshold dose-effect model allows an estimate of maximal risk where a risk has actually been observed. Other models would all yield lower estimates. The SAB, however, also stated that a more reasonable assumption would yield lower estimates of the risk.

Tardiff (1976) using four different models, calculated the maximum risk from chloroform ingestion via tap water. Using a margin of safety of 5000 applied to the minimum effect animal dose, the "safe" level was calculated to be 0.02 mg/kg/day. Using the log probit model and the slope recommended by Mantel and Bryan, the conclusion reached was that at a maximum daily dose of 0.01 mg/kg the risk would be between 0.016 and 0.683 cancers per million exposed population per year. Using the identical data, but with the actual slope of the dose response curve as opposed to the slope of the one in the previous calculation, the conclusion reached was that a maximum daily dose of 0.01 mg/kg would produce less than one tumor per billion population per lifetime. Using the linear or one hit model, usually considered to be the most conservative, a risk estimate of between 0.42 and 0.84 cancers per million population per year was calculated to result from a maximum dosage level of 0.01 mg/kg/day. The two step model produced an estimated maximum risk of between 0.267 and 0.283 cancers per million population per year at a maximum dose level of 0.01 mg/kg/day.

In the National Academy of Sciences (1977) report on "Drinking Water and Health," life-time risks were estimated from the NCI animal data. For concentrations of 10 ppb exposure the number of excess cases of cancers computed to one for every 50,000 exposed persons assuming a risk of 2×10^{-5} and 2 liters per day of water consumed. If the U.S. population using chlorinated water is assumed to be approximately 160 million people this translates into 3,200 excess lifetime deaths from cancer or 45.7 cases per year.

For a concentration of chloroform at 1 ug/liter the estimated lifetime cancer risk would fall at approximately 3.7×10^{-7} at the upper 95% confidence limits.

In evaluating the risk estimates, it is important to compare the calculated maximum risk with the current cancer mortality data. Both liver and kidney cancer are rare diseases in the U.S. The standardized mortality rates in the U.S. for white males and females combined are 52.5 per million per year for liver carcinoma and 29.2 per million per year for kidney carcinoma.

Based on his risk estimates, Tardiff (1976) calculated that the percent of the cancer mortality rates attributable to chloroform in drinking water would be 1.60% and 1.44% for liver and kidney cancer incidence per year respectively assuming the maximum exposure levels. Applying these percentages to the actual cancer mortality rates, the number of cancer deaths per year would be 168 from liver carcinoma or 84 from kidney carcinoma; an estimated maximum of 252 cancer deaths per year attributable to chloroform in drinking water.

EPA's Carcinogen Assessment Group's (CAG) risk estimations for chloroform exposure are shown in Table 7. The risks were computed for several exposure levels and were extrapolated from data from the National Cancer Institute (NCI 1976) bioassay with the male rat and female mouse. Human exposure from drinking water was computed using a weighted average of chloroform concentrations in drinking water for 160 million people whose drinking water supplies are chlorinated.

TABLE 7. Risk Assessment for Chloroform.

ACTION	TOTAL TUMORS PER YEAR	TOTAL TUMORS PER YEAR REDUCED BY ACTIONS
NONE	23.1*-207.0**	---------
CITIES GREATER THAN 50,000 REDUCE TO:		
100 ugm/l	18.6-166.6	4.5-40.4
50 ugm/l	15.6-140.1	7.5-66.9
10 ugm/l	9.6-85.6	13.5-121.4
CITIES GREATER THAN 75,000 REDUCE TO:		
100 ug/l	19.6-175.3	3.5-31.7
50 ug/l	17.3-155.4	5.8-51.6
10 ug/l	12.1-108.5	11.0-98.5

Risks extrapolated from NCI bioassay data *male rate and **female mouse.

In the absence of a THM standard the CAG statistical risk model would predict from 23 to 207 total tumors per year in the exposed human population, depending which animal data (rat or mouse) is utilized as the base.

Computations of estimated human risk and risk reduction at various levels of control were made for the total population in cities larger than 75,000 which are affected by this regulation.

A standard of 100 ug/l would reduce the annual risk according to the statistical model to 19 to 175 total tumors; a standard of 50 ug/l would reduce the risk to 17 to 155 total tumors; a standard of 10 ug/l would reduce the risk to 12 to 108 tumors.

Given that it is not possible to project with certainty or accuracy from risk estimates based on animal data to absolute numbers of cancers in a human population, such extrapolations are useful in attempting to quantify a range of possible impacts of alternate standards.

It should be noted, however, that these average exposure levels which refer to chloroform alone and do not consider the risk from other contaminants in the impacted population are overestimates of the risk in light of the facts that: 1) the computations are based upon lifetime exposure, while in actuality the proposed interim standard is a temporary, phased standard which will be reduced in the future and therefore, the lifetime exposure values would be less, 2) the interim standard clearly calls for maximum reductions obtainable using available technology thus indicating a lower average exposure. They may be underestimated since the risk estimates are based upon toxicity exposure data from chloroform, which is only a portion of the total THM's and other contaminants found in drinking water. Therefore the magnitude of the contribution to the risk of the other THM's (bromohalomethanes), which in some cases consists of a substantial portion of the THM's, and the many other possible contaminants is unknown.

VIII. Summary

The occurrence of trihalomethanes in drinking water supplies of various communities across the United States has been documented. Chloroform was found at concentrations ranging from 0.001-0.540 mg/l and trihalomethane potential concentrations as high as 0.784 mg/l have been detected. The concentration of THM increased on treatment of raw water supplies with chlorine in the process of disinfection and subsequent preparation of water for drinking purposes. The THM concentrations may also be indicative of the presence of other undefined chemicals that are produced in water during chlorination.

Besides the presence of chloroform in drinking water humans are exposed to chloroform from air and food. An analysis of the relative contribution of chloroform in drinking water as compared with air and food exposures considered various relative levels of exposures. Depending upon the ranges of chloroform concentrations that have been detected in air, food and water (which is a function of location, urbanization and industrialization), drinking water may contribute from zero to more than 90% of the total dietary intake.

36-566 O - 79 - 16

Chloroform has been shown to be rapidly absorbed on oral and intraperitoneal administration and subsequently metabolized to carbon dioxide and unidentified metabolites in urine. The metabolic profile of chloroform in animal species such as mice, rats and monkeys is indicated in Table 4 and is qualitatively similar to that in man.

Biological responses on exposure of chloroform to mammals include its effect on the central nervous system resulting in narcosis, hepatotoxicity, nephrotoxicity, teratogenicity, and carcinogenicity. These responses are discernible in mammals on exposure to high levels of chloroform ranging from 30-350 mg/kg; the intensity of response was dependent upon the dose. Although less toxicological information is available for brominated trihalomethanes, mutagenicity and carcinogenicity have been detected in some test systems. Physiological chemical activity should be greater for the brominated THM's than for chloroform.

Exposure to the low levels of trihalomethanes presently found in drinking water supplies may not manifest detectable responses in populations. It is the prolonged human exposure to trihalomethanes that should be a matter of major concern. Prolonged administration of chloroform at relatively high dose levels (100-138 mg/kg) to animals, specifically rats and mice, manifested oncogenic effects. The oncogenic effect was not observed at a lower dose level (17 mg/kg). Assuming that methods do not exist to establish a non-threshold level for long-term effects for carcinogenesis (NAS, 1977), the preceeding data do not imply that a safe level of exposure can be established.

Epidemiological evidence is inconclusive, although positive correlations have been found in several studies. There have been 11 retrospective studies that have investigated some aspect of a relationship between cancer mortality or morbidity and use of drinking water. Due to various limitations in the epidemiological methods, in the water quality data, and problems with the individual studies, the present evidence cannot lead to a firm conclusion that there is an association between contaminants in drinking water and cancer mortality/morbidity. Causal relationships cannot be proven on the basis of results from epidemiological studies. The evidence from these studies thus far is incomplete and the trends and patterns of association have not been fully developed. When viewed collectively, however, the epidemiological studies provide sufficient evidence for maintaining the hypothesis that there may be a potential health risk and that the positive correlations may be reflecting a causal association between constituents of drinking water and cancer mortality.

Preliminary risk assessments made by the Science Advisory Board (SAB), the National Academy of Sciences (NAS), Robert Tardiff of EPA, and the Carcinogen Assessment Group (CAG) using four different models have estimated the cancer risks associated with the exposure from chloroform in drinking water. The exposure to THM's from air and food have not been included in these computations. The total cancer risk estimates associated with the MCL at the 0.1 mg/l level range from the NAS estimated lifetime risk of 4×10^{-5} to the CAG's estimate of 2×10^{-4} using somewhat different assumptions. These risks are similar to the lifetime estimated risks of other known carcinogenic standards: e.g. for vinyl chloride emissions (about 10^{-5}) and ionizing radiation exposure to the general public (about 10^{-5}).

On the basis of the available toxicological data summarized in the above report, chloroform has been shown to be a carcinogen in rodents (mice and rats) at high dose levels. Since its metabolic pattern in animals is qualitatively similar to that in man, it may prove to be a human carcinogen. Epidemiological studies also imply a human risk. Therefore, because a potential human health risk does exist, levels of chloroform in drinking water should be reduced as much as is technologically and economically feasible using methods that will not compromise protection from waterborne infectious disease.

IX. Selected Maximum Contaminant Levels (MCL's)

Since it is evident from the foregoing that a risk to the public exists from exposure to the trihalomethanes in drinking water, the risk should be reduced as much as is technologically and economically feasible without increasing the risk of microbiological contamination. This can be accomplished by several means, and the Safe Drinking Water Act (P.L. 93-523) provides two major regulatory avenues - 1) the establishment of an MCL or, 2) the institution of a treatment requirement.

EPA has determined that the establishment of an MCL through a phased approach, along with monitoring requirements, is the most effective and conservative approach to regulate the levels of trihalomethanes in drinking water. The Administrator has determined that monitoring is both technically and economically feasible. (refer to "Economic Impact Analysis of a Trihalomethane Regulation for Drinking Water," EPA, 1977). Measures taken to reduce the THM concentrations will concurrently provide the additional benefit of reducing human exposure to the other undefined by-products and possibly other synthetic organic contaminants.

Since it is known that chlorination of water is primarily responsible for the relatively high levels of trihalomethanes in drinking water, modifications in the chlorination process, the substitution of other disinfectants, and the use of adsorbents to remove precursor chemicals are possible approaches for control. The optimal approach would be to reduce organic precursor concentrations by adsorbents or other means prior to addition of the disinfectant.

Use of a chlorine residual in a less active form such as combined chlorine or chloramine will significantly reduce trihalomethane formation, however, chloramines are much less potent disinfectants than free chlorine and therefore it would not always be appropriate to adopt this approach. The two chemicals most often mentioned as substitute disinfectants, ozone and chlorine dioxide, are both well known as effective disinfectants and chemical oxidants. The issues of the bio-effects and toxicology of these disinfectants and their by-products are being clarified by the studies underway. In the meantime the application of chlorine dioxide should be limited to 1 milligram per liter.

The National Organics Monitoring Survey found that the mean total trihalomethane (THM) concentrations in the drinking water systems evaluated were approximately 0.068, 0.117, 0.053 and 0.100 mg/l for Phase I, II, III (dechlorinated) and III (terminal) respectively with the highest levels of 0.784 mg/l in Phase II (refer to Table 1).

It is reasonable to assume that the calculated risk estimates for chloroform from various studies do indicate a potential risk to public health. It is possible that a percentage of the total number of liver and/or kidney cancers are attributable to exposure of chloroform in drinking water, although it is most likely that drinking water interacts with a number of other variables such as smoking and diet as effect modifiers in a multifactorial manner. It is also likely that the other trihalomethanes are a potential risk.

Thus, based upon a number of risk extrapolations assuming various levels of exposure to chloroform in drinking water, it has been estimated that such exposures may cause an excess of cancers in the U.S. population (ranging from 0 to several hundred). At higher levels of exposure of chloroform (>0.300 mg/l) the risk estimates would result in larger numbers of excess cancer cases.

The reduction of the total trihalomethanes to the MCL level of 0.10 mg/l would reduce the unnecessary and excessive exposure to these potential human carcinogens, mutagens, and chronic toxicants and may result in the reduction of excess cases of cancer. At the same time, measures taken to reduce THM levels (such as the use of adsorbents) will concurrently result in reduction of human exposure to other contaminants in drinking water.

Since it is economically and technologically feasible to reduce the THM levels in drinking water and there is a benefit achieved by reducing the health risks to exposure, EPA has decided to set the MCL at 0.10 mg/l as an initial step in a phased, regulatory approach. As more data becomes available from implementation experience standards will become more restrictive in the future. In the meantime EPA will take steps as necessary on a case by case basis to provide adequate protection for the delivery of safe drinking water to the public.

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EPIDEMIOLOGICAL STUDIES OF CANCER FREQUENCY AND CERTAIN ORGANIC CONSTITUENTS OF DRINKING WATER--A REVIEW OF RECENT LITERATURE PUBLISHED AND UNPUBLISHED

prepared for the

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by the

Epidemiology Subcommittee
of the
Safe Drinking Water Committee

Board on Toxicology and Environmental Health Hazards
Assembly of Life Sciences, National Research Council

NATIONAL ACADEMY OF SCIENCES

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NOTICE: The project that is the subject of this report ~~was approved~~ by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The Members of the Committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

This report has been reviewed by a group other than the authors according to procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

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List of Participants

Members of the Safe Drinking Water Committee

Dr. John Doull, Chairman
Department of Pharmacology
University of Kansas Medical Center
Kansas City, Kansas

Dr. Joseph F. Borzelleca
Department of Pharmacology
Medical College of Virginia
Richmond, Virginia

Dr. Richard S. Engelbrecht
Department of Civil Engineering
University of Illinois
Urbana, Illinois

Dr. David G. Hoel
National Institute of Environmental Health Sciences
Research Triangle Park, North Carolina

Dr. Cornelius W. Kruse
Department of Environmental Health
Johns Hopkins University
Baltimore, Maryland

Dr. Edwin H. Lennette
California Department of Health
Berkeley, California

Dr. J. Carrell Morris
Division of Engineering and Applied Physics
Harvard University
Cambridge, Massachusetts

Dr. Sheldon D. Murphy
Department of Pharmacology
University of Texas Medical School
Houston, Texas

Dr. Paul M. Newberne
Department of Nutrition and Food Sciences
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dr. Malcolm Pike
Department of Community Medicine
University of Southern California School of Medicine
Los Angeles, California

Dr. Marvin A. Schneiderman
National Cancer Institute
Bethesda, Maryland 20014

36-566 O - 79 - 17

Safe Drinking Water Committee (cont'd)

Dr. Ronald C. Shank
University of California
College of Medicine
Irvine, California

Dr. Irwin H. Suffet
Environmental Studies Institute
Drexel University
Philadelphia, Pennsylvania

Dr. Sheldon Wolff
Laboratory of Radiobiology
University of California
San Francisco, California

Subcommittee on Epidemiology

Dr. Marvin A. Schneiderman, Chairman
National Cancer Institute
Bethesda, Maryland 20014

Dr. Edward C. Hammond
American Cancer Society, Inc.
New York, New York

Dr. Ian Higgins
School of Public Health
University of Michigan
Ann Arbor, Michigan

Dr. George B. Hutchison
Harvard School of Public Health
Boston, Massachusetts

Dr. Abraham M. Lilienfeld
School of Hygiene
Johns Hopkins University
Baltimore, Maryland

Dr. Malcolm C. Pike
Department of Community Medicine
University of Southern California School of Medicine
Los Angeles, California

Dr. Arthur H. Wolff
School of Public Health
University of Illinois at the Medical Center
Chicago, Illinois

Staff

Riley D. Housewright, Project Director
Robert J. Golden, Assistant Project Director
Roy Widdus, Staff Officer

EPIDEMIOLOGICAL STUDIES OF CANCER FREQUENCY AND CERTAIN ORGANIC CONSTITUENTS OF DRINKING WATER-- A REVIEW OF RECENT LITERATURE, PUBLISHED AND UNPUBLISHED

After comparing cancer rates among people in Louisiana whose drinking water comes from the Mississippi River with rates in populations served with water from other sources, Harris (1974) concluded that something in the river water led to increased cancer rates. He suggested that the lower Mississippi contained many chemical pollutants, some, or some combination of which were carcinogenic.

The initial study was challenged by DeRouen and Diem (1975a, 1977) and several other hypotheses put forth. At that time the Environmental Protection Agency (EPA) was monitoring a large number of chemicals in U.S. water suplies--among them chloroform and the other trihalomethanes (THM's). The National Cancer Institute (NCI) was also studying the biological effects of chloroform in its large animal bioassay program and subsequently demonstrated an increase in liver and kidney tumors among animals exposed to high doses of chloroform (Page and Saffioti 1976).

Given these several pieces of information, the EPA asked a number of research groups to determine whether there was indeed a relationship between cancer rates and chloroform and other THM's in water supplies. Even though the liver and kidney were the only sites at increased risk in the animal experiments, the various research groups attempted to evaluate the cancer risk at many other sites as well. The rationale for this is that exposure to a single carcinogen may result in cancer at different sites in different experimental animals and in humans. For example, vinyl chloride has produced nephroblastoma in rats but not in humans. There is also ample evidence of chemicals which produce cancer in some specieis but not in others, for example, 2 napthylamine is a potent bladder carcinogen in humans, dogs, and monkeys, but is inactive in rats and mice.

Most of the EPA requested studies used indirect evidence of the presence of THM in water supplies. Populations receiving surface water, which often contains organic materials and is sometimes treated with chlorine, were contrasted with those receiving ground water. Because ground water usually contains less organic matter and is less often chlorinated in the purification process than surface water, it is less likely to contain THM's. Authors of two studies used direct measurements of chloroform and other THM concentrations, which had been obtained by the EPA in two recent analytical surveys in a regression equation for U.S. county mortality rates with allowance being made for various demographic factors by including further linear regression terms.

The above epidemiological studies (published and unpublished), which comprise to our knowledge the sum total of epidemiological work on this subject, were reviewed by the subcommittee. None of the studies reviewed were able to adequately take into account many well established risk factors for cancer rates at different sites. For example, for bladder cancer one needs to control for occupation, cigarette smoking, use of alcohol and drugs, nonaqueous sources of THM, coffee consumption, socioeconomic status and ethnicity. The studies also had to assume that present exposures to THM reflected lifetime exposures of the populations studied: this is not only because THM concentrations in water have only recently been measurable, but also because the necessary information on migration patterns with associated THM concentrations is not readily available.

The subcommittee has summarized the various studies, made a critical assessment, pointed out where it believes the evidence is deficient, and discussed the potential for further research on this subject. The probabilities of false associations when many comparisons are made were also considered when final conclusions were made.

SUMMARY AND CONCLUSIONS

The studies that the subcommittee reviewed were divided into two groups: those in which nonspecific measures of exposure to putative carcinogens in water (e.g., the use of surface water vs. ground water) were examined and those in which water quality was characterized by measurements of THM concentrations. The subcommittee gave greater weight to the conclusions of the latter group of studies because crude measures of exposure, which lead to comparisons of cancer between surface water users and ground water users, must be of limited value. They do not permit the quantitation of exposure to contaminants in water consumed, which ~~is~~ needed to determine dose-response relationships between THM concentrations and cancer frequencies and to estimate the effects of reducing THM concentrations.

The conclusions drawn in the second group of studies, in which many cancer sites were examined, suggest that higher concentrations of THM's in drinking water may be associated with an increased frequency of cancer of the bladder. The results do not establish causality, and the quantitative estimates of increased or decreased risk are extremely crude. The effects of certain potentially important confounding factors, such as cigarette smoking, have not been determined.

The bladder is not one of the sites found at increased risk in experiments on animals exposed to chloroform. Tumors of the liver and kidney developed in laboratory animals.

The positive association found for bladder cancer was small and had a large margin of error; not only statistical, but much more importantly because of the very nature of the studies. Hogan et al. (1978, unpublished) found regression coefficients of bladder cancer mortality (deaths per 10^5 per year) on chloroform concentration ($\mu g/l$) in drinking water to be approximately 0.003 for males and 0.0021 for females.

Thus, if there is a causal relationship, an increase in chloroform concentration of 100 μg/l might lead to increases of 0.3 deaths per 10^5 per year from bladder cancer in males and 0.2 deaths per 10^5 per year in females. These compare with the U.S. National Mortality Rates (1950-1969) for cancer of the bladder of 6.8 in males and 2.4 in females. Thus, a decrease of 100 μg/l of chloroform in water may lead to a 4.4% decrease in bladder cancer death rates in males and 6.7% in females.

These changes which have been shown in case-control studies to be explicable by as little as 1 to 2 cigarettes per day differences in average cigarette consumption, would probably be too small to be distinguished from possible confounding effects by any epidemiological study. Situations that could be more favorable for investigation should be sought so that further epidemiological work might be more rewarding.

STUDIES BASED ON INDIRECT MEASURES OF WATER QUALITY

Mississippi River-Louisiana, First Study

The first papers reporting relationships between cancer frequency and water quality were those of the Environmental Defense Fund (Harris 1974, unpublished; Page et al. 1976). These two papers were based on the published cancer motrality data by county in the United States (Mason and McKay 1974). The proportions of each Louisiana parish's water that was obtained from the Mississippi River were related, in a regression analysis, to cancer mortality. The study was controlled for urban-rural status, income, and employment in certain potentially hazardous industries. Significant positive correlation coefficients were found in two of the four race-sex groups for genitourinary cancer, and in all four groups for gastrointestinal cancer.

Mississippi River-Louisiana, Second Study

Using the same water quality data and county mortality data as Harris (1974, unpublished), DeRouen and Diem (1975b, unpublished) reported a major difference between northern and southern regions of Louisiana--a potentially important confounding factor for the cancer-water association. This was also noted by Buncher (1975, unpublished). DeRouen and Diem's analyses of cancer mortality and water source were restricted to southern Louisiana where parishes using only Mississippi River water were located. DeRouen and Diem compared cancer mortality at 16 anatomic sites in four race-sex groups (52 site-sex-race groups in all) between persons receiving river water and those who did not. They found seven positive associations (P<.05) of mortality with use of river water in one or more sex-race groups for seven sites or site groups. Similarly, significant negative associations were found for seven sites. The consistency of associations in both sex and racial groups suggested positive associations for cancer of the bladder, breast, rectum, and large intestine, and negative associations (i.e., lower mortality in populations using river water) for cancer of the liver and corpus uteri. Cancer of the lung and cervix uteri had a significant positive association in one population and a significant negative association in another.

Ohio River Area, First Study

A similar approach was used on data from the Ohio River area. Buncher (1975, unpublished) studied the four-state area comprised of Ohio, West Virginia, Kentucky, and Indiana; Kuzma et al. (1977) confined their attention to Ohio. In the Ohio study, white males and females in all Ohio counties were compared according to the predominance of surface or ground water in their supplies. Sites with statistically significant (P<.05) excess mortality associated with surface water were the stomach in males and females and the bladder in males. In two additional site-sex groups, the liver and breast in females were positive at the 20% level. These rates were adjusted for age, county population, percent urbanization, median income, an index of manufacturing activity, and an index of agricultural-forestry, and fishing activity.

Ohio River Area, Second Study

Harris et al. (1977, unpublished) reviewed the Ohio studies. Although they generally agreed with the findings of Kuzma et al. (1977), they failed to confirm the positive association for liver and breast cancer in females. In addition, they reported positive associations for the esophagus in males (not studied by Kuzma) and the pancreas in males.

They studied the effect of water source on cancer mortality by regression analysis similar to that used in the first Ohio area study, but they used as a water variable the percentage of a county population that received surface water.

Upstate New York

Alavanja et al. (1977, unpublished) conducted a case-control study of persons dying with gastrointestinal or genitourinary cancer in several counties in upstate New York. The study was first confined to women to decrease the potentially confounding factor of occupational exposures, and the cancer sites were selected on the basis of indications from prior reports. Consequently, this may be thought of as an hypothesis-testing study. Each cancer case was individually matched with a woman dying of a cause other than cancer.

Matching variables were county, age, race, and birthplace. Statistical analysis procedures did not take the matching into account, but it is impossible to judge the effect of this omission. Water supplies were determined from addresses and were characterized as chlorinated or not chlorinated and as surface or ground water. A doubling of risk was found to be associated with chlorinated supplies in urban areas. A 50% increase in risk was found to be associated with chlorinated ground water when compared with nonchlorinated water in rural areas. There was no increase (risk ratio 1.01) in rural areas supplied with chlorinated surface water in comparison with rural areas using nonchlorinated water.

In 1978, Alavanja's study was expanded to include men. He reported that "Males living in the chlorinated water areas of Erie, Rensselaer and Schenectady counties and females living in the chlorinated water areas of Erie and Schenectady counties are at a greater risk of gastrointestinal and urinary tract cancer mortality than are individuals living in nonchlorinated water areas. Moreover, this excess risk of GI and UT cancer mortality is not due to a disparity in the age, race or ethnic distribution of the population or to an urban/rural factor, or hazardous occupation, or to inorganic carcinogens (Cd, As, Be, Pb, Ni, NO_3^-) or a surface/ground water difference." In one county (Chautauqua) there was a significant deficit of both kinds of cancer mortality in chlorinated areas.

Because of the large population of Erie County, the data acquired there strongly influences the total risks reported. Urbanization is a potentially confounding variable in the study of effects of chlorination, and parcelling out shares of the excess risk between urbanization and chlorination does not seem possible, although some attempts have been made. For example, urban and rural nonchlorinated areas were compared with urban and rural chlorinated areas.

Washington County, Maryland

Kruse (1977, unpublished) studied cancer of the kidney and liver in a population in Washington County, which includes the city of Hagerstown, Maryland. This population has been investigated extensively as an epidemiological community model, and the source of home drinking water had been determined in an earlier survey. This previously gathered information was used in a total population study designed to correlate water source, characterized as chlorinated or not chlorinated, with presence or absence of cancers at specific sites. The approach involved estimating the effect of water source through a multivariate analysis including eight additional potentially confounding demographic and sociological variables. There was an increased incidence of liver cancer associated with the chlorinated water supply, with a risk ratio of 1.5, but the increase was not statistically significant at the 20% level. Similarly, a decrease in incidence of cancer of the kidney with chlorination (risk ratio, 0.96) was not significantly associated with water source. There were only 91 cancer cases in this study.

Los Angeles County

In Los Angeles County Mah et al. (1977, unpublished) correlated cancer mortality rates and incidence rates with chloroform content in drinking water. They divided the county into nine subareas categorized as having low, medium, or high chloroform content of the water. Eight cancer sites were studied: esophagus, stomach, colon, rectum, liver, lung, kidney, and bladder. Tabular and graphic inspection of data and limited analyses suggested no association of cancer rates with chloroform content of water, and the investigators believed no more detailed analysis was justified in view of certain limitations in the basic material, viz., absence of precise data on chloroform content, extensive use of bottled and other water transported from other sources by this population, and large population movements into and out of Los Angeles County in the last several decades.

Ohio River, Third Study

Salg (1977, unpublished) studied populations in areas served by water from the Ohio River, including all counties within the boundaries of the Ohio River Valley Basin as determined from water drainage maps. These counties lie within a seven-state area: Illinois, Indiana, Kentucky, Ohio, Pennsylvania, Tennessee, and West Virginia. The exposure variables, indicating possible intake of pollutants in the water supply, were the percent of county population served by surface water and the percent served by prechlorinated (defined as chlorination prior to filtration) water. The outcome variable was cancer mortality for 346 counties, specific for 19 anatomic sites of cancer. The main variables were investigated in a multivariate analysis using as possible confounding factors nine variables representing demographic and socioeconomic characteristics of the counties.

There were positive associations (P<.2) for 13 of the 19 site categories in one or more of four sex-race population groups. Similarly significant negative associations were found for seven site categories in one or more populations. In two or more population groups there were positive associations for cancer of the esophagus, rectum, breast, larynx, and for Hodgkin's disease.

Salg interpreted her findings to indicate the need for further study of carcinoma of the large intestine, rectum, and bladder. Large intestine cancers were found to be significantly increased in white males. Bladder cancer incidence was significantly elevated in white males and significantly decreased in nonwhite females.

Pittsburgh Study

Carlson and Andelman (1977, unpublished) conducted a study in the Pittsburgh region. They associated site, race, and sex-specific, age-adjusted cancer incidence rates by 1969-1971 census tract with drinking water, which was characterized by source of raw water (surface, ground, and river) and by water treatment plant.

Their paper is principally an investigation of statistical methodology. Their general conclusion is that significant associations, both positive and negative, are found between water quality and cancer incidence. The data are not summarized in a way that permits identification of cancers of specific sites.

New Jersey Study

Vasilenko and Magno (1975, unpublished) studied all 21 counties in New Jersey to determine the relation between water source and age-adjusted cancer mortality from lung, stomach, and urinary tract cancer of white males between 1950 and 1969. Water quality was estimated from the ratio of the number of households served by public systems and private water companies to the number served by individual wells. Confounding variables included in the analysis were urban-rural characteristics, income, education, migration, occupation, industrialization, and sulfur dioxide concentration in the air.

In a multiple regression analysis, the water variable was positively associated with mortality from respiratory cancer and stomach cancer. A nonsignificant negative association was found for bladder cancer.

SUMMARY

Nine of the ten studies described above showed a number of associations, some of which were statistically significant, between indirectly characterized water quality and cancer rates (incidence or mortality). One, the Los Angeles County study, reported no associations, but this study appeared to have greater limitations than any of the others.

Cancer rates at several sites were positively associated with water quality in one or another study, but no site consistently predominated. The bladder, stomach, large intestine, and rectum, which were cancer sites identified in a number of geographic areas, warrant further study.

The effects of certain important demographic variables were considered in a number of studies of this group, but other confounding factors, e.g., cigarette smoking, were not.

STUDIES BASED ON TRIHALOMETHANE CONCENTRATIONS

Three studies (Cantor et al. 1977, unpublished; Hogan et al. 1978, unpublished; and McCabe 1975, unpublished) have been conducted using measured THM concentrations. All three studies used cancer mortality rather than incidence data, although the latter are usually preferable. These studies could not however use incidence data as they are not generally available for the areas covered by the THM surveys.

Cantor et al. studied the relation between age-standardized cancer mortality for 1968 to 1971 of white men and women in U.S. counties that were categorized as urban on the basis that more than 50% of the county population lived in urban areas in 1970.

County THM concentrations were estimated from data obtained in two surveys conducted by the EPA (U.S. Environmental Protection Agency 1975). The National Organics Reconnaissance Survey (NORS) sampled finished water in 80 water treatment plants across the country, and a survey conducted by EPA's Region V office covered 83 plants in the states of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

The analysis took into account the median school years completed by county inhabitants over age 25, foreign stock composition of county, county population, ratio of 1970 to 1950 county population, percent of county that is urban, percent of the county work force engaged in all

36-566 O - 79 - 18

manufacturing industries (U.S. Census 1970), and major geographic region of the United States. An attempt was made by multivariate regression to explain the variability among counties of mortality rates for each site of cancer with sex-specific mortality rates greater than 1.5/100,000/yr. The residual mortality rates, which were "unexplained" by these other variables, were then correlated directly with measured THM levels (logarithms of the concentrations) for the 76 counties in which 50% or more of the population was served by the sampled water. To calculate the correlation coefficients, the data were weighted by the square root of the sex-specific person-years at risk in the population served by the sampled water supply as estimated by the product of percent of population served and population at risk. The statistical techniques used by the authors, particularly the weighting factors, are not standard and probably tend to decrease statistical significance.

The results of Cantor's analysis are shown in Tables 1 and 2. Among males, a significant (P≤10%) positive correlation for the 76 counties was found between nonchloroform trihalomethane (NCTHM) concentration and bladder cancer. When the percent of county population served by the sampled water supply is increased to reduce the misclassification of exposure, correlations with bladder and brain cancer tend to increase. Among women, positive correlations were found between total THM's and lung cancer and between NCTHM and bladder cancer. The lung cancer correlation coefficients did not show a dose-response relationship with the proportion of the population receiving the measured water. But the correlations with bladder cancer did; from 85% to 100% reached conventional significant (P=0.02). A preliminary analysis showed a fairly strong association between halomethane levels and colon cancer rates, but control for composition of the population by ethnicity removed this association.

The authors computed correlation coefficients separately for three geographic regions (North, South, and Mountain Pacific) for the 51 counties in which 65% or more of the population received measured water. There were positive correlations between NCTHM and bladder cancer in males in all regions combined (r=0.30, P=0.03) and in females in each region separately as well as combined (combined r=0.33, P=0.02). For men in the North, a significant correlation was observed between NCTHM and bladder cancer (r=0.52, P=0.02).

Hogan et al. conducted a similar study, in which they related earlier cancer mortality data to chloroform levels in finished water as determined by the same surveys. They used the National Cancer Institute's 20-year age-adjusted county cancer mortality rates for white men and women (Mason et al. 1974) and county chloroform concentrations in drinking water estimated from the EPA's NCRS and Region V surveys (U.S. Environmental Protection Agency 1975). Regression equations were fitted to the mortality rates, using as independent variables chloroform concentrations, 1960 county population, county population density, percent of county that is urban, percent of county population that is nonwhite, percent of county population that is foreign born, median number of school years completed by county residents over age 25, median family income of county, and percent of county work force engaged in manufacturing. Weighting was by total population exposed (both sexes and all races combined).

The results for sites where any association approached statistical significance are shown in Table 3. The data are consistent with an increase in cancer rates of the rectum, the bladder, and possibly the large intestine with increased chloroform concentration.

McCabe showed that age-adjusted total cancer mortality rates correlated positively with estimated chloroform concentrations in 80 cities. Since no allowance appears to have been made for any of the confounding factors, it is inappropriate to draw conclusions from this study to compare with the Cantor and Hogan studies.

All studies were seriously limited by the absence of data on past exposures, which are the only ones that are directly relevant to cancer that has already been diagnosed. Similarly, all studies were deficient in identifying populations that were stable in the areas where the water quality was studied.

None of these papers discuss the nature of the correlation or regression coefficients obtained. In particular whether the positive results found were due to one or two extreme observations or to a more relevant trend over the range of THM values. Similarly none discussed the adequacy of using a simple linear regression equation to allow for certain confounding variables. Without such discussion interpretation must be especially circumspect.

Results of these studies demonstrate the problems of establishing relationships between health statistics and environmental variables, and lend emphasis to the caution with which they should be interpreted.

Prospects for Further Epidemiological Study

Adequate exploratory and hypothesis-generating work has been done. Studies raising suspicion of higher cancer rates among persons whose major water supplies came from surface waters with generally higher THM concentrations compared to rates among those whose major water sources were ground waters have been followed by attempts to relate the cancer rates to actual THM concentrations. Further studies of this kind are unlikely to lead to more useful information, although an examination of age-specific data might prove fruitful. Consequently, future studies should be more specific and should examine possible confounding factors in detail.

When developing actual exposure data, i.e., THM concentrations in water consumed, investigators should gather information concerning duration of exposure to a particular water source. Further investigation of the validity and reliability of chemical analyses of water constituents would also be in order. Such epidemiological studies without experimental intervention usually cannot uncover small effects. Moreover, with so many confounding factors, it would be difficult to ascribe an effect to any factor with certainty.

Designs for further studies may be conveniently divided into two major types for discussion: case-control studies and cohort studies, including intervention studies.

Case-Control Studies

These studies can start with cases (incidence, prevalence) or deaths. For certain investigations the information from deaths may be adequate. However, the degree of detail necessary for investigating carcinogens in water makes it highly desirable that information be collected from the subjects themselves, rather than from near relatives or other proxies. Some populations are exposed to varying amounts of chloroform, e.g., users of certain cough medicines and toothpastes that contain high concentrations of chloroform. Such individuals should be identified among cases and controls.

The site most warranting a case-control study is the bladder, possibly followed by the colon and rectum. Confounding factors include occupation, cigarette smoking, use of alcohol and other drugs (including artificial sweeteners), nonaqueous sources of THM, coffee consumption, socioeconomic status, and ethnicity.

Cohort Studies

Cohort studies, attempting to follow "exposed" and unexposed populations over time, may also be possible. Some natural experiments have been created by using different methods of water purification. Thus, a population from a community using activated charcoal filtration that is adequately and frequently regenerated might be compared over time with a population from a community not using that process. Due attention must be given to latency--the time difference between initial exposure and the appearance of disease. This applies to both retrospective and prospective studies.

Studies should be undertaken only after there is a clear understanding of the magnitudes of detectable differences. Because the effects anticipated from the usual concentrations of THM in drinking water are not expected to be large, large populations must be studied to demonstrate associations. Similarly, if there is no association, large populations must be studied to exclude the existence of the small effects that have been postulated.

Some useful data may be available from foreign countries--and the help of international agencies (World Health Organization-International Agency for Research on Cancer, North Atlantic Treaty Organization, U.S.-Japan Scientific Exchange, U.S.-USSR Scientific Exchange) should be sought.

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July 25, 1978

Table 1. Correlation coefficients between residual mortality rates in white males and halomethane levels in drinking water, by percent of the county population served by the sampled supply.[a]

Site or type of malignancy	Halomethane[b] indicator	Correlation coefficients and (P-value for two-tailed t-test) by county population served, %			
		50%-64%, 25 counties	65%-84%, 26 counties	85%-100%, 25 counties	50%-100%, 76 counties
Pancreas	Chloroform	0.04 (0.83)	-0.06 (0.77)	-0.32 (0.12)	-0.13 (0.27)
Prostate	Chloroform	0.34 (0.10)	0.03 (0.87)	0.30 (0.14)	0.17 (0.14)
Bladder	NCTHM	-0.22 (0.29)	0.29 (0.15)	0.38 (0.06)	0.19 (0.10)
Kidney	Chloroform	-0.16 (0.44)	-0.11 (0.60)	0.42 (0.04)	0.07 (0.55)
Brain	NCTHM	0.10 (0.65)	0.18 (0.37)	0.24 (0.25)	0.17 (0.14)
Non-Hodgkin's lymphoma	NCTHM	-0.33 (0.11)	-0.19 (0.36)	0.36 (0.08)	-0.03 (0.81)
Stomach[c]	Total THM	0.01 (0.96)	0.05 (0.81)	-0.14 (0.49)	-0.02 (0.87)
Pancreas[c]	NCTHM	-0.12 (0.57)	-0.31 (0.12)	0.04 (0.84)	-0.16 (0.18)
Lung[c]	Total THM	-0.02 (0.94)	0.02 (0.90)	0.15 (0.46)	0.07 (0.56)

[a]From Cantor et al., 1977.

[b]Abbreviations: NCTHM, nonchloroform trihalomethanes; THM, trihalomethanes.

[c]Included for comparison with results for females, where stronger associations with the listed indicator were observed.

July 25, 1978

Table 2. Correlation coefficients between residual mortality rates in white females and halomethane levels in drinking water, by percent of the county population served by the sampled supply.[a]

Site of type of malignancy	Halomethane[b] Indicator	Correlation coefficients and (P-value for two-tailed t-test) by county population served, % 50%-64%, 25 counties	65%-84%, 26 counties	85%-100%, 25 counties	50%-100%, 76 counties
Stomach	Total THM	0.01 (0.97)	-0.11 (0.59)	-0.36 (0.07)	-0.16 (0.17)
Pancreas	NCTHM	-0.31 (0.13)	-0.12 (0.56)	0.31 (0.14)	-0.03 (0.82)
Lung	Total THM	0.25 (0.23)	0.28 (0.17)	0.15 (0.46)	0.22 (0.05)
Bladder	NCTHM	-0.01 (0.97)	0.21 (0.30)	0.45 (0.02)	0.21 (0.06)
Pancreas[c]	Chloroform	-0.25 (0.22)	0.20 (0.32)	-0.06 (0.77)	0.02 (0.85)
Kidney[c]	Chloroform	-0.33 (0.11)	0.19 (0.37)	-0.04 (0.83)	-0.01 (0.96)
Brain[c]	NCTHM	-0.07 (0.73)	-0.03 (0.90)	0.19 (0.35)	0.04 (0.72)
Non-Hodgkin's[c] lymphoma	NCTHM	-0.36 (0.08)	0.26 (0.20)	-0.04 (0.83)	0.01 (0.97)

[a]From Cantor et al., 1977.

[b]Abbreviations: THM, trihalomethanes; NCTHM, nonchloroform trihalomethanes.

[c]Included for comparison with results in males, where stronger associations with with the listed indicator were observed.

July 25, 1978

Table 3. Weighted regression coefficients and levels of statistical significance between chloroform concentrations and cancer mortality in men and women.[a]

	White males				White females			
Site	NORS		Region V		NORS		Region V	
	β	P	β	P	β	P	β	P
Large Intestine	.0114	0.01	.0115	0.01	.0102	0.01	-.0019	0.60
Rectum	.0032	0.22	.0062	0.03	.0031	0.04	.0007	0.75
Bladder	.0034	0.10	.0013	0.63	.0017	0.04	.0023	0.07
Liver	-.0026	0.08	.0048	0.03	-.0020	0.21	.0027	0.17
Stomach	-.0096	0.04	-.0023	0.65	-.0069	0.01	.0016	0.63
Esophagus	-.0040	0.06	.0016	0.53	-.0005	0.35	.0003	0.69
Tongue	-.0045	0.12	.0052	0.02	-.0001	0.80	.0000+	0.96

[a]From Hogan *et al.*, 1978

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Mr. MAGUIRE. Our next witness is Sherwin Gardner, Deputy Commissioner of Food and Drugs, FDA.

STATEMENT OF SHERWIN GARDNER, DEPUTY COMMISSIONER OF FOOD AND DRUGS, FOOD AND DRUG ADMINISTRATION, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, ACCOMPANIED BY TAYLOR QUINN, ASSOCIATE DIRECTOR FOR COMPLIANCE, BUREAU OF FOODS

Mr. GARDNER. Thank you, Mr. Chairman. I have with me this morning Mr. Taylor Quinn, who is the Associate Director for Compliance in the Bureau of Foods, the organization that is responsible for some of the material we are going to talk about.

Mr. MAGUIRE. Fine. You may proceed.

Mr. GARDNER. Mr. Chairman, I have a statement which with your permission I would submit in its entirety for the record [see p. 286], and if it is acceptable I would like to turn immediately to the central area of interest, and perhaps we could proceed that way.

Mr. MAGUIRE. That is fine.

Mr. GARDNER. There is a relationship between the Food, Drug, and Cosmetic Act and the Safe Drinking Water Act, and that brings into focus some possible overlaps in regulatory programs of Food and Drug Agency and the Environmental Protection Administration.

We have been working at resolving those overlaps in a sensible way, and Administrator Costle and Commissioner Kennedy have agreed on a division of responsibilities which we believe is consistent with the Congress intentions in enacting the Safe Drinking Water Act, and is also consistent with the other laws under which we operate.

On page 3 of the statement there is described the broad principles of the agreement between the two agencies which we are now going to formalize in what is known in the bureaucracy as a memorandum of understanding. That memorandum of understanding will be placed on the public record so that people will understand how we are going to carry out our programs, and how they will be affected by it.

I would like to go briefly to those principles and describe them for you. The first of those is that the Safe Drinking Water Act establishes a scheme for insuring the safety of drinking water, with EPA assigned the basic Federal responsibility. The agencies—that is, FED and EPA—will take the position that the Safe Drinking Water Act implicitly repealed any authority under the Federal Food, Drug, and Cosmetic Act with respect to drinking water from public water systems, and that water used solely for drinking purposes should no longer be considered a food under the Food, Drug, and Cosmetic Act.

Another important principle in the agreement is that the Food and Drug Administration would continue to regulate bottled water in accordance with the provisions of the Safe Drinking Water Act, and section 410 of the Food, Drug, and Cosmetic Act that prescribes consultation between EPA and FDA in order to conform bottled water standards with primary drinking water standards established by EPA.

The third point is that FDA would continue to have authority to regulate any poisonous or deleterious substances in processed foods that result from the use of water as an ingredient or a component of food. The substances would be considered added substances and subject to regulations under section 402, which deals with adulteration, in the Food, Drug, and Cosmetic Act.

The food additive provisions of the Food, Drug, and Cosmetic Act would not apply to substances that are present in drinking water before the water entered a food processing establishment, because the Safe Drinking Water Act gives the responsibility for regulating the safety of these substances in water to EPA. In addition to the Safe Drinking Water Act, EPA also would use appropriate provisions of both the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act whenever necessary to assure the safety of drinking water.

Another point in the agreement is that water meeting drinking water standards established by EPA will ordinarily be accepted by FDA as suitable for use in making foods; that is, the presence of substances in food that result from the use of water containing such substances will not be considered to adulterate the food under the Food, Drug, and Cosmetic Act.

It may be that, in some circumstances, substances permitted in drinking water by EPA under an exemption or variance should not be used in making foods, and we will have to treat those on an individual basis.

Water used as an ingredient in food would continue to be subject to all the labeling and misbranding requirements that are applicable to all food ingredients. In other words, the presence of water would have to be declared on the label, as one example of that.

EPA and FDA will examine existing regulations to insure that they are consistent with the positions—that is, with the principles—I have just enumerated in the agreement, and will make any necessary revisions or revocations to conform regulations with that agreement.

That is the substance of the agreement, and that resolution then would concentrate the regulatory responsibility for drinking water in a single agency, as is our understanding, and that single agency would be EPA.

Mr. Chairman, I think I will stop at this point and yield to questions from the committee.

[Mr. Gardner's prepared statement follows:]

36-566 O - 79 - 19

STATEMENT

BY

SHERWIN GARDNER

DEPUTY COMMISSIONER FOR FOOD AND DRUGS

FOOD AND DRUG ADMINISTRATION

PUBLIC HEALTH SERVICE

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

BEFORE THE

SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT

COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE

HOUSE OF REPRESENTATIVES

SEPTEMBER 25, 1978

Mr. Chairman:

I welcome this opportunity to describe for the Subcommittee the efforts of both the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) to resolve the complicated jurisdictional matters about our drinking water.

In 1974, Congress enacted the Safe Drinking Water Act (SDWA) which gives EPA the responsibility, in conjunction with the states, for the safety of drinking water. As you know, the FDA also has some responsibility for water. At the time of its enactment, the SDWA of 1974 was heralded as a major milestone for environmental legislation. The goals like those of other pieces of environmental legislation are laudable. Hardly anyone would disagree with the position that safe and pure drinking water is desirable. The attainment of these goals, however, involves decisionmaking processes that are often difficult, which is why we are here today.

Since passage of the SDWA, FDA and EPA have been concerned about the relationships between the two Acts and the possible overlaps in the regulatory programs of our two agencies. We have also been aware of some industry confusion about the applicability of the Acts. However, Administrator Costle and Commissioner Kennedy have met and agreed on a division of responsibilities consistent with Congress' intentions in passing the SDWA and also consistent with the other laws under which we operate.

Basically, this agreement recognizes that the primary responsibility for assuring the safety of drinking water provided by public water systems rests with EPA and the primary responsibility for assuring the safety of bottled water and water used as an ingredient in commercial food products rests with FDA. An FDA/EPA Task Force has been established to prepare a Memorandum of Understanding (MOU) including the procedural details necessary to clarify each agency's responsibilities and any jurisdictional questions. The drafting of that MOU is well underway and should be completed and ready for final review within each agency shortly.

An interagency agreement is not an unusual step for FDA and EPA. The FDA shares responsibility with EPA as well as with the Consumer Product Safety Commission (CPSC) and the Occupational Safety and Health Administration (OSHA) in other areas dealing with environmental issues. Our four agencies are working together on many of our common problems through the Interagency Regulatory Liaison Group (IRLG). One of the objectives of this group is to formulate unified public health policies and practices for the regulation of environmental contaminants. Implementation of the SDWA is one such matter. We have worked to design a practicable regulatory approach to assure the safety of drinking water in the most efficient way.

I would like to describe briefly the broad principles of the MOU.

1. The SDWA establishes a scheme for ensuring the safety of drinking water with EPA assigned the basic Federal responsibility. As a result, the agencies will take the position that the SDWA implicitly repealed any authority under the FFDCA with respect to drinking water from public water systems, and that water used solely for drinking purposes should no longer be considered a "food" under the FFDCA.

2. FDA would continue to regulate bottled water in accordance with the express provisions of the SDWA, and §410 of the FFDCA that prescribes consultation between EPA and FDA to conform bottled water standards with primary drinking water standards.

3. FDA would continue to have authority to regulate any poisonous or deleterious substances in processed foods that result

from the use of water as an ingredient or component of the food. The substances would be considered added substances subject to regulation under §402 of the FFDCA. The food additive provisions of the FFDCA would not apply to substances present in drinking water before the water entered a food processing establishment because the SDWA gives the responsibility for regulating the safety of these substances in water to EPA. In addition to the SDWA, EPA would also use appropriate provisions of both the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act whenever necessary to assure the safety of drinking water.

4. Water meeting drinking water standards established by EPA will ordinarily be accepted by FDA as suitable for use in making foods, i.e., the presence of substances in food that result from the use of water containing such substances will not be considered to adulterate the food under §402.

5. It may be that, in some circumstances, substances permitted in drinking water by EPA, under an exemption or variance, should not be used in making foods.

6. Water used as an ingredient in food would continue to be subject to all the labeling and misbranding requirements applicable to all food ingredients.

7. EPA and FDA will examine existing regulations to ensure that they are consistent with the positions adopted in the MOU and make any necessary revisions or revocations.

As you can see from the outline of the MOU, the interrelationship of the two agencies' responsibilities over water is a complicated matter. The resolution of the questions to be made in the MOU is, we believe, the most suitable one. This resolution brings about a type of regulatory control over water safety consistent with Congress' objectives in passing the SDWA. It also retains for FDA the necessary degree of regulatory control to ensure that foods distributed in interstate commerce do not contain unsafe substances. Ordinarily, we would be reluctant to conclude that one statute implicitly repealed another, particularly a statute concerned with health and safety. We believe, though, that this conclusion is appropriate in this situation to achieve the Congressional objective of giving EPA the basic Federal responsibility for the safety of drinking water, and to eliminate the potential for inconsistent regulation. For example, under the SDWA, EPA is to take feasibility and cost into account in developing water standards and treatment techniques (42 U.S.C. §300g-1), but FDA would not consider these factors if FDA were to regulate substances in drinking water as food additives (21 U.S.C. 348).

We also believe that a clear decision on the jurisdictional questions is necessary in order to ensure that EPA can use the Toxic Substances Control Act as a supplementary source of authority for regulating substances in drinking water. The TSCA does not apply to food (15 U.S.C. 2602). If the status of drinking water as a food were left unresolved, EPA's authority to use TSCA would be left in question. Because the MOU recognizes that drinking water should not be considered a food, EPA will be in a better position to use TSCA when needed to regulate chemical substances in drinking water. This resolution also concentrates regulatory responsibilities for water in a single Federal agency, EPA.

The development of the MOU has been a complex task and the agencies and their staffs have had to face many difficult questions. We feel confident in assuring you that the MOU will be issued shortly. The MOU is now undergoing revisions at the EPA. Once the MOU is released by EPA to FDA we believe that we would be able to review it, and either provide comments on it, or approve it within two weeks.

Of course the actions I have mentioned so far in my statement are not the first steps taken by EPA and FDA to improve the safety of the national drinking water supply.

Under the SDWA, EPA is conducting a comprehensive study of public water supplies and drinking water sources to determine the nature, extent, sources of, and means of control of contamination by chemicals or other substances suspected of being carcinogenic. The EPA is to be commended for the progress they have made so far in implementing this broad environmental law. FDA endorses EPA's efforts to reduce human exposure to chloroform and other trihalomethanes and other organic contaminants in drinking water.

Further, we have recently executed another MOU, effective as of September 14, 1978, with EPA concerning water on interstate carriers. The purpose of the understanding is to set forth cooperative working arrangements in regulating the suitability of the water intended for drinking and culinary purposes on board interstate carrier conveyances. We will provide a copy for the record.

Therefore, the MOU proposal under consideration today represents another major step toward full implementation of the SDWA.

The agency efforts in resolving these matters can be looked on as successful instances of interagency coordination to address important and difficult regulatory issues and to resolve them in a way that best serves the public interest.

Mr. Chairman, this concludes my remarks. I will be happy to answer any questions you or other members of the Subcommittee may have.

Mr. MAGUIRE. Dr. Carter.

Mr. CARTER. Thank you, Mr. Chairman.

Your agreement covers bottled water—is that correct?

Mr. GARDNER. That is correct, with the understanding that water once it enters a food processing plant would be subject to our supervision and control.

Mr. CARTER. Do you monitor this water regularly?

Mr. GARDNER. The water in food processing?

Mr. CARTER. Yes.

Mr. GARDNER. We monitor it as part of our inspection of food processing plants.

Mr. CARTER. Have you checked it for trihalomethanes?

Mr. GARDNER. I do not believe that we would ordinarily do that, unless there was some reason to suspect there was a problem, which we would learn by consultation with EPA.

Mr. CARTER. We have heard testimony to the effect that after treatment through many water plants in this country, because of an interaction of chlorine and humic acid, our water has concentrations of as much as over 100 parts per billion after treatment. Do you not think, then, if this water is used in the processing of foods, that you should check it to see if you are permitting carcinogens to be placed in foods?

Mr. GARDNER. Mr. Carter, we have tried to design this agreement so that there would be a sensible application of safety standards. If EPA has made a determination that the water in a community, after being processed by the facilities of that community, is safe to drink, then it would be safe to use in processed foods, and we would ordinarily not check the water, if we had that assurance.

Mr. CARTER. Thus the water could have 140 or 200 parts per billion of trihalomethanes, but you would not check it without EPA telling you that it was a little bit dangerous, or that it might have carcinogens in it; is that correct?

Mr. GARDNER. That is correct. If EPA has determined that water level is safe for consumption in that community it would be acceptable to us.

Mr. CARTER. Do you also check bottled water; is that correct?

Mr. GARDNER. We check bottled water as we would check any other processed food. That is, we would inspect the facilities in which the water is processed and put into containers and labeled, and if we had reason to suspect that there was a problem with the facilities, we might take some samples of the water and check them in our laboratories.

Mr. CARTER. What do you check the bottled water for, and how?

Mr. GARDNER. We would check the bottled water for contaminants of different sorts. They could be chemical contaminants, they could be organisms, foreign organisms that would occur. Perhaps Mr. Quinn could amplify on that if it would be helpful.

Mr. QUINN. We have an obligation under the Food, Drug, and Cosmetic Act to set standards for bottled water that are in conformity with the primary drinking water standards that EPA sets, so what we did was set out a regulation that defines the various amounts of chemicals that are allowed in the bottled water, and the definitions are the same as in EPA drinking water standards. Then we check for those chemicals which are set forth in our regulations, which is quite a large number.

Mr. CARTER. Since you check for all of these chemicals, what level of trihalomethanes do you find in bottled water?

Mr. QUINN. Trihalomethanes is not one of the ones that is in the primary drinking water standards, so we do not have a level for that.

Mr. CARTER. Pardon me? Would you repeat that?

Mr. QUINN. I do not believe that trihalomethanes are in the primary drinking water standards that we have put into our regulations at the present time.

Mr. CARTER. They are under consideration at this time with a proposed level for trihalomethanes of 100 parts per billion. After this regulation becomes effective will you check the water for trihalomethanes?

Mr. QUINN. I do not know. That is something we will have to determine.

Mr. CARTER. You do not know? Your response is not consistent with what you have said previously, that you will follow EPA regulations.

Mr. GARDNER. Let me jump into the middle of this.

Mr. CARTER. Yes, sir.

Mr. GARDNER. I think Mr. Quinn is saying he does not know that we will do it every time. If there is a reason to suspect that the water being used in that plant is not in conformity with the standards set by EPA——

Mr. CARTER. Well, you know what it is without your checking.

Mr. GARDNER. Well, we are going to have to assume that when EPA sets the standard, and the community water has been certified by EPA as meeting that standard, that it would also conform in the plant, unless there is a reason to suspect that something in that plant that is going on in the processing or handling of water is going to change from the standard that has been established by EPA.

Mr. CARTER. Do you check the water regularly for bacterial contamination?

Mr. QUINN. We do check for coliforms. That is about the only bacterial contamination that we have in our regulation.

Mr. CARTER. How do you do that? There is a simple test for checking for this?

Mr. QUINN. Oh, yes.

Mr. CARTER. What test do you use?

Mr. QUINN. We use the test I believe set forth in AOAC.

Mr. CARTER. Describe it please, sir.

Mr. QUINN. I am sorry, I am not technically competent. I could not describe what it is. I am not a bacteriologist.

Mr. CARTER. I trust you will include that for the record.

Mr. GARDNER. Yes.

Mr. CARTER. It is really a simple method. You use kind of a U-tube. You take the water and if gas forms in one part of the tube, it is usually E. coli. That is the standard they have used over the years for contamination. There may be others.

Thank you very kindly.

Mr. MAGUIRE. Thank you, Dr. Carter.

We have been told, Mr. Gardner, that NIHS and FDA all support the EPA regulations proposed; is that correct?

Mr. GARDNER. Yes, sir, and Commissioner Kennedy testified at hearings, if my memory serves me correctly, back in July. I would be pleased to submit his testimony for the record if you would like to have that.

Mr. CARTER. In view of the fact that it is already in the record, I think probably we will not need it, but thank you for clarifying that point. May I ask that you remain available to respond to any questions members of the committee may have?

Mr. GARDNER. Yes.

Mr. MAGUIRE. Those questions will be submitted in writing.

Mr. GARDNER. Yes, sir, we will be pleased to do that.

Mr. MAGUIRE. Thank you very much. We appreciate your testimony.

Mr. GARDNER. Thank you.

Mr. MAGUIRE. The committee is adjourned.

[The following letters and statements were received for the record.]

ELWOOD H. "BUD" HILLIS
5TH DISTRICT, INDIANA

COMMITTEES:
HOUSE COMMITTEE ON VETERANS' AFFAIRS
HOUSE ARMED SERVICES COMMITTEE

CHAIRMAN:
REPUBLICAN TASK FORCE ON ENERGY AND ENVIRONMENT

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE:
2429 RAYBURN BUILDING
TELEPHONE: 202-225-5037

KOKOMO OFFICE:
518 NORTH MAIN STREET
TELEPHONE: 457-4411

ANDERSON OFFICE:
26 WEST 7TH STREET
TELEPHONE: 642-8023

MARION OFFICE:
220 MARION P.O. BUILDING
TELEPHONE: 662-7227

August 22, 1978

The Honorable Paul Rogers, M.C.
Chairman
Health and the Environment Subcommittee
2415 Rayburn HOB
Washington, D.C. 20515

Dear Mr. Chairman:

This letter is in reference to the Oversight Hearing which the Subcommittee intends to hold September 25 regarding the Proposed Amendment to the Interim Primary Drinking Water Standards on Organics.

I have enclosed a copy of the testimony which I presented at the final public hearing in Washington July 12, regarding these regulations. Also enclosed are excerpts from the House and Senate Appropriations Committees which strongly urge the EPA to complete present research and carefully consider the impact of the costly regulations before proceeding. It would be most appreciated if the material enclosed were made part of the record.

Thank you for your attention and consideration.

With kind regards, I am

Sincerely,

Bud Hillis
Elwood H. Hillis
Member of Congress

STATEMENT BY CONGRESSMAN ELWOOD H. HILLIS

WEDNESDAY, JULY 12, 1978; 9:00 AM

SOUTH AGRICULTURE BUILDING, THOMAS JEFFERSON AUDITORIUM

PROPOSED EPA AMENDMENT TO INTERIM PRIMARY DRINKING WATER REGULATIONS

I AM CONGRESSMAN BUD HILLIS REPRESENTING THE 5TH CONGRESSIONAL DISTRICT OF INDIANA. MANY OF MY CONSTITUENTS ARE PROVIDED WATER UTILITY SERVICE BY THE INDIANAPOLIS WATER COMPANY, AND IT IS ON THEIR BEHALF THAT I AM HERE TO TALK ABOUT THE ECONOMIC IMPACT OF THE ENVIRONMENTAL PROTECTION AGENCY'S PROPOSED AMENDMENT TO THE INTERIM PRIMARY DRINKING WATER REGULATIONS.

IT IS MY UNDERSTANDING THAT IF THE INDIANAPOLIS WATER COMPANY AS A RESULT OF THESE REGULATIONS IS FORCED TO ADD GRANULAR ACTIVATED CARBON (GAC) FILTRATION SYSTEMS AT EACH OF ITS PLANTS, THE CAPITAL COSTS WILL EXCEED $45 MILLION IN 1978. BY THE TIME THE FACILITIES ARE ACTUALLY INSTALLED, INFLATION WILL PROBABLY HAVE DRIVEN THE COSTS EVEN HIGHER TO SOMEWHERE ON THE ORDER OF $55 MILLION. I AM TOLD THAT THESE GAC COSTS WILL THEREBY NECESSITATE AN INCREASE IN WATER RATES OF GREATER THAN 60 PERCENT. THIS IS FAR MORE THAN EPA'S PROJECTED MODEST ESTIMATE OF AN ANNUAL INCREASED WATER BILL OF APPROXIMATELY $3 TO $6 PER FAMILY UNDER THE BEST CONDITIONS, AND $9 TO $17 PER FAMILY UNDER THE WORST CONDITIONS.

IT SEEMS TO ME THAT THESE ARE UNNECESSARY COSTS FOR THE EPA TO IMPOSE AT THIS TIME WHEN THERE IS APPARENTLY SO LITTLE EVIDENCE EXISTING OF AN ACTUAL POTENTIAL HEALTH PROBLEM WITH TRACE AMOUNTS OF ORGANICS IN DRINKING WATER. WHILE NOT PROFESSING TO BE FULLY VERSED IN THE TECHNICALITIES OF THE PROPOSED REGULATIONS, I HAVE BEEN INFORMED THAT THERE IS CONSIDERABLE SCIENTIFIC DISPUTE OVER WHETHER THE BENEFITS OF THE PROPOSED REGULATIONS JUSTIFY THE RESULTING SUBSTANTIAL COSTS.

CERTAINLY, WE ARE ALL INTERESTED IN HAVING DRINKING WATER WHICH IS SAFE. HOWEVER, IT IS MY UNDERSTANDING THAT VIRTUALLY EVERY

STATE HEALTH AGENCY WHICH HAS TESTIFIED ON THE REGULATIONS HAS ATTACKED IT AS UNFOUNDED OR PREMATURE. I FIND IT DIFFICULT TO BELIEVE THAT THE ENTIRE HEALTH WORLD AT THE STATE LEVEL IS WRONG. EVEN YOUR AGENCY HAS INDICATED THAT THE EVIDENCE FROM STUDIES THUS FAR IS INCOMPLETE DUE TO LIMITATIONS IN THE SCOPE OF THE STUDIES, THE SMALL SAMPLE SIZES, THE LACK OF WATER QUALITY DATA, AND THE TRENDS AND PATTERNS OF ASSOCIATION NOT HAVING BEEN FULLY DEVELOPED.

SINCE MORE DEFINITATIVE STUDIES ARE CURRENTLY BEING CONDUCTED BY EPA AND THE NATIONAL CANCER INSTITUTE, AND SINCE EPA HAS REQUESTED THE NATIONAL ACADEMY OF SCIENCES TO PROVIDE AN INDEPENDENT ASSESSMENT OF THE STUDIES ALREADY COMPLETED, WOULD IT NOT SEEM MORE PRUDENT TO WAIT UNTIL THESE ASSESSMENTS HAVE BEEN COMPLETED?

ALTHOUGH THE HOUSE REPORT WHICH ACCOMPANIED THE SAFE DRINKING WATER ACT STATES THAT CONCLUSIVE PROOF OF AN ADVERSE EFFECT IS NOT A PREREQUISITE TO SUCH REGULATIONS, THIS DOES NOT MEAN THAT IT WAS THE INTENT OF THE CONGRESS THAT SUPERFICIAL OR INCOMPLETE INDICATIONS BE REASON ENOUGH.

I WOULD LIKE TO STRONGLY URGE THAT BEFORE THE CONSTITUENTS OF MY DISTRICT ARE REQUIRED TO PAY THE RATES WHICH WILL BE NECESSARY TO FINANCE THESE EPA REQUIREMENTS, THERE BE A CONSENSUS AMONG STATE AND FEDERAL HEALTH OFFICIALS AND THE SCIENTIFIC COMMUNITY THAT (1) THERE IS, IN FACT, A PROBLEM AND (2) IF THERE IS A PROBLEM, GAC IS THE ANSWER.

THE CONGRESS HAS DELEGATED TO THIS AGENCY A GREAT RESPONSIBILITY TO THE AMERICAN PEOPLE. THIS RESPONSIBILITY MUST BE EXCERCISED CAREFULLY. IT IS ESSENTIAL THAT WHATEVER REGULATIONS THE EPA PROPOSES BE BASED ON SIGNIFICANT EVIDENCE. THIS IS ESPECIALLY TRUE WHEN ONE OF THE MOST FREQUENT COMPLAINTS RAISED BY CONSTITUENTS TO CONGRESSIONAL OFFICES IS THAT THERE IS TOO MUCH REGULATION WITHOUT CONSIDERATION FOR THE RESULTING COSTS.

THEREFORE, I CAUTION THE EPA TO GO SLOWLY IN LABELING THESE TRACE AMOUNTS OF ORGANIC CHEMICALS AS CANCER-CAUSING UNLESS THERE IS MORE SIGNIFICANT EVIDENCE THAN EPA HAS NOW PUT FORTH TO SUPPORT SUCH A POSITION.

THANK YOU.

Calendar No. 984

95TH CONGRESS 2d Session	SENATE	REPORT No. 95–1060

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT—INDEPENDENT AGENCIES APPROPRIATION BILL, 1979

AUGUST 1 (legislative day, MAY 17), 1978.—Ordered to be printed

Mr. PROXMIRE, from the Committee on Appropriations, submitted the following

REPORT

[To accompany H.R. 12936]

The Committee on Appropriations, to which was referred the bill (H.R. 12936) making appropriations for the Department of Housing and Urban Development, and for sundry independent executive agencies, boards, institutes, commissions, corporations, and offices for the fiscal year ending September 30, 1979, and for other purposes, reports the same to the Senate with various amendments and presents herewith an explanation of the contents of the bill.

AMOUNT OF NEW BUDGET (OBLIGATIONAL) AUTHORITY

	Fiscal year 1979
Amount of bill as passed by House	$68, 208, 848, 000
Amount of change by Committee	+255, 526, 000
Amount of bill as reported to Senate	68, 464, 374, 000
Amount of appropriations to date, 1978	74, 308, 601, 000
Amount of budget estimates, 1979	69, 517, 534, 000
Under estimates for 1979	−1, 053, 160, 000
Under appropriations for 1978	−5, 844, 227, 000

The EPA earlier this year proposed amendments to its regulations under the Safe Drinking Water Act to limit certain organic chemicals sometimes found in trace amounts in drinking water. The Committee notes that there are divisions of thought in the scientific community as to whether a health risk exists which would justify these proposals, as well as serious questions concerning the cost, effectiveness, and potential health hazards of the granular activated carbon systems which the EPA would require be installed. The Committee further notes that many water providers believe they will be unable to meet the financial burdens placed on them by these regulations unless rates to their customers are raised—in some cases multiplied.

The cost of these regulations could be almost $1,000,000,000 by the EPA's own estimate, or up to $4,000,000,000 or $5,000,000,000 by other estimates. Already some have argued that, if these regulations become final, federal financial assistance will have to be provided. Therefore, the Committee wishes to take this opportunity to express its own concerns.

The Committee questions whether final promulgation of these regulations within the near future might be premature, in that the evidence to support the EPA's proposals may not justify their issuance. In view of the growing public awareness of government inspired inflationary pressures, and although the Committee has not marshalled the expertise to make its own scientific judgment in this area at this time, the Committee urges the EPA, before going ahead with these costly regulations, to complete the research and make the difficult, balanced judgment to inspire the confidence of knowledgeable persons who must meet the requirements and pay the costs.

ENFORCEMENT

1978 appropriation	$70, 837, 000
1979 budget estimate	[1] 95, 555, 000
House allowance	94, 555, 000
Committee recommendation	94, 755, 000

[1] Includes $700,000 requested in House Document 95-331.

The Committee recommends $94,755,000 for EPA's enforcement program in fiscal year 1979. This amount is $800,000 below the budget estimate and $200,000 above the amount provided by the House.

The enforcement efforts of the Environmental Protection Agency are an integral part of the Agency's program of controlling environmental pollution. Much of the EPA's enforcement activities are in support of or in cooperation with State and local enforcement initiatives in such areas as air quality standards, navigable and interstate water quality standards, and issuance of pollution discharge permits. Enforcement responsibilities dovetail with those under the abatement and control account, focusing on air, water quality, drinking water, solid waste, pesticides, toxic substances, and noise. The Agency uses a number of enforcement methods to deal with environmental pollution, including such actions as notices of violation, abatement orders, civil and criminal court actions and, in the case of pesticides, recalls and seizures.

95TH CONGRESS 2d Session } HOUSE OF REPRESENTATIVES { REPORT No. 95-1255

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATION BILL, 1979

JUNE 1, 1978.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. BOLAND, from the Committee on Appropriations, submitted the following

REPORT

together with

ADDITIONAL VIEWS

[To accompany H.R. 12936]

The Committee on Appropriations submits the following report in explanation of the accompanying bill making appropriations for the Department of Housing and Urban Development, and for sundry independent agencies, boards, commissions, corporations, and offices for the fiscal year ending September 30, 1979, and for other purposes.

INDEX TO BILL AND REPORT

availability of substitutes, and the economic consequences of regulating the chemical, EPA, through rulemaking procedures, may take a number of actions. If EPA finds a chemical to be an unreasonable risk of injury to health or to the environment, the Agency may prohibit the manufacture or distribution of the chemical, limit the amount of the chemical that may be produced, regulate the use of the chemical, require the chemical to be labeled with warnings or instructions and prohibit or regulate the chemical's disposal. EPA may also require a chemical manufacturer to improve quality control procedures if the manufacturing process causes a chemical to present an unreasonable risk to health or the environment. In the event that the immediate regulation of a chemical is necessary to protect human health or the environment, EPA may issue a rule effective upon publication in the Federal Register or initiate a civil action for the seizure, recall, or public notification of the hazards of the chemical.

Committee Recommendations by Appropriation

Of the amounts approved in the following appropriation accounts, the Agency must limit transfers of funds between media to not more than 10 percent of the budget plan without first obtaining approval of the Committee.

AGENCY AND REGIONAL MANAGEMENT

1978 appropriation	$72,840,000
Estimate, 1979	[1] 84,185,000
Recommended in bill	84,185,000

[1] Includes $100,000 requested in H. Doc. 95-331.

The Committee recommends the budget estimate of $84,185,000 for agency and regional management in fiscal year 1979. These activities include executive direction and leadership for all programs and support to such areas as public affairs, legislative liaison, international affairs, equal employment opportunity, Federal agency pollution control activities, program planning and economic analysis, budgeting, accounting, auditing, personnel management, organizational analysis, ADP operations, grant and contract policy and other housekeeping activities.

RESEARCH AND DEVELOPMENT

1978 appropriation	$316,747,000
Estimate, 1979	324,128,000
Recommended in bill	328,028,000
Increase above estimate	+3,900,000

The purpose of EPA's research and development programs is to produce the scientific information and technical tools on which national policy is based and the effective control strategies in the regulation, prevention and abatement of environmental pollution. The Committee notes, however, that in the past EPA has at times put greater emphasis on publishing a standard rather than on the compilation of the necessary scientific data on which to base it. Under these circumstances, EPA's research and development programs have been directed more toward a legal defense of regulations rather than information for their development. Accordingly, the Committee recomends that EPA undertake a complete study of its research and development effort to determine how it can be made more responsive and effective in the development of realistic standards.

An example of proposed regulations issued without substantive supporting scientific evidence is the recently published regulation on control of organic chemical contaminants in drinking water supplies for communities above 75,000 population. Of particular concern is that the control strategy of granular activated carbon filtration is being proposed by EPA without sufficient plant experience. The Agency is urged to thoroughly test this control strategy in actual plants before mandating that it be adopted on a nationwide basis. There remain too many unanswered questions concerning cost, effectiveness and potential health hazards.

The Committee recommends the budget estimate with the following changes:

—$2,000,000 for contractual efforts. A minimum of one-half of the reduction should be applied to the air ecological effects activity. The Committee is concerned that EPA is not properly selecting which tasks should be accomplished in-house and which under contract. A complete review of the procedures used in making such determinations should be made at the earliest possible date.

—$1,000,000 for monitoring and technical support activities. The budget estimate for these activities in fiscal year 1979 is more than $41,000,000 compared with $28,500,000 in 1978. The recommendation will permit a significant increase in 1979 and should be adequate to meet high priority requirements.

—$3,000,000 for anticipatory research. This will provide for an increase of $1,131,000 above the 1978 level of $1,729,000. The Committee also recommends that the number of positions devoted to anticipatory research remain at the fiscal year 1978 level. The Committee is aware of the need for long-term research to permit the Agency to address new environmental problems. However, extensive management attention must be devoted to this activity to ensure that it does not become a vehicle for research projects that cannot be justified elsewhere or have little promise of practical applicability.

+$600,000 for implementing a mosquito control research program. This activity should focus on a national effort for the development of integrated pest management methods for mosquito populations associated with fresh water irrigated crop systems using the rice land agroecosystem as a model. Increasing problems resulting from the presence of massive mosquito populations in food production areas where irrigation is used and in adjacent urban areas make it urgent that new methods for controlling this pest problem be developed with minimum reliance on chemical preparations.

+$800,000 for aquatic weed control research. The Committee notes that aquatic weeds are causing water quality and navigation problems in many of the Nation's waterways. This research should be directed toward the control of aquatic weeds using chemical and biological measures.

+$1,100,000 for groundwater research. The funds are targeted for a study of the Garber-Wellington aquifer in Oklahoma to be conducted through the Kerr Laboratory. Groundwater provides approximately 20 percent of all fresh water used in the United States. Addi-

Pennichuck
Water Works
11 High Street
Nashua, New Hampshire 03061
Telephone (603) 882-5191

July 20, 1978

The Honorable Paul G. Rogers
United States House of Representatives
Chairman, Subcommittee on Health & the Environment
Rayburn Building 2407
Washington, D. C. 20515

Dear Representative Rogers:

It has come to my attention that your Subcommittee on Health and the Environment has scheduled an oversight hearing for July 25, 1978 relative to EPA's Safe Drinking Water Program. Accordingly I am writing to express concern over the effect of the proposed organic chemicals amendment to the EPA Interim Primary Drinking Water Regulations on the Pennichuck Water Works consumer.

The Pennichuck Water Works, Nashua, N. H. is an investor owned water utility founded in 1852 and today serves some 68,000 people. We are presently completing the engineering design for a 20 million gallons per day water filtration plant to meet the requirements of the Interim Primary Drinking Water Regulations that became effective in June 1977.

The cost of the filtration plant will be approximately $6,500,000. This is awesome considering that the company's total current assets are $9,800,000. In fact, this single addition is greater than the total of all additions to plant and equipment over the past 11 years. The project alone will require an increase in our water rates of about 50% or apporximately $48 per household annually throughout our service area.

The above addition to our plant will provide maximum assurance of a continuing high quality and safe drinking water. Such expenditures, although great, are necessary and good in view of the benefit to, and the protection of the consumer.

Conerning the proposed organic chemical contaminant regulations, however, many questions must be raised relative to their benefit and need at this time. These questions have been adequately raised and posed at public hearings by research scientists and professional water works associations such as the National Association of Water Companies, the American Water Works Association, and the New England Water Works Association to name a few.

To comply with the proposed organic regulations as written, the cost of our filtration plant, mentioned above would increase an additional $1,000,000 (from $6,500,000 to $7,500,000) and the annual operating costs ,(for regeneration or replacement of carbon), it is conservatively estimated, will be about $500,000. This would double our current operating expenditures. The net effect of these additional costs would require a further increase in water rates of abour 25% or approximately $24 per household annually.

In view of the unanswered questions relative to health effects and the mandated use of granular activated carbon, the additional costs imposed on our consumers appear to be unwarranted.

Until the scientific facts are known, and operating criteria established, promulgation of the proposed organics regulations without modification at this time may prove to be capricious.

Thank you for any consideration you may give this letter. I will be happy to provide further information, if you so desire.

Very truly yours,

John C. Collins

John C. Collins, President
PENNICHUCK WATER WORKS

CC: Representative Cleveland

STATE OF ALASKA
DEPT. OF ENVIRONMENTAL CONSERVATION

JAY S. HAMMOND, GOVERNOR

POUCH O – JUNEAU 99811

September 13, 1978

The Honorable Paul G. Rogers
Chairman, Subcommittee on Health
and the Environment
Committee on Interstate
and Foreign Commerce
U. S. House of Representatives
Washington, D. C. 20515

Dear Congressman Rogers:

We understand that the Subcommittee on Health and the Environment, which you chair, has scheduled oversight hearings on PL 93-523, the Safe Drinking Water Act of 1974. The Alaska Department of Environmental Conservation has worked with this important new initiative in public health since its passage. We are now in the final stages of receiving delegation of primary enforcement authority for the Public Water Supply Supervision Program in Alaska from the Environmental Protection Agency. As a result of our experience in implementing PL 93-523, we would like to share our concerns with you, make some suggestions for detailed review by the Congress, and recommend some areas where revision may be in order. We request that these comments be considered as official testimony before the hearings.

PL 93-523 establishes the basic framework for a cooperative program of regulation of the nation's public water supplies by the Federal and State governments. The Act itself stipulates numerous requirements and standards to be met by water suppliers, and it authorizes the Environmental Protection Agency to prescribe additional requirements in the Code of Federal Regulations.

Thus, the nation's Public Water Supply Supervision Program, as a whole, is shaped by the combination of PL 93-523 and the EPA drinking water regulations. Hence, oversight hearings on the Act would not be complete without consideration of these regulations. Accordingly, our testimony is divided into both comments on the Act itself, and on the Federal drinking water regulations.

The Safe Drinking Water Act of 1974

In general, the State of Alaska supports the testimony concerning the SDWA recently offered by the Conference of State Sanitary Engineers to the annual meeting of the American Water Works Association and to the U. S. Senate Committee on Public Works and the Environment, a copy of which is attached. Specifically, it is our opinion that:

1. The public notice requirements (Section 1414.C) are too prescriptive and too rigid. In Alaska, there are public water supplies located where publication of a notice of a drinking water hazard in a newspaper would be nearly useless in many remote communities where newspapers are not in common circulation or they are not delivered for several days or even weeks after publication. In addition, the law seems to require public notice of violations that are corrected before the public notice can be issued. Such after-the-fact notices are merely exercises that serve no useful purpose.

The law dictates several occasions for which public notice is required, for example, failure to comply with a maximum containment level, treatment technique or testing procedure; failure to meet monitoring requirements, failure to announce the existence of a variance or exemption; and failure to comply with the conditions of a variance or exemption. The states should be allowed discretion to decide if and when the various failures by a public water system are sufficiently serious to justify public notice. For example, a public notice concerning failure to follow a testing procedure would probably mean little or nothing to water consumers. Too many public notices, particularly those for incidents of relative insignificance, do little more than "cry wolf," and may cause people to ignore notices advertising real hazards.

The law should certainly establish a requirement for public notice, but should allow the states and EPA to determine in which instances it shall be required, and how it should be issued.

2. EPA has claimed that Section 1412(b)(1)(B) of the law obligates establishment of a maximum containment concentration whenever there is only sketchy evidence of a hazard to human health. The section should be amended to require the establishment of maximum containment concentrations necessary to meet the requirements of Section 1412(a)(2).

3. The definition of "public water system" should be changed to "a system for the provision of piped water for human consumption." Having the term "to the public" in the definition opens the way to controversy as to whether or not particular systems are subject to regulation.

4. The law should not establish a termination date for exemptions. Section 1416(b)(2) should be amended so that the states or EPA, as applicable, have the discretion to prescribe in the exemptions the schedules by which water systems achieve compliance with the drinking water regulations.

5. A section should be added to the Act calling for development of a data base and a methodology by which to measure the impact of the Act and its administration on public health. State legislatures are reluctant to support programs for which there are no clearly visible and measurable gains. Improvements in public health resulting from specific programs have often been very difficult to measure because: (1) so many factors influence public health that the impact of a single program is difficult to isolate; and (2) health statistics are rarely collected or analyzed with the specific purpose of routinely measuring the cause and effect relationship between drinking water quality and public health. The future of the national drinking water program should be based, to the extent possible, on a thorough understanding of the health effects of the program.

6. Compliance with the Act and regulations authorized by it will only be achieved gradually over several years. Hence, the law should allow the states or EPA, as applicable, flexibility in determining enforcement priorities and establishing deadlines for compliance by various categories of public water systems and sources.

EPA Regulations

Regulations are the specific requirements drawn up by government agencies to interpret and make specific the intent of laws passed by the legislative process. As such, regulations should be faithful to policies established in the applicable statute. On occasion, however, government agencies become a bit overzealous in executing their charge. When that happens, major public policy issues are determined by bureaucratic fiat rather than the legislative process. EPA has, by and large, done a commendable job of promulgating regulations to implement PL 93-523. There are instances, however, where, in our opinion, these regulations and interpretations should be reconsidered. Among these are:

1. The EPA regulations establishing a maximum containment level, and monitoring requirements for turbidity are too inflexible. While we do not argue against regulating turbidity in public water supplies, we do feel that different strategies for controlling turbidity should be allowed, depending on local conditions. The State of Alaska recently applied for primary enforcement authority under the Act, proposing State regulations

with turbidity control provisions slightly different from EPA's which were, in our opinion, more effective in protecting public health in Alaska. Attached is correspondence from me to EPA Region X Administrator Don Dubois on this matter. However, EPA denied us the flexibility to control turbidity with this innovative mechanism.

EPA officially has indicated that a major reason for denying Alaska's turbidity control proposal was the precedent that it would establish for other states. But when the Act was passed, Congress stressed the need for states to be allowed flexibility to adapt national requirements to local conditions. We are, therefore, faced with the dilemma of lawmakers calling for state discretion on one hand, and EPA concluding that states are not allowed flexibility in developing programs to meet local needs on the other. While EPA appears on the surface to recognize flexibility for state programs, in fact, such flexibility has been sacrificed on the altar of national consistency.

2. Strictly interpreted, Section 142.30 of the National Interim Primary Drinking Water Implementation Regulations call for EPA to institute enforcement activities of varying kinds, ranging from notice to the state and water suppliers, to civil actions, whenever there is a violation of a primacy state's drinking water regulation. There will, of course, always be violations, especially early in the implementation of the program. It would, however, be a mistake for EPA to start up a massive enforcement machinery every time there is a violation, however small. States must be allowed discretion to prioritize enforcement activities according to resources available and the relative health risk resulting from various classes of violation. EPA's role should be reduced to periodic evaluation of a primacy state's overall program, rather than second guessing a state and interfering in each individual enforcement action.

3. The public notification requirements of the National Interim Primary Drinking Water Regulations are an extension of the overly prescriptive requirements in the Act. The regulations go even further than the law in specifying how and when public notices must be issued by community water supplies. For example, the regulations require repeated, periodic public notices stating that an exemption has been issued, for as long as the exemption is in effect. But if an exemption has been granted through a public process, and an unreasonable risk to health does not exist, continuing public notice serves no useful purpose.

Also, the regulations prescribe in great detail exactly how the news media will be used for public notices. In our view, the national regulations should give only general guidance concerning where public notice is required, and the states should be allowed to determine when and how notices should be issued. The public notice provisions in the regulations for non-community systems, Section 141.32(d), would, in our view, be appropriate for all systems.

The above remarks outline the major concerns the Alaska Department of Environmental Conservation has with the language and administration of the Safe Drinking Water Act. As the Congress deliberates amendments to fine-tune this important program, we will be pleased to provide additional information on our views. My staff and I stand ready to assist the Subcommittee in any way we can to improve the nation's Public Water Supply Supervision Program. We appreciate the opportunity to submit this testimony.

Sincerely,

Ernst W. Mueller
Commissioner

March 21, 1978

Mr. Donald Dubois
Regional Administrator
U. S. Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Dubois:

We are in receipt of your letter of March 13 disapproving the State of Alaska's request for primary enforcement authority under the Safe Drinking Water Act of 1974. As you might expect, we were highly disappointed, not only at the disapproval itself, but the inordinate amount of time the Environmental Protection Agency took to respond to our request.

We are, as you are aware, in substantial disagreement with EPA's determination that Alaska's drinking water regulations are less stringent than those promulgated by EPA. It is our view that Congress intended states to have sufficient flexibility to provide for local needs in implementing this important program, while still providing a high degree of protection for the nation's water supplies. That flexibility should provide for states to develop different programs--programs which may slightly vary monitoring schedules, maximum contaminant concentrations, and treatment technology to assure that water is safe to drink. Unfortunately, EPA has interpreted the national maximum contaminant concentrations in such a rigorous manner that the states are unable to enjoy this flexibility.

In the specific case of Alaska, it remains our view that, taken as a whole, our proposed regulations and public water supply supervision program are at least as stringent as the National Primary Drinking Water Regulations require. Regardless, however, it is our intention to continue to seek primacy, even if this would require a change in our drinking water regulations which became effective December 31, 1977. As I am sure you agree, a public water supply supervision program operated in Alaska by the State is infinitely preferable to one operated by EPA. Reluctantly, therefore, we plan to announce, via public notice as required by the Alaska Administrative Procedure Act, that we propose to make both the maximum contaminant concentrations for turbidity, and the monitoring requirements for turbidity essentially the same as the National Primary Drinking Water Regulations. This announcement will be made in mid-April.

With regard to the turbidity monitoring requirement, as you will recall, we discussed this in detail before our application for primacy was submitted. At that time, you indicated that EPA would be going to public notice with a relaxed requirement. We then took the proposal EPA was apparently preparing, and drafted it into our regulations. It was, and is, our view that it is preferable to develop a single, final package of regulations at the operating level, rather than suffer a series of changes back and forth. For that reason, we will be carefully watching EPA's action in promulgating the revision to the turbidity monitoring requirement. In the event the national requirement is ultimately changed to substantially that contained in the State of Alaska's current regulations, it would be foolish for us to change our regulations to meet the present Federal requirement, only to have to change them back to the original form within a few months. Such a merry-go-round approach would, at the least, strain the public's confidence that our respective bureaucracies can actually manage a meaningful public water supply supervision program. We, therefore, urge EPA to expeditiously handle the revision to the turbidity monitoring requirement, with substantially less delay and fumbling than accompanied the processing of Alaska's application for primacy.

At the schedule proposed in this letter, we should be able to meet your schedule for having regulations adopted, and reapplying for primacy by July 15, 1978; the revised regulations themselves could go into effect on or before August 15, 1978, so that EPA could consider our application and grant primacy before September 30. In this way, the remaining 25 percent of the State water supply supervision grant can be retained by the State.

We presume that your March 13 letter is the definitive response of EPA on our application for primacy. We wonder, therefore, what the effect is of Mr. Burd's letter to Mr. Scribner of the same date. We shall presume that Mr. Burd's letter is to be taken as providing suggestions to be taken under consideration in our on-going review of the drinking water program, and not as additional requirements, over and above those sent in your letter, which we must make in order to assume primacy. While some of the suggestions in Mr. Burd's letter undoubtedly will be incorporated into our program, others cannot be accomplished because of timing constraints and logistics. My staff will be responding to Mr. Burd directly when we have had an opportunity to review the matter completely.

Sincerely,

Ernst W. Mueller
Commissioner

STATEMENT OF THE STATE OF NORTH CAROLINA
FOR THE WRITTEN RECORD OF THE
OVERSIGHT HEARING ON THE IMPACT OF
PROPOSED EPA REGULATIONS,
SUBMITTED TO THE HEALTH SUBCOMMITTEE OF THE
COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE
SEPTEMBER 25, 1978

The State of North Carolina is pleased to submit a statement for the written record on the implementation of PL93-523, the Safe Drinking Water Act. We hope our comments will be of help to you in your review of the Act.

The State of North Carolina is dedicated to the protection of the health of all its citizens and the protection of our drinking water supply. Although we have not achieved primacy, we have signed a Memorandum of Understanding with the Environmental Protection Agency and we have an excellent working relationship with the regional office of EPA on the implementation of the program in North Carolina.

There are, however, some major concerns we have that, in our opinion, would improve the Act and its effectiveness.

Our first concern is with the existing definitions for "community" and "non-community" public water systems. Under these definitions North Carolina has approximately 3,000 to 3,200 community systems and an estimated 15,000 non-community systems. Many of the 15,000 systems are country gas stations, stores and churches.

While the State of North Carolina will continue to assure safe drinking water for all people in the State, we suggest that the definition for a public community system would be more accurately defined as one serving 10 or 15 residences. Non-community systems should be distinctly defined in the Act to avoid vague interpretation.

A second concern is that under Section 1412(b)(1)(B) the Administrator is permitted to establish Maximum Contaminant Levels based on his judgment which may have any adverse health effect. The State of North Carolina believes that public confidence in established contaminant levels will be greatly improved by basing these levels on scientific evidence which documents a real public health hazard.

The State of North Carolina joins the Southern Environmental Resources Conference of the Council of State Governments in requesting an extensive research effort, in accordance with the National Academy of Sciences recommendations, in order to provide the documentation needed to support the requirement to control organic chemicals in drinking water.

Finally, a third concern regards the public notification requirement. Paragraph (C) of Section 1414 requires a water system owner to give public notice whenever a violation of the regulations occurs. The State of North Carolina would like to be able to preserve a strong public credibility posture. We suggest there be some flexibility for the State and EPA to determine the need for public notification based on the circumstances and nature of the violation.

In addition to the above issues, the North Carolina Department of Human Resources, which administers the program in North Carolina, has cited other specific sections where modifications in the Act would be desirable. Those citations follow:

<u>Sec. 1412</u> National Drinking Water Regulations

(a)(2) The phrase "generally available taking costs into consideration" in reference to attainable levels of contaminants is construed by EPA to mean "generally available to large municipal systems" and does not consider the small subdivision or mobile home park system which can not afford treatment techniques used by large systems. This phrase should be rewritten to apply to small systems as well as large ones. This modification of the phrase should be made throughout the Act wherever it occurs.

Sec. 1413 State Primary Enforcement Responsibility

Whenever the drinking water regulations are modified by the EPA Administrator, State regulations must also be modified by those States having primary enforcement responsibility granted by this Section. In some States it requires up to eighteen months for a regulation to be changed. Therefore, a paragraph should be added to this section to provide States with up to eighteen months to comply with necessary revisions to their regulations prior to a determination that they no longer meet primary enforcement responsibility requirements.

Provision should be included in this section for a State to return primacy to EPA whenever a State believes it can no longer adequately support the Act and its regulations.

Sec. 1414 Failure by State to Assure Enforcement of Drinking Water Regulations

(d) EPA regulations based on this paragraph require a State to adopt secondary drinking water regulations or be penalized for failure to enforce its primary enforcement responsibility although the requirements for primacy do not include the adoption of secondary drinking water regulations. It is recommended that this paragraph be deleted from the Act.

Sec. 1414 Variances

Sec. 1416 Exemptions

These sections are satisfactory as written; however, the EPA guidelines detailing the specific requirements to be submitted for each category are quite restrictive and impose some unnecessary burdens on the public water supply system owner who attempts to obtain a variance or exemption.

Sec. 1442 Research, Technical Assistance, Information, and Training of Personnel

(d) This paragraph provides for training personnel of State agencies and units of local government at institutions of higher learning but does not provide for the training of water treatment facility operators who are in direct control of operations. An amendment should be added which will provide resources to the operator to attend short courses, seminars, workshops, etc. to increase his knowledge and improve his ability to perform his job. Necessary funds for this training should also be provided.

Sec. 1443 Grants for State Programs

This section should be amended to provide funds for the continuation of grants to States to carry on the public water supply system supervision programs. Funds should be at least equal to the 1979 appropriation of $45,000,000 plus contingencies for inflation.

Sec. 1444 Special Study and Demonstration Project Grants; Guaranteed Loans

This section needs to be amended to more clearly define a small public water system. A small public water system could reasonably be defined as one serving a population of up to 5,000 persons. Although grants are provided in this section for development and demonstration of new or improved methods, approaches, or technology for providing a dependably safe supply of drinking water, no specific grants are allocated to small public water systems for assisting in the development and demonstration of a project which would enable these systems to solve problems peculiar to the systems themselves. This section should be amended to reflect this need and adequate funding should be provided.

Sec. 1446 National Drinking Water Advisory Council

This section establishes the National Drinking Water Advisory Council to advise, consult with and make recommendations to the Administrator of the Environmental Protection Agency. This section should be amended to require the Administrator to give due consideration to the recommendations and advice of the Council. The criteria for members of the National Drinking Water Advisory Council should be amended to include at least two individuals in responsible charge of a State regulatory water supply program. These are the individuals contemplated by the Act as being in responsible charge of the primary enforcement program in each State.

I am hopeful that our experience and suggestions for modification in the Safe Drinking Water Act will be of help to you in your overview process.

Thank you for this opportunity.

OFFICE OF THE GOVERNOR

INDIANAPOLIS, INDIANA 46204

OTIS R. BOWEN, M. D.
GOVERNOR

July 5, 1978

STATEMENT BY GOVERNOR OTIS R. BOWEN, M.D.

I am Otis R. Bowen, M.D., Governor of the State of Indiana.

As Governor, I am naturally concerned about the health and welfare of the citizens of Indiana. I am also concerned about their pocketbooks. If EPA's proposed amendment to the Interim Primary Drinking Water Regulations is adopted, the financial impact within Indiana will be substantial. We have eight cities in Indiana which, I understand, have water systems serving populations of 75,000 or more. Each of these is potentially impacted by the proposed regulation.

I am told that the cost of installing granular activated carbon filtration facilities at the City of Fort Wayne plant could exceed $30 million. I am told the estimated capital cost for Indianapolis could be more than $45 million, and that for Evansville, the capital cost will be in excess of $19 million.

Naturally, one expects water rates to increase with such enormous capital investments, and I am also told that they will. Water rates in Fort Wayne would increase anywhere from 69-86% if GAC contactors are required. In Indianapolis, the increase in water rates is projected to be in excess of 60% if GAC contactors are required at each of the three treatment plants of Indianapolis Water Company.

To put it mildly, these cost increases are shocking -- even in the context of present inflation. Equally shocking is the thought that we shall be installing facilities which I am informed are highly energy consuming of both oil and electric power.

While I am not a specialist in the carcinogenicity of substances in drinking water, I am skeptical that the so-called "benefits" of the proposed regulations come anywhere near justifying these costs. I read in the background material accompanying the proposed regulation that the "epidemiological evidence relating to THM concentrations or other drinking water quality factors and cancer mortality is not conclusive, but 'suggestive' of a health risk." I read further that, "When viewed collectively the epidemiological studies provide sufficient evidence for maintaining a hypothesis that a potential health risk may exist and that the positive statistical correlations may be due to some association with drinking water quality." I regard this as an extremely weak basis on which to force the taxpayers of Indiana to spend millions of dollars for a so-called "insurance policy."

Our State Environmental Management Board has filed a thoughtful and thoroughly researched comment on the proposed regulation. Specifically, Mr. Ralph C. Pickard, on behalf of the Board, wrote EPA, "it is absurd to propose a regulation based on the little information you have." Mr. Pickard concluded, "We think it is in the best interest of the public that more definitive information be obtained on the health effects of trihalomethanes and the synthetic organic chemicals, and on the effectiveness of granular activated carbon for organics removal before regulations are promulgated. The regulations you are proposing will cost the public millions of dollars with no evidence that the regulations are necessary." I agree with Mr. Pickard's conclusions.

I also note that the Conference of State Sanitary Engineers has severely criticized the proposed regulation.

I strongly recommend that EPA take a long, hard look at what it is doing. While I am most certainly for seeking out and destroying the causes of cancer, it appears to me that confronted with the cry of "cancer" from a few, EPA is overreacting with a terribly expensive and inflationary proposition which will affect many -- all to deal with a problem which may not exist.

Otis R. Bowen, M.D.
Governor

NASSAU COUNTY DEPARTMENT OF HEALTH

240 OLD COUNTRY ROAD
MINEOLA, N.Y. 11501

FRANCIS T. PURCELL
COUNTY EXECUTIVE

JOHN J. DOWLING, M.D., M.P.H.
COMMISSIONER

FRANCIS V. PADAR, P.E.
ASST. DEPUTY COMMISSIONER
DIV. OF ENVIRONMENTAL SERVICES

COMMENTS ON USEPA PROPOSED AMENDMENT TO INTERIM PRIMARY DRINKING WATER REGULATIONS RELATING TO CONTROL OF ORGANIC CHEMICAL CONTAMINANTS

August 29, 1978

Introduction

This report addresses USEPA proposed amendment to the Interim Primary Drinking Water Regulations relating to control of organic chemical contaminants in drinking water, as published in the Federal Register, Volume 42, No. 28, February 9, 1978, and in Volume 43, No. 130, July 6, 1978.

The County of Nassau on Long Island in New York has experienced an intensive exposure to synthetic organic chemicals (SOCs) in its public water supply since November 1976. The County Health Department, upon discovery of these substances in the groundwater source of its drinking water, serving a population of 1,420,000, launched a comprehensive investigation of the extent of water contamination in 421 public wells and exercised its regulatory authority in selective restriction of wells. Concurrently, a massive survey of 3,100 potential sources has been made and significant abatement actions realized.

The successful resolution of organic chemical contamination of drinking water in Nassau County, preceding the formal nationwide regulations now under consideration, has provided a valuable yardstick for a constructive evaluation of the proposed USEPA policies and strategies in general and the specific applications to groundwater sources in particular.

The Department encountered and substantially resolved a series of problems during these largely pioneering efforts. Those related to water supply included the assessment of health effects, establishing maximum permissible SOC levels in drinking water, selecting constituents for analysis, and conducting an extensive well sampling and testing program, certification of commercial laboratories, developing in-house gas chromatography capability, interpretation of varying SOC levels in individual wells, and establishing criteria for restricting the use of production wells. Difficulties in source identification and abatement involved the adoption of discharge standards, developing techniques, capabilities, and conducting field surveys to identify and abate industrial and commercial sources, and the identification and abatement of consumer product sources.

Valuable guidance and assistance was obtained during the design and implementation of these programs from the USEPA Region II and the State Health Department whose representatives had access to the national studies and surveys underway since the promulgation of the Safe Drinking Water Act of 1974. A detailed account of the Department's efforts in control of organic chemicals in drinking water is attached.[1]

General Comments

1. The health risk associated with the presence of organic chemicals in drinking water is sufficiently documented to warrant controls at this time as a prudent public health measure. It is urged that public exposure to organic chemicals be minimized however and wherever possible beyond any specific standards which may be promulgated for drinking water.

2. Scientific knowledge of organic chemicals should be sought on a priority schedule. This includes research on health risks as recommended by the National Academy of Science in their report, "Water Supply and Health". It also includes thorough investigation of the mechanics of pollution of groundwater and involves, as a minimum, the study of typical contaminated aquifer segments to determine the most cost-effective management scheme and the behavior of organic pollutants within a groundwater system. Finally prototype water treatment demonstration should be conducted at an accelerated schedule to address typical organic chemicals, a representative range of raw water characteristics, and an appropriate array of promising treatment methods.

3. The control of sources of organic chemicals, while not within the province of the Safe Drinking Water Act, should be established as a corollary to the promulgation of drinking water standards. The current USEPA approach to source regulation is not suitable for discharges to groundwater where small amounts of synthetic organic chemicals produce a long-term contamination problem, are not diluted as in surface waters, and are not readily detectable. Control mechanisms, in addition to source outlet regulation should include segregation by industry, combined with separate disposal of waste containing organic chemicals, prohibition of potentially harmful organics in consumer products, and substitution of toxic chemicals by those of lesser or no deleterious properties.

4. Maximum contaminant levels (MCL) for specific toxic substances and for total concentrations should be established based on best available information. The presently proposed approach for total trihalomethanes (TTHM) is valid but for SOCs is not. Without a specific MCL for individual and total SOCs, the States will be unable to uniformly and properly assess whether the source of water is "subject to contamination". Furthermore, under this requirement the States will be put in a position of indirectly establishing a MCL which is an EPA responsibility which cannot and should not be delegated. A direct assumption of EPA

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[1] "Control of Organic Chemical Contaminants in Underground Source of Drinking Water, Nassau County, New York", Presented at New York Public Health Association Annual Meeting, Albany, N.Y., June 10, 1978.

responsibility in this regard will also reduce the cumbersome and expensive waiver procedure required under the present statement of the proposed regulations.

The standards should apply to all public drinking waters regardless of the size of system. The logic of EPA's present position does have merit in that large population segments will receive protection at minimum cost through initial controls on systems serving greater than 75,000 people. There is an equal EPA responsibility toward consumers in small systems, however, which can be satisfied by phasing the requirements for treatment. The knowledge that treatment will be required several years hence in of itself will no doubt stimulate many owners of smaller supplies to seek solutions sooner, many of which would involve alternate sources of water, and in plant modifications, which would reduce overall population exposure to suspected carcinogens. The EPA should also consider that the standards promulgation process itself is extremely slow and delays caused by a later modification may be at the expense of human health.

5. The monitoring requirements should apply to all public water systems and not merely to those serving populations greater than 10,000. A monitoring requirement is even more critical than a treatment requirement since it provides for all consumers the knowledge of any exposure to toxic substances in their drinking water and affords them the opportunity to make a responsible decision should their water be contaminated, either within a mandated schedule provided by the EPA regulations or sooner. Such knowledge early on will also stimulate interim modifications of water treatment to reduce TTHM generation, and a more urgent exploration for alternate sources of water. Knowledge of water contamination will also stimulate identification and correction of sources of organic chemicals. Monitoring costs are not excessive and can be readily absorbed.

6. The present statement of the proposed regulations does not address the matter of approved laboratories. The early experience in Nassau County dramatically illustrates the need for laboratory certification. The laboratory approval program now in place in New York State provides a model for similar approaches either under the control of the EPA or by individual States. The regulation should clearly establish the needed mechanism for laboratory approvals for all TTHM and SOC analytical procedures. The EPA should moreover publicize the number of analyses which will be needed in each region to stimulate the generation of commercial laboratory capability.

7. Dual reporting to the EPA and to the State is not appropriate or necessary. The proposed regulations require that monitoring results obtained to determine TTHM compliance be submitted to the State and EPA within thirty days of completion. Such duplication is not warranted in those States which have been assigned primacy under the law to administer the Safe Drinking Water Act.

8. The provisions of the Safe Drinking Water Act and the Congressional appropriations for its implementation make funds available to States with a primacy role. There is no recognition, however, of the substantial added cost of water supply supervision at the local level, particularly in urban and suburban communities. Monies allocated to States in this program should be required to be further allocated to local regulatory agencies in proportion to the effort expended. It is not an appropriate defense on the part of State agencies that federal subsidies do not pay for the full cost of their own water supply supervision program. There is furthermore no adequate justification for States such as New York, which fund 50 percent of direct costs for local public health programs, to benefit from federal funds themselves and not pass on an appropriate percentage to local regulatory agencies on an equitable basis. The bastion for implementation of the Safe Drinking Water Act and particularly for the proposed regulations, is at the local level. The current critical fiscal posture of local governments merely highlights a chronically critical problem.

Control of Total Trihalomethanes (TTHM)

1. The regulations, as proposed, appear to be oriented to surface water systems. Monitoring requirements for groundwater supplies should differ from surface water supplies chiefly because of the presence of multiple entry points (wells), variations in the use of entry points, the dispersion of entry points, and the generally closer proximity of entry points to the point of consumption. As an example, the three largest water supply systems in Nassau County utilize a total of 75 well facilities, to serve 557,092 consumers. In addition, preliminary testing indicates that the precursors necessary for the trihalomethane formation are not present in Long Island groundwaters, confirming EPA comment that groundwater is a less likely source of trihalomethanes. Analysis of 51 samples from six chlorinating water supply systems in Nassau County indicated only 3 samples with any trace of trihalomethane with a maximum result being 3 ug/l.

Giving due consideration to the above, the following monitoring requirements are proposed for groundwater systems:

Testing of Entry Points	- Annual testing of each entry point consisting of analyses of one chlorinated and one dechlorinated sample.
Distribution Testing	- Semi-annual testing of distribution points at a rate proportional to the population served from one sample to a maximum of eight samples.

Compliance with MCL should be computed separately for each entry point and for the distribution system as a whole with collection of two consecutive resamples required 24 hours apart at the entry point if a level of TTHM of 100 ug/l is exceeded. Compliance with the MCL at the entry point should be determined based upon an average of an initial test and the two retests, and compliance with the MCL in the distribution system based upon a running annual average of results.

The proposed regulations permit reduction of sampling frequencies by the State to not less than one sampling every six months based upon the data from at least one year of compliance monitoring data. Since groundwater source systems generally do not show sudden variations in chemical quality, and since annual testing of entry points would provide the necessary degree of monitoring, it is reasonable to reduce the frequency of, or eliminate, required testing in the distribution system. Testing for TTHMs in the distribution system should be either reduced or eliminated based upon a favorable determination by the State after at least two years of monitoring compliance according to the schedule recommended above.

2. Compliance with the proposed TTHM standard of 100 ug/l for groundwater sources should be based initially on data for individual wells with option provided to water purveyor to either remove wells exceeding the MCL from service or otherwise providing or modifying treatment. In those instances where the occasional use of a well exceeding the MCL may be required to meet peak demand, the MCL standard should be based on average distribution system results in accordance with a sampling program approved by the State provided that all other reasonable efforts to satisfy demand are taken prior thereto including use of alternate satisfactory sources and the institution of water conservation measures.

<u>Control of Synthetic Organic Chemicals (SOC)</u>

1. Groundwater sources being protected are less subject to the sudden quality variations experienced by certain surface water supplies and, therefore, should normally be granted a variance from the granular activated carbon (GAC) treatment technique as proposed for synthetic organic chemicals. The lack of clarity of some of the definitions in Section 141.54, which provides for variances from the treatment techniques, is a serious concern. Recommendations for clarification are as follows:

    a. The term "deep groundwater" is vague and subject to many interpretations. The substitution of "wells or other groundwater facilities greater than 50 feet in depth or artesian" is recommended. This will exclude facilities subject to sudden changes in water quality from surface water infiltration.

    b. The term "raw water sources" should be specified as applying to the individual actual well or facility for groundwater systems. The term otherwise could be applied to an entire aquifer which we believe is not the correct application. Aquifers are often not clearly delineated and contaminants within the aquifer are generally very localized.

2. There is no disagreement with provisions of the proposed regulations which permit the State, for groundwater sources among others, to grant waivers from the GAC treatment technique and to determine any additional information and analyses required to grant such a waiver. This would permit the State to establish or approve sampling programs for a GAC treatment technique waiver determination in the areas where groundwater contamination may be a problem. This, in fact, has been a successful operative procedure on Long Island for almost the past two years. In Nassau County alone, some 424 public supply wells have been tested. The application of New York State Health Department interim guidelines for organic chemical levels in drinking water has resulted in the removal from service of 14 public wells. Where the water supplies concerned wish to continue to use these wells on a regular basis, installation of GAC treatment would be appropriate as proposed by the EPA interim regulations.

3. The waiver issuing authority to be granted to the State should be broadly interpreted for groundwater systems. It may be desirable, under emergency conditions for short periods of time, to use a well which would normally otherwise be required to have GAC treatment or not be used. The State should have sufficient latitude in the interpretation of Section 141.54 to determine the conditions for such use.

4. The requirement that treatment technique variance requests be made by the effective date should be modified. It is acceptable for existing water systems, however, under its provisions, new systems and plants which are planned and constructed after the effective date regardless of source protection would be required to install GAC. The request for a variance for new systems or sources should be allowed at any time and be incorporated as part of the facility plan review and approval.

Further information, data, or clarification, will be provided on request to substantiate the foregoing comments.

Francis V. Padar, P.E., M.C.E.
Assistant Deputy Commissioner

CONTROL OF ORGANIC CHEMICAL CONTAMINANTS IN UNDERGROUND SOURCE OF DRINKING WATER, NASSAU COUNTY, NEW YORK (1., 2.)

By: Francis V. Padar, P.E., M.C.E., Director, Division of Environmental Quality, Nassau County Department of Health, Mineola, New York

Introduction

In response to the adoption of the Safe Drinking Water Act in 1974, the USEPA commissioned a study by the National Academy of Sciences (NAS) to identify the human health risk associated with the ingestion of organic chemicals when present in drinking water as a basis for the promulgation of water quality standards. Concurrently the USEPA conducted a series of surveys to determine the presence and levels of these substances in public water supplies nationwide and investigations were made to identify the sources and mechanisms of contamination and to find effective methods to both prevent the introduction of such chemicals into the drinking water and to remove them from the raw water to within safe levels.

While much significant investigative work has been completed and valuable data collected and analyzed on the health significance of organic chemicals in drinking water, on the extent of contamination, and on prevention and control technologies, there remains today a substantial lack of definitive information upon which to base decisions on drinking water standards and consequently on the implementation of controls. The problem is further complicated by the high cost of available treatment methods to remove organic chemicals from raw water sources and the multiplicity and variety of contaminant sources.

Public alarm and confusion was generated by the extensive publicity which attended the New Orleans episode in 1974 has been rekindled by subsequent discovery of organic chemicals in water supply sources in other communities. Little has been done to allay public fears or to clarify the issues for the public's understanding.

Background

The discovery of synthetic organic chemicals in public water supply wells in Nassau

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1. Presented at New York Public Health Association Annual Meeting, Albany, New York, June 19, 1978.
2. Updated and corrected July 25, 1978.

County on Long Island in New York in late 1976 presented a unique challenge to local health officials. At the time, the health risk could not be identified because of the absence of published toxicological data. Capability for laboratory analysis was lacking locally and extremely limited at the federal and state level to expeditiously assess the extent of contamination in the 435 public wells. Sources of the contaminants also could not be readily identified because the priority for the limited laboratory support had to be assigned to testing of public wells. Sources once identified could not be legally abated moreover, because the chemicals found were not then identified as to their toxicity and were not therefore addressed in either the prevailing officials drinking water or discharge standards.

Resolution of the problem was further hampered by the public confusion generated locally by the exaggerated reports of the mass media and compounded by a public hearing held by a State legislative committee in December 1976 which members publically castigated federal, state, and local regulatory officials, although it was clear that the Assemblymen did not understand the issues.

The Department of Health was soon able to obtain a reliable assessment of the health risk for each of the organic chemicals which provided a valid basis for restricting the use of impacted wells. A systematic well testing program was initiated through the cooperation of the USEPA Region I initially and the State Health Department on a sustained basis. A comprehensive assessment of 3,000 potential industrial and commercial sources was initiated as well as a survey of suspected consumer products.

By April of 1978 each public water supply well had been tested at least twice and wells found to be contaminated were removed from service. By June 1978, the industrial and consumer product surveys were virtually completed and abatement actions in process.

Plans have been made for further analysis of groundwaters, private wells, and potential municipal sources of organic compounds and for systematic regularization of commercial sources such as drycleaners and automobile service stations. More comprehensive investigations are being designed to determine the mechanics of groundwater pollution, treatability of uniquely acidic water of Long Island, and to determine the most cost-effective method for management of contaminated aquifer segments.

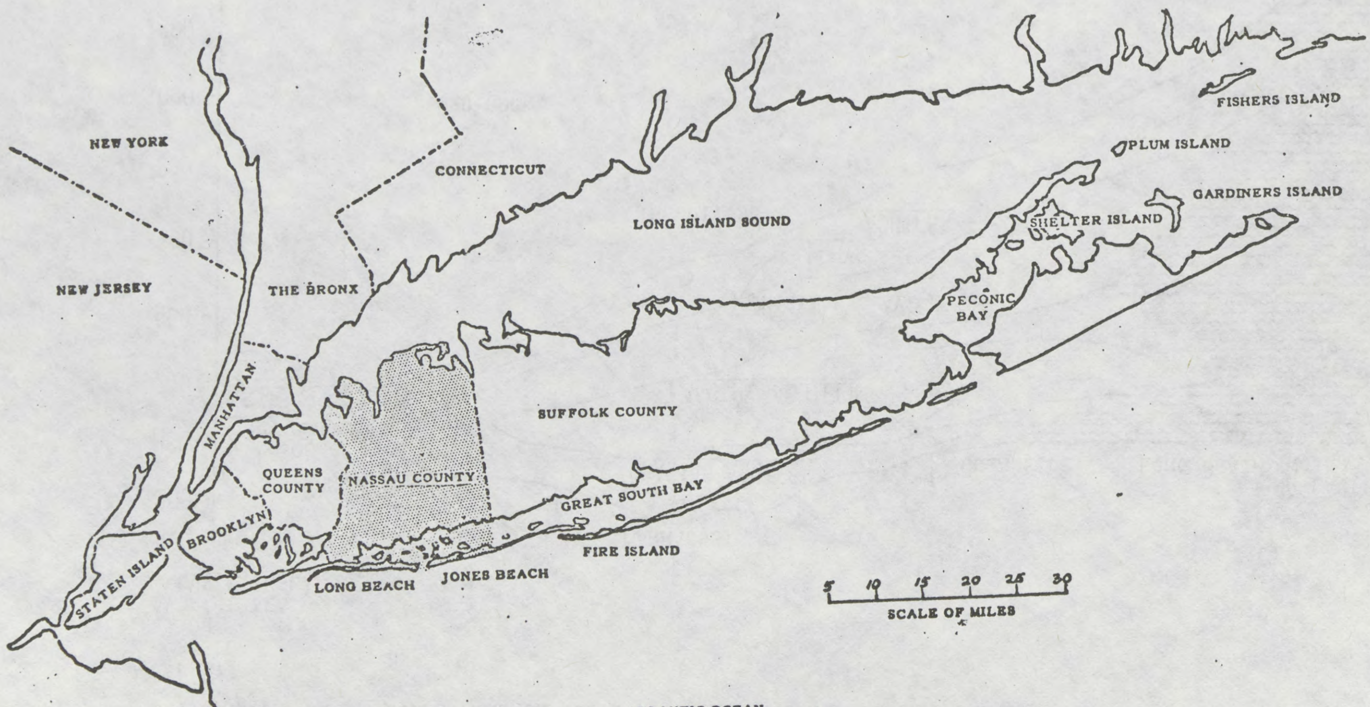
The experience and knowledge gained, the organization and procedures developed for various aspects of the investigation, and the data collected, may be useful in guiding other communities which may encounter similar situations. The probability of such occurrences are high considering that organic chemicals are an intrinsic part of our industrialized society. The water of most urban and suburban areas are probably already contaminated with these substances to some degree.

The lack of availability of the sophisticated and costly gas chromatography/mass spectrometry analytical capability has generally prevented more general identification of organic chemicals in local communities. This condition will change with increasing availability of commercial laboratories qualified to perform such work at reasonable cost, coupled with the expected promulgation of USEPA standards which will require water quality monitoring and the institution of treatment of water supplies threatened by the presence of trihalomethanes and synthetic organic chemicals.

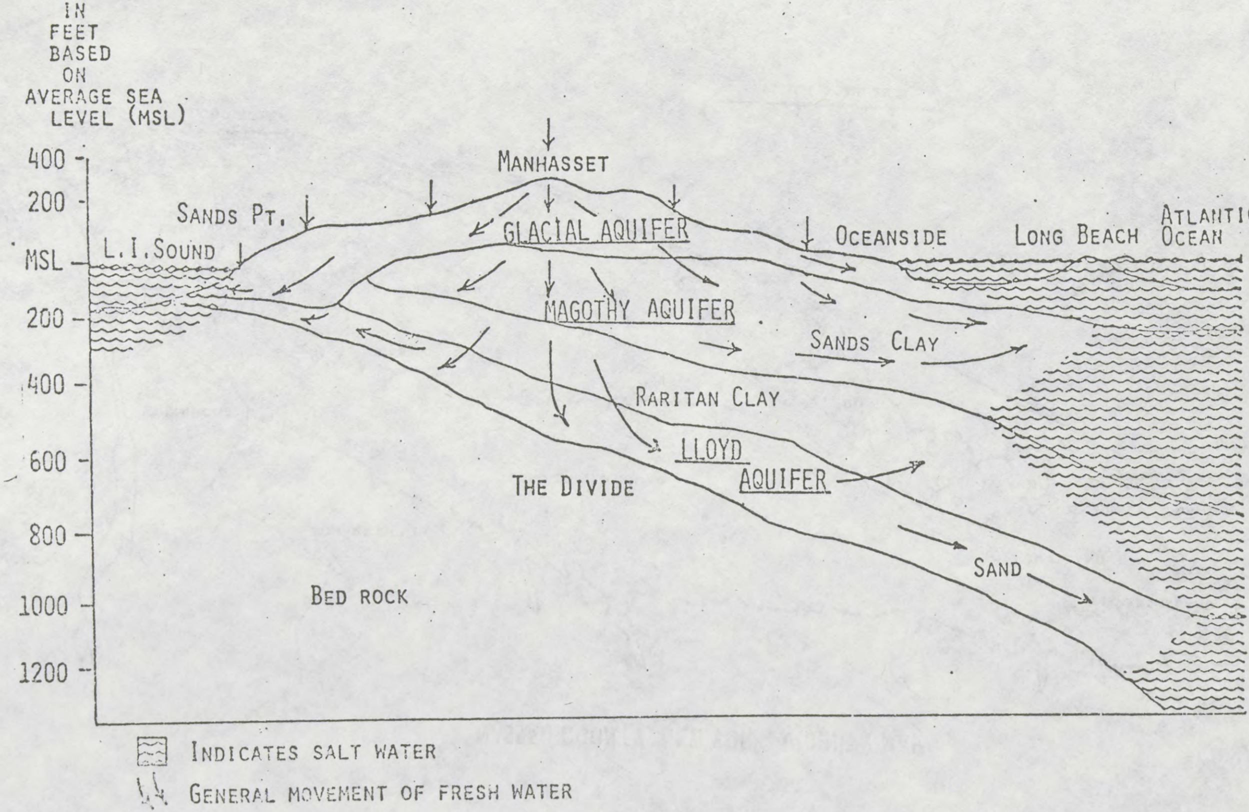
Nassau County Water Supply System

Drinking water supplying the 1.42 M population of Nassau County is obtained solely from underground water pumped from three aquifers. A geological cross-section of the County is shown in the accompanying chart. The uppermost, Glacial, aquifer, although highly productive hydrologically because of its highly permeable sand and gravel composition, is contaminated by inorganic sewage constituents and

NASSAU COUNTY, NEW YORK, VICINITY MAP



SIMPLIFIED GEOLOGIC SECTION - NASSAU COUNTY, NEW YORK



nutrients. It is generally abandoned as a source of public water.

The directly underlying Magothy formation provides 80 percent of the public water today. Although less productive than the Glacial because of a finer sand present interlaced with clay lenses, its artesian qualities enable its development economically. Well depths generally range between 400 and 600 feet. This aquifer has exhibited pollution, notably from nitrates concentrated in a central band east to west in response to the natural groundwater flow pattern which causes a more vertical flow component of recharged precipitation and accompanying contaminants inland as opposed to both the north and south shores. About 25 public wells have been restricted because of nitrate levels exceeding drinking water standards.

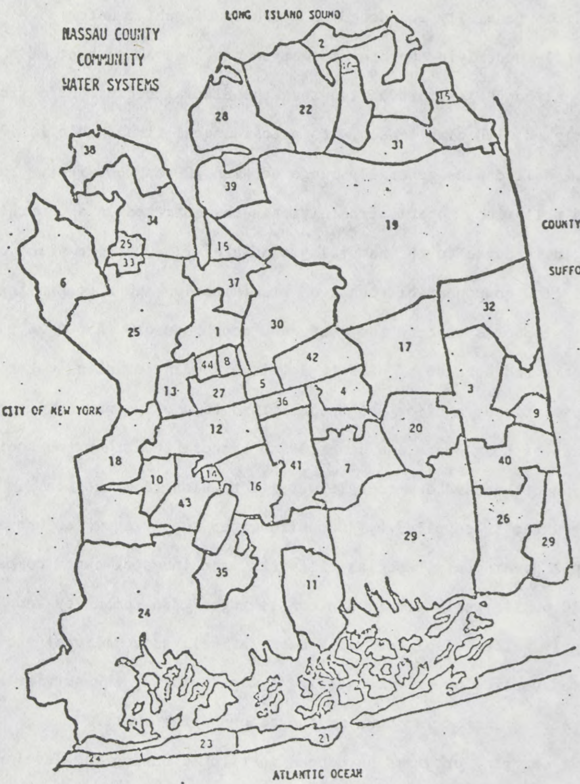
The lowest, Lloyd, aquifer has been limited to use by communities on the barrier islands of Long Beach and Jones Beach because the other two aquifers in those areas cannot be used due to salt water intrusion from the sea.

Drinking water is supplied by 46 public water supply agencies operated by local municipal governments, special districts, and investor owned companies. A total of 440 public wells are in use consisting of 386 community and 54 non-community supply wells. Isolated residences, as well as commercial and industrial facilities are supplied by private wells. A map depicting the service areas of the various water agencies is shown in the accompanying chart.

Extensive sewering programs have been instituted during the development of the County which today serve 68 percent of the population. Over 90 percent will be served upon completion of current sewering programs by 1985. The extent of sewering in the County is shown on the chart.

Assessment of Health Risk

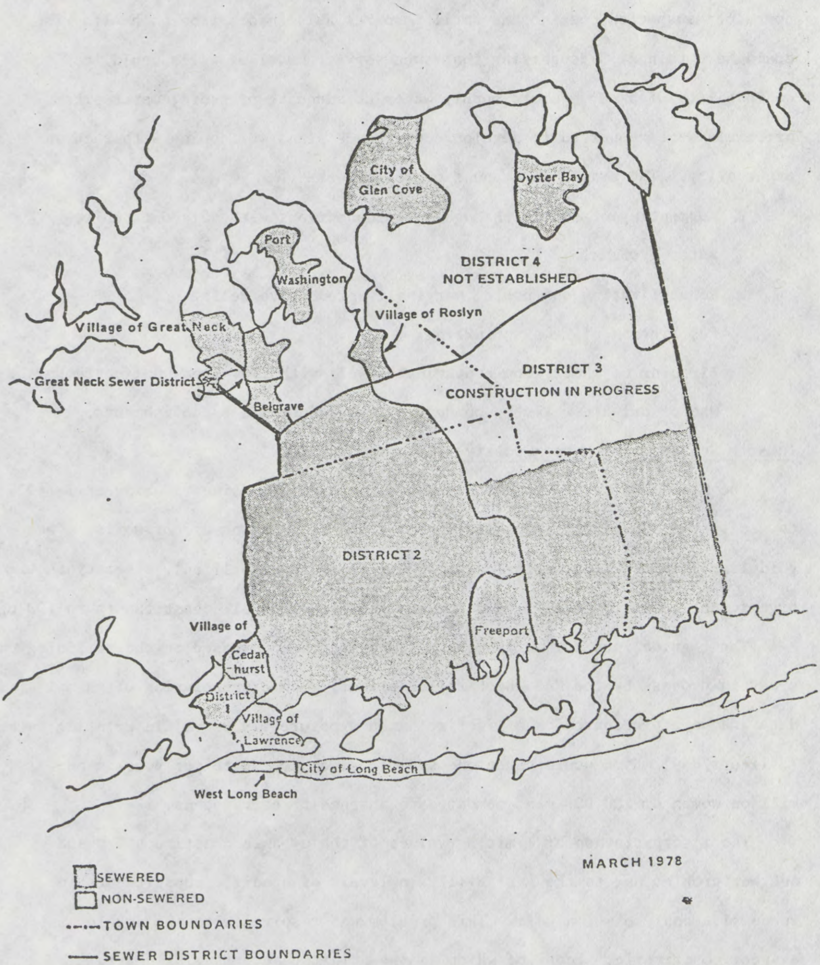
The lack of information and guidance in 1976 and early 1977 of the levels of these constituents which were significant from a public health standpoint and the sparse, as well as often conflicting, information on cancer causing properties



1. Albertson Water District
2. Bayville Village
3. Bethpage Water District
4. Bowling Green Water District
5. Carle Place Water District
6. Citizens Water Supply Company
7. East Meadow Water District
8. East Williston Village*
9. Farmingdale Village
10. Franklin Square Water District
11. Freeport Village
12. Garden City Village
13. Garden City Park Water District
14. Garden City South Water District*
15. Glenwood Water District*
16. Hempstead Village
17. Hicksville Water District
18. Jamaica Water Supply Company
19. Jericho Water District
20. Levittown Water District
21. Lido-Point Lookout Water District
22. Locust Valley Water District
23. Long Beach City
24. Long Island Water Corporation
25. Manhasset-Lakeville Water District
26. Massapequa Water District
27. Mineola Village
28. Glen Cove City
29. New York Water Service - Merrick Division
30. Old Westbury Village
31. Oyster Bay Water District
32. Plainview Water District
33. Plandome Village
34. Port Washington Water District
35. Rockville Centre Village
36. Roosevelt Field Water District
37. Roslyn Water District
38. Sands Point Village
39. Sea Cliff Water Division
40. South Farmingdale Water District
41. Uniondale Water District
42. Westbury Water District
43. West Hempstead-Hempstead Gardens Water District
44. Williston Park Village
45. Sel-Bra Acres Water Supply (Cove Neck)
46. Mill Neck Estates Water Supply

* Supplies 8, 14, and 15 served by other supplies during 1'
No raw water data is given for these non-source supplie:

SEWER DISTRICTS IN NASSAU COUNTY



of these compounds, caused the Department to address the restriction of well use on the basis of minimizing public health risk.

Water supply officials were requested to take wells out-of-service which contained suspected carcinogens until more reliable information on health risk could be obtained. Recognizing that successive removal of wells could lead to an inability of a purveyor to supply water at adequate pressure, waterworks officials were requested to develop contingency plans for coping with such an eventuality. The available avenues of relief were:

- Augmenting of supply through interconnections with adjacent public water systems.
- Rehabilitation and use of marginally productive wells.
- Restriction of lawn sprinkling.
- Blending of water from contaminated well with flow from unaffected wells.
- Use of private wells by commercial and industrial establishments.

Interim Standards of Water Quality

The State Health Department developed "interim guidelines" during early 1977 to assist the Department in evaluating data and restricting use of wells. The guidelines limited vinyl chloride to 10 ug/l (parts per billion), other synthetic organic chemicals to 50 ug/l, and the combined level of all constituents to 100 ug/l.

These guidelines for maximum human consumption were based on the toxicological study in process by the NAS which relied primarily on extrapolation of animal data and were predicated on a lifetime human exposure (70 years) in drinking water (2 liters/day) which would cause one additional cancer death per year in one million women or 100,000 men, compared to absence of carcinogens.

The interpretation of limiting values of the organic constituents posed another problem due to the variability in levels of specific constituents in successive analyses of a well. This problem was resolved with the development of a specific criteria, a copy of which is shown in the accompanying chart.

Initial Phases of Investigation

The discovery of trace organic compounds in the drinking water of Nassau County grew out of an investigation started in 1972 by the Department of Health of taste and odor problems in several water supply wells of the Grumman Aerospace Corporation facilities in Bethpage in the southeastern portion of the County. Conventional wet chemistry analyses for possible inorganic contaminants could not identify the cause. In March of 1974, the Region II offices of the USEPA assisted by sampling and testing two Grumman wells, as well as industrial waste sumps of both the aerospace firm and those of the nearby Hooker Chemical Company, the latter which was then engaged in manufacture of poly vinyl chloride (PVC). Vinyl chloride and chloroethylenes were found in the waste sumps, but not in the two wells.

Initial identification of organic contaminants in Grumman wells was in October 1975 when State Health Department analyses reported vinyl chloride at 50 ug/l in one well and trichloroethylene and tetrachloroethylene in both wells.

Further testing of the 14 Grumman wells and nearby public water supply wells were impeded until late in 1976 due to commitments of both the USEPA and State Health Department laboratory capability to other projects and problems. In December 1976, tests of four municipal wells showed two with levels of chloroform at eight and 12 ug/l. Tests of six Grumman wells revealed an appreciably higher concentration of more organic compounds than the community wells.

In December 1976 the USEPA and State Health Department provided increased laboratory support and 98 tests were made before the end of the year of 21 public wells in 11 water districts. Ten of these were found to contain appreciable concentrations of synthetic organic chemicals and were restricted from use.

All the analyses were limited to the organic chemical group identified as volatile compounds adhering to the initial profile of synthetic chemicals detected in the wells and sumps of the industrial complex and also used primarily as solvents by industrial firms which included the Grumman facility, as well as other smaller establishments. These chemicals were also generally identified as suspected carcinogens in drinking water as opposed to non-volatile compounds which as a group had a much lower adverse health potential.

Comprehensive Testing of Wells

In early 1977, the State Health Department agreed to test public wells on a sustained basis at a rate of about 15 per week and the Department developed plans for a county-wide assessment of volatile organic compounds in the 46 community supplies as well as in 34 non-community public supplies. A prioritized sequence was established which considered the following factors:

- Well location in proximity to suspected industrial, commercial, or municipal source of organic compounds.
- Wells representative of each aquifer and spatially distributed throughout the County.
- Wells in year-round use initially followed by reserve wells used during peak demand periods.
- Private and observation wells which would provided needed data not available from public water supply wells.

Following the completion of the initial cycle of tests on all public wells, resamples were taken of those wells with only one analysis. By April of 1978, 1,162 samples were collected and analyzed from 510 wells including non-public wells. The breakdown of these tests by well types and resulting well restrictions is tabulated in the following chart:

Types of Wells	Wells Total	Wells Tested	Tests Made	Wells Restricted Total	Wells Restricted Current
Public					
Community	386	372	939	18	11
Non-Community	54	49	97	2	2
Sub-Total	(440)	(421)	(1,036)	(20)	(13)
Non-Public					
Grumman Corporation	14	14	36	9	9[1]
Other	-	75	90	11	11
Sub-Total		(89)	(126)	(20)	(20)
Totals		510	1,162	40	33

1. The Grumman Corporation installed a separate water supply system for 20,000 employees using municipal sources of water.

Laboratory Certification

A key factor in the interpretation of laboratory analyses reported by several governmental and commercial laboratories was the wide variation in organic compounds and concentrations reported from well to well and in successive tests of the same well. While these variations could be attributed to changes in the sources tested, there were sufficient occurrences of unusual laboratory findings to suggest the need for a formal certification process for commercial laboratories. The State Health Department undertook the responsibility and did develop by May 1977, an approval procedure for commercial laboratories performing tests for organic compounds. The USEPA-II in a cooperative role agreed to inspect out-of-state laboratories for the State Health Department using the State criteria.

The process was slow because of the rapidly developing technology in gas chromatography/mass spectrometry equipment and analytical techniques. Approved laboratories were also required to retain highly qualified directors and to expend a significant percentage of their time in quality control procedures and checks. By June 1977 only one commercial laboratory was approved. As of June 1978 however, five commercial laboratories are approved, as well as the laboratory of the Nassau County Department of Health. Approved laboratories and type of approval are shown on accompanying chart.

The lack of early development of the laboratory approval system unfortunately cast doubt on the validity of results of 192 analyses which were contracted for by public water supply officials and others in a sincere effort to cooperate with the Department in the expeditious identification of the extent of well contamination during 1977.

Extent of Well Contamination

The overall extent of contamination of drinking water is demonstrated by the proportion of total wells at various ranges in levels of organic chemicals. Based on data representing 421 public wells analyzed, 384 (91 percent) contain less than 10 ug/l of organic chemicals, 10 wells (2.4 percent) contain between 10 and 20 ug/l, 13 wells (3.2 percent) between 20 and 50 ug/l, and 14 wells (3.2 percent) exhibit concentrations equal or greater than 50 ug/l. This data represents the total of organic constituents in the most recent laboratory analysis.

A similar analysis of the same wells grouped by aquifer reveals a distribution of organic contaminants in decreasing levels for the progressively lower aquifers. Of the 53 Glacial wells tested, 42 (79 percent) have organic chemicals at levels below 10 ug/l. Of the 330 Magothy wells 305 (92 percent) have these substances below the 10 ug/l level. The Lloyd aquifer has the highest percentile - 37 of 38 wells tested or 98 percent-below the 10 ug/l level. The same decreasing relationship is exhibited by wells in each aquifer with higher levels of organic chemicals. The data is summarized in the accompanying tabulation.

There were no cases experienced where individual constituents were all below the "guidelines" of 50 ug/l where the total of all organic compounds exceeded the

STATE OF NEW YORK DEPARTMENT OF HEALTH
LIST OF APPROVED ENVIRONMENTAL LABORATORIES
FOR ORGANIC ANALYSES BY GAS CHROMATOGRAPH

AS OF JUNE 9, 1978

	Name	Type of Approval
1.	Buffalo Division The ARO Corporation 3695 Broadway Buffalo, N.Y. 14425	Pesticides and Herbicides
2.	E.H. Labs., Div. Labs Research Nassau County Department of Health 209 Main Street Hempstead, N.Y. 11550	Volatile Compounds
3.	O'Brien & Gere Engineers 1304 Buckley Road Syracuse, N.Y. 13201	Pesticides and Herbicides
4.	Foster D. Snell, Inc. Hanover Road Florham Park, N.J. 07932	Volatile Compounds
5.	H2M Corporation Laboratory 500 Broad Hollow Road Melville, N.Y. 11746	Pesticides and Herbicides Volatile Compounds
6.	N.Y. Testing Laboratory, Inc. 81 Urban Avenue Westbury, N.Y. 11590	Pesticides and Herbicides Volatile Compounds

DISTRIBUTION OF PUBLIC WELLS BY LEVEL OF
SYNTHETIC ORGANIC CHEMICALS AND BY AQUIFER [1]
NASSAU COUNTY, NEW YORK

Well Category	Wells Total	Wells Tested	No. of Tests	Number of Wells by Range of Levels for Individual Contaminants[2] and by Aquifer: $\leq$ 10ug/1			10- < 20ug/1			20- < 50ug/1			$\geq$ 50ug/1		
				G[3]	M[3]	L[3]	G	M	L	G	M	L	G	M	L
COMMUNITY	386	372	939	30	279	31	2	6	1	4	8	0	3	8	0
NON-COMMUNITY	54	39	97	12	36	6	0	1	0	0	1	0	2	1	0
TOTALS	440	421	1,036	42	305	37	2	7	1	4	9	0	5	9	0

1 Data as of April, 1978.
2 Reflects highest result for individual contaminants in most recent test. Most recent test for a "Restricted" well is the last sample exceeding "Guidelines."
3 G, M, L represent the Glacial, Magothy, and Lloyd aquifers in which the wells are screened.

100 ug/l level.

Distribution of individual organic contaminants in public wells provides another informative summary of the data. The most common organic constituent in community wells were tetrachloroethylene, 1, 1, 2 trichloroethylene, chloroform, 1,1,1 trichloroethane, carbon tetrachloride, and trifluorotrichloroethane listed by decreasing numbers of wells in which detected. The four leading constituents were also the most prevalent in non-community public wells which generally are screened at more shallow depths.

Monitoring wells exhibited a greater variety of constituents detected in a significantly larger proportion of wells with highest concentrations for individual contaminants generally greater than for water supply wells. This is attributed to generally more shallow well depths than water supply wells and the locations of these wells closer to industrial areas. The four leading constituents were also the same as for both groups of public wells. Data is summarized in accompanying charts.

Organic compounds detected in single instance in public wells are listed below together with level at which detected:

1, 2 dichloroethylene (7 ug/l)	alkanes (+)
toluene (0.3 ug/l)	freon 113 (+)
methylene chloride (1.8 ug/l)	bromodichloroethane (3 ug/l)
PCB (0.02 ug/l)	

Compounds detected in isolated occasions in monitoring wells included 1,2 dichloroethylene, phenathrene, tetrafluoropropanol, butyl phthalate, and "x" phthalate. In all cases the results were qualitative only.

Public Health Significance

The organic substances found in public water supply wells in Nassau County include none which have been listed by the National Academy of Science [1] as "known" human carcinogens or as "suspected" human carcinogens. Three compounds detected

1. "Drinking Water and Health", National Academy of Sciences, June 1977.

ORGANIC CHEMICALS DETECTED IN PUBLIC WATER SUPPLY WELLS [1,3]
NASSAU COUNTY, NEW YORK

Constituent[2] (1)	Wells Tested (2)	Total Tests (3)	Wells Positive (4)	Percent Positive (5)	Maximum Level Detected (ug/1) (6)
COMMUNITY WELLS					
Tetrachloroethylene	372	930	57	15	375
1,1,2-Trichloroethylene	372	930	50	13	300
Chloroform	372	913	41	11	67
1,1,1-Trichloroethane	372	923	33	9	310
Carbon Tetrachloride	365	845	20	5	21
Trifluorotrichloroethane	328	590	4	1	$\geq$35
NON-COMMUNITY WELLS					
Chloroform	49	96	10	20	6
Tetrachloroethylene	49	96	9	18	367
1,1,1-Trichloroethane	49	96	7	14	150
1,1,2-Trichloroethylene	49	96	6	12	30

1 Data reflects samples collected as of April 28, 1978.
2 Listed in decreasing number of wells positive.
3 Constituents appearing in a single sample not shown.

ORGANIC CHEMICALS DETECTED IN MONITORING SYSTEM WELLS [1,3]
NASSAU COUNTY, NEW YORK

Constituent[2] (1)	Wells Tested (2)	Total Tests (3)	Wells Positive (4)	Percent Positive (5)	Maximum Level Detected (ug/1) (6)
1,1,1-Trichloroethane	75	87	30	40	5,100
Trichloroethylene	75	88	30	40	3,800
Tetrachloroethylene	75	87	30	40	688
Chloroform	75	87	14	19	21
Carbon Tetrachloride	66	77	2	3	135
1,1,2-Trichloroethane	24	26	2	8	20
Trifluorotrichloroethane	50	54	2	4	19

1 Data reflects samples collected as of April, 28, 1978.
2 Listed in decreasing number of wells positive.
3 Constituents appearing in a single sample not shown.

however, have been identified by the NAS as animal carcinogens. These are listed below together with their associated cancer risk:

Compound	Upper 95% Confidence Estimate of Lifetime Cancer Risk per ug/l
Chloroform	3.7×10^{-7}
Carbon tetrachloride	1.5×10^{-7}
Trichlorothylene	1.3×10^{-7}

The detection in Grumman wells of vinyl chloride - the only "known" human carcinogen identified in drinking water by the USEPA resulted in immediate suspension of the use of contaminated wells. These wells are not included in the data presented herein because they are no longer used as public water supply wells.

Identification and Abatement of Sources

While the first priority in the investigation of organic compounds was to identify the extent of the problem by assessing the drinking water sources, it was recognized early in the investigation that there would be a need to identify and abate the sources of organic compounds. These were categorized as industrial and commercial sources, consumer products, and community facilities, the latter to include stormwater recharge, sewage treatment plants, incinerator discharges, and landfill leachate.

Industrial and commercial sources were the first to be addressed. A plan was developed to perform on-site surveys of each of 3,500 establishments in the County and the field phase was initiated in December, 1976. Survey forms and procedures were developed and training of the survey team was conducted through the courtesy of the Industrial Waste Bureau of the State Department of Environmental Conservation.

The survey procedure for each establishment was to determine through interview of plant officials and direct observation, the use by the facility of organic chemicals, the identification of specific compounds and quantities used, and the disposition of these chemicals either as a component of the wastewater effluent or by batch disposal either on or off site.

Identification of a potential discharge of organic chemicals to the groundwater at a plant triggered a regularization procedure to identify constituents of concern as well as their concentrations and to cause an immediate cessation of the discharge of organic chemicals or the institution of permitting procedures under the State Pollution Discharge Elimination System (SPDES) calling for an engineering evaluation and an abatement plan on a reasonable compliance schedule.

A $100,000, one-year C.E.T.A. project was approved in June of 1977, which enabled the recruitment of a staff of 9 technical personnel (bachelors degree with major in chemistry or biology),and 1 clerk-typist, to augment the permanent staff. $7,200 was allocated for commercial laboratory analyses of industrial wastes.

The industrial waste survey was first implemented in the south-eastern portion of the County in conjunction with the water supply testing program and later extended to other parts of the County.

It was learned that in many establishments the use of organic solvents is in a manner such that relatively small quantities of waste containing organic chemicals are collected and dumped into sumps or cesspool systems or flushed into drains. These include equipment cleaning operations such as by printers, machine shops, and automobile service stations. Drycleaners, too, in typical solvent recovery operations generate several gallons of condensed steam containing the unrecoverable fraction of solvents.

While the individual contribution of organic chemicals to the water environment by these processes is small, the overall adverse impact is appreciable because of the large number of such operations and the trace quantities of organic chemicals which are significant to public health. Chemical analyses of three drycleaning plants revealed a waste loading of between 1,800 and 200,000 ug/l. A typical discharge is 8 gallons on a weekly basis. There are 400 drycleaning plants in the County and 1,000 automotive service stations.

In most instances, small batches of waste can be effectively controlled through the use of "Store and Remove" SPDES permits. In many other instances changes in products and use enabled corrections to be made at the time of the plant survey.

By June 1978, 3,097 plants were inspected of which 1,014 were found to be using chemicals. Of these 379 facilities were identified as using chemicals of concern. Immediate abatement efforts were feasible in 82 establishments and SPDES permits indicated for 227 other plants. At 124 sites, sampling and testing of plant effluent was considered appropriate and 59 such tests have been completed. Remaining establishments to be surveyed are primarily 1,400 drycleaners and automotive service stations. Status of control efforts is shown on accompanying chart.

The data generated by the Industrial Organic Chemical Waste Survey has been evaluated in several ways. An ADP "Symap" System was used to plot data on chemical usage by constituent and by quantities on a map of the County. Resulting maps were superimposed on similarly prepared "Symaps" on which were printed the concentration of the same constituent in water supply wells. This was done for the three most prevalent organic chemicals used by industry (1,1,1 trichloroethane, tetrachloroethylene, and trichloroethylene. The total of the three chemicals were also plotted and the companion maps compared. Charts showing chemical usage for the three chemicals and for methylene chloride, as well as total industrial usage are appended.

Generally the comparison of chemical usage and concentration in wells demonstrates a significant cause-effect relationship related to industrial solvents. These comparisons, however, must consider the temporal and spatial lag between chemical discharge and appearance in a well caused by slow groundwater movement (½ to 2½ feet/day), varying lateral flow components of groundwater throughout the County, changes

Industrial Usage of Organic Chemicals
Nassau County, New York

STATUS OF REGULATION - JUNE 1978

Industry Category		Wastewater Discharges Sampled	Abatement Actions	
Classification[1]	Description		Corrections	S & R SPDES[2] Permits
Mfg. (1900-2399)	Ordinance, Food Tobacco, Textile Prod.	1	1	—
Mfg. (2400-2799)	Wood and Paper Prod., Printing & Publishing	6	11	4
Mfg. (2800-3199)	Chemical, Petroleum Rubber, Plastic, Leather Prod.	8	4	—
Mfg. (3200-3499)	Stone, Clay, Glass Metal & Metal Fabrication	6	13	7
Mfg. (3500-3999)	Machinery, Electrical Transp. Equip., Instruments, Misc.	27	31	20
Wholesale & Retail Trade (5000-5999)	Wholesale, Retail Consumer Goods, Trading	2	8	—
Services (7000-8999)	Misc. Services including Gas Stations & Dry Cleaners	3	14	2
Miscl. (0000-1899) (4000-4999) (6000-6999)	Agriculture, Construction Transportation, Finance	2	1	—
Aerospace	Aerospace Mfgr.	—	—	—
	Totals	55	83	33

1. Standard Industrial Code
2. "Store and Remove" SPDES Permits.

as of 5/28/78

in chemical usage by industry, and influence of other sources of the same chemicals.

Data on chemical usage has been summarized by constituent and tabulated by industrial category in decreasing order of chemical usage.

These tabulations have been prepared for the same four chemicals plotted on "Symaps". The total organic chemical usage by industry is 1,284,500 gallons per year broken down as follows:

Constituent	No. of Plants	Chemical Usage (gallons/year)
1,1,1 trichloroethane	129	561,451
tetrachloroethylene	440	373,979
trichloroethylene	59	196,050
methylene chloride	47	153,017
Totals	641[1]	1,284,497

[1]Not additive due to multiple use of chemicals by plants.

Consumer Product Control

A second major source of synthetic organic chemicals in the groundwater which was investigated was the consumer products containing those substances which through use and disposal would contribute to contamination of the groundwater.

Identification of consumer products of concern consisted of a survey of 25 percent of the County's retail hardware and department stores, supermarkets, sanitary supply companies, and automotive supply stores. Information found on product labels was recorded and filed regarding the purpose and method of use of products, their ingredients and manufacturers. Letters of inquiry were also sent to the manufacturers of over 500 products of concern to ascertain more complete ingredient information and yearly sales volumes in Nassau County.

Based on the information gathered, each product was evaluated using following three criteria:

1. The product contains or is suspected of containing harmful organic chemicals.
2. The product has the potential of entering the groundwater via its usage.
3. The product is used in significant quantities in Nassau County.

This evaluation yielded 250 products which may have the potential of contributing to groundwater degradation. A breakdown of the product categories is shown on attached tabulation.

The control of consumer products identified as potential organic contaminants to the groundwater is most appropriately accomplished by banning the sale of some products and encouraging proper use and disposal of others by consumers to reduce their adverse impact.

CONSUMER PRODUCT SURVEY DATA
NASSAU COUNTY, NEW YORK

Category	Number of Products	Annual Usage	Estimated Quantities of Chemicals of Concern
Organic Solvent Cesspool Cleaners and Drain Aids	10	67,500 gals.	56,900 gals.
Solid Toilet Bowl Deodorizers	14	270,000 lbs.	267,300 lbs.
Laundry Degreasers	5	25,300 gals.	6,100 gals.
Household Cleaners and Disinfectants	40	N.A.[1]	N.A.[1]
Oven Cleaners	3	N.A.	N.A.
Paint and Varnish Removers	39	21,400 gals.	17,100 gals.
Solvents and Cleaning Fluids	47	79,800 gals.	33,100 gals.
Driveway and Garage Degreasers	12	3,300 gals.	N.A.
Spot Removers	10	1,200 gals.	800 gals.
Engine and Metal Degreasers	23	5,400 gals.	N.A.
Radiator Flushers	10	N.A.	N.A.
Floor Strippers, Cleaners, and Dressings	12	1,200 gals.	N.A.
Car Waxes and Cleaners	17	N.A.	N.A.
Miscellaneous	8	N.A.	N.A.
Total	250	205,100 gals.	114,000 gals.
		270,000 lbs.	267,300 lbs.
			(does not include Petroleum Distillates)

[1]Not available.

The single most significant products requiring control are cesspool and drain cleaners which constituents total 85 percent of methylene chloride, 1,1,1 trichloroethylene, ortho dichloro benzene, and other aromatic and halogenated compounds. Total usage annually of these products in the County is 67,500 gallons.

These products are generally applied directly into plumbing drains and in unsewered areas are recharged to the groundwater through cesspools and tile fields.

The State Attorney General has instituted a program to gain voluntary removal of these products from sale in Nassau and neighboring Suffolk County on the basis that their use represents a contravention of State water discharge standards and constitutes a public health nuisance.

Other products will be addressed in similar manner based on technical guidance from local health officials following the criteria on significance of impact.

Community Source Identification

Sporadic testing of sewage treatment plant effluents discharged to groundwater, incinerator discharges, stormwater runoff, and landfill leachate, have identified the presence of organic chemicals of concern, but not in quantities to elicit priority concern at this time.

Three sewage treatment plants have been sampled and analyzed indicating small amounts of chlorinated hydrocarbons. These can be attributed to background levels in the associated groundwater and/or compounds created by chlorination of the sewage.

Recharge basins sampled in industrial areas have been negative for industrial chemicals. Two landfill leachates have been analyzed - one showing negative and the other chemicals only slightly above interim guidelines. The one incinerator sampled (cooling water) contained 75 ug/l of bromoform (non-industrial).

Further Investigations Required

Substantial achievements have been realized in the identification and abatement of sources of organic chemicals and appropriate interim measures instituted to regulate the use of impacted wells to prevent public exposure. Much more investigative and control efforts are required however, and this work is now in various stages of design and planned implementation.

Further assessment of the extent of groundwater contamination is scheduled as part of the planned sampling and testing program for the second half of 1978. Samples will be collected and tested to determine organic compounds in private residential wells, to further identify the extent of contamination of the Glacial aquifer which supplies the Magothy, and to assess bottled water. Expanded analyses will be performed as well to evaluate water quality with respect to non-volatile organic chemicals, pesticides and herbicides, non-halogens, and four additional halogens (para and orthodichloro benzene, methylene chloride and 1,2 Dichloroethylene).

Special projects are being designed with intent to seek federal funding to study the mechanics of groundwater pollution by organic chemicals, to determine the most cost-effective water treatment method for local water supply sources, and to evaluate impacted segments of aquifers in order to determine the most cost-effective water management alternative.

The industrial organic waste survey is scheduled to address the control of 1,000 automotive service stations and 400 dry cleaning establishments which will depend on the extention of the CETA contract for an additional year. Concurrently, the regularization of SPDES permits will continue for those waste discharges and store and removeoperations identified with planned completion by mid-1979.

Following the completion of the permit process for industrial waste control an ongoing surveillance program will be required for the 250 establishments under permit. This operation will require one professional engineer, two sanitarians, and a clerk-typist and will cost $60,000 each year in direct salaries.

Conclusions

Assessment of the impact of organic chemicals on water supply sources and the identification and abatement of sources in Nassau County has taxed the resources and the ingenuity of the environmental services staff of the Department of Health because of the extensive work and pioneering approaches required. A strong sense of accomplishment has also been engendered with the realization that in the process the public has been protected from direct exposure in their drinking water and that sources are systematically being brought under control.

The absence of reliable toxicological data to demonstrate specific public health impact remains a problem in terms of the legality of enforcement efforts as well as in the assurance that the extensive effort expended is truly warranted. The prediction of health officials that drinking water standards eventually will be of one order of magnitude more restrictive (from 100 to 10 ug/l) than the present guidelines is reassuring in the sense that the problem is significant and that regulation is a valid course of action.

The prognosis therefore follows that water pollution control and wastewater management will extend to another basic area replete with new treatment technologies, expanded regulation, and sophisticated analytical laboratory capability.

DIAGRAM OF WELL CATEGORY ASSIGNMENTS

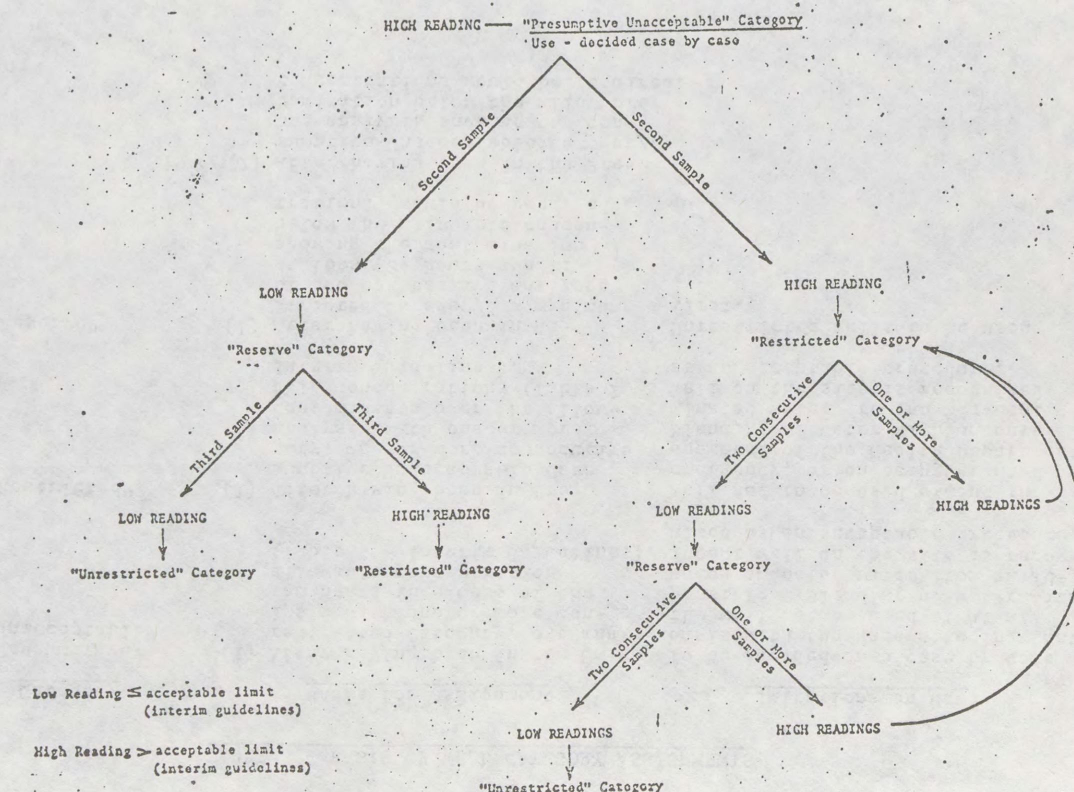


TABLE 3 - BASIS OF WELL CATEGORY ASSIGNMENTS

Category	Basis for Assignment	Limitations on Use
"Presumptive Unacceptable"	(1) After having been in the Unrestricted Category, one analysis with one or more contaminants in excess of the allowable concentrations (Table 2 - Interim Guidelines).	To be decided on a case by case basis with the understanding that the well not be used if at all possible. Blending of water with uncontaminated water from an adjacent well on the site is recognized as an acceptable procedure.
"Restricted"	(1) After having been in Presumptive Unacceptable Category, one or more consecutive analyses with one or more contaminants over the allowable concentrations (Table 2 Interim Guidelines).	Well not to be used except in emergency, or on being granted approval of the Health Department. Blending of water with uncontaminated water from an adjacent well on the site is recognized as an acceptable procedure.
"Reserve"	(1) After having been in Restricted Category, a minimum of two consecutive analyses at least 24 hours apart, showing the contamination below the allowable concentrations, would be required.	Unrestricted wells to be used first.
	(2) After having been in the Presumptive Unacceptable Category, one analysis showing the contamination below the allowable concentrations would be required.	

(REV. 6/13/77)
(6/16/77)

TABLE 3 - BASIS OF WELL CATEGORY ASSIGNMENTS (CONT'D.)

Category	Basis for Assignment	Limitations on Use
"Unrestricted"	(1) After having been in the Reserve Category, a minimum of two consecutive analyses at least 24 hours apart, showing the contamination below the allowable concentrations, would be required.	None.
	(2) Not previously in the Restricted or Reserve Categories, and having no individual constituent and/or total organic concentration in excess of the allowable concentration.	

NOTE: All resampling must include all constituents which were analyzed for in previous samples.

(REV. 6/13/77)

36-566 O - 79 - 24

Industrial Usage of Organic Chemicals
Nassau County, New York

1, 1, 1 TRICHLOROETHANE

Industry Category			
Classification [1]	Description	Number of Companies	Chemical Usage (Gallons/Year)
Mfg. (2800-3199)	Chem, Petro, Rubber and Plastic, Leather Prods.	11	398,741
Mfg. (3200-3499)	Stone, Clay, Glass Metal and Metal Fabrication	16	97,730
Mfg. (3500-3999)	Machine; Electronic, Trans Equip; Instruments; Misc.	89	40,300
Aerospace (3700-3799)	Aerospace Mfg.. 6	1	23,375
Mfg. (2400-2799)	Wood and Paper Prod., Printing and Publishing	8	963
Mfg. (1900-2399)	Ordinance, Food; Tobacco; Textile Prod.	4	342
Wholesale and Retail Trade (5000-5999)	Wholesale Retail Consumer Goods; Trading	—	—
Services (7000-8999)	Misc. Services Including Gas Stations & Dry Cleaners	—	—
Miscl. (0000-1899) (400-4999) (6000-6999)	Agriculture, Construction Transportation & Finance	—	—
	Totals	129	561,451

1. Standard Industrial Code

Industrial Usage of Organic Chemicals
Nassau County, New York

TETRACHLOROETHYLENE

Industry Category		Number of Companies	Chemical Usage (Gallons/Year)
Classification [1]	Description		
Services (7000-8999)	Misc. Services including Gas Sta. & drycleaners	1400 (extrapolated)	350,000
Mfg. (1900-2399)	Ordinance Food Tobacco Textile Prod.	7	12,093
Mfg. (3500-3999)	Machinery, electrical Trans. Equip., Instr., Misc.	22	5,476
Mfg. (3200-3499)	Stone, clay, glass Metal & metal fabrication	6	3,275
Mfg. (2800-3199)	Chemical, Petroleum, Rubber, Plastic & leather prod.	4	3,130
Mfg. (2400-2799)	Wood & paper Prod. Printing & publishing	1	5
Wholesale and Retail trade (5000-5999)	Wholesale, Retail, Consumer, Goods, Trading	—	—
Misc. (0000-1899) (4000-4999) (6000-6999)	Agriculture, Constr. Transp., Finance	—	—
Aerospace	Aerospace Mfg.	—	—
	Totals	1440	373,979

1. Standard Industrial Code

As of May 28, 1978

Industrial Usage of Organic Chemicals
Nassau County, New York

TRICHLOROETHYLENE

Industry Category			
Classification 1	Description	Number of Companies	Chemical Usage (Gallons/Year)
Aerospace	Aerospace Mfg.	1	103,850
Mfg. (3200-3499)	Stone, Clay, Glass Metal & metal fabrication	14	77,120
Mfg. (3500-3999)	Machinery, electrical Trans. Equip. Instr. Misc.	39	12,364
Mfg. (2800-3199)	Chemical, Petroleum, Rubber & Plastic, Leather Prod.	1	2,400
Mfg. (1900-2399)	Ordinance, Food, Tobacco Textile Prod.	1	312
Mfg. (2400-2799)	Wood and Paper Prod., Printing & Publishing	3	4
Wholesale & Retail (5000-5999)	Wholesale, Retail Consumer Goods, Trading	-	-
Services (7000-8900)	Misc. Services including Gas Stations and Drycleaners	-	-
Misc. (0000-1899)	Agriculture	-	-
(4000-4999)	Construction	-	-
(6000-6999)	Transportation, Finance	-	-
	Totals	59	196,050

1. Standard Industrial Code

As of May 29, 1978

Industrial Usage of Organic Chemicals
Nassau County, New York

METHYLENE CHLORIDE

Industry Category: Classification[1]	Description	Number of Companies	Chemical Usage (Gallons/Year)
Mfg. (2800-3199)	Chemical, Petroleum Rubber and Plastic, Leather, Prod.	7	74,976
Mfg. (3500-3999)	Machinery, Electrical Transp. Equip., Instr., Misc.	17	74,369
Mfg. (2400-2799)	Wood & Paper Prod., Printing and Publishing	18	2,413
Mfg. (3200-3499)	Stone, Clay, Glass Metal and metal fabrication	3	1,240
Mfg. (1900-2399)	Ordinance, Food Tobacco, textile prod.	2	19
Wholesale and Retail Trade (5000-5999)	Wholesale, Retail Consumer goods, Trading	—	—
Services (7000-8999)	Misc. Services including gas stations & drycleaners	—	—
Misc. (0000-1899) (4000-4999) (6000-6999)	Agriculture, Construction Transportation, Finance	—	—
Aerospace	Aerospace Mfg.	—	—
	Totals	47	153,017

1. Standard Industrial Code

Industrial Usage of Organic Chemicals
Nassau County, New York

TOTAL MAJOR CHEMICALS [2]

Industry Category: Classification [1]	Industry Category: Description	Number of Companies	Chemical Usage (Gallons/Year)
Mfg. (2800-3199)	Chemical, Petroleum Rubber, Plastic, Leather Prod.	13	479,247
Services (7000-8999)	Misc. Services Including Gas Stations & Dry Cleaners	1,400	350,000
Mfg. (3200-3499)	Stone, Clay, Glass Metal & Metal Fabrication	35	179,365
Mfg. (3500-3999)	Machinery, Electrical, Transp. Equip., Instr., Misc.	156	132,509
Aerospace	Aerospace Manufacturing	1	127,225
Mfg. (1900-2399)	Ordinance, Food, Tobacco, Textile Prod.	10	12,766
Mfg. (2400-2799)	Wood & Paper Products, Printing, and Publishing	26	3,385
Wholesale & Retail Trade (5000-5999)	Wholesale, Retail, Consumer Goods, Trading	—	—
Miscl. (0000-1899) (4000-4999) (6000-6999)	Agriculture, Construction Transportation, Finance	—	—
	Totals	1,641	1,284,497

1. Standard Industrial Code

2. Includes, 1, 1, 1 Trichloroethane, Tetrachloroethylene, Trichloroethylene, and Methylene Chloride

As of May 28, 1978

ERRATA SHEET

Page 2, third para., line 4 - "Region I" should read, "Region II".

Page 5, last line - "is shown in the accompanying chart" should read, "is appended".

Page 10, first para., second line, "constituent" should read, "constituents".

Chart - "Industrial Usage of Organic Chemicals - TETRACHLOROETHYLENE" - under Description column "Misc. Services Including Gas Sta. & Drycleaners, Number of Companies "400" should read, "1400". Total "440" should read, "1400".

Chart - Industrial Usage of Organic Chemicals - TOTAL MAJOR CHEMICALS under Description column,"Misc. Services Including Gas Stations & Dry Cleaners ", Number of Companies "400" should read, "1400". Total "641" should read, "1641".

STATEMENT BY THE
CITY OF LOS ANGELES
ON THE PROPOSED ORGANIC CONTROL AMENDMENTS TO THE NATIONAL INTERIM PRIMARY DRINKING WATER REGULATIONS

The City of Los Angeles welcomes this opportunity to present its views on the proposed regulations for the control of organic chemical contaminants in drinking water.

Through its Department of Water and Power, the city provides water and power to 3 million residents and has an excellent record of over 75 years of providing a safe water supply. Los Angeles is active in meeting the objectives of the Safe Drinking Water Act as administered by the Environmental Protection Agency (EPA). We are currently in the planning stage of a costly filtration project for the Los Angeles Aqueduct to meet the new EPA turbidity standard.

While Los Angeles supports measures necessary to protect public health, we are responsible to our ratepayers to ensure that expenditures of public funds are made only after the need and benefits have been established. Vital information on the need, benefits, and costs of this program is lacking, and therefore we are strongly opposed to the proposed standards and recommend instead that EPA should:

1. Delay implementation of these and any further organics regulations until stronger evidence of need has been established,
2. Expand and accelerate federally financed, large-scale health-effects research as recommended by the National Academy of Science,
3. Encourage water systems to lower trihalomethane levels by setting the 100 parts per billion (ppb) standard as a national goal and require monitoring by utilities serving over 75,000 people, and
4. Provide federal monitoring of major water sources nationwide to determine synthetic organic chemical levels.

We object to the EPA proposal to set a maximum contaminant level for trihalomethanes of 100 ppb and their expressed intent to lower this level in the future to 10 ppb. The National Academy of Sciences was charged by Congress and the EPA to recommend maximum contaminant levels for organics in water to protect public health. The Academy found they lacked sufficient data for doing so and recommended that further research be conducted. Among members of the scientific community, there is widespread disagreement of the health significance of low levels of organic contaminants. The American Water Works Association (AWWA) recently published the findings of an EPA-sponsored study of the effects on human health of trace organic chemicals in drinking water. The two-year study, reports AWWA, found no evidence to back EPA's regulations for the control of organic chemical contaminants in drinking water.

EPA has proposed a treatment method using granular activated carbon (GAC) to remove man-made synthetic organics from water supplies. The National Academy of Sciences was directed to make studies and recommendations on synthetic organic chemical levels in water. However, the Academy recognized that uncertainties exist regarding health risks of these compounds and recommended further research to determine whether low levels of these compounds actually increase the probability of human cancer. We agree that this additional research is necessary and that it would be premature for EPA to impose the GAC treatment requirement on water systems.

The lack of knowledge on synthetic organics is demonstrated by the vagueness of the proposed regulations. The regulations require utilities to monitor for 60 synthetic organics. However, the only guidance provided for determining the need to install GAC treatment is the statement that a variance cannot be issued if "significant contamination" exists. The term significant contamination is not defined but left open to future interpretation by EPA and State Health Agencies. It is impossible for utilities to determine the impact of this regulation on their costs until it is seen how it will be applied by regulatory agencies.

The costs of controlling the formation of trihalomethanes and providing GAC treatment are unknown because there has not been adequate experience with design, construction, and operation of

THESE FACILITIES. FOR EXAMPLE, IT IS INTERESTING TO NOTE THAT DETAILED COST ESTIMATES OF THE CAPITAL INVESTMENT FOR TURBIDITY REDUCTION IN LOS ANGELES ALONE WILL BE APPROXIMATELY ONE-HALF OF EPA'S ESTIMATE OF THE NATIONWIDE COSTS FOR TURBIDITY CONTROL IN ALL CITIES OVER 100,000 IN POPULATION. A SAMPLE SURVEY CONDUCTED BY LOS ANGELES OF ONLY 31 SUCH CITIES FOUND THAT A $257 MILLION INVESTMENT WOULD BE REQUIRED TO MEET THE TURBIDITY STANDARDS RATHER THAN THE $135 MILLION EPA ESTIMATED.

UTILITIES MUST NOT BE FORCED TO CONSTRUCT TREATMENT FACILITIES AT A COST OF HUNDREDS OF MILLIONS OF DOLLARS NATIONWIDE WHEN THESE PROJECTS HAVE ONLY QUESTIONABLE JUSTIFICATION. USING EPA COST DATA, LOS ANGELES WOULD HAVE TO SPEND $93 MILLION IN CAPITAL COSTS AND $4.6 MILLION IN ANNUAL OPERATING COSTS TO PROVIDE GAC TREATMENT. THIS ESTIMATE WAS MADE BEFORE EPA ANNOUNCED THAT THEIR ORIGINAL ESTIMATE FOR ORGANICS CONTROL HAD DOUBLED. MUCH MORE TIME IS NEEDED TO GAIN INFORMATION FROM RESEARCH AND EXPERIENCE BEFORE TREATMENT METHODS ARE ADOPTED.

THE EPA SHOULD REQUIRE LARGE UTILITIES TO MONITOR FOR TRIHALOMETHANES TO IMPROVE OUR DATA BASE. TEST METHODS ARE ESTABLISHED AND COSTS ARE JUSTIFIABLE FOR THOSE CITIES SERVING OVER 75,000 PEOPLE. ON THE OTHER HAND, THE COST AND COMPLEXITY OF MONITORING FOR SYNTHETIC ORGANIC CHEMICALS IS TOO EXPENSIVE FOR THESE UTILITIES AND SHOULD BE MANAGED, OPERATED, AND FINANCED BY THE EPA. SUCH A PROGRAM SHOULD BE BASED ON COST EFFECTIVENESS, FOCUSING ON THE SYSTEMS IDENTIFIED AS HAVING THE HIGHEST SYNTHETIC ORGANIC CHEMICAL LEVELS.

IN CONCLUSION, THE CITY OF LOS ANGELES RECOMMENDS THAT THE PROMULGATION OF THE PROPOSED EPA STANDARDS SHOULD BE DELAYED INDEFINITELY. EPA SHOULD CONTINUE THE TOXICOLOGICAL AND EPIDEMIOLOGICAL RESEARCH ON ORGANICS IN WATER SUPPLIES. THESE STUDIES SHOULD BE FEDERALLY FINANCED AND THE FINDINGS MADE AVAILABLE TO THE WATER SUPPLY INDUSTRY. IF EVIDENCE OF THE HEALTH RISK OF ORGANIC CONTAMINANTS IN WATER IS DEVELOPED, AND THE MONITORING OF WATER SUPPLIES SHOWS WHERE IMPROVED WATER QUALITY IS NECESSARY, TREATMENT METHODS CAN THEN BE IMPLEMENTED.

WHILE AWAITING THE RESULTS OF THIS RESEARCH, AND ENCOURAGED BY EPA'S LEADERSHIP, WATER UTILITIES THROUGHOUT THE NATION WILL CONTINUE THE SOUND WATER QUALITY MAINTENANCE PROGRAMS THEY HAVE BEEN NOTED FOR WORLDWIDE.

STATEMENT BY

NATIONAL LEAGUE OF CITIES

ON THE

SAFE DRINKING WATER ACT

The National League of Cities welcomes this opportunity to comment on implementation of the Safe Drinking Water Act and, in particular, the Environment Protection Agency's proposed regulations to control organic chemicals in drinking water.

The National League of Cities consists of, and is the national spokesperson for, approximately 15,000 municipal governments in all 50 states and Puerto Rico. Members are represented both directly and through a network of state municipal leagues.

The National League of Cities has always supported providing clean, safe drinking water to the public, and we commend the Environmental Protection Agency for the progress it has made in carrying out Congress' Safe Drinking Water Act mandate. However, we would like to bring to your attention a matter of concern which the National League of Cities raised prior to enactment of the Safe Drinking Water Act four years ago. That issue is who should pay for the costly alterations to locally managed water systems which are aimed at meeting federally mandated standards. Local governments currently cannot meet the expensive federal mandates the safe drinking water regulations require and also meet the many other federal mandates at a time of reduced local resources, "proposition 13"-type initiatives that are sweeping the country, and an already over-stretched local bonding capacity. Local elected officials also are concerned about the unstable, rising cost estimates published by the Environmental Protection Agency and the even higher cost estimates prepared by their own municipal water departments.

This past July, the National League of Cities Environmental Quality Policy Committee met to review the proposed regulations to control organic chemicals in drinking water supplies. Following a lengthy discussion, members of the committee agreed to endorse the necessity to protect the public from the health effects of organic chemicals in drinking water. The Committee agreed there is "a scientifically established probability of danger" that certain concentrated levels of organics found in some drinking water systems could endanger human health. This finding came after an exhaustive review of EPA's findings, as well as other findings, and was a hotly debated issue. However, because of the poor fiscal condition of many cities, the National League of Cities strongly supports some form of federal financial assistance for this federally mandated regulation. Attached is a resolution on this issue passed by the National League of Cities' membership at its 1977 Congress of Cities in San Francisco.

Another deficiency in the regulations the National League of Cities would like to address is the lack of available information on alternative treatment methods for the removal of organic contaminants. While the regulations recommend granular activated carbon treatment, they also allow cities to utilize other methods if they can prove them effective. However, adequate information and research on alternatives is not available and the cost of obtaining the information is prohibitive for individual units of local governments. We believe that this is a proper role the federal government should play -- a role of providing technical assistance and research and development expertise to local governments to enable cities to make a sound decision as to what treatment method is best suited to meet the safe drinking water mandate and protect the public health.

A third critical issue for cities is the proposed 18-month schedule for submitting preliminary designs for a treatment facility and/or obtaining a variance. We have two primary concerns in this area. First, several cities inform us that it is not technically possible to prepare the most cost effective preliminary design for a treatment system in an 18-month time frame. The required program activities, such as water sampling, variance assessment, preparation of pilot testing facilities, operation of the pilot units, determination of design criteria, and detailed system design, would take a minimum of 27 months and possibly as long as three years. In addition, even if a preliminary design could be prepared in 18 months, work would have to begin immediately. The practical impact of this provision is that cities will be forced to expend scarce public funds for design work even before a determination is made on their qualifications to obtain a variance. We recommend extending the 18-month phase to 36 months to allow for preparation of the most cost-effective treatment system.

We appreciate the opportunity to share our views with you on these important regulations. We hope the federal government will proceed in a cost-effective manner to find a cost-effective solution.

National League of Cities

1620 Eye Street, N.W.
Washington, D. C.
20006
(202) 293-7310
Cable: NLCITIES

RESOLUTION #22

FINANCIAL ASSISTANCE FOR SAFE DRINKING WATER MANDATED COSTS

WHEREAS, the central cities in many major metropolitan areas operate water systems that serve millions of people within their own boundaries and in surrounding suburban communities, regional systems controlled by the central cities; and

WHEREAS, many of these central cities have operated and managed their water systems effectively for decades, supplying clean and safe drinking water to all of their customers; and

WHEREAS, the Federal Government has imposed strict standards for safe drinking water, which standards these cities have consistently met and maintained; and

WHEREAS, the Federal Government is increasing its regulation of drinking water systems and system improvements throughout the United States; and

WHEREAS, many cities in this country have provided water system services to their communities and adjacent suburban communities with plants and facilities that are now rapidly maturing and have faced or continue to face similar problems in meeting the increased federal regulatory involvement in safe drinking water management; and

WHEREAS, the Federal Government now supplies 75 percent matching funds for construction of sewer treatment plants;

NOW, THEREFORE, BE IT RESOLVED that the National League of Cities hereby memorializes the United States Congress to:

1) Adopt legislation to provide financial and technological assistance to municipal water systems, particularly to the cities that have owned, developed, operated, and managed safe drinking water systems;

2) Insure that federal regulatory involvement with and assistance to safe drinking water systems does not preclude or restrict continued control by the cities of the regional water systems that they have so effectively managed in the past;

3) Place the improvement and support of safe drinking water systems high on the list of national priorities for the next decade.

Approved by the Membership of the National League of Cities
• Annual Business Meeting • December 7, 1977 • San Francisco

[Whereupon, at 11:55 a.m., the committee was adjourned.]

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