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WATER RESEARCH AND DEVELOPMENT

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HEARING

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

S. 2701

A BILL TO AMEND THE WATER RESOURCES PLANNING ACT (75 STAT. 244, AS AMENDED)

AND

S. 2704

A BILL TO PROMOTE A MORE ADEQUATE AND RESPONSIVE NATIONAL PROGRAM OF WATER RESEARCH AND DEVELOPMENT AND FOR OTHER PURPOSES

AND RELATED BILLS

APRIL 7, 1978

SERIAL NO. 95–H54

Printed for the use of the Committee on Environment and Public Works

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WATER RESEARCH AND TECHNOLOGY

FRIDAY, APRIL 7, 1978

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER RESOURCES,
Washington, D.C.

The subcommittee met at 9:37 a.m., pursuant to call, in room 4200, Dirksen Senate Office Building, Hon. Pete V. Domenici presiding.

Present: Senator Domenici.

Senator DOMENICI. The subcommittee hearing will commence.

First, I want to apologize for the chairman, Senator Gravel. He cannot be here this morning. In his absence he asked me to chair.

Senator McClure also cannot be here, and we will make his opening remarks part of the record.

[Senator McClure's statement follows:]

OPENING STATEMENT OF HON. JAMES A. MCCLURE, U.S. SENATOR FROM THE STATE OF IDAHO

Mr. Chairman, I would like to briefly mention two water resource bills that I have introduced on behalf of water resource interests in the country. The first, S. 2577, revises the Water Resource Council by placing it in the White House and strengthens the authority of the Council over water resource agencies in the government. This bill was drafted by the Interstate Conference on Water Problems and is the product of water resource planning experts throughout the country. While I realize that today's hearings are primarily focused on the Administration's bill to extend the existing Council for one more year, I believe S. 2577 should receive serious consideration by this Committee in the near future as the voice of those people most involved in the States on what the future of the Council should be.

The other measure, S. 2826, amends the Water Resources Research Act of 1974 to provide additional authorization for the water research institutes as well as changing some provisions of the Act to strengthen the institutes and provide varied funds for water research programs. This bill is recommended by the National Association of State Universities and Land-Grant Colleges and supported by Directors of the various state institutes. It differs in application in several ways from the Administration bill and also warrants serious consideration by this Committee as an approach to water research that many institutes and Universities support.

I am pleased to have been able to introduce these bills on behalf of these groups and encourage discussion and attention to the alternatives in federal water programs that they represent.

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator DOMENICI. I am pleased to open today's hearing and to welcome our witnesses.

As we look down the road toward meeting our national needs for usable supplies of water in the decades ahead, this hearing provides

great opportunity. Far too little attention has been given to more effective water utilization through greater water research and saline water conversion.

For those of us in the West, let me give some indication of how critical the situation is. The West comprises one half of the Nation's land mass. We receive only about 14 percent of the rainfall.

Population and agricultural growth are already straining available water resources. Six Western States, including parts of New Mexico, are dependent on a huge underground reservoir called the Ogallala. The Ogallala is projected to begin drying up sometime in the mid-1980's. Thus, parts of the Sunbelt, the most rapidly growing part of the Nation, faces the future on a declining water supply.

In my own State, New Mexico, the State will need some 3 million acre-feet of water in the year 2020 to meet its needs. Present projections indicate that only 2 million acre-feet will be available.

Beneath that State, however, lies 15 billion acre-feet of saline water, 5,000 times the State's projected 2020 needs. It is obvious that even modest improvements in the cost and availability of desalinization could solve that State's problems and the West's water dilemma.

It is against this crisis backdrop of the West's acute water needs that the desalinization program must be viewed.

Last year, as a first step toward renewed emphasis, the Congress enacted Public Law 95–84, the Water Research and Conversion Act of 1977. Section 2 of the 1977 law directed the Secretary of the Interior "to study, design, construct, operate, and maintain desalting plants demonstrating the engineering and economic viability of membrane and phase-change desalting processes at not more than four locations in the United States * * * provided, that at least two such plants shall demonstrate desalting of brackish ground water."

A total of $40 million was authorized for the section 2 program, beginning in fiscal year 1978, with additional sums to be available "as are necessary to defray operations, maintenance, and energy costs for demonstration plants during the periods of Federal responsibility for such activities."

In recent weeks, the administration has sent forward a bill (S. 2704) that would supersede and repeal the 1977 act. It would establish an organic Water Research and Saline Water Conversion Act.

While I applaud this initiative, I do so with reservation. I do not believe we can ignore our 1977 program. So, subsequent to the introduction of S. 2704, I submitted an amendment that would incorporate fully last year's saline water initiative into the new program.

Specifically, the amendment creates a new section 206 in S. 2704, providing specific dollar authorizations for this work in section 402 of the bill. As indicated, this would merely codify the 1977 provision within this new organic act.

I honestly don't believe we can abandon the 1977 saline demonstration effort. And while I laud the proposals introduced by the administration, I believe we must do both, those items contemplated by it, and those contemplated by the 1977 act.

I would also like to include in the record Senate bills S. 2577 and S. 2826 introduced by Senator McClure.

[The bills, S. 2701, S. 2704, S. 2577, and S. 2826 follow:]

95TH CONGRESS
2D SESSION

S. 2701

IN THE SENATE OF THE UNITED STATES

MARCH 9 (legislative day, FEBRUARY 6), 1978

Mr. GRAVEL (for himself and Mr. DOMENICI) (by request) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To amend the Water Resources Planning Act (75 Stat. 244, as amended).

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) section 401 (a) of the Water Resources Planning Act of 1965 (75 Stat. 244, as amended) is hereby amended by deleting the words: "not to exceed $6,000,000 for fiscal year 1978" and inserting in lieu thereof "the sum of $2,886,000 for fiscal year 1979".

(b) Section 401 (b) of the Water Resources Planning Act (75 Stat. 244, as amended) is further amended by deleting the words: "not to exceed $2,000,000 for fiscal

year 1978" and inserting in lieu thereof: "the sum of $3,328,000 for fiscal year 1979".

(c) Section 401 (c) of the Water Resources Planning Act (75 Stat. 244, as amended) is amended by deleting the words "not to exceed the sum of $3,905,000 for fiscal year 1978" and inserting in lieu thereof: "the sum of $1,299,000 for fiscal year 1979".

(d) Section 301 (a) of the Water Resources Planning Act (75 Stat. 244, as amended) is amended by deleting the words: "for fiscal years 1977 and 1978, $5,000,000 in each such year" and inserting in lieu thereof $3,000,000 for fiscal year 1979".

SEC. 2. Appropriations authorized by this Act for salary, pay, retirement or other benefits for Federal employees may be increased by such additional or supplemental amounts as may be necessary for increases authorized by law.

95TH CONGRESS
2D SESSION

S. 2704

IN THE SENATE OF THE UNITED STATES

MARCH 9 (legislative day, FEBRUARY 6), 1978

Mr. GRAVEL (for himself and Mr. DOMENICI) (by request) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To promote a more adequate and responsive national program of water research and development, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. This Act may be cited as the "Water Research and Development Act of 1978".

FINDINGS

SEC. 2. The Congress finds and declares that—

(a) providing for the protection of the Nation's water resources, assuring an adequate supply of water of good quality for the production of food, materials, and energy for the Nation's needs, and increasing the effi-

cient use of the Nation's water resources are essential to national economic stability and growth, and to the well-being of our people;

(b) the Nation's capabilities for technological assessment and planning and for policy formulation for water resources must be strengthened at both the Federal and State levels;

(c) there should be a continuing national investment in water-related research and technology which is commensurate with growing national needs; and

(d) the manpower pool of scientists, engineers, and technicians trained in fields related to water resources constitutes an invaluable natural resource which should be increased, fully utilized, and regularly replenished.

STATEMENT OF PURPOSE

SEC. 3. It is the purpose of this Act to assist the Nation and the States through water resources science and technology—

(a) to provide a supply of water sufficient in quantity and quality to meet the Nation's expanding needs for the production of food, materials, and energy;

(b) to preserve and enhance our water resources and the water related environment;

(c) to promote conservation and efficient use of the Nation's water resources;

(d) to promote research and development, demonstration, and technology transfer dealing with both quality and quantity of water resources;

(e) to identify and find practical solutions to the Nation's water and water resources related problems;

(f) to promote the training of scientists, engineers, and other skilled personnel in the fields related to water resources;

(g) to foster and supplement present programs for the conduct of research, technology development and transfer, and innovative water resources management, conservation, and operating practices;

(h) to provide for research, development, technology demonstration and transfer with respect to converting saline and other impaired waters to waters suitable for municipal, agricultural, industrial, recreational, or other beneficial uses;

(i) to disseminate information through the maintenance of a water resources scientific information center with adequate information bases so that the Nation's water research community, by utilizing the center, can be fully informed of on-going research, completed research, and other types of information necessary for them to effectively conduct their work;

(j) to better coordinate the Nation's water resources and development programs; and

(k) to enhance the capacity of the Federal water establishment, and of water interests nationwide, for recommending to the President and the Congress changes in national water resources research and technology policy as appropriate.

TITLE I—WATER RESOURCES RESEARCH AND DEVELOPMENT

SEC. 101. (a) The Secretary of the Interior (hereinafter in this Act referred to as the "Secretary") is hereby authorized and directed to assist in carrying on the work of a competent and qualified water resources research and technology institute, center, or equivalent agency (hereinafter referred to as "institute") at one college or university in each State, which college or university shall be a college or university established in accordance with the Act approved July 2, 1862 (12 Stat. 503, 7 U.S.C. 301ff), entitled "An Act donating public lands to the several States and territories which may provide colleges for the benefit of agriculture and the mechanic arts" or some other institution designated by Act of the legislature of the State concerned: *Provided*, That: (1) if there is more than one such college or university in a State established in accordance with said Act of July 2, 1962, funds under this section shall, in the

absence of a designation to the contrary by act of the legislature of the State, be paid to the one such college or university designated by the Governor of the State to receive the same, subject to the Secretary's determination that such college or university has, or may reasonably be expected to have, the capability of doing effective work under this title; (2) two or more States may cooperate in the designation of a single institute or regional institute, in which event the sums assignable to all of the cooperating States shall be paid to such institute; (3) a designated college or university may arrange with other colleges and universities within the State to participate in the work of the institute.

(b) (1) It shall be the duty of each such institute to plan and conduct and/or arrange for a component or components of the college or university with which it is affiliated or other colleges or universities within the State, to conduct competent research and development including investigations and experiments of either a basic or practical nature, or both, in relation to water resources, to promote dissemination and application of the results of these efforts, and to provide for the training of scientists and engineers through such research, investigations, and experiments;

(2) The research, investigations, experiments, and training may include, without being limited to, aspects of the hydrologic cycle; supply and demand for water; saline

water conversion; conservation and best use of available supplies of water and methods of increasing such supplies; water reuse; and economic, legal, social, engineering, recreational, biological, geographic, ecological, and other aspects of water problems; scientific information dissemination activities, including identifying, assembling, and interpreting the results of scientific and engineering research on water resource problems; and providing means for improved communication of research results, having due regard for the varying conditions and needs of the respective States, for water research and development projects now being conducted by agencies of the Federal and State Governments, and for the need to avoid undue displacement of scientists and engineers elsewhere engaged in water resources research and development;

(3) The annual program submitted by the State institutes to the Secretary for approval shall include assurances, satisfactory to the Secretary, that such programs were developed in close consultation and collaboration with leading water resources officials within the State to promote research, training, and other work meeting the needs of the State. Additionally, it shall be the duty of each State institute to provide the Secretary with periodic information, at the Secretary's discretion, on water resources research and development activities, needs, and priorities within the State

which shall be coordinated with State, local, regional and river basin entities, and to cooperate with the Secretary in preparing periodic reports of ongoing research within the State and its funding by both Federal and non-Federal organizations. Institutes are required to see that notices of research projects are submitted to the Center referred to under title III, section 302;

(4) The designated State institutes shall cooperate with the Secretary in the development of five-year water resources research and development goals and objectives; and

(5) The designated institutes will receive and review all research and development proposals from the academic community for technical merit and relevance to priorities and forward all such proposals to the Secretary for consideration and funding.

(c) There is further hereby authorized a program of technology transfer to be carried out by the State institutes. Such funds, as are appropriated for this purpose, shall be made available on a competitive basis to the State institutes, based on the merit of project or program proposals submitted to the Secretary, for the purpose of transferring research and development results to other organizations for further development, demonstration, and practical application.

SEC. 102. Funds appropriated pursuant to this title, in

addition to being available for expenses for research and development experiments, and training conducted under authority of this title, shall also be available for printing and publishing the results thereof in the furtherance of technology transfer and for planning and direction. The institutes are hereby authorized and encouraged to plan and conduct programs financed under this title in cooperation with each other and with such other agencies and individuals as may contribute to the solution of the water problems involved, and funds appropriated pursuant to this title shall be available for paying the necessary expenses of planning, coordinating, and conducting such cooperative research.

SEC. 103. The Secretary is hereby charged with the responsibility for the proper administration of this title and, after full consultation with other interested Federal agencies, may prescribe such procedures, rules, and policies as may be necessary to carry out its provisions. He shall require a showing that institutes designated to receive funds have, or may reasonably be expected to have, the capability of doing effective work. He shall furnish such advice and assistance as will best promote the purposes of this title, participate in coordinating research initiated by the institutes under this title, indicate to them such lines of inquiry as to him seem most important, and assist the establishment and maintenance of cooperation among the institutes, other research organiza-

tions, the United States Department of the Interior, and other Federal establishments.

(b) The Secretary shall develop a five-year water resources research program in cooperation with the institutes and appropriate water entities, indicating goals, objectives, priorities, and funding requirements.

(c) The Secretary shall annually ascertain that the requirements of subsection 101 (b) have been met as to each institute, whether it is entitled to receive its share of the annual appropriations for water resources research and development under section 401 (a) of the Act and the amount which it is entitled to receive.

SEC. 104. Nothing in this title shall be construed to impair or modify the legal relation existing between any of the colleges or universities under whose direction an institute is established and the government of the State in which it is located, and nothing in this title shall in any way be construed to authorize Federal control or direction of education at any college or university.

SEC. 105. The Secretary is authorized to make grants to, and finance contracts and matching or other agreements with qualified educational institutions; private foundations or other institutions; and with private firms and individuals whose training, experience, and qualifications are adequate

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in his judgment for the conduct of water research and development projects; and with local, State, and Federal Government agencies to undertake research and development concerning any aspect of water-related problems which he may deem desirable in the national interest.

SEC. 106. Water resources research and development programs carried out in accordance with this title may include, without being limited to: water use conservation and efficiencies; water and related planning; saline water conversion; water reuse; management and operations; legal systems; protection and enhancement of the water-based environment; institutional arrangements; salinity management; and economic, social, and environmental impact assessment. Due consideration shall be given to priority problems identified by water and related land resources planning, data acquisition and like studies conducted by other agencies and organizations.

SEC. 107. As used in this title, the term "State" includes the Commonwealth of Puerto Rico, the District of Columbia, and the territories of the Virgin Islands and Guam.

SEC. 108. Contracts or other arrangements for water resources work authorized under this title with an institute, educational institution, or nonprofit organization may be undertaken without regard to the provisions of section 3648 of the Revised Statutes (31 U.S.C. 529) when, in the judg-

ment of the Secretary, advance payments of initial expenses are necessary to facilitate such work.

SEC. 109. (a) The Secretary is authorized to study, design, implement, operate, and maintain water resources programs and activities demonstrating the technical and economic viability of processes, systems, or techniques for the purpose of improving the water or water-related environment and to demonstrate the application of water resources research and development results and technology for beneficial purposes.

(b) (1) Funds appropriated pursuant to the authority provided by sections 401 (c) and 403 for use under this section may not be expended until thirty calendar days (including days on which either the House of Representatives or the Senate are not in session because of an adjournment of more than three calendar days to a day certain) have elapsed following transmittal of a report to the chairman of the Committee on Interior and Insular Affairs of the House of Representatives and the chairman of the Committee on Environment and Public Works of the United States Senate.

(2) Such report shall present information that includes, but is not limited to, the location of the demonstration activities, the characteristics of the water and water-related problem, the processes or concepts to be demonstrated, the estimated initial investment cost of the demonstration, the

estimated annual operating cost of the demonstration, the source of energy for the demonstration and its cost, environmental consequences of the demonstration; and the estimated costs associated with the demonstration considering the amortization of all components of the demonstration.

(3) Such report shall also be accompanied by a proposed contract or agreement between the Secretary and a duly authorized Federal or non-Federal public or private entity, in which such entity shall agree to share cost to the extent deemed important to the purposes of the activity as determined by the Secretary. Such proposed contract or agreement may provide that either the contractual entity or the United States will develop the activity described in the report and that the United States will either operate and maintain the activity or may participate in the operation and maintenance during which, in either case, access to the activity and its operating data will not be denied to the Secretary or his representatives.

(4) The Secretary is authorized to include in the proposed contract or agreement a provision for conveying all rights, title, and interests of the Federal Government to the Federal or non-Federal, public or private entity, subject to a future right to reenter the activity for the purpose of financing at Federal expense modifications for advanced technology and for its operation and maintenance for a successive

term under the same conditions as pertain to the original term.

TITLE II—WATER RESEARCH AND DEVELOPMENT FOR SALINE AND OTHER IMPAIRED WATERS

SEC. 200. Consistent with the Federal responsibility for water resources development and conservation by means of comprehensive planning, water resources development projects, protection of water quality standards, and other measures for the beneficial use of water from various sources, the Congress finds it necessary to provide for the development of technology for the conversion of saline and other impaired waters for beneficial uses. It is the policy therefore to assist and encourage the development of practical means to utilize saline water technology to convert impaired waters of any type from any source to a quality suitable for municipal, industrial, agricultural, and other beneficial uses to transfer research and development results.

SEC. 201. The Secretary is authorized and directed to—

(a) conduct, encourage, and promote basic scientific research and fundamental studies to develop effective and economical processes and equipment for the purpose of converting impaired water into water suitable for beneficial uses;

(b) pursue the findings of research and studies

authorized by this title having potential practical applications, including application to matters other than water conversion, and to other supply sources such as brackish waters, staged development, and use with energy sources;

(c) conduct engineering and technical work including the design, construction, and testing of various processes, systems, and pilot plants to develop saline water conversion processes to the point of demonstration;

(d) study methods for the recovery, beneficial uses and disposal of residuals, and marketing of byproducts resulting from the improvement of conversion of impaired water in an environmentally acceptable manner;

(e) undertake economic studies and surveys to determine present and prospective costs of producing water for beneficial purposes in various parts of the United States by saline water conversion processes and, by means of models or other methodologies, prepare and maintain information concerning the relation of such conversion processes and systems to other aspects of State, regional, and national comprehensive water resources planning.

SEC. 202. (a) The Secretary is authorized to conduct preliminary investigations and explore potential cooperative agreements with non-Federal utilities and governmental en-

tities in order to develop recommendations for Federal participation in the design, construction, operation, and maintenance of demonstration and prototype plants utilizing advanced saline water technologies for the production of water for beneficial use.

(b) In carrying out the provisions of this section, the Secretary shall utilize the expertise of the water and power marketing agencies of the Department of the Interior or of other Federal agencies to insure that the recommended project and the supporting agreements are fully integrated and compatible with the water and power systems of the region.

(c) The Secretary is authorized to accept financial and other assistance from any State or public agency in connection with studies or surveys relating to impaired water and facilities and to enter into contract with respect to such assistance.

SEC. 203. The Secretary may issue rules and regulations to effectuate the purposes of this title.

SEC. 204. As used in this title—

(a) the term "saline and other impaired water" includes but is not limited to seawater, brackish water, mineralized ground or surface water, irrigation return flows, and other similarly contaminated waters;

(b) the term "United States" extends to and includes the District of Columbia, the Commonwealth of

Puerto Rico, American Samoa, Guam, the Virgin Islands, and other locations under the jurisdiction of the United States;

(c) the term "pilot plant" means an experimental unit of sufficient size used to evaluate and develop new or improved processes or systems and to obtain technical and engineering data;

(d) the term "demonstration" means a plant of sufficient capacity and reliability to demonstrate on a day-to-day operating basis that the process or system is feasible and that such process or system has potential for applications to water system improvement;

(e) the term "prototype" means a full-size, first-of-a-kind production plant used for the development and study of full-sized technology, energy, and process economics.

SEC. 205. (a) The Secretary is authorized to study, design, construct, operate, and maintain water resources projects demonstrating the feasibility of utilizing saline water conversion processes or systems for the purpose of processing saline or other impaired water to a quality suitable for municipal, industrial, agricultural, and other beneficial uses, and to demonstrate research and technology for other beneficial purposes.

(b) (1) Funds appropriated pursuant to the authority

provided by section 402 (a) (3) of this Act for use under this section may not be expended until thirty calendar days (excluding days on which either the House of Representatives or the Senate is not in session because of an adjournment of more than three calendar days to a day certain) have elapsed following transmittal of a report to the chairman of the Committee on Interior and Insular Affairs of the House of Representatives and the chairman of the Committee on Environment and Public Works of the United States Senate.

(2) Such report shall present information that includes, but is not limited to, the location of the demonstration project, the characteristics of the water to be processed, the process or processes to be utilized, the water supply problems confronting the area in which the project will be located, alternative sources of water and their probable costs, the characteristics of the project, the estimated initial investment cost of the demonstration project, the estimated annual operating cost of the demonstration project, the source of energy for the project and its cost, environmental consequences, and the estimated unit cost of water, or other costs associated with the demonstration project considering the amortization of all components of the demonstration project.

(3) Such report shall also be accompanied by a proposed contract or agreement between the Secretary and a

duly authorized Federal or non-Federal public or private entity, in which such entity shall agree to share cost to the extent deemed important to the purposes of the project as determined by the Secretary. Such proposed contract may provide that either the contractual entity or the United States will construct the project described in the report and that the United States will either operate and maintain the project or may participate in the operation and maintenance during which, in either case, access to the project and its operating data will not be denied to the Secretary or his representatives.

(4) The Secretary is authorized to include in the proposed contract a provision for conveying all rights, title, and interest of the Federal Government to the Federal or non-Federal, public or private entity, subject only to a future right to reenter the facility for the purpose of financing at Federal expense modifications for advanced technology and its operation and maintenance for a successive term under the same conditions as pertain to the original term.

TITLE III—TECHNOLOGY TRANSFER AND INFORMATION DISSEMINATION

SEC. 300. The Secretary is authorized to conduct a research assessment and technology transfer program which transfers research and development results to other organi-

tical application to water and water-related problems. The Secretary may enter into agreements with the State and local governments and with other public and private organizations and individuals, including cost-sharing or cost-participation agreements, for the transfer or application of research results for the solution of water-related problems and to further the transfer developed by programs authorized under this Act. The Secretary may issue publications and may conduct seminars, conferences, training sessions, or use other such techniques he deems necessary to expedite the transfer of research results and technology development. The technology transfer activities will be coordinated with activities undertaken under titles I and II of this Act.

SEC. 301. The Secretary is further authorized to maintain a national center for the acquisition, processing, and dissemination of information dealing with all areas of water resources research, technology development, and demonstration. Each Federal agency engaged in water resources including research, technology development, and demonstration, shall cooperate by providing the center with documents and other pertinent information. The center shall (a) maintain for general use a collection of water resources information provided by Federal and non-Federal government agencies, colleges, universities, private institutions, and individuals; (b) issue publications or utilize other media to disseminate

research, technology development, and demonstration information for the purposes of this Act and enter into agreements with public or private organizations or individuals to stimulate acquisition and dissemination of information, thus contributing to a comprehensive, nationwide program of research and development in water resources and the avoidance of unnecessary duplication of effort; (c) make generally available abstracts and other summary type information concerning water resources activities including research accomplished and in progress by all Federal agencies and by non-Federal agencies, private institutions, and individuals, to the extent such information can be obtained, and reports completed on research projects funded under provisions of this Act; and (d) in carrying out the information dissemination activities authorized by this section, the Secretary shall to the extent feasible use the resources and facilities of other agencies and of the clearinghouse for scientific, technical, and engineering information established in the Department of Commerce pursuant to sections 1151 through 1157 of title 15, United States Code.

SEC. 302. There shall be established, in such agency and location as the President determines to be desirable, a center for cataloging current scientific research in all fields of water resources. Each Federal agency doing water resources research shall cooperate by providing the cataloging center

with information on work underway. The cataloging center shall classify and maintain for general use a file of water resources research and investigation projects in progress or scheduled by all Federal agencies and by such non-Federal agencies of government, colleges, universities, private institutions, firms, and individuals as voluntarily may make such information available.

TITLE IV—GENERAL PROVISIONS

SEC. 400. (a) As used in this Act, the term "Secretary" means the Secretary of the Interior.

(b) In carrying out his functions under this Act, the Secretary may—

(1) make grants to educational institutions and scientific organizations, and enter into contracts with institutions and organizations and with industrial or engineering firms;

(2) acquire the services of chemists, physicists, engineers, and other personnel by contract or otherwise;

(3) utilize the facilities of Federal scientific laboratories;

(4) establish and operate necessary facilities and test sites to carry on the continuous research, testing, development, and programing necessary to effectuate the purposes of this title;

(5) acquire processes, technical data, inventions,

patent applications, patents, licenses, land and interests in land (including water rights), plants and facilities, and other property or rights by purchase, license, lease, or donation pursuant to the Federal Property and Administrative Service Act (40 U.S.C. 471) as amended, where applicable;

(6) assemble and maintain pertinent and current scientific literature, publications, patents, licenses, land and interests in land (including water rights thereto);

(7) cause onsite inspections to be made of promising projects, domestic and foreign, and in the case of projects located in the United States, cooperate and participate in their development when the purposes of this title will be served thereby;

(8) foster and participate in regional, national, and international conferences relating to water resources;

(9) accept financial and other assistance from any local, State, Federal, or other agency or entity in connection with studies or surveys relating to water problems and facilities, and enter into contracts with regard to such assistance;

(10) coordinate, correlate, and publish information with a view to advancing the development of practicable water conversion projects; and

(11) cooperate with other Federal departments and

agencies, with State and local departments, agencies, and instrumentalities, and with interested persons, firms, institutions, and organizations.

SEC. 401. (a) (1) There are hereby authorized to be appropriated for the purposes of implementing section 101 (a) of this Act such sums annually as are sufficient to provide an amount not to exceed $110,000 to each participating institute, on a cost-sharing basis, for the fiscal year ending September 30, 1979, and such sums as are necessary for the fiscal year ending September 30, 1980;

(2) There is further authorized to be appropriated an amount not to exceed $750,000 on a cost-sharing basis for the purpose of implementing section 101 (c) of this Act for the fiscal year ending September 30, 1979, and such sums as are necessary for the fiscal year ending September 30, 1980, all such sums to remain available until expended;

(3) Cost sharing under sections 101 (a) and 101 (c) shall be on the basis of two Federal shares to not less than one non-Federal share. Federal funds made available under this section shall not be used for support of indirect costs as defined by current Federal regulations; however, such indirect costs may be credited as a non-Federal contribution to the total cost of activities to be carried out pursuant to the Federal grant or contract.

(b) There is authorized to be appropriated for carrying out the purposes of section 105 of this Act for the fiscal year ending September 30, 1979, the sum of $4,000,000, and such sums as are necessary for fiscal year 1980, to remain available until expended, to match, on a dollar-for-dollar basis, funds made available by non-Federal sources to meet the necessary expenses of specific water resources research and development projects which could not otherwise be undertaken. Federal funds provided under this subsection shall be available on a competitive basis and shall be available to any organization or individual.

(c) There is authorized to be appropriated for purposes of carrying out the research, development, and demonstration activities authorized by sections 105 and 109 of this Act for the fiscal year ending September 30, 1979, the sum of $3,200,000, and such sums as are necessary for fiscal year 1980, available until expended, which shall be available on a competitive basis to any organization or individual to finance grants, contracts, matching grants, or other arrangements which equal 100 per centum or any lesser per centum, of the total cost of the projects involved.

SEC. 402 (a). There is authorized to be appropriated to carry out the provision of title II of this Act for the fiscal year ending September 30, 1979, the sum of $8,800,000, and such sums as are necessary for fiscal year 1980, to

remain available until expended. The categories for which such funds are authorized are as follows:

(1) research,

(2) development, and

(3) demonstration.

The funds appropriated pursuant to such authorization shall be distributed to the foregoing categories as determined by prevailing budgetary priorities.

(b) Not more than 5 per centum of the funds to be made available in any fiscal year for research under the authority of this title may be expended for foreign activities subject to the approval of the Secretary of State to assure that such activities are consistent with the foreign policy objectives of the United States, in cooperation with public or private agencies in foreign countries for research useful to the programs in the United States.

SEC. 403. There are authorized to be appropriated the sum of $4,464,000 for the fiscal year ending September 30, 1979, and such sums as are necessary for fiscal year ending September 30, 1980, to carry out the sections of title I, II, III, and IV of this Act other than those for which special specific authorizations are made.

SEC. 404. Each application for a grant, pursuant to this Act, shall, among other things, state the nature of the project to be undertaken, the period during which it will be pursued,

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the water problem it addresses, the qualifications of the personnel who will direct and conduct it, the importance of the project to the water-related economy of the Nation, the need for and expected utilization of the results, the region and the State concerned, its relation to other known research projects previously conducted or currently being pursued, the procedures by which the results can be disseminated, and the extent to which it will provide opportunities for the training of water resources scientists and engineers. No grant shall be made except for projects approved by the Secretary and all grants shall be made upon the basis of the merit of the project, the need for the knowledge it is expected to produce when completed, and the opportunities it provides for the training of water resources scientists and engineers.

SEC. 405. (a) Sums appropriated pursuant to this Act may be paid at such times and in such amounts during each fiscal year as determined by the Secretary and upon vouchers approved by him. Except as may be otherwise specified by this Act, funds received pursuant to such payment may be used for any allowable costs within the meaning of the Federal procurement regulations that establish principles for determining costs applicable to research and development under grants and contracts with educational institutions.

(b) Each State institute operating pursuant to title I of this Act shall have an officer appointed by its governing

authority who shall receive and account for all funds paid to the institute under the provisions of this Act and who shall provide to the Secretary an annual statement of the amounts received under any of the provisions of this Act during the preceding fiscal year, and of its disbursement. If any of the moneys received by the authorized receiving officer of any State institute under the provisions of this Act shall, by any action or contingency, be found by the Secretary to have been improperly diminished, lost, or misapplied, it shall be replaced and until so replaced no subsequent disbursement of Federal funds shall be made to any institute of such State.

SEC. 406. (a) The Secretary shall cooperate fully with, and shall obtain the continuing advice and cooperation of, all agencies of the Federal Government concerned with water problems, State and local governments, and private institutions and individuals, to assure that the programs conducted under this Act will supplement and not duplicate other water research and technology programs, will stimulate research and development in neglected areas, and will provide a comprehensive, nationwide program of water resources research and development. In order to further these purposes, as well as to assure research undertaken by the Secretary on wastewater treatment and treatment of water for potable use is most responsive to needs in implementing the Federal

Water Pollution Control Act, as amended (Public Law 92–500), and the Safe Drinking Water Act, as amended (Public Law 93–523), the Secretary will consult with the Administrator of the Environmental Protection Agency in developing and implementing programs in these areas. The Secretary will encourage utilization of the center referred to in title II, section 302, for cataloging current research projects in order to assure that programs conducted under this Act will supplement and not duplicate other research and technology programs and will encourage other Federal agencies to do likewise.

(b) The President shall, by such means as he deems appropriate, clarify agency responsibilties for Federal water resources research and development and provide for interagency coordination of such research, including the research authorized by this Act. Such coordination shall include (1) continuing review of the adequacy of the Government-wide program in water resources research and development and identification of technical needs in various water resources research categories, (2) identification and elimination of duplication and overlaps between two or more programs, (3) recommendations with respect to allocation of technical effort among the Federal agencies, (4) review of technical manpower needs and findings concerning the technical man-

power base of the program, (5) recommendations concerning management policies to improve the quality of the Government-wide research effort, and (6) actions to facilitate interagency communication at management levels.

SEC. 407. (a) Property acquired by the Secretary under this Act for use in futherance of the purposes of this Act may be conveyed to a cooperating institute, educational institution, or nonprofit organization in accordance with the Federal Property and Administrative Services Act of 1949, as amended.

(b) The Secretary may dispose of water and byproducts resulting from his operations under this Act. All moneys received from dispositions under this Act shall be paid into the Treasury as miscellaneous receipts except where such operations may be undertaken as a part of a Federal reclamation project in which case the financial provisions of the reclamation laws (32 Stat. 388 and Acts amendatory thereof and supplementary thereto) shall govern.

SEC. 408. With respect to patent policy and to the definition of title to, and licensing of inventions made or conceived in the course of, or under any contract or grant pursuant to this Act, and notwithstanding any other provision of law, the Secretary shall be governed by the provisions of sections 9 and 10 of the Federal Nonnuclear Energy,

Research and Development Act of 1974 (Public Law 93-577; 88 Stat. 1887, 1891; 42 U.S.C. 5908, 5909): *Provided, however,* That subsections (l) and (n) of section 9 of such Act shall not apply to this Act.

SEC. 409. The institutes shall submit a summary report to the Secretary on or before January 31 or each year which highlights research and development work accomplished during the preceding fiscal year, the status of projects underway, and recommended future projects. This report is in addition to such other reports as may be required by sections 101(b) and 405(b) of this Act. The Secretary shall submit a summary report to the President and the Congress on or before April 1 of each year which summarizes program activities of the preceding fiscal year and projects for the future.

SEC. 410. (a) The Water Resources Research Act of 1964 (Public Law 88-379, 78 Stat. 329; 42 U.S.C. 1961 et seq.), as amended, the Saline Water Conversion Act of 1971 (Public Law 92-60, 85 Stat. 159; 42 U.S.C. 1959 et seq.), as amended, and the Water Research and Conversion Act of 1977 (Public Law 95-84) are hereby repealed.

(b) Nothing elsewhere in this Act is intended to repeal, supersede, or diminish existing authorities or responsibilities

of any agency of the Federal Government concerning water resources.

(c) Nothing in this Act shall be construed to alter existing law with respect to the ownership and control of water.

95TH CONGRESS
2D SESSION

S. 2577

IN THE SENATE OF THE UNITED STATES

FEBRUARY 23 (legislative day, FEBRUARY 6), 1978

Mr. MCCLURE introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To provide for the conservation, development, and use of the Nation's natural resources through the coordinated management of water and related land resources, through the establishment of an Office of Water Resources in the Office of the President, by providing financial assistance for State water management, and by providing for creation of interstate coordinating commissions.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. That this Act may be cited as the "Comprehensive Water Management Act".

INTRODUCTION AND POLICY

SEC. 2. In order to meet the Nation's water quantity and water quality requirements, it is hereby declared to be the policy of the Congress to:

(a) Encourage the conservation, protection, development, and utilization of water and related land resources of the United States through comprehensive and coordinated management by the Federal Government, States, local governments, and private individuals.

(b) Promote effective coordination of water resources at the Federal level which is essential to meaningful national water management.

(c) Assist the States in increasing their capabilities for managing their respective water and related land resources.

(d) Provide, at the Federal level, for the management which is beyond the financial and technical capabilities of the States, local governments, and private enterprise.

Title I of this Act provides a mechanism for coordinating water management at the State and Federal levels. It provides for an Office of Water Resources, in the Executive Office of the President, and establishes advisory councils for interaction by Federal and State water officials.

Title II of this Act provides a system under which State water management programs would be defined and accomplished by the States, based on State priorities and options, related to defined national objectives and interests and with Federal cooperation and assistance through Federal actions which are consistent with State programs and defined national objectives and national interests.

Comprehensive water management programs provided for under title II of this Act are intended to consider both intrastate and interstate water management. There is a need, however, to assure adequate means for interaction among States and, where the national interest is involved, among States and the Federal Government on matters of international, interstate, regional, and national concern.

Each State, in developing its water management program under title II must provide details to the Office of Water Resources on the particular mechanism and/or process under which it will coordinate and cooperate with other States, regions, and the Federal Government.

Each State must provide information to the Office, the President, and Congress, on the particular institutional arrangement under which Federal/State cooperation will be afforded in coordinating interstate water matters.

Each State must be given its option as to the particular institutional arrangement it desires to address interstate water matters.

Some States may wish to enter into a State-Federal partnership to provide for program coordination; problem identification; a system for resolving conflicts between States or between States and the Federal Government; and such other programs or actions as may be mutually agreed upon by parties involved.

Title III of this Act provides for establishment of interstate water coordination commissions for those States who wish to utilize this means of providing interstate coordination.

EFFECT ON EXISTING LAWS

SEC. 3. Nothing in this Act shall be construed—

(a) to expand or diminsh existing Federal or State jurisdiction or responsibility in water rights; or to displace, supersede, limit, or modify any interstate compact or the jurisdiction or responsibility of any legally established joint or common agency of two or more States, or of two or more States and the Federal Government; or to limit the authority of Congress to authorize and fund projects;

(b) to change or otherwise affect the authority or responsibility of any Federal official in the discharge of the duties of his office unless such actions are inconsistent with the provisions of this Act; and

(c) to supersede, modify, or repeal existing laws applicable to the various Federal agencies which are authorized to develop or participate in the development of water and related land resources or to exercise licensing or regulatory functions in relation thereto, unless such laws, licensing, or regulatory functions are inconsistent with the provisions of this Act; or to affect the jurisdiction, powers, or prerogatives of the International

Joint Commission, United States and Canada, the Permanent Engineering Board and the United States operating entity or entities established pursuant to the Columbia River Basin Treaty, or the International Boundary and Water Commission, United States and Mexico.

DEFINITION

SEC. 4. Comprehensive water management shall include, but not be limited to, planning, data collection, research, development, regulation, and coordination of water and related land resources of the United States, including water quantity and water quality.

TITLE I—OFFICE OF WATER RESOURCES

SEC. 101. (a) There is established in the Executive Office of the President an Office of Water Resources (hereinafter referred to as the "Office").

(b) The Office shall be composed of—

(1) A Director who—

(i) shall be appointed by the President, by and with the advice and consent of the Senate, who shall be compensated at the rate provided for level IV of the Executive Schedule in section 5313 of title 5, United States Code, and who shall not as Director of the Office hold any other position as an officer or employee of the United States;

(ii) shall be a person who, because of training, experience, and attainments in the water resources field, is exceptionally well qualified to analyze and interpret trends in water resources and related land resources needs; to appraise programs and activities of the Federal Government in light of the policy set forth in this Act; to formulate and recommend national policies to promote the orderly conservation, development, and utilization of water and related land resources; and serve as the water resources advisor to the President.

(2) a Deputy Director, appointed by the Director with the recommendations of the State advisory council, compensated at the rate prescribed for grade GS–18 under section 5322 of title 5, United States Code, to serve as the Administrator of Grant Programs under title II of this Act. The Deputy Director shall be a person who, because of training, experience, and attainments in State water management is exceptionally well qualified to work with States in accomplishment of Federally assisted State water management programs.

(3) Such other staff as is required for the performance of the Office.

SEC. 102. The Director shall—

(a) Appraise the adequacy of existing and proposed policies and programs to meet requirements of the Act; after consultation with the public, States, and Federal agencies, make recommendations to the President with respect to Federal policies, programs, and projects affecting water and related land resources; and, when authorized by the President, consult with Federal agencies, States, and the public in the development and recommendation of guidelines and procedures for water management programs for Presidential and congressional consideration.

(b) Assist and advise the President in the preparation of the water resources report required by section 105 of this Act;

(c) Transmit to the President for his review and transmittal to the Congress such reports on priorities as are submitted by each State whenever such priority reports involve apparent conflicts with defined national interest or when States specifically request such transmittal to emphasize State needs and concerns.

(d) Review and appraise the significant water and related land resources programs and activities of the Federal Government in the light of the policy set forth in this Act including their relationship to State programs and priorities, and areas of inconsistency or conflict between agency

actions, defined national interest, and the State management program, and make recommendations to the President with respect thereto:

(i) advise the President on water resources management, including planning, research, data collection, and development with regard to Federal funding and in cooperation with the Office of Management and Budget, provide the President with an annual review and analysis of funding proposed for water resources management in the budgets of all Federal agencies, and their relationship to State priorities and the national interest;

(ii) determine the applicability and consistency of Federal programs in basic data collection, research, and development between Federal agencies and between Federal actions and State water management priorities and programs;

(iii) provide the necessary staff and other support required for efficient and effective functioning of the two advisory councils;

(iv) coordinate the input to Federal policy from the two advisory councils; and

(v) facilitate the reconciliation of differing views expressed by the Federal and State water advisory councils.

(e) Where Congress has not specifically defined the

national interest in a water matter including, but not limited to, planning, development, and conservation, establish procedures for defining the national interest through actions of the Office and the advisory councils including conduct of appropriate public hearings.

(f) Coordinate research related programs with the Director of the Office of Water Research and Technology to assure that Federal research activities address State water management concerns and encourage the advancement of scientific knowledge relating to water and insure the transfer of technology to potential users as required by section 201 of the Water Resources Research Act of 1964, as amended.

(g) Determine the Institutional arrangements preferred by each State for affording interstate water management coordination and provide the States with the opportunity for the establishment of regional or interstate coordinating entities as provided in section 301(a) of this Act, if they wish to select this means to provide Federal-State cooperation in matters involving interstate water resources management.

(h) Coordinate activities of the office with other appropriate Federal, State, and interstate agencies and schedule and act as Chairman of at least four meetings annually of each of the Federal Water Advisory Council and the State water advisory council created in section 103 of this Act.

(i) Establish a Project Review and Coordinating Committee in cooperation with the Federal and State advisory councils to review projects authorized but unfunded and to monitor compliance with laws, regulations, and defined national interests and to determine the impact of projects on Federal, State, and local programs and objectives.

SEC. 103. (a) There shall be created under the Office of Water Resources—

(1) a Federal Water Advisory Council, and

(2) a State water advisory council.

(b) The Federal Water Advisory Council (hereinafter referred to as the "Federal Council") shall consist of—

(1) one member from each of the following departments, who shall, at the time of appointment, be an assistant secretary over bureaus, divisions, services, or other primary subcabinet units which administer the primary water and related functions of the department, or an equivalent policy representative in the Office of the Secretary or Undersecretary. Such member shall be appointed by the head of such department, and serve as the representative of such department with full authority to commit the department to decided actions:

(i) Department of the Interior;

(ii) Department of Agriculture;

(iii) Department of the Army;

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(iv) Department of Commerce;

(v) Department of Housing and Urban Development;

(vi) Department of Transportation; and

(vii) Department of Energy;

(2) an Assistant Administrator of the Environmental Protection Agency designated by the Administrator;

(3) a member of the Council on Environmental Quality designated by the Chairman; and

(4) those members (if any) appointed pursuant to the provisions of paragraph (c) of this subsection.

(c) Whenever the President determines that any program or other action under consideration by the Federal Council directly affects—

(1) Any other department or agency of the United States, the President shall designate such department or agency as being one which is entitled to representation on the Federal Council during the period (as determined by the President) for which such program is in effect or such action is under consideration, and the head of such department or agency shall, at the earliest practicable date after such department or agency is so designated, appoint an Assistant Secretary, or equivalent who has policy responsibilities involving water resources, as

a member of the Federal Council to represent such department or agency.

(d) The Federal Council shall—

(1) assist and advise the Director in carrying out the duties specified under section 102 of this Act;

(2) review the responsibilities of their respective agencies as relates to water and related land resources and submit recommendations to the Director on conflicts or problem areas which may impact on existing legislation or require consideration of new legislation to enable the agency to more appropriately carry out its assigned responsibilities consistent with this Act;

(3) bring to the attention of the Director any conflicts in the manner in which Federal agencies are administering legislation related to water and related land resources so that a uniform Federal implementation procedure may be developed;

(4) review permit procedures of Federal water resource agencies and make recommendations to simplify such procedures;

(5) continuously review instructions issued by Federal water resource agencies to implement legislation in order to simplify the administrative burden on citizens and States in preparing reports to comply with Federal legislation; and

(6) assure Federal agency support for the State title II programs including review and comment on any water related guidelines and regulations issued by a Federal agency and programs implementing such regulations, in order to ensure the consistency of the agency guidelines, regulations, and programs with State programs and defined national interests and objectives.

(e) Members of the Federal Council may elect a Chairman who shall also serve as the coordinating officer of the Federal members.

(f) The State water advisory council (hereinafter referred to as the "State council") shall consist of not more than twelve members as selected by the governing body of the National Governors' Association. Ten of the members shall be selected by the governing body in such a manner as to provide broad national coverage. All of these ten members shall be full-time State water resources employees. Two of the members shall represent interstate water management agencies with one representative chosen from east of the Mississippi River and one member from west of the Mississippi River. Each of these members shall be a full-time official of an interstate water management agency.

(g) Members of the State council shall be appointed for staggered terms as determined by the governing body of the National Governors' Association.

(h) The State council shall—

(1) advise the Director in carrying out the provisions of section 102 of the Act;

(2) serve as advisor to the Director in matters relating to State water resource programs. The State advisory council shall be consulted by the Director regarding all matters of significant State interest. Whenever the Director's position on a significant water matter differs with the views and position of the State advisory council, such differences shall be recorded and appended to any report forwarded to the President or Congress;

(3) advise the Director with respect to the activities and programs conducted by the Office and the coordination of such activities and programs with the activities and programs of Federal, State, and local governments;

(4) make such recommendations as it may deem appropriate regarding the implementation and improvement of water management procedures, studies, and other activities and programs undertaken by the Office and new activities and programs which the Office should undertake or support; and

(5) cause to be published in the report established by section 105 of this Act, such views and recommenda-

tions as the State council may deem appropriate relating to the functions set forth by this section.

(i) When authorized by the Director, funds provided under section 401 of this Act may be used to pay the travel and such other related costs which are incurred by members of the State council incident to their attendance at any meetings of the State council, subject to applicable Federal travel regulations.

(j) Members of the State council shall elect a chairman who shall also serve as the coordinating officer of the State members.

SEC. 104. (a) For the purpose of carrying out the provisions of this Act, the Director may—

(1) hold such hearings, sit and act at such times and places, take such testimony, receive such evidence, and print or otherwise reproduce and distribute so much of its proceedings and reports thereon as the Director may deem advisable;

(2) acquire, furnish, and equip such office space as is necessary;

(3) use the United States mails in the same manner and upon the same conditions as other departments and agencies of the United States;

(4) employ and fix the compensation of such per-

sonnel as deemed advisable in accordance with the civil service laws and Classification Act of 1949, as amended;

(5) produre services as authorized by section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), at rates not in excess of the daily equivalent of the rate prescribed for grade GS–18 under section 5332 of title 5 of the United States Code in the case of individual experts or consultants;

(6) purchase, hire, operate, and maintain passenger motor vehicles;

(7) incur such necessary expenses and exercise such other powers as are consistent with and reasonably required to perform functions under this Act; and

(8) contract with private consultants to perform studies required to provide the information needed to carry out the purposes of the Act.

(b) The Director is authorized to administer oaths when it is determined that testimony shall be taken or evidence received under oath.

(c) To the extent permitted by law, all appropriate records and papers of the Office of Water Resources shall be made available for public inspection during ordinary office hours.

(d) Upon request of the Director the head of any Federal, department or agency is required—

(1) to furnish to the Office such information as may be necessary for carrying out the Office's functions and as may be available to or procurable by such department or agency; and

(2) to detail to temporary duty with the Office on a reimbursable or nonreimbursable basis such personnel within administrative jurisdiction as the Office may need or believe to be useful for carrying out its functions, each such detail to be without loss of seniority, pay, or other employee status.

(e) The Director shall be responsible for—

(1) the appointment and supervision of personnel;

(2) the assignment of duties and responsibilities among such personnel; and

(3) the use and expenditures of funds.

SEC. 105. The President shall transmit to the Congress annually, beginning one year after the date of enactment of the Comprehensive Water Management Act, a water resources report (hereinafter referred to as the "report"), which shall briefly set forth the following:

(a) an evaluation of existing and potential problems concerning water management as related to defined national interest;

(b) a review of the programs and activities (including regulatory activities) of the Federal Government,

the State and local governments, and nongovernmental entities or individuals, with particular reference to their effect on water resources quantity and quality and the conservation, development, and utilization of water and related land resources as they relate to national interests;

(c) such additional views and comments including minority views as may be submitted by the State council established by section 103 of this Act;

(d) suggestions for remedying the deficiencies by existing programs and activities, together with recommendations for legislation;

(e) a summary of the accomplishment of the States under title II of the Act;

(f) an evaluation of the consistency of Federal water resources programs with State priorities and the national interest;

(g) an evaluation of the effectiveness of Federal/State coordination procedures, including interstate coordination, and recommendations for improvement where applicable;

(h) a summary of any identified conflicts between State programs and the defined national interest;

(i) an assessment of the adequacy of national water policy to meet the national need; and

(j) a summary of the progress and effectiveness of

the integration of water quality and water quantity programs.

TITLE II—STATE COMPREHENSIVE WATER MANAGEMENT PROGRAM

SEC. 201. (a) In recognition of the appropriate role of the States in water and related land resources management, there are hereby authorized to be appropriated to the Office for fiscal years 1979 and 1980, $40,000,000 in each such year, for fiscal years 1981 and 1982, $50,000,000 for each such year, and for fiscal years 1983 and 1984, $75,000,000 for each such year for grants to States to assist them in developing and participating in the development of comprehensive water and related land management programs.

(b) The Office, in consultation with the State advisory council created under title I of this Act, shall establish procedures for providing assistance to the States in comprehensive water management.

The procedures shall be based on rules, arrangements, and provisions prepared in cooperation with State agencies and the public, subject to public hearings. The procedures shall provide a flexible program for the States to exercise their authorities and discharge their responsibility for the management of water within the States, consistent with defined State programs and the national interest.

These efforts are dependent on cooperative State-

Federal water management as a national objective requiring consistency of Federal actions with State programs and policies and consistency of State actions with defined national interests through the provisions of this Act.

(c) Rules, regulations, and procedures established pursuant to this section shall require that—

(1) each State participating in the comprehensive water management under title II shall provide to the Office a summary of—

(i) the programs and policies which the State will follow in carrying out its water management program including any laws and planning strategies;

(ii) current and anticipated water and water related problems which are of concern to the States;

(iii) needs of the State in accomplishing its water management program and solving its problems;

(iv) priorities of the State in meeting its needs and solving its problems; and

(v) existing or proposed methods and institutional arrangements which the State will use in coordinating State-Federal water matters including those matters of an interstate nature and concern involving other States and the Federal Government.

(2) the State summary shall address such elements it wishes to include in the State water management

program including the designation of those elements it considers to be of highest priority for accomplishment and the expected time frame required. State selected elements and priorities may change as State management objectives are met and new objectives are sought.

(3) in accordance with the requirements of title I of this Act the Office of Water Resources shall—

(i) review the State summaries;

(ii) review, analyze, and comment on the consistency of Federal projects and programs with State programs and priorities;

(iii) identify areas of defined national interest and their relationships and applicability to State programs and priorities;

(iv) identify conflicts between State and Federal activities and programs and provide a mechanism to seek resolution of such conflicts;

(v) seek assurances from Federal agencies that the agency activities will support the State water management program and State priorities wherever such programs and priorities are not inconsistent with defined national interests;

(vi) review the relationships of related Federal assistance programs to the State program authorized under title II of this Act, including but not

limited to, those listed in section 203(2) of this Act, identify areas of inconsistency and conflict and seek assurances from involved Federal agencies that such assistance programs will supplement and complement State water management programs and will be part of a comprehensive water management effort within defined national interests; and

(vii) advise and seek cooperation of other Federal agencies administering programs which may contribute to achieving the purposes of this Act.

SEC. 202. (a) From the sums appropriated pursuant to section 201 for any fiscal year the Office shall from time to time during the fiscal year make allotments to the States, in accordance with its regulations, on the basis of—

(1) the need to establish basic and stable staff capacity to develop and carry out the program;

(2) identified water and water related needs and problems;

(3) population of the States; and

(4) area of the States.

For the purposes of this section the population of the States shall be determined on the basis of the latest estimates available from the Department of Commerce and the area of the States shall be determined on the basis of the official records of the United States Geological Survey.

(b) From each State's allotment under this section for any fiscal year the Office shall pay to such State (1) an amount to establish and maintain a basic and stable organization, this amount will not require State matching to qualify and (2) an amount which is not more than 80 per centum of the cost of carrying out the remaining part of the State program approved under section 203.

SEC. 203. (a) The Office shall approve any program for comprehensive water and related land management which includes a flexible approach to addressing needs and problems and which includes—

(1) provisions for public involvement, water conservation, and coordination of the State program with Federal agencies and affected States;

(2) provides for comprehensive management with respect to intrastate or interstate water resources, or both, in such State to meet the needs for water and water-related activities taking into account prospective demands for all purposes served through or affected by water and related land resources development, with adequate provision for coordination with all Federal, State, and local agencies, and nongovernmental entities having responsibilities in affected fields;

(3) provides, where comprehensive water and related land resources management is being carried on with

or without assistance under: section 701 of the Housing Act of 1954, the Land and Water Conservation Fund Act of 1965, the Clean Water Restoration Act of 1977, the Wild and Scenic Rivers Act of 1968, the National Flood Insurance Act of 1968, the Estuarine Protection Act of 1968, the Environmental Policy Act of 1969, the Rural Development Act of 1972, the Federal Water Pollution Control Act of 1972, the Coastal Zone Management Act of 1972, the Safe Water Drinking Act of 1974, the Federal Nonnuclear Energy Research and Development Act of 1974, the Resources Recovery Act of 1976, and such other related Acts as appropriate, for full coordination between comprehensive water resources management and other statewide management programs and for appropriate mechanisms to insure that such water resources management will be in general conformity with the development program and policy of such State;

(4) designates a State entity, by State law or the Governor, as applicable (hereinafter referred to as the "State agency") to administer the program;

(5) sets forth the procedure as described in section 201 (c) to be followed in carrying out the State program and in administering such program;

(6) provides such accounting budgeting, and other fiscal methods and procedures as are necessary for keep-

ing appropriate accountability of the funds and for the proper and efficient administration of the program; and

(7) provides that a State agency will submit annually to the Office an assessment of progress in meeting its goals and objectives in comprehensive water management.

The annual report shall include:

(i) An update of the State summary, including goals and objectives to achieve the State determined needs and their relative priority recommendations for accomplishment.

(ii) A listing of problems, concerns, and management program elements which were dealt with during the year by the State through use of grants-in-aid funds.

(iii) A summary of the benefits accrued to the State under the program. The type and nature of productivity attained under each work element.

(iv) Comments on Federal programs and projects related to the State water management program.

(b) The Office shall not disapprove any program without first giving reasonable notice and opportunity for hearing to the State agency administering such program.

SEC. 204. Whenever the Office, after reasonable notice and opportunity for hearing to a State agency, finds that—

(a) the program submitted by such State and ap-

proved under section 203 (a) has been so changed that it no longer complies with a requirement of such section; or

(b) in the administration of the program there is a failure to comply substantially with such a requirement, the Office shall notify such agency that the grant will be terminated or suspended under this title until it is satisfied that there will no longer be any such failure. Until the Office is so satisfied, it shall make no further payments to such State under this title.

SEC. 205. For the purpose of this title the term "State" means a State, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam.

SEC. 206. (a) Each recipient of a grant under this Act shall keep such records as the Director of the Office shall prescribe, including records which fully disclose the amount and disposition of the funds received under the grant, and the total cost of the project or undertaking supplied by other sources, and such other records as will facilitate an effective audit.

(b) The Director of the Office and the Comptroller General of the United States, or any of their duly authorized representatives, shall have access for the purpose of audit and examination to any books, documents, papers, and records of

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the recipient of the grant that are pertinent to the determination that funds granted are used in accordance with this act.

TITLE III—INTERSTATE COORDINATING COMMISSIONS

SEC. 301. (a) In recognition of the need for coordination of interstate activities and resolution of interstate water problems involving interstate water management and defined national interests, States are required under title II of this Act to provide the Office of Water Resources with facts on the mechanisms and institutional arrangements which will be used to provide coordination between States on interstate water matters. States may select whichever means they consider appropriate to provide interstate coordination. Those States which desire to participate in a joint State-Federal Coordinating Commission with supporting Federal funding may wish to become members of interstate coordinating commissions as provided by this title.

(b) The President is authorized to declare the establishment of an Interstate Water Coordinating Commission (hereinafter referred to as "Commission") upon request addressed to the Office by two or more States within which all or part of the basin or basins concerned are located, if the request by the States—

(1) defines the area for which a Commission is requested;

(2) is made in writing by the Governors or in such manner as State laws may provide; and

(3) is concurred in by the Office and by all States within which portions of the basin or basins concerned are located and, in the event the Upper Colorado River basin is involved, by at least three of the four States of Colorado, New Mexico, Utah, and Wyoming. River basin commissions previously established under title II of Public Law 89–80 may continue to function as interstate coordinating commissions subject to the provisions of title III of this Act if so declared by members of such Commissions.

(c) Each such Commission shall, to the extent consistent with section 3 of this Act—

(1) serve as the principal mechanism for the coordination of interstate activities and definition of interstate problems and shall seek resolution of interstate problems involving interstate water management, including any defined national interests;

(2) foster and undertake such studies of water and related land resources problems in its area, river basin, or group of river basins as deemed necessary to carry out its functions; and

(3) upon agreement of all States and Federal agencies involved, engaged in such other activities including planning, as are necessary to coordinate interstate water management and resolve related problems.

SEC. 302. Each Commission shall be composed by members appointed as follows:

(a) a Chairman appointed by the President, who shall report to the Director of the Office and who shall also serve as Chairman and coordinating officer for the Federal members of the Commission and who shall represent the Federal Government in Federal-State relations on the Commission and who shall not, during the period of service on the Commission hold any other position as an officer or retired employee of the Federal Government;

(b) one member from each Federal department or independent agency determined by the President to have a substantial interest in the work to be undertaken by the Commission, such member to be appointed by the head of such department or independent agency and to serve as the representative of such department or independent agency;

(c) one member from each participating State which lies wholly or partially within the area for which the Commission is established, and the appointment of

each such member shall be made in accordance with the laws of the State represented. In the absence of government provisions of State law, such State members shall be appointed and serve at the pleasure of the Governor;

(d) one member appointed by any interstate agency created by an interstate compact to which the consent of Congress has been given, and whose jurisdiction extends to the waters of the area for which the Commission is created; and

(e) when deemed appropriate by the President, one member, who shall be appointed by the President, from the United States section of any international commission created by a treaty to which the consent of the Senate has been given, and whose jurisdiction extends to the waters of the area for which the Commission is established.

SEC. 303. (a) Each Commission shall organize for the performance or its functions within ninety days after the President shall have declared the establishment of such Commission, subject to the availability of funds for carrying on its work. A Commission shall terminate upon agreement of a majority of the States composing the Commission. Upon such termination, all property, assets, and records of the Commission shall thereafter be turned over to such agencies of the United States and the participating States as shall be

determined by the Office; *Provided*, That studies, data, and other materials useful to any of the participants shall be kept freely available to all such participants.

(b) State members of each Commission shall elect a Vice Chairman, who shall serve also as Chairman and coordinating officer of the State members of the Commission and who shall represent the State government in Federal State relations on the Commission.

(c) Vacancies in a Commission shall not affect its powers but shall be filled in the same manner in which the original appointments were made; *Provided*, That the Chairman and Vice Chairman may designate alternatives to act for them during temporary absences.

(d) In the work of the Commission every reasonable endeavor shall be made to arrive at a concensus of all members on all issues, but failing this, full opportunity shall be afforded each member for the presentation and report of individual views; *Provided*, That at any time the Commission fails to act by reason of absence of consensus, the position of the Chairman, acting in behalf of the Federal members, and the Vice Chairman, acting upon instructions of the State members, shall be set forth in the record. The Chairman, with concurrence from the Vice Chairman, shall have the final authority, in the absence of an applicable bylaw adopted by the Commission or in the absence of a consensus, to fix the

times and places for meetings, to set deadlines for the submission of annual and other reports, to est ablish subcommittees, and to decide such other procedural questions as may be necessary for the Commission to perform its functions.

SEC. 304. Each Commission shall—

(1) Engage in such activities and make such studies and investigations as are necessary and desirable in carrying out the purposes set forth in section 301 (b) of this Act.

(2) Identify and report to the Office any inconsistencies, problems, and differences between Commission programs and individual State programs and defined national interests.

(3) Seek resolution of any identified inconsistencies, problems, and differences between the States and the Federal agencies involved.

(4) Submit to the Office and the Governor of each participating State a report on its work at least once each year. Such report approved shall be by the Chairman and Vice Chairman and sent to the head of such Federal, State, interstate, and international agencies as the President or the Governors of the participating States may direct.

The report shall include a work plan and objectives of the Commission; describe the status of and progress in coordi-

nating interstate water problems; and describe relationships to individual State water management programs.

SEC. 305. (a) For the purpose of carrying out the provisions of this title, each Commission may—

(1) hold such hearings, sit and act at such times and places, take such testimony, receive such evidence, and print or otherwise reproduce and distribute so much of its proceedings and reports thereon as may be necessary to accomplish its purpose;

(2) acquire, furnish, and equip such office space as is necessary;

(3) use the United States mails in the same manner and upon the same conditions as departments and agencies of the United States;

(4) employ and compensate such personnel as it deems advisable, including consultants, at rates not in excess of the daily equivalent of the rate prescribed for grade GS–18 under section 5332 of title 5, United States Code, and retain and compensate such professional or technical service firms as it deems advisable on a contract basis;

(5) arrange for the services of personnel from any State of the United States, or any subdivision or agency thereof, or any intergovernmental agency on a reimbursable or a nonreimbursable basis;

(6) make arrangements, including contracts, with any participating government, except the United States or the District of Columbia, for inclusion in a suitable retirement and employee benefit system of such of its personnel as may not be eligible for or continuing in another governmental retirement or employee benefit system, or otherwise provide for such coverage of its personnel;

(7) purchase, hire, operate, and maintain passenger motor vehicles; and

(8) incur such necessary expenses and exercise such other powers as are consistent with and reasonably required to perform its functions under this Act.

(b) The Chairman of a Commission, or any member of such Commission designated by the Chairman thereof for the purpose, is authorized to administer oaths when it is determined by a majority of the Commission that testimony shall be taken or evidence received under oath.

(c) To the extent permitted by law, all appropriate records and papers of each Commission shall be made available for public inspection during ordinary office hours.

(d) Upon request of the Chairman of any Commission, or any member or employee of such Commission designated by the Chairman thereof for the purpose, the head of any Federal department or agency is authorized—

(1) to furnish to such Commission such information as may be necessary for carrying out its functions and as may be available to or procurable by such department or agency; and

(2) to detail to temporary duty with such Commission on a reimbursable basis such personnel within his/her administrative jurisdiction as such Commission may need or believe to be useful for carrying out its functions, each such detail to be without loss of seniority, pay, or other employee status.

(e) The Chairman of each Commission shall, with the concurrence of the Vice Chairman, appoint the personnel employed by such Commission, and the Chairman shall, in accordance with the general policies of such Commission with respect to the work to be accomplished by it and the timing thereof, be responsible for—

(1) the supervision of personnel employed by such Commission;

(2) the assignment of duties and responsibilities among such personnel; and

(3) the use and expenditure of funds available to such Commission.

SEC. 306. (a) Any member of a Commission appointed pursuant to section 302 of this Act shall receive no additional compensation by virtue of membership on the Commission,

(b) The per annum compensation of the Chairman of each Commission shall be determined by the President, but when employed on a full-time annual basis shall not exceed the maximum scheduled rate for grade GS–18 of the Classification Act of 1949, as amended; or when engaged in the performance of the Commission's duties on an intermittent basis such compensation shall be not more than $100 per day and shall not exceed $12,000 in any year.

SEC. 307. (a) Each Commission shall recommend what share of its expenses shall be borne by the Federal Government, but such share shall be used only for those purposes set forth in section 301(c)(1), subject to approval by the office. The remainder of the Commission's expenses shall be otherwise apportioned as the Commission may determine for the purposes of sections 301(c)(2) and (3) subject to availability of funding. No Federal funds shall be provided for the purposes of sections 301(c)(2) and (3) unless evidence is provided to assure that such efforts are necessary to supplement and complement actions provided for by title II of this Act and are approved by all Federal and State agencies involved. Each Commission shall prepare a budget annually and transmit it to the office and the States. Estimates of proposed appropriations from the Federal Government shall be included in the budget estimates submitted

by the office under the Budgeting and Accounting Act of 1921 as amended, and may include an amount for advance to a Commission against State appropriation for which delay is anticipated by reason of later legislative sessions. All sums appropriated to or otherwise received by a Commission shall be credited to the Commission's account in the Treasury of the United States.

(b) A Commission may accept for any of its purposes and functions appropriations, donations, and grants of money, equipment, supplies, materials, and services from any State of the United States or any subdivision or agency thereof or intergovernmental agency, and may receive, utilize, and dispose of the same.

(c) The Commission shall keep accurate accounts of all receipts and disbursements. The accounts shall be audited at least annually in accordance with generally accepted auditing standards by independent certified or licensed public accountants, certified or licensed by a regulatory authority of a State, and the report of the audit shall be included in and become a part of the annual report of the Commission.

(d) The accounts of the Commission shall be open at all reasonable times for inspection by representatives of the jurisdiction and agencies which make appropriations, donations, or grants to the Commission.

TITLE IV—AUTHORIZATION OF APPROPRIATIONS

SEC. 401. There is authorized to be appropriated to the Office of Water Resources such sums as are necessary to carry out the purposes of the Act, specified in titles I and III, and as set forth in section 201 (a) for title II.

SEC. 402. The Office of Water Resources is authorized to make such rules and regulations, subject to the provisions of section 201 (b), as it may deem necessary or appropriate for carrying out those provisions of this Act which are administered by it.

SEC. 403. The Director may with the consent of the head of any other department or agency of the United States utilize such officers and employees of such agency on a reimbursable or nonreimbursable basis as are necessary to carry out the provisions of this Act.

SEC. 404. Notwithstanding any other provisions of law, Federal appropriations for all resource management studies to be conducted by and through the Office of Water Resources shall be made to the Office and the Office shall be responsible for assigning studies and apportioning funds; providing that for studies administered by a Commission such funds shall be assigned through the Office to said Commission.

SEC. 405. Records, administrative equipment, and other property belonging to the Water Resources Council will be transferred to the Office of Water Resources.

SEC. 406. Public Law 89–80, Eighty-ninth Congress, as amended, is hereby repealed.

95TH CONGRESS
2D SESSION

S. 2826

IN THE SENATE OF THE UNITED STATES

APRIL 4 (legislative day, FEBRUARY 6), 1978

Mr. MCCLURE introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To establish water resources research centers, to promote a more adequate national program of water research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Water Resources Research Act of 1964 (Public Law 88–379, 78 Stat. 329; 42 U.S.C. 1961 et seq.), as amended is amended to read as follows:

"(a) This Act may be cited as the "Water Resources Research Act of 1978".

"(b) In order to assist in assuring the Nation at all times of a supply of water sufficient in quantity and quality to meet the requirements of its expanding population, it is

the purpose of the Congress, by this Act, to create a nationwide capability, including a network of State institutes, which will provide a State and regional and national focus for resolving water and related land problems through the stimulation and sponsorship of research, investigations, experimentations, and demonstrations; dissemination of data and research results to all users including the general public; and the training of scientists in disciplinary and interdisciplinary fields which affect the water resources.

"TITLE I—STATE WATER RESOURCES RESEARCH INSTITUTES

"SEC. 100. (a) There are authorized to be appropriated to the Secretary of the Interior for the fiscal year 1979 and each subsequent year thereafter sums adequate to provide $150,000 each year to assist each participating State in establishing and carrying on the work of a competent and qualified water resources research institute, center, or equivalent agency (hereinafter referred to as 'institute') at one college or university in that State, which college or university shall be a college or university established in accordance with the Act approved July 2, 1862 (12 Stat. 503), entitled 'An Act donating public lands to the several States and territories which may provide colleges for the benefit of agriculture and the mechanic arts' or some other institution designed by Act of the legislature of the State con-

cerned: *Provided,* That (1) if there is more than one such college or university in a State, established in accordance with said Act of July 2, 1862, funds under this Act shall, in the absence of a designation to the contrary by act of the legislature of the State, be paid to the one such college or university designated by the Governor of the State to receive the same subject to the Secretary's determination that such college or university has, or may reasonably be expected to have, the capability of doing effective work under this Act; (2) the designated State institute shall cooperate closely with other colleges and universities in the State with demonstrated research, information dissemination, and graduate training capabilities in developing a statewide program directed to resolving State and regional water and land related problems; (3) two or more States may cooperate in the designation of a single interstate or regional institute, in which event the sums assignable to all of the cooperating States shall be paid to such institute; (4) the designated State institute shall cooperate closely with regional consortia, as may be designated by the Secretary, to increase the effectiveness of the nationwide network of institutes and for the purpose of regional coordination, particularly with regional river basin commissions and other interagency river basin organizations as may be established by Congress; and (5) a designated college or university may, as authorized

by appropriate State authority, arrange with other colleges and universities within the State to participate in the work of the institute: *Provided further,* That for fiscal year 1979 not more than $125,000 shall be appropriated for each of the District of Columbia, the Virgin Islands, Puerto Rico, and Guam, and for fiscal year 1980 not more than $150,000 shall be appropriated for each of such areas.

"(b) There shall be authorized to be appropriated to the Secretary of the Interior for fiscal year 1979 and each year thereafter sums adequate to provide an additional $100,000 to each State institute to support water resources research in the institutes: *Provided,* That these funds are approved only for specific projects and only if the institute has shown to the satisfaction of the Secretary that it has developed a comprehensive research plan focused on water problems of high priority and of importance to more than one State in its region: *And provided further,* That the institute shows that the research projects supported have at least $1 of non-Federal contribution for each $2 of Federal support under this section.

"(c) It shall be the duty of each such institute to plan and conduct and/or arrange for a component or components of the college or university with which it is affiliated or with other qualified colleges or universities in the State to conduct competent research, investigations, and experiments of either

a basic or practical nature, or both, in relation to water resources and to provide for the training of scientists through such research, investigations, and experiments. Such research, investigations, experiments, and training may include, without being limited to, aspects of the hydrologic cycle; supply and demand for water; conservation and best use of available supplies of water; methods of increasing such supplies; and economic, legal, social, engineering, recreational, biological, geographic, ecological, and other aspects of water problems; having due regard to the varying conditions and needs of the respective States and regions, to water research projects being conducted by agencies of the Federal and State Governments, the agricultural experiment stations, other university research centers, and others, and to avoidance of any undue displacement of scientists and engineers elsewhere engaged in water resources research. The annual programs submitted by the State institutes to the Secretary for approval shall include assurance satisfactory to the Secretary that such programs were developed in close consultation and collaboration with leading water resources officials within the State and region to promote research, information dissemination, training, and other work meeting the needs of the State.

"SEC. 101. (a) There is further authorized to be appropriated to the Secretary of the Interior for the fiscal year

1979 and each year thereafter sums adequate to provide to each State institute a minimum of $75,000 and no more than $125,000 for the purpose of organizing and carrying out an approved program of technology transfer and/or information dissemination so that the results of research are put into practical use at the earliest feasible time: *And provided further,* That the institute shows that the technology transfer and/or information dissemination program have at least $1 of non-Federal contribution for each $2 of Federal support under this section. This technology transfer program must comprise a comprehensive plan to provide scientific information dissemination activities, such as identifying, assembling, and interpreting the results of scientific and engineering research deemed potentially significant for solution of water resource problems, providing means for improved communication regarding such research results, including prototype operations, ascertaining the existing and potential effectiveness of such for aiding in the solution of practical problems, and for training qualified persons in the performance of such scientific information dissemination.

"SEC. 102. (a) There is further authorized to be appropriated to the Secretary of the Interior for the fiscal year 1979 and each subsequent year thereafter sums not in excess of $10,000,000. Such moneys, when appropriated, shall be available to match, on a dollar-for-dollar basis, funds made

available to institutes by States or other non-Federal sources to meet the necessary expenses of specific water resources research and information dissemination projects which are of high priority to one or more States in the region or which have national significance and which could not otherwise be undertaken, including the expenses of planning and coordinating regional water resources research projects by two or more institutes. Such high priority projects shall be identified by the Secretary of the Interior in consultation and collaboration with the institutes, including regional institute consortia as designated by the Secretary.

"(b) Each application for a grant pursuant to subsection (a) of this section shall, among other things, state the nature of the project to be undertaken, the period during which it will be pursued, the qualifications of the personnel who will direct and conduct it, the importance of the project to the water economy of the Nation, the region, and the State concerned, its relation to other known research projects theretofore pursued or currently being pursued, the extent to which potential users of the research findings have been involved in formulation of the research plan and method for user involvement during the study period, and the extent to which it will provide opportunity for the training of water resources scientists. No grant shall be made under said subsection (a) except for a project approved by the

Secretary, and all grants shall be made upon the basis of the merit of the project, the need for the knowledge which it is expected to produce when completed, and the opportunity it provides for the training of water resources scientists.

"SEC. 103. Sums available to the States under the terms of sections 100, 101, and 102 of this Act shall be paid to their designated institutes at such times and in such amounts during each fiscal year as determined by the Secretary, and upon vouchers approved by him. Funds received by an institute pursuant to such payment may be used for any allowable costs within the meaning of the Federal procurement regulations that establish principles for determining costs applicable to research and development under grants and contracts with educational institutions (41 CFR 1-15.3), including future amendments thereto: *Provided*, That the direct costs of the programs of each State institute, as distinguished from indirect costs, are not less than the amount of the Federal funds made available to such State institute pursuant to section 100 of this Act. Each institute shall have an officer appointed by its governing authority who shall receive and account for all funds paid under the provisions of this Act and shall make an annual report to the Secretary on or before the first day of December of each year, on the total program of the institute in research; technology transfer and information dissemination and training toward the

resolving of water and land related problems of each State and region during the preceding fiscal year, and of its disbursement, on schedules prescribed by the Secretary. If any of the moneys received by the authorized receiving officer of any institute under the provisions of this Act shall by any action or contingency be found by the Secretary to have been improperly diminished, lost, or misapplied, it shall be replaced by the State concerned and until so replaced no subsequent appropriation shall be allotted or paid to any institute of such State.

"SEC. 104. Moneys appropriated pursuant to this Act, in addition to being available for expenses for research, investigations, experiments, demonstrations, technology transfer, and training conducted under authority of this Act, shall also be available for printing and publishing the results thereof and for administrative planning and direction. The institutes are hereby authorized and encouraged to plan and conduct programs financed under this Act in cooperation with each other, with other colleges and universities and with such other agencies and indivduals as may contribute to the solution of the water and related land problems involved, and moneys appropriated pursuant to this Act shall be available for paying the necessary expenses of planning, coordinating, and conducting such cooperative research and information dissemination.

"SEC. 105. The Secretary of the Interior is hereby charged with the responsibility for the proper administration of this Act and, after full consultation with other interested Federal agencies, shall prescribe such rules and regulations as may be necessary to carry out its provisions. He shall require a showing that institutes designated to receive funds have, or may reasonably be expected to have, the capability of developing a comprehensive program of research, information dissemination, and training designed to resolve water- and land-related problems in a timely manner. He shall furnish such advice and assistance as will best promote the purposes of this Act, participate in coordinating research initiated under this Act by the institutes, indicate to them such lines of inquiry as to him seem most important, and encourage and assist in the establishment and maintenance of cooperation by and between the institutes and between them and other research organizations, the United States Department of the Interior and other Federal establishments.

"SEC. 106. On or before the 1st day of October in each year after the passage of this Act, the Secretary shall ascertain whether the requirements of section 103 have been met as to each State, whether it is entitled to receive its share of the annual appropriations for water resources research, information dissemination, and training under sections 100,

101, and 102 of this Act, and the amount which it is entitled to receive.

"SEC. 107. Nothing in this Act shall be construed to impair or modify the legal relation existing between any of the colleges or universities under whose direction an institute is established and the government of the State in which it is located, and nothing in this Act shall in any way be construed to authorize Federal control or direction of education at any college or university.

"TITLE II—ADDITIONAL WATER RESOURCES RESEARCH PROGRAMS

"SEC. 200. (a) There are authorized to be appropriated to the Secretary of the Interior $10,000,000 for the fiscal year 1979 and for each of the fiscal years 1980–1988 inclusive, from which appropriations the Secretary may make grants to and finance contracts and matching or other arrangements with educational institutions, private foundations or other institutions, with private firms and individuals whose training, experience, and qualifications are, in his judgment, adequate for the conduct of water research projects, and with local, State, and Federal Government agencies, to undertake research into any aspects of water and related land problems which are of a national interest and which are not otherwise being studied.

"(b) In addition to other requirements of this Act, the Secretary's annual report to the President and Congress as required by section 307 of this Act shall indicate in a comprehensive manner the contribution made to resolving water- and land-related problems of a national interest by contract and grant award approved under subsection (a) of this section.

"TITLE III—MISCELLANEOUS PROVISIONS

"SEC. 300. The Secretary of the Interior shall obtain the continuing advice and cooperation of all agencies of the Federal Government concerned with water problems, of State and local governments, and of private institutions and individuals, to assure that the programs authorized in this Act will supplement and not duplicate established water research programs, to stimulate research in otherwise neglected areas, and to contribute to a comprehensive, nationwide program of water and related resources research. He shall make generally available information and reports on projects completed, in progress, or planned under the provisions of this Act, in addition to any direct publication of information by the institutes themselves.

"SEC. 301. Nothing in this Act is intended to give or shall be construed as giving the Secretary of the Interior any authority or surveillance over water resources resarch conducted by any other agency of the Federal Government, or as repealing, superseding, or diminishing existing author-

ities or responsibilities of any agency of the Federal Government to plan and conduct, contract for, or assist in research in its areas of responsibility and concern with water resources.

"SEC. 302. Contracts or other arrangements for water resources work authorized under this Act with an institute, educational institution, or nonprofit organization may be undertaken without regard to the provisions of section 3684 of the Revised Statutes (31 U.S.C. 529) when, in the judgment of the Secretary of the Interior, advance payments of initial expense are necessary to facilitate such work.

"SEC. 303. No part of any appropriated funds may be expended pursuant to authorization given by this Act for any scientific or technological research or development activity unless such expenditure is conditioned upon provisions determined by the Secretary of the Interior, with the approval of the Attorney General, to be effective to insure that all information, uses, products, processes, patents, and other developments resulting from that activity will (with such exceptions and limitations as the Secretary may determine, after consultation with the Secretary of Defense, to be necessary in the interest of the national defense) be made freely and fully available to the general public. Nothing contained in this section shall deprive the owner of any background

patent relating to any such activity of any rights which that owner may have under that patent.

"SEC. 304. There shall be established, in such agency and location as the President determines to be desirable, a center for cataloging current and projected scientific research in all fields of water resources. Each Federal agency doing water resources research shall submit quarterly to such cataloging center information on research underway, scheduled, and completed. The cataloging center shall classify and maintain for general use a printed catalog and computer information search system of water resources research and investigation projects in progress or scheduled by all Federal agencies. The cataloging center shall also establish a program to facilitate and encourage non-Federal agencies of government, colleges, universities, private institutions, firms, and individuals as to voluntarily make similar information available concerning inhouse research and research supported by grants and contracts on a systematic basis.

"SEC. 305. The President shall, by such means as he deems appropriate, clarify agency responsibilities for Federal water resources research and provide interagency coordination of such research, including the research authorized by this Act. Such coordination shall include (a) continuing review of the adequacy of the Government-wide program in water resources research, (b) identification and elimination of duplication and overlaps between two or more agency pro-

grams, (c) identification of technical needs in various water resources research categories, (d) recommendations with respect to allocation of technical effort among the Federal agencies, (e) review of technical manpower needs and findings concerning the technical manpower base of the program, (f) recommendations concerning management policies to improve the quality of the Government-wide research effort, and (g) actions to facilitate interagency communication at management levels. The President shall submit to Congress on December 1 of each year a report on the progress being made to effectuate the coordinating function described in this section and the need for legislation to implement the objectives of this section.

"SEC. 306. As used in this Act, the term 'State' includes the Commonwealth of Puerto Rico, the District of Columbia, and the territories of the Virgin Islands and Guam.

"SEC. 307. The Secretary shall make a report to the President and Congress on or before January 1 of each year on contributions which the total institute program (sections 100, 101, and 102) has made toward resolving water and related land problems during the preceding fiscal year. The report shall also include a detailed statement of the water and related land problems to be given priority attention during the next fiscal year. This statement shall be developed in consultation and collaboration with the network of State institutes.

"SEC. 308. Excess personal property acquired by the Secretary under the Federal Property and Administrative Services Act of 1949, as amended, for use in furtherance of the purposes of this Act may be conveyed by the Secretary to a cooperating institute, educational institution, or nonprofit organization, with or without consideration, under such terms and conditions as the Secretary may prescribe.".

Senator DOMENICI. We have the Honorable Guy Martin. He will testify with reference to the Water Resources Council activities. Mr. Martin, would you introduce those people accompanying you? We are glad to have you with us today.

STATEMENT OF HON. GUY MARTIN, ALTERNATE TO THE CHAIRMAN, WATER RESOURCES COUNCIL, ACCOMPANIED BY SWEP DAVIS, DEPUTY ASSISTANT, WATER PLANNING AND STANDARDS, ENVIRONMENTAL PROTECTION AGENCY; ADM. OWEN W. SILER, COMMANDANT, U.S. COAST GUARD, U.S. DEPARTMENT OF TRANSPORTATION; AND LEO M. EISEL, STAFF DIRECTOR, WATER RESOURCES COUNCIL

Mr. MARTIN. Thank you, Senator.

I have with me today Swep Davis, representing Tom Jorling from the Environmental Protection Agency. At the far right is Dr. Leo Eisel, staff director of the Water Resources Council; and Adm. Owen Siler, Commandant, U.S. Coast Guard.

Senator DOMENICI. Let me welcome all of you here.

Mr. MARTIN. With your permission, I understand it would meet the schedule to have statements submitted.

Senator DOMENICI. Their statements will be made part of the record. But I do want to talk with them a little bit.

Mr. MARTIN. Yes, sir. We have them here to supply information.

I will attempt to summarize my testimony so we can move along rapidly on this matter. I should say at the very outset that we are very much aware of the time period in which this particular hearing and this particular authorization consideration falls. It is a time which could very easily be regarded as a legitimate time of judgment for the success of the Water Resources Council. In my testimony, I systematically go through a series of considerations.

Some of which I would like to bring to your attention. First, if I could, let me read some language from the 1965 Water Resources Planning Act which created the Council:

> The Council shall make recommendations to the President with respect to the Federal activities and programs. The Council shall establish procedures for Federal participants in the preparation of river basin plans and for the formulating and evaluation of Federal water and land resources projects. After reviewing River Basin Commission plans, the Council shall formulate "National interest" recommendations and transmit to the President.

I read this because it is fair to say, without being unduly harsh, the Council has not fully carried out this change over the last 12 years. years.

Secondly, the various mission-oriented Federal agencies have rarely put much of their important policymaking power on the table at WRC. They have largely tended over the course of those years to retain that in their own houses and not to bring that to the Council.

On another mission, that of State and local cooperation, the Council gets its highest marks. It serves as a good conduit for States, regions and localities to discuss important issue with the Federal Government. But even on this count, there has been a reluctance on the part of the member agencies to put the big issues on the table at WRC, pre-

ferring instead to carry out the main missions through their own organizations.

Finally, there is a general concern on our part, and I know on the part of many that have dealt with the Council, that it hasn't exerted the strength some hoped it would. It hasn't provided the strong direction that was anticipated and expected as a result of this act.

Perhaps some of that is built into the expectations of being overly optimistic. But others, I think, are truly unfulfilled realistic expectations for the Council. There are specifies I could add, but I think this committee is well aware of it.

Let me describe what this administration has tried to do to address those problems. First, what I would like to do is briefly summarize for you our assessment of some of the accomplishments of the Council and lay out very briefly some of the things that have been done that we think are important.

First, the Council completed in 1968 the first national assessment. At the time that it was completed it was the first nationwide perspective on water supply availability. It has also prepared the principles and standards which established consistent uniform project planning and evaluation criteria for all Federal water agencies. This brought the consideration of environmental values into the evaluation of projects for the first time.

The Council is also extremely active in the area of flood-plain management. "The Council Unified National Program for Flood-Plain Management," published in 1976, is serving as a framework for all Federal agencies to carry out their flood-plain management activities.

The Council has developed a number of significant and well-regarded technical procedures for water management across the country. It also has—and I list in my testimony—sponsored and worked with the river basin commissions and carried out a series of special studies with them. I list those in my testimony and will not repeat them here. But I think most people agree they have been most helpful to a number of areas in the country.

The Council has also carried out the title III grants to the State programs, which was intended to assist the States to become equal partners with the Federal Government in planning. I think it can fairly be said it was the initiative of the Water Resources Council that provided a very valuable starting point for States to move into certain areas of water resource planning.

And I would, of course, separate that, for instance, from the standard State responsibility in water management areas which, of course, have been carried out well by the States for years.

Lastly, I think it would be useful to mention the 1976 drought study carried out by the Water Resources Council. I think it was significant that the President, Congress, and others turned to the Council to do a very important segment of the drought relief work. They carried out a large part of a very good and responsive program.

These summaries relate basically to items that the Council has completed. Let me move to a summary of the series of programs that are presently underway. I think these are particularly significant because they reflect on the programs of the Council that might be interrupted if the present authorization was not continued.

Those include the second national water assessment. It is an updating of the earlier national assessment and will be completed this summer. It will be a follow-on to the earlier document and will supply water supply and demand requirements until the year 2000.

The Council is also working at the present time to implement the President's recent Executive order regarding flood-plain management. And that involves the reconsideration of some 200 sets of agency regulations regarding flood-plain management and standizing the approach that the various agencies take in this area.

This is an extremely important program because it has the capability to see that the Federal Government doesn't get in the way of decent State and local planning in the flood-plain area and that our programs complement theirs.

The Council is also involved with instream flow requirements. What it is attempting to do is not to establish a set of Federal requirements, but to establish methods of interpreting what instream flows might be. And to quantify that so there can be uniformity in that regard.

The Council is working diligently on Federal consistency which is the program by which we intend to bring some meaning to the plans of the various river basin commissions. And at the present time, as you know, there is a charge—probably grounded in fact—that indicates that the plan put together by the regional river basin commissions go on shelves and don't get used. We are looking at whether or not the Federal Government should take an attitude of making its own plans consistent with river basin plans.

The Council is also working on a water for energy study pursuant to section 13 for the Non-Nuclear-Energy Act.

There are others, Mr. Chairman, and I could go on. But I think the point is made there have been accomplishments in the past despite the failures. There is important ongoing work being conducted at the present time.

What I think I need to say at the bottom line is that this administration very early recognized some of the problems, some of the unfilled expectations, that were present in the Council and took some actions to try to deal with those problems.

And I would like to very briefly summarize the things that we have already done to try to address some of the problems we have incurred. First, very early in my tenure, we determined—myself and my colleagues—that over the years there was a tendency of the Federal agencies not to put the big issues on the Council table and not to send policy leaders to the meetings.

One of the conditions that was a contributing factor to that was the creation of a huge committee system so that most issues, including important policy issues, were hashed out at a staff level among the member agencies which gave the policymakers less charge and responsibility in the issue than they might otherwise have had.

We acted very early in the administration to abolish that committee structure and create a method that relied more heavily on the WRC staff, and a quick turnaround of problems that force myself and my colleagues to deal directly with the issues themselves.

Most of our meetings are now attended by 70 to 80 percent at the Assistant Secretary level, and pressure is on these people to work on

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policy issues firsthand. It improved the discussion and quality of the discussion.

The President designated the Council as one of the three major partners in the formulation of water policy review presently underway. Secretary Andrus, in his capacity as Chairman, has kept the Council up to date and very involved in that study.

In fact, the Council staff has provided much of the key research work during that study. The Council staff was also the central point for all the public input to the water policy review, conducting numerous hearings and meetings, and receiving well over 1,400 comments from the public.

I should also indicate again——

Senator DOMENICI. Mr. Martin, what is the schedule for the water policy review now?

Mr. MARTIN. Mr. Chairman, the water policy review will be submitted to the White House, I believe, within the next 10 days. I would have probably said that 10 days ago, but I feel fairly confident in telling you that Secretary Andrus, on behalf of the Council, Jim McIntyre at OMB, and Charles Warren, Chairman of the CEQ, are prepared to submit it to the White House in 10 days.

And the results of that, along with some meetings chaired by the White House staff and the President, will lead the President to his conclusions. The paper submitted is an option paper with opinions expressed on different approaches.

I think, Mr. Chairman, that the summary of the actions that I have outlined indicate that we have recognized the Council's weaknesses. We have done those things that improve the capability of the Council to have a meaningful policy role.

We have, I think, substantially increased the commitment of the administration to the Council by making it serve a more meaningful role. But we don't believe we have made all the necessary changes.

There are two major incompleted administration projects that are presently still out that when completed will determine the future shape of the Council. The first of these is the water policy review. I won't repeat what I just said, but I predict that the conclusions of that review will place great reliance and responsibility on the Council or something very much like it.

In other words, we have no question in our minds that it is vitally important to have a body consisting of the key Federal water agencies which has authority and power within the Federal Government, and the necessary mandate and adequate structure to deal with the State and regional river basin commissions in order to address water problems.

Exactly what the shape of that organization will be, and exactly what the responsibilities should be, is something we won't know until the President makes his decisions.

The second initiative, of course, is the natural resources reorganization project. Early on, the President made a decision that he would separate the reorganization project from the water policy review. It's a much larger effort and covers all of the areas. But he did ask us to coordinate very closely. We have done that.

We have spent a considerable amount of time with those working on the reorganization project. My own analysis of the situation would

tell me that the water policy review is on a faster track right now than is the reorganization.

I do believe that the water policy review will be available for consultation in a very short period of time.

Senator DOMENICI. Well, it might make sense to have the review ahead of reorganization.

Mr. MARTIN. I said yesterday, Mr. Chairman, at similar hearings in the House, that it occurred to me that that is exactly the case. Particularly since we could probably make some mutual choices with regard to water policies and keep the WRC working on those issues.

When it becomes apparent to the Congress or the President that a reorganization can better serve that policy, we can make a judgment together.

I think, to summarize, Mr. Chairman, I would just say this: I list in my testimony a series of activities which would cease if the Council were not authorized for the following year. We believe that creating that kind of a hiatus at this point would be an extremely unfortunate thing and not at all in the national interest.

We believe that this administration, for all the controversy, has been rather candid about the source of the problems in some of the major water institutions that exist at the Federal level. So, we believe that it would be in the best national interest to extend this authorization of the Water Resources Counsel for another year, and to resolve insofar the questions relating to what changes should be made to the Council.

In the meantime, there is much to be done. Let me stop at that point.

Senator DOMENICI. In summary, you are recommending a 1-year extension,

Mr. MARTIN. Of the Council.

Senator DOMENICI. Of the Council in its present form, more or less, and the reason for the 1 year is that we are looking at the overall water policy and it may take a different shape within the total reorganization of the thrust and effort in water resources?

Mr. MARTIN. Take a different shape, or it will invest the Council with substantial new authority to resolve a number of the criticisms in the past years.

Senator DOMENICI. Does the Council actively mediate disputes between the Federal agencies?

Mr. MARTIN. The answer to that is probably no. It mediates disputes on certain key issues, but it does so at a very preliminary level in the stage in the problem-solving process. If disputes arise in the administration, it is OMB and the White House, let's say.

But the initiation of problems such as a Federal program to deal with flood-plain action, the Council is assigned responsibility of creating a Federal position.

Senator DOMENICI. I have a few more questions. But let me ask you if you will do something for the committee. Senate bill 2577, would you at your earlier convenience just analyze that bill and submit your analysis to us?

Mr. MARTIN. For official administration report on that bill?

Senator DOMENICI. No; just asking for an anlysis of the bill. I wonder if you could give me an idea how much resources do you estimate the Federal Government puts into all kinds of water research and evaluation, and the type of things that would be comparable to energy

research and development? You know, I am just amazed as I look at the growing budget of energy research because it is a crisis. And then I look over and it seems to me that water crisis is either upon us or right around the corner, and I just see no relationship between the resources and the nature of those two problems. Would you generally agree with that?

Mr. MARTIN. I am told by my staff that the total amount dedicated to Federal water research is $225 million. I will get the source of that figure and update it for you.

I was about to say, without giving specifics, my perception is certainly similar to yours.

Senator DOMENICI. We will inquire specifically as to where that figure is spent. Do any of the panelists that you brought with you want to have any comments? We need to be very brief today. We only have another hour or hour and a half and want to get on with the balance of the hearing.

But I would be glad to hear observations or thoughts you might have.

Admiral SILER. I wish to endorse the comments of Mr. Martin. I feel that it is important to have a Federal coordinating body to insure that we have a unified Federal position among all the Departments that is consistent with the policy of the administration and one that meets the requirements set forth by the Congress.

Mr. DAVIS. Mr. Chairman, I also wish to endorse those comments. We share many of the concerns expressed in the past about deficiencies of the Council. And similarly, we in any scenario we see the Council as having an important role.

Mr. EISEL. I have nothing to add.

Senator DOMENICI. I think it is fair to say if we were to proceed beyond a 1-year authorization we certainly would have to go into this matter in much more detail and see if we wanted to mandate a more effective role in terms of policy and bringing together at the top in a more mandatory manner rather than leaving it to one administration and the other not to.

It appears, Guy, you are saying administratively this administration is pulling in higher decisionmakers to utilize its strength and to utilize it as an umbrella, so to speak; is that correct?

Mr. MARTIN. Yes, sir. I think that is accurate. And I have no disagreement with your statement, should there be no meaningful change over the next year, that would be time to sit down together and see how we could redesign the entire structure.

Senator DOMENICI. I did make your statement part of the record (see p. 186), and thank all four of you for coming today. You are welcome to stay. Something might come up here where we might ask you something, but you don't have to.

Thank you. Guy, you are going to appear with another panel, are you not?

Mr. MARTIN. Yes, I am.

Senator DOMENICI. You are back with us wearing a different hat; same quarterback, different team. You don't look any different.

You are accompanied by?

STATEMENT OF HON. GUY MARTIN, ASSISTANT SECRETARY, LAND AND WATER RESOURCES, U.S. DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY GARY COBB, DIRECTOR, AND MANUEL MORRIS, DEPUTY DIRECTOR, OFFICE OF WATER RESEARCH AND TECHNOLOGY

Mr. MARTIN. Mr. Chairman, I am accompanied on my right by Mr. Gary Cobb, who is the Director of the Office of Water Research and Technology in the Department of Interior. On my left is Mr. Manuel Morris, who is the Deputy Director.

Senator DOMENICI. It's good to see you. How do you like your new job?

Mr. COBB. I like it very much, Senator.

Senator DOMENICI. We are going to name you the 50–50 panel today. Do you understand what I'm talking about?

Mr. COBB. I understand, Senator.

Senator DOMENICI. I understand you had a day's preparation for this hearing, also.

Mr. COBB. Monday or Tuesday.

Senator DOMENICI. That makes it easier for you and also easier for me, I assume.

Mr. COBB. I hope so, Mr. Chairman.

Senator DOMENICI. Guy, do you want to proceed?

Mr. MARTIN. Yes, Mr. Chairman. Thank you very much.

Part of my charter in this job, I guess, is to come around and explain agencies that previously had problems. Mr. Chairman, I know I don't have to spend a good deal of time backgrounding you in this area. and I won't attempt it. Let me say this: There is a little more recent history regarding OWRT in the House than the Senate. There were hearings last year of great interest in the House, in which I appeared. I assure you that I took a deep personal interest.

It happened that Mr. Cobb and Mr. Morris didn't join me until quite late in the beginning of the administration. For a good period of time, I dealt directly with this Office myself. I am proud of that because I spent the kind of personal time with the problems that you don't get an opportunity to do as an Assistant Secretary very often.

I have gotten to know the consistuency involved and feel, notwithstanding some of our conversations yesterday, in the House regarding the demonstration program, that we have made some important progress in putting this Office back into a shape that can work, and be supported by the administration.

To give you an idea what I said last year. I would like to incorporate my House testimony, if it is all right with you, into the record. It is important to indicate my judgment of the past of the program.

Senator DOMENICI. That will be done. [See p. 262.]

Let me just tell you how difficult the proposed regulations for the demonstration project have been on a Senator like myself. You know, I proposed those here. The House accepted the demonstration project. The President signed the bill not too long ago. My State and three or four others read the bill and got to work on getting ready to apply.

My State legislatively appropriated $25,000 so that they could put together a feasability study. They designated an agency, and it was picked out because it could work with the Federal Government well and with the local community. They appropriated up to $200,000 for them to get involved, and the next thing we read is that you have proposed regulations that would make this program a 50–50 match.

In fact, if you read them literally, it could be a 1-percent Federal–99-percent State match. And it just appears to us that the law did not say that, and that those kinds of regulations are not consistent with the law. And, of course, we can change the law to make it consistent. But we haven't yet. We haven't adopted the bill you sent up here that basically repeals that law, as I look at it. At least, it changes it so drastically with reference to demonstrations that you are given authority under yours to go 99 to 1, 50 to 50, 70 to 20. And that is not what the bill that passed the Congress said.

And I think we should put that on the table at the offset. Now, Guy, you can go ahead.

Mr. MARTIN. Senator, one of the things that happened yesterday which I think is unfortunate is that because of the focus on a single very important item, which was basically the funding of demonstration projects, much good work which has been done was not discussed. In other words, this program consists of a wide variety of very important things. There is an overall program of water research. There is the overall program of desalting research. There is the university institute program.

All of which we made, we think, very important, very constructive changes. And I would be pleased to have further discussions of those and to submit that, if you have no concerns about it, and defer that with only a few brief comments.

Senator DOMENICI. No. I spent enough time with the Director on that to know that he genuinely is interested in a broad, new thrust, and that he honestly believes that the bill that Senator Gravel and I introduced on behalf of the administration does that.

I would like you to cover that, and we will get on to the demonstration projects.

Mr. MARTIN. Senator, let me just be very brief talking about some of the other aspects of this program. First, let me talk about the bill in terms of the university program. There has been a good deal of criticism which I encountered very early in my tenure regarding the way in which the universities contributed to the water research and support the Federal Government gave.

I want to share with you that my personal conclusion, from a good deal of work and borne out by demonstrable facts, is creation of water institutes at the State level and the usefulness and meaning of the university communities overall has really been demonstrated. I think it is extremely important that we continue that relationship.

Senator, let me give you the flavor of what we have done. In the past the Federal Government has provided a basic allotment, and every year the universities come in and say, "We need more support." The Federal Government, in its fiscal wisdom, says we can't spend any more. That allotment level will not be increased.

Our conclusion was while basic allotment support ought to be continued, we ought to cease that fight and make money available on another basis. Try gradually over the years to increase the size of

the pie and to try to make those institutes which are most able to do it compete for available funds to do priority research. So, while we continue the basic allotment program and will support it, we advocate two other programs as well. We hope in the coming years to support increasing levels of funding, hopefully, because we can demonstrate the research being done is good.

The first is a contract program. It would be totally federally funded, and based on a series of priority research areas.

Senator DOMENICI. Let's get that clear for the record and for me. What do your institutes get now?

Mr. MARTIN. $110,000. And we propose to hold that level.

Senator DOMENICI. And authorization for more and never appropriated?

Mr. MARTIN. That is right.

Senator DOMENICI. And authorized——

Mr. MARTIN. $250,000.

Senator DOMENICI. What does your bill propose?

Mr. MARTIN. At $110,000 this year.

Senator DOMENICI. Do they get that without any funding of their own?

Mr. MARTIN. Yes. That is right.

Senator DOMENICI. That is a basic grant to each State water institute?

Mr. MARTIN. Exactly. And, of course, most of them have doubled, tripled and more that amount on their own. We do request that there be cost sharing in our bill. In other words we ask that in addition to the basic Federal designation to the institute, that there be some State commitment to the institute at the same time.

Senator DOMENICI. For them to get the basic amount?

Mr. MARTIN. Yes, sir.

Senator DOMENICI. Are there any State institutes you assume would have difficulty with that?

Mr. MARTIN. We have not been told of any that would have that difficulty.

Mr. COBB. Mr. Chairman, last fall we met with the State institutes to discuss this matching policy of one part in cash or kind. In fact, under present policy, Mr. Chairman, the universities are not allowed to apply the allotment money to overhead, base salaries. So there is the contribution of real resources equivalent to the match.

And with the exception of one or two universities, we were told they would not have a problem achieving the match.

Senator DOMENICI. $55,000?

Mr. COBB. Yes, sir. In cash or kind.

Senator DOMENICI. And then on beyond that you are saying you are going to promote competition for any extra money?

Mr. MARTIN. Let me lay out the two programs. The first is what we call the contract program, which would be directed at a series of priority research areas. This general category works with the universities and their various committees to set those priorities.

Frankly, we believe they subscribe to this approach, and we can be successful in identifying major themes of research that we are doing anyway. So what we would do is attempt to bring focus to that program to answer some criticism that was made in the past.

A second program, which would be called a matching program would be directed at State and regional needs rather than a series of research priorities. And that would be a 50/50 matching program between the institutes or other parties and the Federal Government.

And now we have opened the class of competitors. The class of competitors for that money would not only include institutes and universities, but States, local governments, and the private sector. Our theory is, as you said earlier, water research is such a high priority and such an important thing that we feel it inappropriate to focus the capability to do work in a single community.

My own belief is that, because of their experience, the universities will continue to be the major contributor to this research. They have the capability, desire, and enthusiasm for it. But I think we will see innovative proposals from other sectors.

Senator DOMENICI. Does your bill envision there would be one kind of clearing institute in the State or region, or cleared nationally?

Mr. MARTIN. As our bill presently reads, the university institutes within the State, would be the clearinghouse for all university proposals, but would not clear the proposals of States or the private sector. We discussed this matter.

I think probably some of the universities may well ask to be a clearinghouse for all proposals.

Senator DOMENICI. Don't you think that you are just going to get a huge number of grants that just come directly to the Federal Government if we don't designate some focal point in the State?

Mr. COBB. Mr. Chairman, as Assistant Secretary Martin has indicated, our judgment is that the university community will continue to be very effective competitors in water research because they have the capability.

So, one would expect, I guess, a large number of the proposals would come from the university community. Those proposals will be reviewed by the center, which will provide to us comments about the relationship of that research to the States' needs and priorities, and technical comments.

The research proposals coming from the State-private sector otherwise would be submitted directly to the Federal Government. We came to that judgment largely because of the concern about proprietary interest and concerns expressed in the discussion about that.

In any event, the research centers, we expect through their participation with the Secretary of the Interior in developing and keeping up to date a national water research priority and an agenda which we will update annually, will have a great deal of input into the research programs of the Nation. That is the new objective for the program that heretofore really hadn't been carried out.

Senator DOMENICI. That could end up very duplicative, also. Although, I don't think it is now. Where you have different proposals with a little different twist from 12 different places. On the other hand, there is no logical focal point unless it is the institute within the State.

Mr. COBB. I think it is a two-way process. As we work here, it would go back out so we would provide guidance, or at least some view as to what national needs are. And we will have to take the responsibility in our program at the Federal level to eliminate the duplication from the various States and regions.

Senator DOMENICI. The institute will have a broader mission in terms of coordinating research, will they not?

Mr. COBB. Yes, sir, Mr. Chairman.

Mr. MARTIN. One of the features I wanted to mention is that we also added a new objective for the Federal Government, States and universities to design a rolling 5-year program for water research. One of the criticisms of the whole program is there is no control or direction to the research. If you go out and talk to any of the research groups, they understand their direction and have one. But as a general matter, that direction is not understood.

What we hope to do is produce a rolling 5-year research priority so that the program can be identified according to what you were looking for in the next 5 years, as updated each year. And that would be a standard to which we would hold many of the elements of the program.

Senator DOMENICI. In Senate bill 2704, your proposal, what is the total dollar amount versus current law? And it seems to me it isn't very much more in current law. So, we have about the same amount of money, more people competing.

It just seems to me that this might have a negative effect rather than a positive effect.

Mr. MARTIN. Well, we obviously don't think so, Senator, or we wouldn't have proposed it. You are right, the levels are relatively comparable.

Mr. COBB. Mr. Chairman, with respect to the administration bill, it requests authorization of appropriations for fiscal year 1979 consistent with the President's budget request and such sums as necessary with repect to 1980.

Currently the matching grant program is requested at $4 million, and the contract grant program, $3.2 million. That is as high as it has ever been. And the contract grant program I would have to submit for the record the prior appropriation. So, this year's appropriation we request for research in the program is as high as it has ever been. But I think, Mr. Chairman, we would further make the point that the research needs that we we feel exist are greater than that. And in the administration, we have made a commitment, and Mr. Martin's testimony supports increases for these areas.

Mr. MARTIN. I should mention the technology transfer program that has been added. It meets the criticism that the results of this good university research in many cases have gone on the shelf. From the perspective of those who have done it, they have made every effort to see that this does not happen, but there is not a general recognition of the value of this research.

So, we have provided the technology transfer program relating to universities and general water research under these titles I have just discussed. That program will undoubtedly be characterized as being inadequate in terms of funding. And so I repeat again, there is probably no amount that would be clearly defined as adequate. This is the beginning of a program, and I think it is important. Funding would be competed for.

Moving to the programs in the saline and other impaired water areas, I would cite at the beginning that OWRT continues its commitment to the basic reseach program. I will ask Mr. Morris to take a look at the dollars that are involved in that.

Mr. MORRIS. $3.7 million, approximately, for saline water research. There is $3.7 million available for saline water research in the 1979 program. The 1978 fiscal year program is $2.1 million, and water reuse program, approximately $2 million more.

A similar amount in the 1979 program at $1.3 million in water reuse, and $2.4 million in membrane freezing and new concepts.

Mr. MARTIN. Senator, I asked Mr. Morris to do that to give you some perspective. I think it is equally significant to say that there was a real question so far as I am concerned regarding the commitment of the past administration to saline water programs of any type. I can't characterize their attitude because I am not fully informed on it. But my perception is there was not a commitment to that program.

While we have not made what is regarded as a breakthrough budgetarily, the attitude toward the work is different. I regard it as valuable work. I would say that it will be a difficult battle over a period of time to increase, to continually increase the program except as we are able to demonstrate credible results from the research and the demonstrations.

A major disagreement that we unearthed yesterday is really a difference in approach. The difference is, I think, that Congress, last year particularly, became frustrated with the inability or the unwillingness to move forward in this area and took matters in its own hands. I don't disapprove of that, but say to you that one approach coming in has to be different. I have to work with the administrative contracts that built the program to have a credibility to allow me to get back into a full program.

I think it would be very useful for me to lay out a chronology that I didn't lay out yesterday, which is important to understand motivation if not the results in this area.

Senator DOMENICI. Let me get rid of any doubts in your mind. You don't have to be meek about your assessment of the previous administration. It is correct that they have little or no commitment to saline brackish water research. In my opinion, it is pretty obvious they had little concern about making the Office of Water Technology the kind of office that it ought to be. If I appear to be rather incredulous because you come up here and say you want to change that attitude, it is because we have been burned so often. We have an excellent format in that Office of Water Technology to take the lead in this country in a real meaningful way in one of the most important resource areas that this country has, and it is almost a nothing office.

To come up and tell us we are going to change the attitude just isn't enough. We have to see something that indicates it is going to happen. I want to ask either you or Mr. Cobb specifically, so we will get right to the heart of the matter. The law I refer to that we passed last year that the President signed said, "The United States will construct the plant at no cost to the non-Federal public entity, and the United States will provide all costs of operating and maintenance of the plant for a term of at least 2 years but not more than 5."

I want any of you to tell me how you justify that language with a 50/50 cost sharing guideline, which it appears to me the law explicitly forbids? How do you explain that?

Mr. MARTIN. Would you let me try this chronology on you, because I think it is important to answer that question?

Senator DOMENICI. All right.

Mr. MARTIN. First, last year there were hearings in the House; I did not attend. The acting director at that time, Mr. Burton, attended. There were also hearings here. Following those hearings, you passed the bill that you just mentioned. That was the new authorization for title II and included the demonstration program that you allude to. That was the $40 million. No appropriation was made to carry out that bill.

Senator DOMENICI. We are about to do it now.

Mr. MARTIN. I understand that. But there was no appropriation made then. I can't solve the problem, but at least help you understand the approach to that law.

Senator DOMENICI. Let me make it clear that I don't think it is very relevant that we didn't appropriate money. Because the bill was passed beyond the appropriations cycle.

Mr. MARTIN. I understand that. The plants were not named in the bill, although there was some characteristics set out of the type of technology and the type of problems. I came up in September 1977 and testified to the House side, but not here, in some oversight hearings. In those hearings I laid out the program that I had in mind. In that testimony I made clear my feelings as to how we could best put together a program.

I was aware of your bill and that the approach that I was outlining was a different approach to the problem. I, frankly, was unable to take a strong role in your August 2 bill because I did not form opinions about the program which gave me the ability to take a strong position.

Senator DOMENICI. When did you do that oversight testifying?

Mr. MARTIN. In September of 1977, just after you passed the bill.

Senator DOMENICI. That bill was effective August 2?

Mr. MARTIN. August 2, yes, sir. My testimony, I believe, was in mid-September, end of September. And I am just telling you candidly that at the time your bill passed I was, frankly, unable to take a major role in it. I had not formed conclusions. But what I did do is two things in my testimony. First, I discussed my approach to this problem. And you have to understand at that time I was burdened with whatever administrative funding constraints were being discussed.

I was looking for two things. One, demonstrations. Not demonstrations set down in an area as a public work project so much as a problem solving technique. Something to take a practical local or State problem and make a demonstration relating to it.

So when done, you not only have a technology but the program. I talked about the concept, throughout the program or trying to use cost-sharing and matching as a way of increasing the enthusiasm of the Federal Government. The capability of Federal Government overall, including OMB, to confront these programs was in question.

Our recent actions are not an attempt to constrict your program. We propose to do something which you had not intended to do that went further than what you wanted. I said in my testimony we intended to reprogram money so we could spend money to get going on demonstration programs prior to the time you could appropriate anything in Congress.

So in a way, we attempted to say we have a different approach, but we are willing to reprogram and move money up front to get going

on the demonstration. We think in that regard we saved many months in terms of when we could get going. That reprograming is pending now. We wish it would be approved. We would like to get going. We feel $200,000 total for the program is needed. That will allow us to do feasibility studies on the first demonstration plant and start up—on studies for the second one. That does not answer your question, but I want to ge back to that. What I am telling you is we share the desire to get moving and are taking actions on one administrative approach for the program.

While the reprograming may not seem like a big deal to you, it wasn't easy. With regard to cost sharing, we simply believe, not so much because we are going to be punitive or to fly in the face of your very clear language it shall be at "no cost," but we have concluded the best way for us to do it is two things. One, to construct a program which will guarantee whatever the capability to cost share, that we will have a working, dedicated partner in carrying out demonstrations.

I am well aware of the Orange County experience. We have sent Mr. Cobb out there. And we want to avoid it. We think cost sharing would be a good way to get the dedication we want.

The second thing it will accomplish, it will allow me as I go year to year to administrations to build this demonstration program with a little greater support internally. That is simply a conclusion of mine. If you think I am wrong and want to go back, I can accept that.

Senator DOMENICI. Wait a minute. You know me well enough that I am not one of these fellows that likes to hit people over the head. But what you have in mind for promoting of demonstration projects in this area is nothing more than what you would like to do. What Congress passes is what the law is, OK? And what concerns me is how you and Mr. Cobb as public servants can take the law as explicit as this one and write regulations which are flat, absolutely inconsistent, or guidelines, whatever you call them.

Now, it appears to me that you have a much more appropriate mechanism, and that is to propose changes in the law. Now you have done that. All right. But in the meantime, in the meantime you have overtly put guidelines in place for a program that is absolutely inconsistent with it. Maybe you don't mean anything and maybe you are going to tell me, Mr. Cobb, that the guidelines don't mean anything. That would be delightful. But they mean an awful lot for people out there preparing for it. Because they are writing letters saying, "What kind of laws do you pass?"

Here are the words and we are getting the guidelines from this office and it says something different. If your guidelines are what you prepared to buttress your proposals to change the law, that is excellent. But if intended to be your view of what the law ought to be instead of what the Congress said, you know, I don't need to repeat history to you. This is a tiny thing within the scheme of history, but not consistent with what I think the President expects out of you people, out of you administrators.

Mr. MARTIN. I would like to respond. These guidelines are certainly not intended to be an interpretation of the present law. In no respect are they intended to be that. I must stay that for the first time you expressed very well what the great consternation was yesterday. There is a misunderstanding in what we intended.

First of all, we read the law as you do. But when I went up and discussed this program last year with the House, I was very candid about the present approach. It was not badly received. I didn't characterize it as my interpretation of the law, I characterized it as the way to go in the future to make the program work. Based on that, we began to work on a new approach. The guidelines are certainly not regulations and are not intended to be. What we did and what I directed Mr. Cobb to do, because of the good reception to cost sharing, was to spend his time working on the redevelopment of the new program to get moving and a series of guidelines to carry out that program. I agree with you, I think that was a mistake and inappropriate to send them out.

But I want you to be clear, it in no way represents our interpretation of the law. What I did is come openly before the Congress last year and say there may be a better way for us to get together on demonstration projects and begin reprograming and solicitation for proposals to get moving on it faster than if we had waited. My judgment on that posture is important. If there is no way that Congress will accept that, we can try to live with the present approach. I will have to fight the same fight at OMB that I fought before and I will do that. But I am being candid with you about what I can do.

Senator DOMENICI. What you are telling me is if we don't change the law you intend to enforce it?

Mr. MARTIN. Sure.

Senator DOMENICI. If we appropriate the money to get started on them with no match or with a different kind of match which maybe describes the kinds of things a State or locality ought to submit such as water rights, water supply rights-of-way, and the like, you will proceed with whatever the Congress appropriates and is required, would you not?

Mr. MARTIN. Of course, Senator.

Senator DOMENICI. And let me tell you why I think the approach you have on the one hand is good and, on the other hand, won't work. I am not one that thinks the Federal Government ought to pay for everything. We have over 30 States that have substantial budget surpluses, and we are presently marking up the budget. That is what that fellow interrupted me about a while ago, to get a proxy.

We are looking at the $90 billion deficit requested by the committees of this Congress, $62 billion by the President, and 30 States with surpluses. So on your basic bill of getting States to put money into water, I am with you. I am equally convinced that saline development, development of saline demonstration projects is nowhere near the point that it should be if the Federal Government were to follow through the last 10 years with additional resources and development.

And if one is located in Wyoming or California, and a new one with the best technology and development in other things, I don't think it is the responsibility of any State to pay for that. Because we have got to make additional breakthroughs that are good for all brackish water. So, I don't believe it really belongs to New Mexico or Wyoming or even some States in middle America with huge brackish ponds.

We don't know if they need the water, but what if they thought they did? It belongs to everybody. That is why I think it is not a 50/50 match program. We have to get them to commit enough or it is

another bust. But there is a lot more interest than when we first produced these first saline plants. There are a lot more industries involved and they, too, feel they would like to be part of the equipping to make the breakthroughs, but don't think it is going to happen without some of the major demonstration projects.

Mr. MARTIN. I appreciate what you say, and I think you have reasoned it through very thoroughly. I don't think our disagreements are great.

Let me say two things that might be significant. First, the idea that there not be a ceiling on this match is an oversight. I think that is good judgment and probably should be put on. It is something we didn't think through. When I thought of 50/50, we thought of it as a ceiling rather than a floor. There is no floor as well as no ceiling. Our proposal was intended to allow us to seek 50/50 as an objective.

Frankly, based on early interest, that kind of objective can probably be obtained. We think it is a reasonable goal to seek. But there is more, Senator. We know there are going to be areas where good, exciting work can and should be done but there is less ability to show. I guess what I am saying is the objective is important as is the flexibility that goes with it. So, we are not as far apart as the way we reasoned it through, but as an objective that might be sought out.

I also add that all other things being equal, I am very hopeful that some of your other witnesses on saline water will at least reflect a sense that goes beyond my words. I hope they reflect there has been a change in attitude. I think this year, we see the struggles we have to go through to increase that money each year. I can give you my personal assurance that I will every year seek to make this program meaningful.

Senator DOMENICI. I don't see the budgetary problem being as difficult as you. The President's executive budget comes over here and we go through it in the Budget Committee, and the Appropriations Committee follows it as a guideline. But I imagine that at least three- or four-line item areas where we send less up in the appropriation, or more.

All I am trying to get out of it is a commitment. If the Appropriations Committee sees fit to initiate funding and puts in the initial money, the budget authority is already there with $40 million. And if they put in $1 million and we get started, or half a million dollars, or $2 million for the first year to get started, all I want to know is you do not intend to set your own guidelines as to how you are requesting to do it.

Mr. MARTIN. You have my complete assurance for that. I put our proposals before you because I think it is a better way to go. This schedule for demonstrations is, I think, something people really haven't considered in their thinking, but it is a schedule and I will submit it to you, as it shows how it could be done.

Senator DOMENICI. Please.

Incidentally, the committee recommended to the Appropriations Committee and the Budget Committee $10 million to kick off the project. I am not telling you that has cleared on the budget or the Appropriations Committee, but I am positive it will clear the Budget Committee. And I have every reason to believe a substantial amount will be appropriated.

We are interested in that schedule, and it will help us when we testify because we want to be realistic.

Go ahead.

Mr. MARTIN. I think that probably would wrap up what I would say, Senator.

I also might mention that we have a technology transfer title which we think is extremely important with regard to national water research. And it carries out the mission of transferring major items of technology as opposed to those products that may come from a university-sponsored research.

We intend to make those two programs nonduplicative. And want to conclude at that point, Senator. I want to say, I thank you. I think our exchange, from my perspective at least, was very useful. And I think you allowed me to clear up at least the approach we are talking about, and I think that is good.

Senator DOMENICI. We have some questions from Senator Gravel that we would like you to answer for the record as soon as you can, (see p. 127.) and we will submit some additional ones.

Mr. Cobb, did you want—and we are going to make your statement part of the record, Mr. Martin, as you requested.

Do you have a statement, Mr. Cobb?

Mr. COBB. Yes, sir, Mr. Chairman, I do. With your permission, our statement will be entered into the record. [See p. 242.]

Senator DOMENICI. Let's do that.

STATEMENT OF GARY COBB

Mr. COBB. I would briefly highlight a couple of points as further emphasis on points already made. We feel the new thrust and the new approach in carrying out a comprehensive program in water resources that we put forward in our basic legislation is important.

We think that by focusing our research efforts more and providing appropriations through a matching program and a contract grant program that we will be able to have the Federal research results and be able to provide the kind of research that is ready when needed in our country.

We are very interested in the program, and I would emphasize that point. The second point is with respect to technology transfer. Secretary Martin just mentioned we are proposing, really, a new technology transfer program that woudl be administered at the State level by the centers. This would be with water management in the State, and bring together all the research we could get together for water problems in that State.

The program will be directed at major national issues and use all kind of mechanisms to be more effective in the future than in the past.

I think, Mr. Chairman, with those very brief remarks, I would, then, respond to any questions that you may have.

Senator DOMENICI. Let me ask a couple of questions.

I don't understand the relationship of the Office of Water Research and Technology with, let's say, the Environmental Protection Agency's goals and objectives under the Clean Water Act. How do they relate now under your bill?

Mr. COBB. Mr. Chairman, in the past the objectives of the program have been coordinated through a Committee on Water Resources

Research that has not really been effective. In the future, under the new proposal and under reorganization, I am sure that that will be addressed.

In our bill, to assure that there is the needed coordination, there is included in the bill provision for coordination specifically with the Environmental Protection Agency, particularly in our work on water review.

We believe that our program should have a broad mandate to do water research and technology development related to water management, and that our work in saline water and desalination should have a very broad mandate dealing with water quality and reuse and recycling.

We think the membrane process, as well as freezing, has the greatest potential perhaps for reuse.

Senator DOMENICI. Let me be more specific. I would assume that the Clean Water Act is presenting a series of problems to a number of communities in terms of cleaning up their water, and that EPA is out in the field trying to help, and States are frustrated because the water in the area is just not quite clean, yet there is no other source.

It isn't just a question of drilling another well or tapping another source; it just has something in that whole basin that is just slightly over the requirements.

Now, do their problems filter in to you so that you can focus research attention into that area?

Mr. COBB. Yes, Mr. Chairman. In fact, I have already met with their Deputy Assistant Administrator in the research area. We have set up a meeting to be held later this month or early next month, a daylong meeting where we outline research problems in implementing the Clean Water Act, and we outline our program to make sure what we are doing together is mutually beneficial.

Let me make a point that the committee I mentioned held a judgment that the research at the Federal level was not adequate. I passed to Mr. Martin $225 million as a total effort. I had it called in over the phone.

But the point is that that is the total Federal effort. There are many people, informed people, who hold the judgment that substantially more should be provided. The point I am driving at is we have too little resources now.

With adequate coordination, we can eliminate the duplication, and even then we will not have as much effort as we should have. So, I am not worried about duplication.

Senator DOMENICI. Where is most of that money? It certainly isn't in your office.

Mr. COBB. EPA had between $50 and $60 million; Agriculture, $35 million; HUD had the same amount; Interior, including our program, had $63 million.

Our program this year is about $30 million, as you know. Transportation, $4 million; Energy had what—related research of about $14 million; and the balance was made of National Science Foundation, Smithsonian, TVA, and others.

Senator DOMENICI. There is another bill that is relevant to your office—Senate bill 2826—and we would ask that you comment on that. Not in an official way, but merely your views.

[Information requested follows:]

Amendments to the Water Resources Research
Act of 1964, Proposed by NASULGC

o Title I Institutes

NASULGC Proposal

oo The Act of 1964 is amended to:

ooo authorize $150,000 each year per Institute instead of the current $250,000 and proposed $110,000

ooo require Institutes to cooperate closely with other colleges and universities relating to:

oooo demonstration of research results

oooo information dissemination

oooo graduate training

oooo developing State-wide program to resolve State and regional water problems

ooo provides that designated institute cooperate with regional consortia as designated by Secretary for purposes of regional and river basin coordination

ooo provides annual authorization for additional $110,000 to each institute for:

oooo funds approved only for specific projects and only if institute shows to the satisfaction of the Secretary it has developed comprehensive research plan focused on problems of high priority and importance to more than one State in region and further the institute shows that research projects have at least one dollar non-Federal contribution for each two dollars of Federal support under this section.

OWRT Comments

oo The proposed institute funding is $25,000 higher than we believe is necessary considering our other programs - e.g. matching and water resources research. The additional $100,000 per institute

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is proposed as only available to the institutes. We believe our proposal for competitive research for matching and contracts and grants would produce a better product

NASULGC Proposal

- oo Adds Technology Transfer section
  - ooo authorizes each institute a minimum of $75,000 and not more than $125,000 for organizing and carrying out approved technology transfer program
  - ooo requires cost-sharing on basis of two Federal to one non-Federal
  - ooo provides for improved communication of research results

OWRT Comments

- oo The Administration's proposal is adequate to begin an appropriate program and on a competitive basis between the institutes. We believe this to be the better approach

NASULGC Proposal

- oo Matching grants amended to authorize $10 million and to include information dissemination

OWRT Comments

- oo We believe the level of funding for FY 1977 to be adequate. The amount spent is in line with our plans, goals and objectives. Additional funding in the amount proposed would require additional staff

NASULGC Proposal

- oo Additional water research continued through 1988
  - ooo authorizes $10 million annually

OWRT Comments

- oo Same as above

Senator DOMENICI. I would like to discuss the whole problem with you in more detail, but we are not going to be able to. We will have to glean it from your statements and perhaps informally talk with you as we mark up the bill.

We have several witnesses to hear, and I am running out of time. Let me tell you how much I appreciate your time. Mr. Martin, I truly believe that a good purpose is served in your coming down and working on this problem with Mr. Cobb. Because I think unless someone in your status in Interior or position is genuinely interested, this will get lost in the shuffle, and I really believe it is vital.

I thank you for it. I wish you well, Mr. Cobb, this year, and I hope we get most of your bill passed with some amendments.

Mr. COBB. Thank you, Senator.

Mr. MARTIN. Thank you, Senator. I appreciate it.

Senator DOMENICI. Let me ask you, Mr. Cobb. You did visit New Mexico and the basin. First, there is no doubt in your mind that the State has a very firm commitment for research and development?

Mr. COBB. I am aware of the legislation. I spent a day with Steve Reynolds. We went to Alamogordo. We met with delegations from Carrizozo and Tularosa, and went over to Artesia and met with the mayor there.

It is a very interesting water problem, and I am looking forward to working with you and others on that problem.

Senator DOMENICI. Let me ask you if either of you are aware of research that is going on at a little town called Lumberton, under the auspices of Los Alamos Laboratories, on an algae process for desalinization?

Mr. COBB. Yes, sir, I am aware of that research. In fact, the OWRT took a look at the process. Tom Bahr is here today and he is going to testify later, and he spent that day with me.

We are very interested in this, and he will detail it for you.

Senator DOMENICI. Very fine. Thank you very much.

Mr. COBB. Thank you.

[Information relative to Lumberton, N. Mex., and responses to written questions follow:]

Research at Lumberton, New Mexico

A water treatment plant using algae to remove unwanted minerals and salts is providing about 25 thousand gallons of water per day to the community of Lumberton, New Mexico. The Four Corners Regional Commission is sponsoring the project and KLA Labs is the contractor. The Desert Treatment Plant has a holding capacity of 60 thousand gallons. Twenty five thousand gallons are being used daily by the town. The algae are versatile single cell protein producing organisms which can be cultured. Both the Aztec and Klamath Indians once used algae as their principal food and to purify their water. The three largest natural algae growing lakes in the world are Lake Chad in Africa, Lake Texcoco in Mexico and Klamath Lake in Oregon. The use of algae to clean and treat sewage with water is long-established. In the process of denoting that process and in culturing algae for medicinal and food purposes, KLA Labs and other contractors discovered that algae will remove minerals and heavy metals from water. The culture of algae began in New Mexico with a pilot plant in Los Alamos. There are now commercial projects in Bosque, New Mexico, Klamath Lake, Oregon, Lama, Solo and West Union, Iowa. The Lumberton project has been in operation since January and a similar project is planned in Chama, New Mexico. The water at Lumberton comes from a 360 foot deep well and runs through an underground coal field. It has such a concentration of chemicals and gases it is not drinkable even by livestock. The process developed by KLA Labs uses micro algae to remove the contaminants. The water is pumped into the plant, de-gased and algae are used to remove the bicarbonates and other minerals. The algae are then screened-out with the micro particles of contaminants. The water then goes to a chlorinating and ozone system. The pH factor is adjusted within the ozone system. The algae process removes 60 per cent of the dissolved solids in the water making it drinkable.

General Questions Submitted by Senator Domenici

1. P.L. 95-84 states in part: "That the United States will construct the plant...at no cost to the non-Federal public entity and that the United States will provide all costs of operation and maintenance of the plant for a term of at least two but not more than five years." How do you justify 50-50 cost sharing guidelines, which the law explicitly forbids?

As you know, at recent hearings concerns were expressed about the guidelines attached to my letter, and specifically to provisions on cost-sharing. Those hearings made it clear that the intent of our letter was not well understood. We believe this clarification will be of assistance. We certainly desire to have the best proposals considered under the desalination demonstration program. Regarding cost-sharing, we completely understand that the present law (P.L. 95-84) provides for a non-Federal public entity to furnish, at no cost to the United States, necessary water rights, water supplies, rights of way, power source interconnections, and brine disposal facilities. The United States would construct the plant at no cost to the non-Federal public entity and the United States would provide all costs of operation and maintenance of the plant for a term of at least two but not more than five years. The provisions of that law will be carried out, unless the new Administration proposal for a variable cost-sharing policy having an objective of equal sharing of costs or such modifications as considered appropriate, is adopted by Congress.

As we indicated at the hearings, we believe our approach, which would be sensitive to the cooperator's abilities, will create a stronger program, better linkages with the OWRT and its partners in a demonstration, and more stable Administration support. We will implement the cost-sharing policy for the demonstration program provided for by law.

2. Your transmittal letter said "Section 205 of the bill authorizing demonstration activities is essentially an adaptation of provisions of P.L. 95-84." Yet S. 2704 does away with the mandate for demonstrations, does away with the requirement for four demonstration plants, does away with the requirement that at least two demonstration plants be built to handle ground water, imposes what could be 99% cost sharing on the local sponsor, and provides no direct funding for the program. Is it really fair to imply the two items are similar?

   The two bills are similar in that they both authorize a saline water conversion demonstration program. The language of Section 205 of S. 2704 is broader than that of P.L. 95-84 in that it provides for cost sharing and for participation in demonstration plant activities with both Federal and non-Federal entities. All demonstration project activities authorized by P.L. 95-84 could also be carried out under provisions of S. 2704.

3. Mr. Cobb, on page 12 of your statement you talk of "feasibility studies... for demonstration desalting plants." What specifically is planned in F.Y. 1979? When do you anticipate entering into the four demonstration contracts? What is the anticipated cost in each of the next three fiscal years?

   Our plan conceives of sequentially constructing and operating these plants. Assuming early site identification, feasibility studies for an initial plant would be completed early in F.Y. 1979. Assuming minimum delay in funding, design contracts could be completed during F.Y. 1979. Construction would be completed during F.Y. 1980. It is anticipated that operation would begin during early F.Y. 1981. Additional plants will follow at approximately one year intervals. The anticipated total cost of implementing such a program is difficult to supply wihout having the benefit of the first feasibility study.

4. How do you assess the need for saline conversion? Isn't what we really need are some practical demonstrations in the real world?

Demonstrations are needed to obtain cost and performance data needed by water planners and water suppliers to make judgements and decisions regarding how saline water technology can be applied to solve or mitigate real world water problem situations. Technology that is only developed to the pilot plant stage is not adequate to assure the viability of saline water conversion technology as a solution to real world water problems.

5. What will be the level of work at the Roswell test facility and the Wrightsville Beach facility in F.Y. 1979, as opposed to the present year and F.Y. 1977?

The level of effort during F.Y. 1977 at both the Roswell and Wrightsville Beach Test Facilities was close to minimum.

At the Roswell Test Facility, we conducted tests in support of the Yuma Desalting Plant. This information was given to the Bureau of Reclamation for design and construction of the Yuma Plant. In FY's 1978 and 1979, the activities at both the Roswell and Wrightsville Beach Test Facilities will be expanded commensurate with the expansion of the saline water research and development activities. The pilot plant test data collected at these test facilities will be helpful in our demonstration plant program. Because Roswell has the special capability of synthesizing brackish water within a broad range of salinities and with wide variations in composition, that facility will be particularly helpful in providing data useful in the brackish water demonstration

plant program. The Wrightsville Beach Facility will emphasize work in freezing and in use of reverse osmosis for seawater conversion.

6. Please provide figures over the past decade for the level of appropriations for the research and for the saline programs.

(See table attached.)

7. How much is OWRT spending on "urban flood control, including accelerated runoff and erosion control, stormwater runoff and water quality in urbanized areas"? Isn't this really the field of EPA and the Corps of Engineers?

OWRT has been spending about $130,000 per year over the last four (4) years in this area.

Agencies such as the Corps of Engineers and the Environmental Protection Agency have missions relative to flood control, stormwater runoff and water quality in urbanized areas. Funds provided to these agencies are to conduct studies, construct facilities or to make grants. OWRT's mission is to conduct research on water resources problems with a view toward development of new and novel ways for these mission agencies to use to solve these problems. OWRT's work cross-cuts the missions of various agencies, allowing the research to cover the entire problem rather than only that portion falling within the purview of a single agency. We coordinate our research with other Federal agencies, including the Corps and EPA, to afford them the opportunity to see what we are proposing to fund and to allow them to tell us what research they think needs to be done to permit them to better carry out their missions.

OFFICE OF WATER RESEARCH AND TECHNOLOGY

Appropriations 1953 - 1979
($ in Thousands)

Fiscal Year	Saline Water Conversion	Water Resources Research	Total
1953	175		175
1954	400		400
1955	400		400
1956	600		600
1957	550		550
1958	725		725
1959	1,183		1,183
1960	3,605		3,605
1961	3,795		3,795
1962	9,805		9,805
1963	9,600		9,600
1964	11,850		11,850
1965	16,150	3,450	19,600
1966	22,485	6,396	28,881
1967	29,851	6,910	36,761
1968	20,800	11,130	31,930
1969	25,556	11,181	36,737
1970	25,000	11,281	36,281
1971	28,573	13,242	41,815
1972	27,025	14,290	41,315
1973	26,871	14,304	41,175
1974	3,627	13,769	17,396
1975	5,907	13,885	19,792
1976	3,400	14,780	18,180
1977	7,571	11,453	19,024
1978	11,000	14,307	25,307
1979	10,075	17,079	27,154
Total 1977	285,504	146,071	431,575
Total 1978	296,504	160,378	456,882
Total 1979	306,579	177,457	484,036

Domenici's Questions and Answers

1. Under Section 101 of S. 2704, would the role of the institutes be different in any way from their role under the present law?

Yes. The role of the institutes has been expanded under the proposed legislation. The proposed legislation provides for technology development, demonstration activities, and technology transfer. The new legislation is more explicit in the areas of institute research investigations and includes saline water, water reuse, water conservation, etc. The proposed legislation also is more explicit on the coordination of programs within the State, local, regional, and river basin entities, and on cooperation with the Secretary in preparing periodic reports of ongoing research and development within the State and its funding by both Federal and non-Federal organizations. The proposed bill requires the institutes to cooperate with the Secretary in the development of a 5-year water resources research and development goals and objectives plan. The proposed legislation is more explicit in designating that the State Institutes will review all research and development proposals from the academic community for technical merit and relevance to priorities and will forward all such proposals to the Secretary for consideration. Section 101(c) is considerably more explicit in the carrying out of a State institute technology transfer program.

2. How will the saline water research effort mentioned in Title I mesh with the program in Title II?

The authorities contained in the existing water resources research authorization are broad enough to include saline water research. However, State institutes have not participated in saline water research in the past to avoid overlap or duplication of those programs carried out under the Saline Water Conversion Act. Inclusion of saline water conversion research in Title I broadens the activity base of the State institutes and should enable a more comprehensive saline water research program. Title I activities in this area will be integrated with Title II activities thereby strengthening the entire program.

3. What specifically is contemplated by the directive for 5-year goals on page 7, lines 8-10?

Under the proposed legislation, each State would be required to develop and submit to OWRT a 5-year plan setting forth State water resources research and development goals and objectives. Further, this plan would be regionally coordinated and submitted to the Office of Water Research and Technology. A national plan would evolve from plans submitted by other institutes and regions within the framework of national goals and objectives which would evolve from institute cooperation and participation. Since the States are required to coordinate the development of their programs with local, regional, and river basin entities, and to participate in the development of national goals and objectives, a more problem related, comprehensive, research and development program can be established.

4. What requirement for time and money would the various procedures of Section 101 impose on each institute? Please explain the specific differences from current practice, including any lessening of paper work or administrative requirements?

The charter for the institutes is expanded under Section 101 as previously mentioned in the answer to question number 1. Additional time and money are required to fully implement the expanded charter. The basic funding for the institutes is proposed at $110 thousand which would be supplemented with additional funds obtainable through technology transfer, matching grants, and the water resources contract and grant programs. On balance there may not be any lessening of paper work or administrative requirements. Such functions as the review of research proposals originating from universities within the State and the development of 5-year State plans for water research goals and objectives will require additional time and effort. On the other hand, there are a number of things that we believe can be done to reduce paperwork flow between Washington and the State, principally by assigning to the State institute directors increased authority to handle a number of administrative details without referral to Washington.

5. What is the current cost-sharing program for the State institutes? Why is a 2-1 cost-sharing as contemplated in S. 2704 justified?

Currently most of the institutes match Federal funds although there is no legal or administrative matching requirement. There are a few that may find it difficult or impossible to match on a 50-50 basis. A 2-1 cost-sharing with the institutes proposed in S. 2704 is for the purpose of stimulating State institute involvement and

commitment in needed water resources research activities. Since most institutes are currently matching Federal funds, we do not believe this will be an undue burden.

6. Is it fair to characterize the new program covering the institutes as being more competitive, making the institutes scramble more among themselves for the few dollars available? Is that sound? Are there any institutes that will have difficulty in raising their $55,000 annual share of the costs?

Yes, a few institutes may have difficulty in raising their $55,000, but they could raise less than $55,000 and still be eligible for the 2-1 match. Some institutes might prefer to join a consortium of one or more other institutes, to pool their available funds for the matching allotment. Cost-sharing proposals were discussed with all of the institute directors and the consensus was that this would not necessarily place a financial burden on them. Both the matching grant and the water resources contract and grant programs would be competitive under the proposed bill and available to any institution, individual, or contractor submitting a meritorious proposal. The consequence could be more effective use of the Federal research dollar.

7. What specific types of governmental R&D are contemplated by Section 105?

The type of research contemplated under Section 105 will depend upon the research and development needs of the 5-year program. At present, we identify five major areas in needing research, as follows:

(a) Urban Water Problems - A shifting of the population from a rural to an urban society has resulted in approximately 75 percent of the Nation's population living on approximately two percent of the land. The principal problems associated with this shift include: (1) municipal and industrial waste generation;

(2) water pollution associated with urban runoff; (3) effects of urbanization in local climate and hydrological processes; (4) flood damage protection; and (5) provision of adequate municipal and industrial water supplies.

(b) Energy-related Water Problems - Increased development of the Nation's fossil energy resources will have additional impact on local and regional resources. For example, surface and subsurface mining have created water quality problems in many areas. Streams have become so polluted by acid mine drainage and spoils leachates that they are no longer useful for fish, recreation and water supply.

(c) Ground Water Resources Problems - Another area of concern is effective management of the Nation's ground waters. This is particularly critical in the West where irrigation and domestic water supplies depend on ground waters. Problem areas requiring research include: ground water quality modelling, regional predictional capacity, analysis of institutional adaptation for ground water management, and the definition of exotic uses, i.e., energy storage as hot water aquifers and new uses for resources previously thought unusable because of reasons of quality or cost. Institutional problems which need attention are: management arrangements for interstate aquifers, and adoption of ground water permit systems in states where unadministered riparian concepts have long been dominant.

(d) Problems on Conserving the Nation's Water Resources - Excessive municipal, industrial, and agricultural water use occurs throughout the country due to lack of rational water conservation practices and methodologies. There is a need to evaluate current practices and develop innovative methods to conserve use of energy and water. Examples include: (1) water demand forecasting and control and improved methodologies for pricing and rate structures; (2) legal and institutional methods such as code and specification revisions, metering practices and public education; (3) improved residential water reduction and recycling devices; and (4) development of improved methods for irrigation efficiency.

(e) Problems of Maintaining Environmental Quality - The Nation continually faces the problem of maintaining environmental quality. There is a need to establish the scientific base for reasonable environmental standards, regulations and practices. Areas of concern are: (1) environmental loading and contamination associated with human activities and natural sources; (2) environmental processes that result in pollutant transformation, transport

and removal; (3) pollutant identification, characterization and measurement; (4) development of health and ecological effects; and (5) development of alternative control technologies for environmental enhancement and restoration.

8. What specific research or demonstration authorities are included in this bill that are not included in present law?

The proposed bill broadens the technology development and demonstration authority to encompass the water resources research program in addition to similar authority that now pertains only to the saline water program. The bill also is more explicit in the role of State institutes in technology development and transfer. The proposed bill also makes the matching grant and water resources contracts and grants programs more competitive by making funds available to any institution, firm, or individual presenting a meritorious proposal. Title II of the bill covering the saline water conversion research and development is more explicit in how results can be employed. It also broadens the demonstration aspect by providing for cost-sharing, allows a wider choice of technologies to be selected as well as a wider choice of water types.

9. What specific types of programs and demonstrations are anticipated under the Section 109 program? Would such demonstration be conducted solely by the Department, or would they be available under grants to states and other organizations?

Types of programs envisioned under Section 109 would include water resources planning and operating models that will provide information for management judgments and decisions. Demonstrations of water conservation and water re-use methods or technologies as these evolve from research and development activities are further examples.

Demonstrations could be conducted by the Department or in partnerships with others and could be totally Federally funded or on a cost-sharing basis, including grants or matching grants to States and other organizations.

10. How would the Title II program be different from the one now in effect?

The Title II program under S. 2704 covers the saline water conversion research and development and demonstration activities. It differs from current legislation in that it broadens the areas where saline water conversion research and development results can be employed and provides for demonstrating these technologies more broadly than is currently authorized. The substance of the current Title II research program under the Water Resources Research Act would be very similar to the authorization proposed in Sec. 105 of S. 2704, although it is intended that such research be focused more on highest priority problems.

11. Under the Section 205 program, how would you determine the proper level of cost-sharing?

Our guidelines for implementation of this section indicate an objective of 50-50 cost-sharing, but actual cost-sharing would be negotiated with perspective partners to take into account their needs, the type of demonstration to be employed, and their ability to participate financially.

12. Is it correct that the local cost-sharing under S. 2704 would be strictly up to the Secretary, and he could set it at 99 percent local costs, if he wished?

Yes and no. It is not envisioned that a demonstration activity would be carried out with a local entity supporting 99 percent of the cost.

It is within the authority of the Secretary to totally fund a demonstration project with Federal funds or any degree of cost-sharing.

13. Why does S. 2704 not include the requirement of P.L. 95-84 that there be up to 4 desalting plants and at least two be built to handle ground water?

We believe that the demonstration program should be broadly based in order that it can be directed at real world water problems and at the same time demonstrate something new with regard to the technology. The program should be directed at the best opportunities to demonstrate the value of the technology in water management. That could include applications in treatment of brackish water, sea water, and wastewater. Constraining the program to specific types of problems and applications may result in demonstration activity that does not show the greatest potential future economic and technical application in water management in our country.

14. What are the expected levels of expenditures under S. 2704 after FY 1979?

Full implementation of S. 2704 would require expenditures or outlays in the neighborhood of $30 - $35 million for the next three years.

15. How is section 205 similar to the 1977 Act?

Section 205 is similar in that it provides for the design, construction, and operation of saline water conversion demonstration plants. It is broader than provisions of the 1977 Act in terms of cost-sharing, number of plants to be built, and the types of water the plants and applications of the technology that could be undertaken.

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16. What funds are expected to be covered by the language on page 25, lines 9-16?

This portion of the bill is similar to that contained in previous saline water conversion legislation and would limit the amount of "research" funds to not more than 5 per centum to be expended for foreign activities. For FY 1979, this would be applicable to $2.4 million saline water conversion research funds.

17. In describing Section 205 in the transmittal letter, the Administration stated that "other Federal as well as non-Federal entities are eligible participants with the Secretary in this program." Does this mean the Navy or DOE or BLM might be seeking OWRT demonstration grants? Is that wise?

No. It means that if authority is available, joint projects funded cooperatively may be initiated. For example, another Federal entity may be experiencing difficulties and may have an urgent need for use of saline water conversion technology. In such a case, it may serve our needs to demonstrate certain types of technology by working cooperatively with that agency. A case in point is the Bureau of Reclamation's Yuma desalting project which is currently authorized and funded under its own legislation and does not need to be characterized under our demonstration plant program. There may be similar situations in the future and we are seeking flexibility in the language of the bill so that we can participate in this type of activity when appropriate.

QUESTIONS SUBMITTED BY SENATOR GRAVEL

1. Please state and explain the rationale for requesting open-ended program authorization and increased funding for OWRT in view of the fact the Administration has not completed its water and policy review and reorganization project. Why should OWRT be treated differently from other Federal water resources agencies or organizations?

The proposed legislation, S. 2704, provides for a two-year funding authorization. Budgets are subject to annual appropriations. There is ample opportunity for amendments or changes resulting from the President's reorganization or new policies. The programs carried out under existing authorities for water resources research and saline water conversion are important to the Nation and should be continually strengthened as provided for in the proposed legislation. Changes may be in order when the water policy review and reorganization projects are completed and an assessment is made of their impacts on the office.

2. It would appear that water resources research should support the needs and priorities established within a planning framework. In this regard, how does the proposed OWRT program exhibit input and guidance from the Water Resources Council? How will you ensure that the 5-year research program provided for in S. 2704 will adequately reflect planning needs and priorities?

OWRT programs are coordinated with the Water Resources Council, within the Department, and with other government organizations involved in water resources research and/or development. Working relationships already exist with the Environmental Protection Agency and others in connection with the water reuse program. Future reorganization proposals may strengthen mechanisms for coordination and integration of Federal programs at the national level. Development of the 5-year research program will be a joint effort between the institutes and OWRT. The institutes

will have coordinated the development of their 5-year program with their State agencies, river basin commissions, and local entities and in turn submit these to OWRT. Inputs will then include State and local governments, which will be synthesized into a national program involving the other Federal agencies.

3. Explain what steps you will take to ensure that OWRT research activities are coordinated with State water officials and river basin commissions.

The proposed legislation, S. 2704, provides explicitly for the State institutes to develop their 5-year plan in close coordination with State and local entities and river basin commissions. These 5-year plans are then submitted to OWRT for development of the national 5-year plan. OWRT will monitor the work of the State institutes in this regard, and will actually work closely with the institutes in the development of 5-year plans.

4. What steps are you taking to ensure that the OWRT research and development program for converting impaired waters does not duplicate or overlap similar activities of EPA. How have you divided research responsibilities in this field?

EPA reviews and evaluates all water reuse proposals submitted to OWRT thereby minimizing any possibility of duplication. Program review meetings of the joint OWRT/EPA technical staffs are periodically held. Essentially, EPA's R&D is oriented towards development of technology to meet water quality objectives and standards. OWRT programs are directed at research, development and demonstration of technologies to improve

water management, including water quantity and quality and water reuse. The program is concerned with seawater, surface and groundwater sources. Programs carried out by EPA supplement its regulatory activities in helping to provide the technologies for compliance with water quality standards. We are emphasizing in the OWRT program, research and development leading to the reuse of rehabilitated wastewater.

5. Title III of S. 2704 authorizes establishment of a national center for "acquisition, processing, and dissemination of information" and a second center for "cataloging current scientific research." Since their functions seem complimentary, if not duplicative, why are two centers necessary?

The Water Resources Scientific Information Center (WRSIC) is an ongoing activity within the Office of Water Research and Technology. Included in the activities of this Center are the acquisition, processing, and dissemination of information concerning completed water resources research. To do this, scientific information is abstracted, indexed, and placed into a data bank, so that when a request is received for information there is a means to select out those research activity results that are pertinent to the request. The second center for cataloging current scientific research provides legislative justification for the Smithsonian Scientific Information Exchange (SSIE) to continue to serve as the "cataloging" center for

all current scientific research, not merely ongoing water research. The functions of WRSIC and SSIE are complimentary and not duplicative. Where cooperation between these two groups has been indicated, such cooperation has been excellent.

6. The authorities provided in Section 109(a) are very broad. Please provide an explanation and examples of the types of programs and activities that will be carried out under these authorities.

The type of activity contemplated under Section 109(a) will depend upon the identification of priority needs resulting from development of the 5-year program goals and objectives. At the present time we have identified 5 major areas in need of solutions which may require demonstration. Two examples of demonstration which could evolve under this section are the maximization of energy production in hydroelectric systems; or the application of groundwater models to estimate the impact of water conservation measures on water use and water basin recharge as a measure of drought coordination. The currently identified priority areas may be modified as the 5-year plans evolve in the future. These 5 areas are as follows:

(a) Urban Water Problems - A shifting of the population from a rural to an urban society has resulted in approximately 75 percent of the Nation's population living on approximately two percent of the land. The principal problems associated with this shift include: (1) municipal and industrial waste generation, (2) water pollution associated with urban runoff, (3) effects of urbanization on local climate and hydrological processes, (4) flood damage protection, and (5) provision of adequate municipal and industrial water supplies.

(b) Energy-related Water Problems - Increased development of the Nation's fossil energy resources will have an additional impact on local and regional resources. For example, surface and subsurface mining has created water quality problems in many areas. Streams have become so polluted by acid mine drainage and spoils leachates that they are no longer useful for fish, recreation, and water supply.

(c) Groundwater Resources Problems - Another area of concern is the effective management of the Nation's groundwaters. This is particularly critical in the West where irrigation and domestic water supplies depend on groundwater. Problem areas requiring research include: groundwater quality modelling, regional predictional capacity, analysis of institutional adaptation for groundwater management, and the study of novel applications such as energy storage as hotwater aquifers and new uses for resources previously thought unusable because of quality or cost considerations. Institutional problems which need attention are: (1) management arrangements for interstate aquifers, and the adoption of groundwater permit systems in states where unadministered riparian concepts have long been dominant.

(d) Problems on Conserving the Nation's Water Resources - Excessive water consumption by municipalities, industries, and agriculture is occurring throughout the country due to lack of rational water conservation practices and methodologies. There is a need to evaluate current practices and develop innovative methods to conserve energy and water. Examples include: (1) water demand forecasting and control and improved methodologies for pricing and rate structuring; (2) legal and institutional methods such as code and specification revisions, metering practices and public education; (3) improved residential water reduction and recycling devices; and (4) development of improved methods for irrigation efficiency.

(e) Problems of Maintaining Environmental Quality - The Nation continually faces the problem of maintaining environmental quality. There is a need for a scientific base for environmental standards, regulations and practices. Areas of concern are: (1) environmental loading and contamination resulting from human activities and natural causes; (2) environmental processes that result in pollutant transformation, transport and removal; (3) pollutant identification, characterization and measurement; (4) health and ecological factors; and (5) development of alternative control technologies for environmental enhancement and restoration.

7. S. 2704 authorizes a technology transfer program, on a competitive basis, for State institutes. Why is this authority restricted to State institutes when such a significant portion of the OWRT research program is carried out by other organizations and individuals (Section 105)?

The proposed bill would authorize the State institutes to conduct technology transfer programs so that research results from any source can be directly transferred principally to the States and local entitites and others to address a specific problem at the State or regional level. These activities will be coordinated on a national basis. The national technology transfer activity transfers technology that has broad application in the U. S. directed to major problems of national significance.

8. It appears that the National "centers" established by Section 301 and 302 are primarily to coordinate research and technology development. Do you see a need for more coordination at the Federal level for technology transfer? If so, how could this coordination be affected?

The centers referred to in Sections 301 and 302 are to accumulate, catalog, store and disseminate information on completed and ongoing water resources research and development activities. There are several purposes for doing this. The centers provide computerized national information bases that anyone can use to determine what research is in progress and what research has been accomplished in specific water resources areas. These then provide the means for individuals and organizations and OWRT and other government agencies to avoid funding repetitive or duplicative research and development work. We do not see the need for more coordinating mechanisms at the Federal level for technology transfer.

As pertains to OWRT's technology transfer efforts, interagency coordination and cooperation have been very good. What we do see, however, is the need for greater use of the information center. To better achieve this, OWRT contemplates a more aggressive program and additional remote terminals to assure that information stored in its information center system is readily available to those who can use such information.

9. On the average, what percent of your annual matching grants research funds have gone to: (1) state institutes, (2) other educational institutions, and (3) private organizations? Do you expect a similar division of funds in the future?

Matching grants funds in the past have all gone to State institutes pursuant to P.L. 88-379. Other educational institutions may contract with the State institute in research projects under the matching grant program. Under the proposed legislation, these funds would be available on a competitive basis to any academic or non-academic organization. It would be unrealistic to estimate at this time what the division would be between state institutes, other educational institutions, and other public or private organizations. After a few years of experience we will be able to provide this information.

10. Does S. 2704 represent any lessening of the commitment of OWRT to support research by the private sector?

No, it does not. As a matter of fact, the intent of making the matching grant and water resources contract and grant programs competitive and available to all is to more fully support the commitment of OWRT to conduct of research funding based on the merits of proposals from all sources.

11. Section 101(5) requires state institutes to receive and review, and forward to OWRT with comments, all research proposals from the academic community. Is this a departure from current procedures? If so, why do you feel the change is needed?

This is a departure from current procedures whereby only annual allotment program and matching grant program research proposals are routed to and reviewed by State institutes. All other research proposals submitted by the academic community come directly to OWRT.

The change we are proposing channels all research proposals from the academic community through the State institutes.

We feel the change will improve the coordination of water resources research efforts by the academic community within each State. Further, it will serve to strengthen the posture of the institutes within the States so that they may become recognized as State water resources research focal points for the benefit of State and local organizations as well as for the benefit of a coordinated and integrated national water research program.

Senator DOMENICI. Do we have Mr. Finck, Mr. Bell, Mr. Williamson? Could we have the three of you, quickly? Could you tell me your name, please?

STATEMENTS OF JOHN A. FINCK, NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION, REPRESENTING THE NEW ENGLAND RIVER BASINS COMMISSION; AND CRAIG BELL, ASSISTANT DIRECTOR, WESTERN STATES WATER COUNCIL, SALT LAKE CITY, UTAH

Mr. FINCK. My name is John A. Finck. I am with the New York State Department of Environmental Conservation.

Senator DOMENICI. Let me get the next witness.

Mr. BELL. I am Craig Bell, assistant director, Western States Water Council.

Senator DOMENICI. Mr. Williamson is testifying on the House side.

Mr. Finck and Mr. Bell, we are pushed for time. We want you to expedite your testimony and hit the high points as best you can. Thank you very much for coming today.

Mr. FINCK. Thank you, Mr. Chairman. It is my pleasure to present the testimony of Governor Carey of New York State (see p. 288), and also the testimony of the State members of the New England River Basins Commission (NERBC) (p. 290). The State members include the six New England States and New York State.

Also, I would like to put into the record, along with the other two statements, and to cite as a reference the written statement of Governor Matheson of Utah (p. 297), who is chairman of the National Governors' Association's Water Management Subcommittee. Also attached to the Governor's statement is the 11-principle position of the National Governors' Association on the national water policy review.

Senator DOMENICI. Fine. They will be made part of the record.

Mr. FINCK. First, I would like to summarize very briefly Governor Carey's testimony. The Governor is in very strong support of the extension of the Water Resources Planning Act and the title III provisions. For the title III program we recommend the authorization be $5 million annually. In the administration's bill the amount is only $3 million.

The $5 million is the amount that has been authorized for the past 2 years. Also, the Governor supports the title II river basin commissions. We are involved in three of them in New York State. These include not only New England, but also the Great Lakes and the Ohio River Basin Commissions.

Governor Carey believes that the work of the commissions is good and steadily improving, and in some areas they have done some outstanding work. The written testimony provides detailed examples.

One of the other points that the Governor would like to stress is the need for continuation of the Hudson River level B study, which terminates this year. There has been about $1 million spent so far.

Governor Carey would like to have the study extended for another year and authorized at $135,000. He feels this is very important because we are making progress on providing critical water supplies for the New York City area which involves approximately 12 million

people. The Governor requests that the authorization be carried forward to complete the critical work.

In the final analysis Governor Carey feels some kind of an entity or a stronger Water Resources Council that would report directly to the President is needed. He indicates that the Council is the only thread of continuity we really have now to the States and to the regional planning bodies. However, he would like to see some kind of an entity come out of the national water policy review that would strengthen the Federal coordinating mechanism.

That is the summarized statement of Governor Carey.

Senator DOMENICI. Tell me about that Hudson. What is that in the law? What was that funded under?

Mr. FINCK. That was authorized by Congress, a separate authorization.

Senator DOMENICI. I am unaware of it. Do you elaborate on it in your statement a little more?

Mr. FINCK. Right.

Now, I shall summarize the statement of the States of the New England River Basin Commission. The NERBC States support title I, the extension of the Water Resources Planning Act for the Water Resources Council. In particular they request that $150,000 be authorized for flood plain management work on the Connecticut River.

This work would be done under section 73 of the Water Resources Development Act of 1974. The work is very important and is to be accomplished in conjunction with the Corps of Engineers and the Soil Conservation Service. The commission needs to be funded so that the work can be fully coordinated and responsive on a regional basis.

Regarding the section on the title II commissions, very important work has resulted from the commission's work. For example, the NERBC has developed a factbook on the development of facilities for Outer Continental Shelf oil which has been used throughout the country. Also the commission is conducting a power study for small-scale hydropower development, which will be very helpful not only in New England but nationwide.

For the commission's operation budget, $54,500 is needed to respond to the coastal flooding which occurred last February. The commission involvement is needed to coordinate direct action among all participants—public and private—to alleviate future disasters of this nature.

In regard to the title III program, the NERBC States endorse the authorization for $5 million annually. This is the level of funding requested by Governor Carey.

Also, in the statement—and I am not going to read it—is a description of each State's program and the type of work being done under title III. From the description you can see that the money is primarily for staff work in critical water areas.

Under the section on level B and special studies, it is very important for the five coastal New England States to have a ports and harbors study. This study was high on the list of the Water Resources Council new starts. As you know, Mr. Chairman no new starts are included in the administration's budget this year. Because of its need we are requesting authorization for the ports and harbors study. The total cost would be $600,000, and the level for fiscal year 1979 would be $308,000.

I overheard your discussion on cost sharing for the water resources research and in the case of the ports study the New England States have already announced that they would cost-share 25 percent in-kind match, and are ready to start on the study.

That summarizes the statement of the State members of NERBC from New England and New York.

In reference to the statement of Governor Matheson on behalf of the National Governors' Association, he supports the title III program of the States. In addition, the Governor mentions the need for a national coordinating entity or stronger entity than the current Water Resources Council. Governor Matheson also supports title II river basin commissions where there are commissions.

Mr. Chairman, this completes my testimony.

Senator DOMENICI. Thank you very much. Your full statement will be made part of the record. We are pleased that you took time to come down, Mr. Finck. We appreciate it.

STATEMENT OF CRAIG BELL

Mr. BELL. We have a written statement, also, which we will submit for the record. (See p. 312.)

The executive committee members of the Western States Water Council have authorized me to testify to urge your support for extending title III of the Water Resources Planning Act for the next fiscal year by recommending passage of S. 2701.

If I may read just a couple of paragraphs from the statement, I believe it is the bottom line of our testimony.

> We believe that for continuity and consistency of State water planning efforts, funding should be continued this year so that a hiatus is not created as initiatives, yet to be recommended by the White House for water policy reform and reorganization of natural resource agencies, are considered by the Congress. Passage of the legislation would continue in the act in its present form and allow Congress to fully consider any recommended revisions of the Act.
>
> If funding is terminated, we feel there could be some significant harmful effects. Some States would find it difficult under current economic pressures to convince State legislatures that State funds should be continued without the matching Federal dollars and that the level of State appropriations should be increased to compensate for Federal withdrawal of support.
>
> As a result, funds for States' use in water resource planning, would be avialable in smaller quantities. Very capable planners would have to be terminated from the State employment.
>
> States would find that they could not be responsive to requests from Federal agencies to participate in planning efforts, to travel to Washington, D.C., and comment on the multitude of natural resource hearings and forums that are, and will be occurring.

That is the thrust of our statement, and we will submit in full the statement for the record. We appreciate the opportunity to testify.

Senator DOMENICI. Thank you very much, Mr. Bell. You can rest assured that the committee won't let the year lapse.

The second part, if you heard us discuss it, is one that will take us some time, but I am sure we will reauthorize the council for a year with its various functions.

We appreciate your taking not only the time but coming a long distance.

Mr. BELL. It was my pleasure, sir.

Senator DOMENICI. Thank both of you very much. Now we have a number of witnesses from various States. Is Mr. Bahr, the director of the water resources research institute at New Mexico State here? Why don't you come up first? Let's see if we can get two or three of you at the table. Mr. Fairchild from Sacramento, and Mr. George Hanbury, city manager, Virginia Beach.

You know the ground rules.

STATEMENT OF THOMAS BAHR, DIRECTOR, NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE, LAS CRUCES, NEW MEXICO

Mr. BAHR. First of all, Senator, I would like to thank you for the opportunity to testify. I have submitted a written testimony for the record. (See p. 315.) I will be rather quick about this and highlight some of the points right now.

I am currently director of the New Mexico Water Resources Research Institute, having come there just a little over a month ago from the State of Michigan. At Michigan I was the director of the comparable institute in that State for the last 5 years. Having just come from the most water-rich State in the Nation, 40 percent of which is surface fresh water to one of the most water scarce States, gives me an opportunity to compare greatly contrasting water problems.

The bill being considered here today moves in the direction of imposing and promoting greater quality control and promoting increased competition among participants in the OWRT program. I think the legislation provides increased responsibility to the States, in that they must provide increased State funding and develop more comprehensive planning. The directions in my opinion, will strengthen the national program, and it will provide stronger incentives to improve programs in some of the institutes that have programs that were less aggressive in assembling their resources.

I think for those institutes which have been more aggressive and which have developed a good track record in this regard, the legislation is a significant step in providing them with the opportunity of strengthening their program even further.

On the allotment grant program, all directors, of course, would like to see the funding increase, obviously. I think, though, that the increase in this particular portion of the program should take into consideration that it is not reasonable to expect that all institutes are equal. Some are better than others. The better ones should be appropriately rewarded for the efforts that they have put into the development of a high-quality program.

In this regard a basic allotment to each institute of $150,000 is appropriate to maintain the administrative function of the office, the staff, and technology transfer activities to get research programs off the ground nationally. I think, though, if there were provisions in the bill for an additional allotment, say, in the neighborhood of $100.000 on a competitive basis for meritorious programs, the research payoffs would be very good.

In essence here you would be funding those programs that have had strong track records, and the certainty with which the payoffs would occur would be much greater in this kind of an approach. I won't dwell on this too much longer.

Senator DOMENICI. You have elaborated on that in your statement?

Mr. BAHR. Yes; a little bit more.

The proposed authorization for a technology transfer program is a step in the right direction. It is inadequately funded, but it is a start in the funding and the development of a comprehensive program.

Senator DOMENICI. Let me ask you, do you support the provision in the bill that even for the basic funding you have to have a local match?

Mr. BAHR. Strongly. I am heartened to see that that program has opened up nationally to nonuniversity participants as well. I guess my gut feeling here is that if the criteria for evaluating the quality of a program is well adhered to, the most competitive proposals should be funded regardless of who submits them.

Senator DOMENICI. Do you have any confidence that sending them clear up here to be screened, that that result will occur?

Mr. BAHR. I think so, yes.

Senator DOMENICI. You don't think we ought to screen them first at the local or regional level?

Mr. BAHR. I would like to see some point at which information is at least communicated back and forth between the State institutes and proposals that are going directly to Washington. I can understand the proprietary interest of the private sector in this. But is very embarrassing, quite frankly, to have a proposal bypass the institute and be asked at a later date about a proposal that you haven't even heard of.

Senator DOMENICI. What bothers me is—just being frank with you—I am not sure that we have amassed the right kind of expertise in the Office of Water Research and Technology to do that screening in the manner you have described. Should there not be some additional counseling available to them so that we really would be picking the best ones?

Mr. BAHR. I am not totally familiar with the screening process for the matching grants program as it stands now. But I am a very strong proponent of the peer review system. Proposals, in my opinion, should be reviewed by those people who are recognized experts in the area. And this is especially true, when a proposal gets into far out kinds of ideas that the OWRT staff may not have experience with.

Senator DOMENICI. If the bill is not very expressive on that point, you would suggest that we write in some language which would provide for peer review on the screening process?

Mr. BAHR. That would, I think, be a very good idea.

If I can proceed now with the next aspect of my statement. The State of New Mexico, as I am rapidly finding out, does have major problems with saline and brackish water. One feature of this bill, is that it integrates saline water research with the total water management program. There are many, many communities, small communities, that are very seriously constrained in their development by having inadequate supplies of fresh water for municipal use.

In fact, there are some communities in New Mexico that have drinking water quality that is, quite frankly, raunchy; exceeding recommended public health standards fourfold or fivefold—2,000 parts per million total dissolved solids. That is pretty poor quality water.

In view of more stringent drinking water quality standards coming out now these communities are going to have to turn to more advanced water treatment technology. There are not available supplies for exam-

ple, in certain parts of the Tularosa Basin and I am sure some other States may share this problem.

It is clear the demonstration program can really be helpful here in initiation of a full-scale demonstration of the more recent developments in the desalting technology. Such demonstrations are needed to provide confidence to not only the suppliers of equipment but also the potential users.

I would hope that the language of the bill, as I indicated in my written statement, would not abandon that earlier commitment to the saline demonstration program. As a director of a research institute, I ask how the demonstration program relates to research. Well, I have developed a lot of familiarity with biological processes for water treatment. I have seen algae and aquatic weeds do some pretty fantastic things. I think we need further research in biological treatment processes related to saline demonstrates programs especially in the pretreatment of water prior to its entering a full-scale desalting facility. It doesn't take a high concentration of certain chemicals to really disrupt some of the processes in desalting membranes. Here is where research ties very closely with the demonstration.

Senator DOMENICI. So, you are suggesting for certain aspects of desalting we might have preliminary cleanup that might be biological?

Mr. BAHR. Correct. As an example, I have seen waste water recycling and reuse schemes developed in the State of Michigan, in which you can remove in excess of 95 percent of the nitrate from the water very simply through the process of photosynthesis and other biological processes that occur in the water.

These are things that have to be explored first. One more point here is that there are, of course, very large supplies of brackish to saline ground water in New Mexico. I think these waters may be used directly for some beneficial purposes. We have initiated programs to look at the development of salt water in this regard.

We are for example, initiating programs to develop new strains of bacteria that are resistant to salt and are symbiotic with alfalfa.

We have some other ideas here that we have been talking about in New Mexico on the direct use of brackish and saline water. Some, I think, are very exciting. For example, using the water for aquaculture of certain fish and beneficial seaweeds. These are programs, some of which have been practically proven even already, and some need other investigation at this time.

So I think the sky is the limit in the development of saline and brackish resources in the Southwest of the United States.

Senator DOMENICI. Do you have an opinion as to what the reasonable dollar level for OWRT research program should be? It is between $12 and $13 million now, as you know.

Mr. BAHR. I have a different perspective on that question. I know what we could effectively spend at the State level, both in New Mexico and from my experience in Michigan.

If our base budget were doubled or tripled, we would effectively spend it on good projects.

Senator DOMENICI. Thank you very much. Are you enjoying your work?

Mr. BAHR. Very much so. Very much so.

Senator DOMENICI. They dry climate hasn't adversely affected you.

Mr. BAHR. Not at all.

Senator DOMENICI. Is Mr. Fairchild here?

You are with the Department of Water Resources with the State of California?

STATEMENT OF GUY FAIRCHILD, DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA

Mr. FAIRCHILD. Yes, sir.

Senator DOMENICI. Delighted to have you.

Mr. FAIRCHILD. I have a statement to submit for the record which I will discuss. (See p. 320.) The recent drought in California certainly has highlighted the need for California to make better use of our water supplies and also to make additional water available.

The department of water resources has legislative authority to participate, cooperatively, both financially and from a working standpoint, with the Federal Government in such programs. We have a rather long record, which is discussed in our statement, of participating with the Federal Government in various saline water research and demonstration projects.

In California, probably as much as anywhere, water is the lifeblood of our whole economy and our way of life. In order to satisfy our water needs we must continue to improve management procedures. For example, we recently conducted a $600,000 study of water conservation because of the effect of the recent drought. We made available in certain areas, water conservation devices for installation in homes. From the information we gathered from this inventory, we found that if just 30 percent of the people in California would practice adequate water conservation in their homes, that there would be something like an annual savings of $30 million in energy costs and 110,000 acre-feet of water. So, these are the water management procedures that we are emphasizing in our present programs.

California is very actively working on the next major phase of the State's water resources program. The heart of this program is conservation and reuse of water. This is a $3.5 billion program that is now before the State legislature.

To summarize, we have an interest in, and a history of working with Federal agencies in desalting and reuse of water. We ask the committee to support authorization of funds for additional demonstration programs.

I would answer any questions that you might desire.

Senator DOMENICI. We appreciate your testimony.

If I understand you correctly, you are one of those who feels that we ought to proceed with additional demonstration projects in saline brackish water cleanup; is that right?

Mr. FAIRCHILD. Mr. Chairman, we have to proceed in some fashion. We think that this certainly is a proper program. Considering the amount of money that the State of California spends on water supplies each year, we strongly support a substantial program for research and development to better utilize available supplies, including desalting of brackish water.

Senator DOMENICI. Thank you very much.

Senator DOMENICI. May we have Mr. Hanbury from Virginia Beach?

27-696 O - 78 -10

STATEMENT OF GEORGE HANBURY, CITY MANAGER, VIRGINIA BEACH, VA.

Mr. HANBURY. Mr. Chairman, thank you.

You heard from New Mexico and California as having inadequate water suplies. I would like to address a subject you are probably not familiar with, and that is water supplies on the east coast.

Virginia Beach, Va., is the second largest city in population in Virginia. We were created in 1963 into a county merger. At the present time our population is 255,000, and we have been growing at the rate of 1,000 people a month.

Virginia Beach has had a tremendous problem in water shortage because of our topography. Our average elevation is 6 feet. Anything above 6 feet is high ground in Virginia Beach. It is nothing but brackish water and salt water. We have all of the attributes you are looking for in the desalinization projects.

Last summer during the drought that California and New Mexico experienced, so did the east coast experience. We had, first, voluntary conservation measures, and then mandatory conservation measures, and enforcing them with major fines, and in some instances possible jail sentences.

We got down to a minimum of 45 days left for almost a quarter of a million people with no water whatsoever, and almost 1 million people in our region with no water source.

So, the west coast is not the only region that has a problem with water. Our Congressman supports us in that position. I hope our Senators support us in this position. We have had a tremendous unnerving experience to find water.

All of our sources are outside our jurisdictional limit. They are either counties to the west that wish not for us to acquire a fresh water source; cities to the north that will not let us have sources; or the State of North Carolina on the south that won't allow us to tap their sources. We have no way to go except to the east and the Atlantic Ocean.

We will expend this year and the coming year over $250,000 in order to find new sources of water. I was interested in your comments about the entire State of New Mexico and the sums they expended. The Council of Virginia Beach has expended large funds, as well.

We are desperate. We support the pilot program. We need, however, not only a pilot program to solve short-term problems, but we need to look at the long-term answers. If you grant a desalinization program in Virginia Beach, it won't be just to solve short-range problems, and we will be working for the future and trying to find the answer to see that there is a source of water.

We recognize what the act stated, as you have so vividly pointed out. I was glad the Assistant Secretary recognized the importance of it. However, because of the competition—we realize hardly anybody thinks Virginia has a water shortage problem—we are willing to take any sums that we could get up to 50 percent.

We feel that in that way we could separate the men from the boys and show you we have a desperate problem in Virginia Beach. We have engineering firms to make all types of studies, and we feel the only source is desalinization.

Senator DOMENICI. Thank you very much. Your written statement will be made part of the record. (See p. 327.) And we appreciate your remarks.

Mr. HANBURY. Thank you.

STATEMENT OF MICHAEL BELLANCA, DEPUTY EXECUTIVE DIRECTOR, VIRGINIA WATER CONTROL BOARD, RICHMOND, VA.

Mr. BELLANCA. My name is Michael Bellanca. I am deputy executive secretary of the Virginia Water Control Board, here also in support of the desalinization program which OWRT is undertaking, and specifically in support of the program being advanced by our city of Virginia Beach.

It is the fourth fastest growing city in the United States. Mr. Hanbury has alluded to the fact that on all sides they are surrounded by water. I think he failed to mention that underneath they are faced with nothing but brackish water.

In addition to the approximately $250,000 which the city has put into a water supply study program, and also the saline water program in the past 2 years, they have also gone so far as to spend $110,000 to test the ground water aquifers to determine their content, salinity, and actual stability.

The Corps of Engineers northeast water supply study back in 1975 spoke to the portion of southeastern Virginia, of which Virginia Beach is one of the largest entities. We are currently undergoing a study, through the State water control board, of the water supply problems of the southeast, as well as those in northern Virginia.

We are very much involved in the Potomac allocation agreement, and can attest to the fact that we in Virginia do have water supply problems of our own. Unfortunately, Mr. Chairman, the traditional methods which have been available to solve the water supply problem, we believe are no longer there and no longer available in the short time frame in which we need to solve the water supply problem such as experienced by Virginia Beach last summer. Their usage was 20 million gallons a day, and projected to be somewhere in the neighborhood of 70 million gallons a day by the year 2030. They are, in a sense, at the crunch point. We feel desalting technology programs being advocated by this committee and OWRT are absolutely essential to put water supply in perspective with the time frame needed.

Mr. Chairman, we can support Virginia Beach and the thrust of this subcommittee, and we hope that the funds will be advanced now for the short-term as well as for the long-term solution. Thank you very much.

We would be pleased to answer questions. I have submitted a more detailed supplementary statement which will accompany my remarks. (see p. 344.)

Senator DOMENICI. I would appreciate it if the Virginia witnesses would make specific reference to demonstration project funding to their respective Senators. And we would like to solicit their support when we go before the Appropriations Committee. And if you can see that they are reminded of it specifically, we would take their communications with us when we go there and it would be helpful.

All right. Thank you very much.

Senator DOMENICI. Next we will have Mr. William Whipple, Mr. Hall, Mr. Cline, and Mr. Walker. Mr. Walker is accompanied by Mr. Evans.

STATEMENTS OF WILLIAM WHIPPLE, JR., CHAIRMAN, UNIVERSITIES COUNCIL ON WATER RESOURCES, NEW BRUNSWICK, N.J., ACCOMPANIED BY MILLARD W. HALL, EXECUTIVE SECRETARY, LINCOLN, NEBR.; NEIL CLINE, ORANGE COUNTY WATER DISTRICT, REPRESENTING NATIONAL WATER SUPPLY ASSOCIATION, FOUNTAIN VALLEY, CALIF.; AND WILLIAM R. WALKER, CHAIRMAN, NATIONAL ASSOCIATION OF WATER INSTITUTE DIRECTORS, BLACKSBURG, VA., ACCOMPANIED BY NORMAN A. EVANS, VICE CHAIRMAN

Mr. WHIPPLE. Thank you, Mr. Chairman. My name is William Whipple, Jr. I am the director of the Universities Council on Water Resources, and I have been associated with the Abiquiu Dam in New Mexico.

Senator DOMENICI. How did you get involved in that?

Mr. WHIPPLE. The Corps of Engineers at that time.

Senator DOMENICI. Have you seen it recently?

Mr. WHIPPLE. Not for some time.

Senator DOMENICI. Beautiful. Whatever your role was, it turned out tremendously.

Mr. Whipple, you understand we have a time problem, so if you can expedite your testimony, I will appreciate it.

Mr. WHIPPLE. I will be brief and submit it for the record. (See p. 420.)

I am here representing the University Council of Water Resources, an association of 84 universities of which I am currently chairman. We are gratified for the first time in a good many years to have the support of the administration for water research programs, including the Office of Management and Budget and the Assistant Office of the Secretary, as well as OWRT.

We are not under the impression that they are going to do everything we want. In fact, some of the universities are quite uncomfortable with the increasingly competitive nature. But at the same time, we feel generally this is a big step forward. The Universities Council on Water Resources already last summer recognized some additional focus would be required in Federal programs. And we adopted a resolution at that time urging, in addition to the current pogram, there be consideration of the new areas which have not been given sufficient attention, which lie in the area of interagency concerns.

And I will speak more to this a later on. One particular area we want to talk about is the urbanized areas. The first of the focus area, in water reuse, has already been put underway, and also the subject of water conservation, obviously an area of major interest to the administration.

At the same time, I would like to enter a plea that in endorsing this new focus on these big national problem, we not forget the problems of the local agencies. We are faced with additional functions which we are called on to perform. The emphasis on technology transfer, for example. The administration is calling for competitive awards in

technology transfer, which we think is a fine idea. But in addition to that, every State every year needs technology transfer and this has to come out of their allotment funds; $110,000 is totally inadequate to carry on the research program, to administer the institutes and to carry on the new functions of technology transfer.

The other funds recommended by the bill authorization included matching fund research projects and activities authorized by sections 105 and 109. However, other university colleagues will testify and request a $10 million authorization in each of these two headings. We agree with this as a long-term goal. But for the current year, our recommendations are more modest.

I would like just a minute to discus the focused area of water problems of urbanizing areas. I found other States with areas that have been developing rapidly. Not the big cities, but in-between areas. They are faced with problems of development and big industries. They do not have adequate staff. They are faced with problems of flood control, water supply problems, and then have a necessity of reconciling land-use planning and local public health programs. Frankly, the Federal agency programs have missed the point of some of these local problems.

We think problems of urbanizing areas have been inadequately represented. I have worked with colleagues now across the country. We formed an ad hoc group to push this, including representatives from California and Colorado, because we find those States also have the problem of urbanization. They want to work with us to do this.

We have several Federal agencies holding research programs this summer to put these things together. We have the support of not only OWRT and the Water Resources Council, but EPA and the Soil Conservation Service. And we now have funding, combined funding, from these agencies to hold a conference with the expressed plan of putting together the focus of what we think is an additional research program.

We are asking the authorization be increased by $1 million each for matching funds and for additional research to provide for this over and above the administration request. The administration request includes this area, but could not afford to put very much money on it. We would like to make a major start on what constitutes a major problem.

I talked to several of my Congressmen in nearby areas about this matter and received favorable comments including Senator Williams.

I would like to introduce those comments into the record.

[The comments referred to follow:]

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United States Senate
COMMITTEE ON HUMAN RESOURCES
WASHINGTON, D.C. 20510

December 12, 1977

General William Whipple, Jr.
Director
Water Resources Research Institute
Rutgers University
P.O. Box 231
New Brunswick, NJ 08903

Dear General Whipple:

Thank you for your letter expressing your renewed interest in obtaining federal funds to initiate a major national research effort into land/water problems of urbanization.

My staff assistant, Richard O'Connor, has been keeping me apprised of the consequential research being conducted by the Water Resources Research Center under your leadership and the beneficial impact your work will have on New Jersey, the most urbanized State in the country.

I would be more than happy to contact the appropriate members of the Senate Appropriations Committee in support of your interest in amending the OWRT budget for fiscal year 1979, as to include the dollars necessary to initiate this research project.

I will be back in touch with you once I have contacted Senator Case, for the purpose of coordinating our efforts on your behalf.

With best wishes for a Happy Holiday Season,

Sincerely,

Harrison A. Williams, Jr.

HAW:rots

MILLICENT FENWICK
5TH DISTRICT, NEW JERSEY

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2 March 1978

Mr. William Whipple, Jr.
Director
Water Resources Research Institute
Cook College Campus
P. O. Box 231
New Brunswick, New Jersey 08903

Dear Mr. Whipple:

I have read your most interesting proposal concerning the "Water Problems of Urbanization."

I quite agree with you for the need for co-ordination in developing a sound water policy and your ideas are certainly a step in the right direction. If you let me know how you would like me to help -- I will be happy to join in.

With all good wishes,

Sincerely,

M. Millicent Fenwick

MILLICENT FENWICK
Member of Congress

MF:hmv

FRANK THOMPSON, JR.
4TH DISTRICT, NEW JERSEY

EDUCATION AND LABOR
CHAIRMAN, SUBCOMMITTEE ON LABOR-MANAGEMENT RELATIONS

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March 2, 1978

Mr. William Whipple, Jr.
Director
Rutgers
The State University of New Jersey
P. O. Box 231
New Brunswick, New Jersey 08903

Dear Mr. Whipple:

I have your letter in which you advise of the Institute's hope of getting federal funding for a new program to attack the water problems of urbanizing areas.

I am fully in agreement with the thrust of your effort. In recent weeks, I have been contacted by the governing bodies of Lawrence Township, the Borough of Spotswood, and the Mayor of Monroe Township concerning flood problems relating to the Shabbakunk Creek, the Matchaponix and Manalapan Brooks. I am quite certain in my own mind that the increasing urbanization of central New Jersey is responsible in large part for the problems related to me.

While I shall not attempt to comment on all of the points that you have raised in your proposed program, I should think that detention basins alone would occupy a goodly amount of study. It seems to me that developers ought to be brought to a higher standard of responsibility for groundwater runoff in the areas that they place under construction.

In any case, I am prepared to help in any way that I can. I would ask that you advise me of the appropriate time and alert me as to specific ways in which I can be helpful.

I would suggest at the outset that you bring our New Jersey Washington Office into this effort if you have not already done so.

Kind regards.

Cordially,

Frank Thompson, Jr.

ROBERT A. ROE
8TH DISTRICT, NEW JERSEY

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March 2, 1978

Mr. William Whipple
Director
Water Resources Research Institute
Rutgers University
P.O. Box 231
New Brunswick, New Jersey 08903

Dear Mr. Whipple:

I have received your communication and the attached scope paper on "Water Problems of Urbanization".

The proposal is certainly interesting and innovative. Using the combined talents of a consortium of universities should produce some constructive ideas and approaches to our urban water problems. Upon receipt of your letter I discussed your proposal with the Chairman of the Subcommittee on the Interior of the House Appropriations Committee urging that it be given serious and favorable consideration. He advised me that Mr. Garey Cobb and other state delegates are scheduled to testify before the sub-committee when it begins hearings on the Interior Appropriations Bill.

He assured me that the water urbanization proposal of the universities will be given every consideration.

Be assured that I shall continue to give this matter my attention and efforts.

With all good wishes.

Sincerely,

Robert A. Roe
Member of Congress

Senator DOMENICI. Your prepared statement goes through the bill in terms of the university position in detail, does it not?

Mr. WHIPPLE. Yes, sir.

Senator DOMENICI. We will be interested in that you are speaking for them with reference to the bill as it applies to universities and institutes.

Mr. WHIPPLE. Yes, sir, Senator.

Senator DOMENICI. Mr. Hall is with you; is that correct?

Mr. HALL. Yes, sir.

Senator DOMENICI. Did you want to add anything, Mr. Hall?

Mr. HALL. If I have the time, sir.

Senator DOMENICI. Let's do it very quickly, then.

STATEMENT OF MILLARD W. HALL

Mr. HALL. I would like to say that I do have a prepared statement (see p. 425). I will confine my remarks, however, to a summary of areas with regard to the proposal bill that my able colleague did not emphasize.

One is the technology transfer area. It is an area that I have been involved in directly for some time as director of the Nebraska Water Resources Center. I can tell you that there is a need for both institutional support in technology transfer, and for considerable expenditures in programmatic support.

We in Nebraska have a continuing program funded by the State. And in this last summer we were able to use that program, with project money received from the U.S. Bureau of Reclamation, to do some exciting things with regard to irrigation scheduling and irrigation water conservation in the State of Nebraska.

The other point I would like to make is with regard to the saline water program, which I understand you have heard a lot about already this morning. The universities in general don't feel competent, nor do I, to address this issue, which, it appears, chiefly involves decisions about large-scale demonstration of desalting technology.

Last summer, the Universities Council on Water Resources, which I serve as executive secretary, did pass a resolution in support of the saline water program. And the saline water program reflected in this bill is the one that we have been talking to the administration about, and with which we feel comfortable.

My statement will stand for itself.

Senator DOMENICI. Thank you. We will make it part of the record.

Senator DOMENICI. Mr. Cline?

STATEMENT OF NEIL CLINE

Mr. CLINE. Thank you, Senator. I have a statement I have submitted, which I will summarize (See p. 433.)

Our association is the National Water Supply Association. It shares the mutual interest of solving water problems with technical methods. For the past several years, our association has been very disappointed since the old saline water program was reduced and discarded by Interior.

We are encouraged by the apparent change in attitude by the Department of the Interior. We think S. 2704 submitted by the Depart-

ment seems to cover most of the points we made with respect to the revitalization of the desalination program. But we have some suggestions to make which we respectfully request the committee to consider.

Authorized funding levels in the bill are considered by NWSIA to be too low in some categories, especially with respect to demonstration projects. As proposed, the amounts hardly seem to bear out the forecasts of the revival of a hard-hitting program.

While the reorganization of the OWRT is not appropriately before this committee in the bill under consideration, a new organization chart has been supplied by the Department in connection with the 1979 budget justification. We are not convinced that sufficient staff is being sought to carry the program forward at desirable levels.

Senator DOMENICI. You are agreeing with me that the rhetoric isn't matched up with the dollars?

Mr. CLINE. That is right.

We hear a lot of enthusiam, but don't see a lot of action.

We feel that Congress should conduct meaningful oversight hearings that are at shorter intervals to assure the program was on track.

We heartily endorse the Federal efforts to clean up the Nation's water supply, but we imagine the United States should, at the same time, in order to be consistent, stimulate the necessary research and development, an improve the methods to make the pollution control economically and mechanically achievable.

We believe that the demonstration should be conducted by a national agency. We note under this bill, OWRT has this authority.

Out in California we invested $4 million in the program and the Federal Government contributed about $5 million and walked away before the program was completed. The Secretary mentioned it as a disaster, and I would agree it was a disaster. We are working with the current administration to develop a program that will solve our local inconvenience, and provide a national benefit.

We just believe that the activities of title I require a full staff, and because of lack of staffing, the desalting program was virtually abolished during the last administration.

Senator DOMENICI. We will make your entire statement part of the record.

In the bill that we passed last year with respect to demonstration projects, we had the localities providing water supply rights-of-way, power source connection, brine disposal facilities. Is that a fair showing of local good faith, as you would view it?

Mr. CLINE. I think that it is appropriate to show good faith.

Senator DOMENICI. And it is doable?

Mr. CLINE. For sure, it is.

Senator DOMENICI. Thank you very much.

Let's see, we have one witness left; is that correct?

Mr. Walker?

STATEMENT OF WILLIAM R. WALKER

Mr. WALKER. Right.

I am representing the National Association of Water Institute Directors. I have a statement for introduction into the record. (See p. 443.) I also have a statement from Dr. Calhoun (p. 473), who is execu-

tive vice chancellor for programs, the Texas A. & M. University, representing the National Association of State Universities and Land Grant Colleges.

Senator DOMENICI. We will make those statements part of the record, sir.

Mr. WALKER. I would like to address specifically the most recent bill introduced—S. 2826. First of all, I think it is important that the national network of water institutes be strengthened and maintained. It is our feeling that $150,000 in Federal funds is essential to maintain minimum types of research, information dissemination, and training programs in each State. But this $150,000 alone will not do it. Each one of the States will contribute an additional $150,000 necessary to have a "critical mass" for a viable program.

There have been comments in the past that since water problems are not distributed equally among the States, this should be accounted for in allocating funds. We have therefore introduced language to make available an additional $100,000 to those institutes with severe water problems. The funds are contingent on the Secretary of Interior's approving their specific program and the States' providing a match of one non-Federal for each two Federal dollars. An example of such a specific program might be the 5-year plan developed for Virginia, which reflects what the State agency representatives, planning district personnel, members of the industrial community, and concerned citizens said were needed in addressing our water and land related problems.

In the matching fund program, we recommend that the authorization be raised to $10 million. This appropriation is absolutely essential if we are to make any appreciable impact on such important problems as conservation. In the West we are talking about irrigation efficiency, while in the East we are concerned with conservation, primarily in terms of industrial or domestic use. Another example of such large problem areas concerns urbanizing areas, which General Whipple spoke about earlier. These exist along our east, gulf, and west coasts as well as in the Great Lakes. The man from Virginia Beach spoke very eloquently about the problems facing local governments. They plainly don't have the expertise and the funding to address such problems as flooding and nonpoint sources of pollution in the urbanizing areas. They look to the water institutes as a focal point to help them resolve these kinds of problems. Recent climatic conditions have pointed up the need for contingency planning for droughts and floods.

In the title II program, we recommended that the funding remain at $10 million. We recognize there are certain kinds of problems that the private sector is better able to address than are universities. Combination of universities and private contractors can make an effective team to work on some problems.

In the area of technology transfer, funding must be continuous in order to have an effective program of information dissemination. The universities' experience in dissemination of agricultural information over the past 50 years shows that a minimal type of program requires an expenditure of $75,000 at present dollar values. We think every institute needs that kind of capability. It is my personal feeling that although we have answers to many of our water problems, the decision-makers aren't aware of them. It is imperative for this Nation to have

that kind of information available. But the information is not received simply because there is no "pipeline" to transmit it—the information is available in unusable form or it arrives too late in time. This problem must be addressed, and the water institutes are ideally suited to perform this essential function.

In the area of saline conversion, most of our universities have not had an active program. Notable exceptions are the universities in New Mexico and California. Therefore, it would not be appropriate for us to suggest a specific funding level for this program.

We certainly believe in the concept of accountability. But I think a 2-year authorization period is too short for this kind of program. I agree with Mr. Cline that 5 years is more realistic.

If you look at my testimony for the record, you will see a comparison of the current enabling legislation with that being proposed by the administration, and that recommended by the National Association in Senator McClure's bill S. 2826.

Senator DOMENICI. Thank you very much. We will make the statement part of the record. We appreciate your taking time to come down to be with us.

I am very interested. You seem to have a handle on research. Why couldn't Virginia Beach get some fresh water from some of the surrounding areas. It is none of my business, but——

Mr. WALKER. We are working on that particular area. We have a problem with interbasin transfer. This area doesn't have a good surface water source and its ground water source in some cases is brackish. We are worried about the current level of pumping and its possible consequence of saltwater intrusion.

Senator DOMENICI. Thank you very much.

Is Mr. Williamson here?

He is testifying before the House. We have a letter signed by 10 Senators and one from Senator DeConcini with his comments and an attachment from the Governor of Arizona. Also, a mailgram from the Governor of Idaho, and letters from the State of Wisconsin, Department of Natural Resources, Utah State University, and the DuPont Co. They will all be made part of the record.

[The letters follow:]

HENRY M. JACKSON, WASH., CHAIRMAN
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JAMES ABOUREZK, S. DAK.
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DALE BUMPERS, ARK.
WENDELL H. FORD, KY.
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SPARK M. MATSUNAGA, HAWAII
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JAMES A. McCLURE, IDAHO
DEWEY F. BARTLETT, OKLA.
LOWELL P. WEICKER, JR., CONN.
PETE V. DOMENICI, N. MEX.
PAUL LAXALT, NEV.

GRENVILLE GARSIDE, STAFF DIRECTOR AND COUNSEL
DANIEL A. DREYFUS, DEPUTY STAFF DIRECTOR FOR LEGISLATION
D. MICHAEL HARVEY, CHIEF COUNSEL
W. O. CRAFT, JR., MINORITY COUNSEL

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, D.C. 20510

March 23, 1978

Honorable Mike Gravel
Chairman
Subcommittee on Water Resources
Senate Environment & Public Works Committee
Room 4200
Dirksen Senate Office Building

Dear Senator Gravel:

We write to support the authorization for FY 1979 in S. 2701, the amendments you have introduced to the Water Resources Planning Act of 1965, for the Water Resources Council and the River Basin Commissions. As you know, this legislation is necessary because the Council and Commissions terminate at the end of fiscal year 1978, unless reauthorized.

In anticipation of the recommendations from both the President's National Water Policy Review and the President's Reorganization Project, we believe it is important that the Council and the River Basin Commissions continue in existence at least until both the President and Congress have had an opportunity to review and act on those recommendations.

Our states are members of the Upper Mississippi River Basin Commission and have and will continue to benefit from the work of that Commission. The Upper Mississippi River Basin Commission has effectively resolved interstate conflicts and has negotiated agreements for the construction of dikes on the Red and Bois de Sioux Rivers. The Commission has also established the Great River Environmental Action Team, which has produced significant interagency cooperation and coordination among state and federal agencies in the Upper Mississippi River main stem, including the resolution of certain environmental concerns about the dredging projects of the U.S. Army Corps of Engineers.

The work of the Water Resources Council should be continued because of the assistance it provides our states. This assistance includes the Title III grant program that supports state water management programs, the Council's work in the floodplain management area including implementation of Executive Order 11890, and the technical and information assistance provided to the states through the Second National Water Assessment.

We urge your Subcommittee to favorably report the extension of the Water Resources Council and River Basin Commissions, as provided for in S. 2701.

Sincerely,

Muriel Humphrey
Muriel Humphrey
U.S. Senator

Wendell R. Anderson
Wendell R. Anderson
U.S. Senator

Gaylord Nelson
Gaylord Nelson
U.S. Senator

William Proxmire
William Proxmire
U.S. Senator

John Culver
John Culver
U.S. Senator

Dick Clark
Dick Clark
U.S. Senator

Adlai Stevenson
Adlai Stevenson, Jr.
U.S. Senator

Charles H. Percy
Charles Percy
U.S. Senator

Tom Eagleton
Thomas Eagleton
U.S. Senator

John Danforth
John Danforth
U.S. Senator

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PAUL LAXALT, NEV.
ORRIN G. HATCH, UTAH
MALCOLM WALLOP, WYO.

FRANCIS C. ROSENBERGER
CHIEF COUNSEL AND STAFF DIRECTOR

United States Senate
COMMITTEE ON THE JUDICIARY
WASHINGTON, D.C. 20510

April 6, 1978

The Honorable Mike Gravel
Chairman, Subcommittee on Water Resources
Committee on Environment and Public Works
United States Senate
Washington, D. C. 20510

Dear Mike:

I would like to express my support for S. 2701 which would extend the authorization of the Water Resources Planning Act of 1965 for an additional year.

I would, however, urge the committee to also consider extending the $5,000,000 authorization under Section 301(a) of the Act. I realize that the state programs have been funded at the $3,000,000 level, but I believe that the greater demands on the state commissions justify the higher authorization.

With deep appreciation for your consideration.

Sincerely,

Dennis

DENNIS DeCONCINI
United States Senator

DDC/JJX

cc: The Honorable Bruce Babbitt
Mr. Wes Stiener

KEL FOX, CH.
JOHN L. LEIBER, V. CH.
WESLEY E. STEINER
EXECUTIVE DIRECTOR
AND
STATE WATER ENGINEER
VICKIE MOONEY
SECRETARY

WESLEY BOLIN, GOVERNOR

Arizona Water Commission

222 NORTH CENTRAL AVENUE, SUITE 800
Phoenix, Arizona 85004
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MARSHALL HUMPHREY

April 3, 1978

The Honorable Mike Gravel
Chairman
Subcommittee on Water Resources
of the Senate Committee on
Environment and Public Works
3317 Dirksen Senate Office Bldg.
Washington, D.C. 20510

Dear Chairman Gravel:

It has just come to my attention that the Subcommittee on Water Resources will hold hearings on April 7 on S. B. 2701, extending the Water Resources Planning Act of 1965 for a one year period and appropriating necessary funding. It will not be possible for me to attend the meeting. I would appreciate very much, however, having the views presented herein for the State of Arizona brought to the attention of the Committee and made a part of the official record of the hearing.

The Arizona Water Commission, as the State agency charged with water resource planning, has worked closely over the years with the staff of the Water Resources Council and has been the recipient for the State of Title III grants. The Commission is actively involved in the allocation of Arizona's remaining entitlement in the Colorado River, in the formulation of a State water plan, and in the performance of technical studies of our groundwater basins as support for the newly formed Groundwater Management Study Commission charged with proposing new groundwater law for the State. The Water Resources Planning Act of 1965 has materially expanded our planning capability and has proven of inestimable value to the State. Hence, we urge its continuation.

27-696 O - 78 - 11

The nation's water problems have not lessened. They are more critical and complex today than they were in 1965 when the Water Resources Planning Act was first authorized. In addition, Congress and the Administration have increased the magnitude and complexity of the planning effort that the states must provide through the imposition of multi-objective planning criteria and massive water quality and environmental planning requirements. While these requirements are both necessary and desirable they have increased materially the planning effort that we must make. Hence, we believe that a higher level of support is justified than has been proposed in the President's budget.

We urge that you increase the level of the Title III grant funding of Section 1 (d) from $3 million to $5 million.

Thank you for the opportunity to comment.

Sincerely,

Wesley E. Steiner
Executive Director

OFFICE OF THE GOVERNOR ZB
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BOISE ID 83720

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SENATOR MIKE GRAVEL
SENATE OFFICE BLDG
WASHINGTON DC 20510

THE WATER AND POWER SUBCOMMITTEE OF THE HOUSE INTERIOR AND INSULAR HOUSE COMMITTEE AND THE WATER RESOURCES SUBCOMMITTEE OF THE SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE WILL SOON HAVE BEFORE THEM S.2071 AND H.R.11655 EXTENDING FOR ONE YEAR THE WATER RESOURCES PLANNING ACT. AS PRESENTLY DRAFTED, THAT LEGISLATION WOULD REPRESENT A $6,392,000 DECREASE IN FUNDING FOR THE WATER RESOURCES COUNCIL, RIVER BASINS COMMISSION AND TITLE 3 GRANTS TO THE STATES. THAT DECREASE IN FUNDING WILL SEVERELY RESTRICT THE FEDERAL-STATE WATER RESOURCES PLANNING FUNCTION THAT HAS PROVEN VERY VALUABLE TO IDAHO AND PACIFIC NORTHWEST. THE FORMULATION OF WATER RESOURCES MANAGEMENT PLANS IS BECOMMING INCREASINGLY CRITICAL AND WATER RESOURCES PLANNING ACT HAS BEEN EFFECTIVE VEHICLE FOR UNITS OF GOVERNMENT TO WORK TOGETHER FOR THE FUTURE WATER NEEDS OF ALL CITIZENS. A FUNDING REDUCTION WOULD COUPLE THAT IMPORTANT EFFORT, AND I URGE YOUR SUPPORT OF A RENEWAL OF THE ACT AT CURRENT FUNDING LEVELS.

JOHN V EVANS, GOVERNOR OF IDAHO

19:33 EST

MGMCOMP MGM

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Anthony S. Earl
Secretary

BOX 7921
MADISON, WISCONSIN 53707

April 5, 1978

IN REPLY REFER TO: 8200

Senator Mike Gravel, Chairman
Environmental & Public Works Subcommittee
on Water Resources
U.S. Senate Office Building
Washington, D. C.

Dear Senator Gravel:

I regret that the State of Wisconsin could not be represented at the April 7, 1978 hearings of the Senate and House of Representatives regarding the one year extension of the Water Resources Planning Act (75 Stat. 244). In lieu of our appearance, I am sending this letter in support of S. 2701 which proposes the one year extension.

Since 1966, Wisconsin has received financial assistance through Title III of the Water Resources Planning Act which authorizes grants to states to assist them in developing and participating in the development of comprehensive water and related land resources plans. This grant program has been invaluable in developing the Water Resources Planning Program in the State of Wisconsin. Title III assistance has enhanced coordination between state government and the Great Lakes and Upper Mississippi River Basin Commissions, which together cover the state. It has also facilitated the development of water resources management studies of great utility for comprehensive water resources planning.

The continuation of the Title III grants program is essential to state participation in regional and interstate planning such as the comprehensive coordinated joint planning process that both basin commissions are now undertaking, and the recently completed national water assessment. The expiration of the assistance program would have an adverse effect on our ability to play a role in regional and national water planning.

The continuation of the Title III grants program is also essential to the development of comprehensive long-range water and related land resources planning studies by the state. A wealth of new information about Wisconsin's water resources has been generated and has direct application to water resources management. Needed research has been undertaken and as a result, better decisions have been made. The Title III grant program has allowed the State of Wisconsin to undertake the analysis of water resources management issues whose complexity and magnitude would have otherwise prohibited thorough and thoughtful examination. For example, Wisconsin recently utilized Title III funds to complete a ground-breaking computerized inventory of the land use along our lakes and streams. This is one of the first such efforts in the

nation and is already being utilized as a major planning tool in the design of the nonpoint source water pollution control program. Similarly, the Governor of Wisconsin recently signed into law a bill calling for the inventory of Wisconsin's wetlands for the purpose of protecting these fragile resources. Thanks to the Title III grant program and state matching funds, we not only have several completed studies of wetland use, policy and law available to us to design an effective protection program, but we also have the capability to employ computerized wetland inventory and mapping techniques.

Our state needs the assistance of a strengthened Title III program. If we are to continue with the job we have started, we cannot have a diminished or curtailed support program. Much of our progress in the area of developing planning tools, techniques and information is contingent upon Federal matching dollars. To date, these dollars have not been adequate to support many of our water resources planning activities. I support, and have asked the Wisconsin Congressional Delegation to support, legislation which would extend the Title III grant program indefinitely. Accordingly, I support and urge passage of S. 2701 to extend the Water Resources Planning Act for another year. Without this kind of assistance, I believe that our state and many sister states will be unable to play an effective role in regional and national planning and successfully protect and improve our nation's water resources.

Sincerely,

Anthony S. Earl
Secretary

cc: Representative Lloyd Meeds
Senator William Proxmire
Representative Robert Kastenmeier
Representative David Obey

UTAH STATE UNIVERSITY · LOGAN, UTAH 84322

OFFICE OF THE PRESIDENT

GLEN L. TAGGART
PRESIDENT

April 3, 1978

Senator Mike Gravel, Chairman
Committee on Environment and Public Works
Subcommittee on Water Resources
U.S. Senate Building
Washington, D.C. 20510

Dear Senator Gravel:

Utah State University has a vital interest in the proposed Water Research and Development Act of 1978 (H.R. 11226/S. 2704). When Congress passed P. L. 88-379 to create the Cooperative Federal-State water resources research program now administered through the Office of Water Research and Technology (OWRT), Utah State University already had established an international reputation in water research. Since ours is the second driest state in the union, Utahns have always had to manage our water resources very carefully. Good management must be preceded by sound research, and the State of Utah has responded to this need by appropriating amounts for water research at the University that have now reached about $800,000 annually.

No state, however, can perform the research needed to solve its water problems by acting alone. Since the OWRT program established a nationwide network of water research centers, cooperation through that network has provided a means for Utah to draw on research talent from every state in the country. Research results are exchanged more quickly, and researchers from several states are working cooperatively on common problems.

Page 60 of the November 1977 report to the House Committee on Appropriations on Water Resources Research Programs shows how Utah State has developed a level of expertise in water research that has been able to supplement the state appropriations and the $110,000 OWRT annual allotment with more funding from the competitive research programs of OWRT than received by any other state ($375,530). The total water research program (federal, state, and private support) is shown as the largest of any state in the union.

Two very important points need to be made. First, this research has contributed a great deal to solving the water problems of Utah and our inputs through the OWRT network have helped the other states of the union. Second, in addition to providing this valuable network, the OWRT program has made a very important specific contribution to our research accomplishment. A number of examples may help. The four or five research projects per year sponsored by OWRT allotment funds have, as just three of many possible examples, helped Utah communities manage their limited water supplies more efficiently during the recent drought, provided guidance for more effective water management to meet the needs of new energy producing industries, and developed a solar powered pump for irrigation usage. The additional OWRT funds obtained competitively have enabled much deeper probing into all of these issues as well as many others and have been an important complement to the overall program. Our state would lose an important resource without this support.

Accordingly, Utah State University endorses the efforts in H. R. 11226 (Meeds and Lujan) and S. 2704 (Gravel and Domenici) to correct past program deficiencies. Two of the most important deficiencies in our opinion are that categorical allotments were given to states that did not condition funding on performance and there has not been a funded program to convey research results to those who need it. While the remedies proposed in the bill will certainly make the national water research program more effective, their implementation puts the state water research centers in a very difficult position of making prescribed changes without any supplemental funding for implementation. A state as small as Utah cannot afford to divert any funds from our own priority state research needs to meet additional federal program requirements.

For this reason, Utah State University strongly endorses the amendments proposed by the National Association of State Universities and Land Grant Colleges (NASULGC) to the above bill in order to provide financial support for the program framework. The amendments provide for additional funding for the more successful centers which will become a strong incentive toward producing research results directly applicable to current state needs. The amended technology transfer program would provide funding that centers could use to get recent research results to users in their states rather than fund the centralized effort in Washington as provided in the bill as currently written. These efforts to meet state needs are balanced with a matching grant program in which the state and federal governments can share costs on projects of mutual benefit and a Title II program for federal funding of research on national problems. Overall, the amended bill provides for a balanced effort of federal-state cooperation in water resources research.

The NASULGC amendments relate only to the water resources research portions of the bill and not with the portions on "saline and other impaired waters." We strongly endorse the program on desalination research as originally written.

We would sincerely appreciate your support of the NASULGC amendments to H. R. 11226/S. 2704 to achieve a strong water research program for the future.

Sincerely yours,

Glen L. Taggart
President

Enclosures: 1. Page 60 of the November 1977 Report to the House Committee on Appropriations on Water Resources Research Programs
2. Comparison of OWRT Authorizations for Water Research
3. NASULGC Amendments

Page 60 of the November 1977 Report to the House Committee on Appropriations on Water Resources Research Programs

WATER RESOURCES RESEARCH INSTITUTES FUNDING DATA - FY 1976

	OWRT Funds	Other Federal Funds	Non-Federal Funds	Total Funding
Alabama	138,494	170,000	162,743	471,237
Alaska	110,000	-0-	50,000	160,000
Arizona	206,800	26,699	184,000	417,499
Arkansas	164,817	155,707	108,429	428,953
California	227,666	-0-	1,175,000	1,402,666
Colorado	466,821	170,500	232,039	869,360
Connecticut	121,179	42,118	379,921	543,218
Delaware	110,000	-0-	99,200	209,200
Dist. of Columbia	97,379	-0-	57,678	155,057
Florida	120,400	25,000	215,000	360,400
Georgia	163,000	-0-	249,000	412,000
Guam	40,000	-0-	9,700	49,700
Hawaii	137,263	121,385	411,310	669,958
Idaho	243,227	85,280	211,010	539,517
Illinois	217,370	-0-	430,035	647,405
Indiana	228,945	-0-	202,200	431,145
Iowa	191,778	-0-	257,815	449,593
Kansas	201,694	-0-	66,438	268,132
Kentucky	224,952	-0-	280,888	505,840
Louisiana	122,776	60,000	69,555	252,331
Maine	163,507	14,630	150,610	328,747
Maryland	138,327	-0-	270,320	408,647
Massachusetts	266,299	5,000	225,886	497,185
Michigan	182,312	466,727	480,365	1,129,404
Minnesota	163,159	-0-	111,654	274,813
Mississippi	110,000	-0-	78,669	188,669
Missouri	161,733	-0-	143,463	305,196
Montana	232,401	-0-	155,502	387,903
Nebraska	264,950	261,600	389,375	915,925
Nevada	291,845	545,039	391,785	1,228,669
New Hampshire	130,340	6,800	139,674	276,814
New Jersey	190,561	229,032	109,279	528,872
New Mexico	196,400	281,440	321,875	799,715
North Carolina	378,732	133,607	525,566	1,037,905
North Dakota	183,793	179,255	102,366	465,414
Ohio	228,900	123,300	458,800	811,000
Oklahoma	224,550	15,000	221,019	460,569
Oregon	180,900	77,302	105,300	363,502
Pennsylvania	269,650	135,105	868,931	1,273,686
Puerto Rico	110,000	-0-	40,000	150,000
Rhode Island	130,151	-0-	168,771	298,922
South Carolina	214,455	25,278	206,359	446,092
South Dakota	142,505	81,292	113,829	337,626
Tennessee	125,783	5,469	135,992	267,244
Texas	164,572	-0-	276,311	440,883
Utah	485,530	515,339	970,464	1,971,333
Vermont	110,000	19,000	89,643	218,643
Virginia	228,697	-0-	263,890	492,587
Virgin Islands	40,000	-0-	10,000	50,000
Washington	207,135	-0-	276,718	483,853
West Virginia	110,000	-0-	70,487	180,487
Wisconsin	270,000	775,000	447,000	1,492,000
Wyoming	316,183	393,823	478,130	1,188,136
TOTAL	$10,479,268	$5,263,420	$13,998,425	$29,741,113

OWRT AUTHORIZATIONS FOR WATER RESEARCH

	Current Act	NASULGC Proposed Act	Interior Proposed Act
Allotment	$ 250,000[1]	$ 150,000	$ 110,000[3]
(per institute)		100,000[2]	
Matching Grant	5,000,000[4]	10,000,000	4,000,000[5]
Title II	10,000,000[4]	10,000,000	Not Applicable
Research Development and Demonstration	---	---	3,200,000
Technology Transfer	0[6]	75,000[7]	750,000[8]
		50,000	
Saline Water	0	0	8,800,000[9]

1/ $250,000 per institute authorized; current appropriation is $110,000.

2/ This extra $100,000 would be available only if institutes satisfied certain conditions. It provides an opportunity for better institutes to have better funding.

3/ The allotment requires a non-Federal contribution of one non-Federal dollar for each two Federal dollars.

4/ The Matching Grant and Title II are not now funded at the authorized level.

5/ Matching funds would be available to both universities and private research organizations.

6/ Technology transfer is mentioned in current Act, but no specific funds authorized.

7/ $75,000 per institute would be provided to each institution and an additional $50,000 would be authorized for institutes that qualify.

8/ A total $750,000 is authorized, all of which would be on the basis of competitive grants with one non-Federal dollar required for each two Federal dollars as a cost sharing stipulation for these grants.

9/ In the proposed bill, Title II becomes the Saline Water part and Title I the old water resources research part of the Act.

NASULGC DRAFT AMENDMENTS TO THE WATER RESOURCES RESEARCH ACT OF 1964 (P.L. 88-379 AS AMENDED)

AN ACT

To establish water resources research centers, to promote a more adequate national program of water research, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That (a) this Act may be cited as the "Water Resources Research Act of 1964."

(b) In order to assist in assuring the Nation at all times of a supply of water sufficient in quantity and quality to meet the requirements of its expanding population, it is the purpose of the Congress, by this Act, to create a nationwide capability, including a network of state institutes, which will provide a state and regional and national focus for resolving water and related land problems through the stimulation and sponsorship of research, investigations, experimentations, and demonstrations; dissemination of data and research results to all users including the general public; and the training of scientists in disciplinary and interdisciplinary fields which affect the water resources.

~~to stimulate, sponsor, provide form and supplement present programs for the conduct of research, investigations, experiments, and the training of scientists in the fields of water and of resources which affect water.~~

TITLE I -- STATE WATER RESOURCES RESEARCH INSTITUTES

SEC. 100. (a) There are authorized to be appropriated to the Secretary of the Interior for the fiscal year 1965 1979 and each subsequent year thereafter sums adequate to provide ~~$75,000 to each of the several States in the first year, $87,500 in each of the second and third years, and~~ $150,000 ~~$250,000~~ each year thereafter to assist each participating State in establishing and carrying on the work of a competent and qualified water resources

research institute, center, or equivalent agency (hereinafter referred to as "institute") at one college or university in that State, which college or university shall be a college or university established in accordance with the Act approved July 2, 1862 (12 Stat. 503), entitled "An Act donating public lands to the several States and territories which may provide colleges for the benefit of agriculture and the mechanic arts" or some other institution designed by Act of the legislature of the State concerned: Provided, That (1) if there is more than one such college or university in a State, established in accordance with said Act of July 2, 1862, funds under this Act shall, in the absence of a designation to the contrary by act of the legislature of the State, be paid to the one such college or university designated by the Governor of the State to receive the same subject to the Secretary's determination that such college or university has, or may reasonably be expected to have, the capability of doing effective work under this Act; (2) the designated State institute shall cooperate closely with other colleges and universities in the State with demonstrated research, information dissemination, and graduate training capabilities in developing a statewide program directed to resolving state and regional water and land related problems; (3) two or more States may cooperate in the designation of a single interstate or regional institute, in which event the sums assignable to all of the cooperating States shall be paid to such institute; (4) the designated state institute shall cooperate closely with regional consortia, as may be designated by the Secretary, to increase the effectiveness of the nationwide network of institutes and for the purpose of regional coordination, particularly with regional river basin commissions and other interagency river basin organizations as may be established by Congress; and (5) ~~(3)~~ a designated college or university may, as authorized by appropriate State authority, arrange with other colleges and universities within the State to participate in the work of the institute: Provided further, That for fiscal year ~~1973~~ 1979 not more than $125,000 shall be appropriated for each of the District of Columbia, the Virgin Islands, Puerto Rico, and Guam, and for fiscal year ~~1974~~ 1980 not more than $150,000 ~~$200,000~~ shall be appropriated for each of such areas.

(b) There shall be authorized to be appropriated to the Secretary of the Interior for fiscal year 1979 and each year thereafter sums adequate to

provide an additional $100,000 to each state institute to support water resources research in the institutes provided these funds are approved only for specific projects and only if the institute has shown to the satisfaction of the Secretary that it has developed a comprehensive research plan focused on water problems of high priority and of importance to more than one State in its region and provided further that the institute shows that the research projects supported have at least one dollar of non-Federal contribution for each two dollars of Federal support under this section.

(c) ~~(b)~~ It shall be the duty of each such institute to plan and conduct and/or arrange for a component or components of the college or university with which it is affiliated or with other qualified colleges or universities in the State to conduct competent research, investigations, and experiments of either a basic or practical nature, or both, in relation to water resources and to provide for the training of scientists through such research, investigations, and experiments. Such research, investigations, experiments, and training may include, without being limited to, aspects of the hydrologic cycle; supply and demand for water; conservation and best use of available supplies of water; methods of increasing such supplies; and economic, legal, social, engineering, recreational, biological, geographic, ecological, and other aspects of water problems; ~~;-and-scientific-information-dissemination-activities,-including-identifying,-assembling,-and-interpreting-the-results-of-scientific-and-engineering-research-deemed-potentially significant-for-solution-of-water-resource-problems,-providing-means-for-improved communication-regarding-such-research-results,-including-prototype-operations; ascertaining-the-existing-and-potential-effectiveness-of-such-for-aiding-in-the solution-of-practical-problems,-and-for-training-qualified-persons-in-the-performance-of-such-scientific-information-dissemination~~; having due regard to the varying conditions and needs of the respective States and regions, to water research projects being conducted by agencies of the Federal and State Governments, the agricultural

experiment stations, other university research centers, and others, and to avoidance of any undue displacement of scientists and engineers elsewhere engaged in water resources research. The annual programs submitted by the State institutes to the Secretary for approval shall include assurance satisfactory to the Secretary that such programs were developed in close consultation and collaboration with leading water resources officials within the State and region to promote research, information dissemination, training and other work meeting the needs of the State.

SEC. 101. (a) There is further authorized to be appropriated to the Secretary of the Interior for the fiscal year 1979 and each year thereafter sums adequate to provide to each State institute a minimum of $75,000 and no more than $125,000 for the purpose of organizing and carrying out an approved program of technology transfer and/or information dissemination so that the results of research are put into practical use at the earliest feasible time, and provided further that the institute shows that the technology transfer and/or information dissemination program have at least one dollar of non-Federal contribution for each two dollars of Federal support under this section. This technology transfer program must comprise a comprehensive plan to provide scientific information dissemination activities, such as identifying, assembling, and interpreting the results of scientific and engineering research deemed potentially significant for solution of water resource problems, providing means for improved communication regarding such research results, including prototype operations, ascertaining the existing and potential effectiveness of such for aiding in the solution of practical problems, and for training qualified persons in the performance of such scientific information dissemination.

SEC. 102. ~~101.~~ (a) There is further authorized to be appropriated to the Secretary of the Interior for the fiscal year ~~1965~~ 1979 and each subsequent year thereafter sums not in excess of ~~the following: --1965, $1,000,000; 1966, $2,000,000; 1967, $3,000,000; 1968, $4,000,000; and 1969 and each of the succeeding years;~~

~~$5,000,000~~ $10,000,000. Such moneys when appropriated, shall be available to match, on a dollar-for-dollar basis, funds made available to institutes by States or other non-Federal sources to meet the necessary expenses of specific water resources research and information dissemination projects which are of high priority to one or more States in the region or which have national significance and which could not otherwise be undertaken, including the expenses of planning and coordinating regional water resources research projects by two or more institutes. Such high priority projects shall be identified by the Secretary of the Interior in consultation and collaboration with the institutes, including regional institute consortia as designated by the Secretary.

(b) Each application for a grant pursuant to subsection (a) of this section shall, among other things, state the nature of the project to be undertaken, the period during which it will be pursued, the qualifications of the personnel who will direct and conduct it, the importance of the project to the water economy of the Nation, the region, and the State concerned, its relation to other known research projects theretofore pursued or currently being pursued, the extent to which potential users of the research findings have been involved in formulation of the research plan and method for user involvement during the study period, and the extent to which it will provide opportunity for the training of water resources scientists. No grant shall be made under said subsection (a) except for a project approved by the Secretary, and all grants shall be made upon the basis of the merit of the project, the need for the knowledge which it is expected to produce when completed, and the opportunity it provides for the training of water resources scientists.

SEC. 103 ~~102~~. Sums available to the States under the terms of sections 100, and 101 and 102 of this Act shall be paid to their designated institutes at such times and in such amounts during each fiscal year as determined by the Secretary, and upon vouchers approved by him. Funds received by an institute

pursuant to such payment may be used for any allowable costs within the meaning of the Federal procurement regulations that establish principles for determining costs applicable to research and development under grants and contracts with educational institutions (41 CFR 1-15.3), including future amendments thereto: Provided, That the direct costs of the programs of each State institute, as distinguished from indirect costs, are not less than the amount of the Federal funds made available to such State institute pursuant to section 100 of this Act. Each institute shall have an officer appointed by its governing authority who shall receive and account for all funds paid under the provisions of this Act and shall make an annual report to the Secretary on or before the 1st day of ~~September~~ December of each year, on the total program of the institute in research; technology transfer and information dissemination and training toward the resolving of water and land related problems of each State and region ~~work-accomplished-and-the-status-of-projects-underway,-together-with-a-detailed-statement-of-the-amounts received-under-any-of-the-provisions-of-the-Act~~ during the preceding fiscal year, and of its disbursement, on schedules prescribed by the Secretary. If any of the moneys received by the authorized receiving officer of any institute under the provisions of this Act shall by any action or contingency be found by the Secretary to have been improperly diminished, lost, or misapplied, it shall be replaced by the State concerned and until so replaced no subsequent appropriation shall be allotted or paid to any institute of such State.

SEC. 104 ~~105~~. Moneys appropriated pursuant to this Act, in addition to being available for expenses for research, investigations, experiments, demonstrations, technology transfer, and training conducted under authority of this Act, shall also be available for printing and publishing the results thereof and for administrative planning and direction. The institutes are hereby authorized and encouraged to plan and conduct programs financed under this Act in cooperation with each other, with other colleges and universities and with

such other agencies and individuals as may contribute to the solution of the water and related land problems involved, and moneys appropriated pursuant to this Act shall be available for paying the necessary expenses of planning, coordinating, and conducting such cooperative research and information dissemination.

SEC. 105 104. The Secretary of the Interior is hereby charged with the responsibility for the proper administration of this Act and, after full consultation with other interested Federal agencies, shall prescribe such rules and regulations as may be necessary to carry out its provisions. He shall require a showing that institutes designated to receive funds have, or may reasonably be expected to have, the capability of ~~doing effective work~~ developing a comprehensive program of research, information dissemination, and training designed to resolve water and land related problems in a timely manner. He shall furnish such advice and assistance as will best promote the purposes of this Act, participate in coordinating research initiated under this Act by the institutes, indicate to them such lines of inquiry as to him seem most important, and encourage and assist in the establishment and maintenance of cooperation by and between the institutes and between them and other research organizations, the United States Department of the Interior, and other Federal establishments.

On or before the 1st day of July October in each year after the passage of this Act, the Secretary shall ascertain whether the requirements of section 103 102 have been met as to each State, whether it is entitled to receive its share of the annual appropriations for water resources research, information dissemination, and training under section sections 100, 101, and 102 of this Act, and the amount which it is entitled to receive.

SEC. 106 105. Nothing in this Act shall be construed to impair or modify the legal relation existing between any of the colleges or universities under

whose direction an institute is established and the government of the State in which it is located, and nothing in this Act shall in any way be construed to authorize Federal control or direction of education at any college or university.

TITLE II--ADDITIONAL WATER RESOURCES
RESEARCH PROGRAMS

"SEC. 200. (a) There are authorized to be appropriated to the Secretary of the Interior ~~$5,000,000~~ $10,000,000 for the fiscal year ~~1967~~ 1979 and ~~$6,000,000 for the fiscal year 1968, $7,000,000 for the fiscal year 1969, $8,000,000 for the fiscal year 1970, $9,000,000 for the fiscal year 1971, and $10,000,000~~ for each of the fiscal years ~~1972-1976~~ 1980-38 inclusive, from which appropriations the Secretary may make grants to and finance contracts and matching or other arrangements with educational institutions, private foundations or other institutions, with private firms and individuals whose training, experience, and qualifications are, in his judgment, adequate for the conduct of water research projects, and with local, State, and Federal Government agencies, to undertake research into any aspects of water and related land problems which are of a national interest ~~related to the mission of the Department of the Interior which he may deem desirable~~ and which are not otherwise being studied.

~~(b) No grant shall be made, no contract shall be executed, and no matching or other arrangement shall be entered into under subsection (a) of this section prior to sixty calendar days from the date the same is submitted to the President of the Senate and the Speaker of the House of Representatives and said sixty calendar days shall not include days on which either the Senate or the House of Representatives is not in session because of an adjournment of more than three calendar days to a day certain or an adjournment sine die.~~

(b) (e) In addition to other requirements of this Act, the Secretary's annual report to the President and Congress as required by section 307 of this Act shall ~~specifically identify each~~ indicate in a comprehensive manner the contribution made to resolving water and land related problems of a national interest by contract and grant award approved under subsection (a) of this section. ~~in the preceding fiscal year, including the title of each research project, name of performing organization, and the amount of each grant or contract.~~

TITLE III--MISCELLANEOUS PROVISIONS

SEC. 300. The Secretary of the Interior shall obtain the continuing advice and cooperation of all agencies of the Federal Government concerned with water problems, of State and local governments, and of private institutions and individuals, to assure that the programs authorized in this Act will supplement and not duplicate established water research programs, to stimulate research in otherwise neglected areas, and to contribute to a comprehensive, nationwide program of water and related resources research. He shall make generally available information and reports on projects completed, in progress, or planned under the provisions of this Act, in addition to any direct publication of information by the institutes themselves.

SEC. 301. Nothing in this Act is intended to give or shall be construed as giving the Secretary of the Interior any authority or surveillance over water resources research conducted by any other agency of the Federal Government, or as repealing, superseding, or diminishing existing authorities or responsibilities of any agency of the Federal Government to plan and conduct, contract for, or assist in research in its areas of responsibility and concern with water resources.

SEC. 302. Contracts or other arrangements for water resources work authorized under this Act with an institute, educational institution, or non-profit organization may be undertaken without regard to the provisions of section 3684

of the Revised Statutes (31 U.S.C. 529) when, in the judgment of the Secretary of the Interior, advance payments of initial expense are necessary to facilitate such work.

SEC. 303. No part of any appropriated funds may be expended pursuant to authorization given by this Act for any scientific or technological research or development activity unless such expenditure is conditioned upon provisions determined by the Secretary of the Interior, with the approval of the Attorney General, to be effective to insure that all information, uses, products, processes, patents, and other developments resulting from that activity will (with such exceptions and limitations as the Secretary may determine, after consultation with the Secretary of Defense, to be necessary in the interest of the national defense) be made freely and fully available to the general public. Nothing contained in this section shall deprive the owner of any background patent relating to any such activity of any rights which that owner may have under that patent.

SEC. 304. There shall be established, in such agency and location as the President determines to be desirable, a center for cataloging current and projected scientific research in all fields of water resources. Each Federal agency doing water resources research shall submit quarterly to such ~~cooperate by providing the~~ cataloging center with information on work research underway, ~~or~~ scheduled, ~~by it~~ and completed. The cataloging center shall classify and maintain for general use a printed catalog and computer information search system of water resources reseach and investigation projects in progress or scheduled by all Federal agencies. and The cataloging center shall also establish a program to facilitate and encourage ~~by such~~ non-Federal agencies of government, colleges, universities, private institutions, firms, and individuals as to voluntarily may make such similar information available concerning in-house research and research supported by grants and contracts on a systematic basis.

SEC. 305. The President shall, by such means as he deems appropriate,

clarify agency responsibilities for Federal water resources research and provide interagency coordination of such research, including the research authorized by this Act. Such coordination shall include (a) continuing review of the adequacy of the Government-wide program in water resources research, (b) identification and elimination of duplication and overlaps between two or more agency programs, (c) identification of technical needs in various water resources research categories, (d) recommendations with respect to allocation of technical effort among the Federal agencies, (e) review of technical manpower needs and findings concerning the technical manpower base of the program, (f) recommendations concerning management policies to improve the quality of the Government-wide research effort, and (g) actions to facilitate interagency communication at management levels. The President shall submit to Congress on December 1 of each year a report on the progress being made to effectuate the coordinating function described in this section and the need for legislation to implement the objectives of this section.

SEC. 306. As used in this Act, the term "State" includes the Commonwealth of Puerto Rico, the District of Columbia, and the territories of the Virgin Islands and Guam.

SEC. 307. The Secretary shall make a report to the President and Congress on or before ~~October~~ February 1 of each year ~~showing the disposition during the preceding fiscal year of moneys appropriated to carry out this Act; the results expected to be accomplished through projects financed during that year under sections 101 and 200 of this Act; and the conclusions reached in or other results achieved by those projects which were completed during that year~~ on contributions which the total institute program (Sections 100, 101, and 102) has made toward resolving water and related land problems during the preceding fiscal year. The report shall also include a detailed statement of the water and rela-

ted land problems to be given priority attention during the next fiscal year. This statement shall be developed in consultation and collaboration with the network of State institutes. ~~an account of the work of all institutes financed under section 199 of this Act and indicate whether any portion of an allotment to any State was withheld and, if so, the reasons therefor.~~

SEC. 308. Excess personal property acquired by the Secretary under the Federal Property and Administrative Services Act of 1949, as amended, for use in furtherance of the purposes of this Act may be conveyed by the Secretary to a cooperating institute, educational institution, or nonprofit organization, with or without consideration, under such terms and conditions as the Secretary may prescribe.

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DU PONT
REG. U.S. PAT. & TM. OFF.
ESTABLISHED 1802

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

PLASTIC PRODUCTS AND RESINS DEPARTMENT

April 7, 1978

Senator Mike Gravel, Chairman
Water Resources Subcommittee
Senate Environment and Public Works Committee
4204 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

Attached is a statement on behalf of E. I. Du Pont de Nemours & Company on the subject of desalination. We would appreciate your including it in the formal record of the hearings on the Water Research and Development Act of 1978 and related legislation.

Robert A. Kellar/seh

Robert A. Kellar
Manager - "Permasep" Products

RAK:seh

CC: Mr. Jennings Randolph
Mr. Edmund S. Muskie
Mr. Lloyd Bentsen
Mr. Quentin N. Burdick
Mr. John C. Culver
Mr. Gary W. Hart
Mr. Wendell R. Anderson
Mr. Daniel Moynihan
Mr. Robert Stafford
Mr. Howard H. Baker, Jr.
Mr. James A. McClure
Mr. Peter V. Domenici
Mr. John H. Chafee
Mr. Malcolm Wallop

STATEMENT BY E. I. DU PONT DE NEMOURS & COMPANY
PRESENTED TO SENATE ENVIRONMENT AND PUBLIC WORKS COMMITTEE
WATER RESOURCES SUBCOMMITTEE
RE HEARINGS ON THE WATER RESEARCH AND DEVELOPMENT ACT OF 1978

Demand for fresh water for drinking, agriculture and industry is exceeding supplies from traditional natural sources in many parts of the world. However, new technologies are emerging which make it technically and economically feasible to utilize the world's virtually unlimited supply of salty waters to satisfy this demand. These new desalting processes, such as reverse osmosis, operate with less energy and greater reliability than older distillation processes. The construction of large-scale water desalination plants, based on this new technology, is now possible and additional research and development should reduce costs further.

The Interior Department's Office of Water Research and Technology (OWRT) has played a major role in establishing the viability of desalting as a solution for fresh water shortages. It has supported the improvement and acceptance of new desalting technologies by confirming the legitimacy of desalting advances and coordinating industrywide research and development efforts. OWRT has done this by funding research, supporting demonstration plants, operating test facilities, commissioning "state of the art" reports and transferring technology it has developed to private industry for broader application.

Among OWRT's most significant contributions to increasing the world's fresh water supply has been the development and application of reverse osmosis desalting technology. Because of OWRT's commitment, the United States is the world leader in reverse osmosis technology which is widely accepted for desalting brackish waters and is emerging as an economical seawater desalination method. The process, which uses salt impeding semi-permeable membranes through

which fresh water is forced by pressure, first was studied seriously nearly 20 years ago. Since then, the U.S. government has nurtured the development of reverse osmosis by supporting basic membrane research and testing the technology. OWRT's commitment to reverse osmosis was underscored three years ago when the government decided to equip a major 95 million-gallon-per-day brackish water desalination plant at Yuma, Arizona, with membrane technologies, including reverse osmosis.

The expression of confidence in reverse osmosis, inherent in the Yuma plant decision, convinced potential users of desalting technology that reverse osmosis was indeed feasible for use on a large scale. Saudi Arabia's decision to use reverse osmosis to desalt 58 million gallons of water per day for its capital city of Riyadh can be linked to the acceptance of reverse osmosis for the Yuma plant. A complex of five desalting plants using Du Pont "Permasep" permeators will begin operating this year at Riyadh. Other large-scale systems using reverse osmosis are being built or are under design.

OWRT's confidence in reverse osmosis is well placed. The technology uses about half the energy required by the thermal process which had been the only commercial seawater desalination process before the introduction of reverse osmosis. A report recently completed for OWRT by Fluor Engineers and Constructors also predicts that, when fully developed, energy consumption for reverse osmosis should be even lower. Furthermore, when fully developed, reverse osmosis would produce water at a cost 40 percent cheaper than fully developed distillation technology, according to the report.

We are pleased that reverse osmosis remains a top priority in OWRT's desalting program. Assistant Secretary of the Interior Guy Martin has indicated that OWRT plans to give additional support to basic research to improve the reverse osmosis process. We endorse these research efforts, which quite properly and most fruitfully will be undertaken by universities and research institutes. We suggest that special attention be given to scouting systems for the recovery of energy from the reject stream of high pressure reverse osmosis systems, improving the cost and realiability of reverse osmosis pretreatment systems, studying the precipitation of dissolved solids which causes scaling during the operation of reverse osmosis, electrodialysis, and distillation systems and developing principles defining the mechanisms of specific ion rejection and of water permeation of membranes.

We believe the best role for the desalting industry is not only to develop and produce desalting materials, devices and equipment, but also to participate in programs which demonstrate and improve new desalination processes. The primary vehicle with the most promise for encouraging cooperation by industry with OWRT in this area is OWRT's demonstration plant program. This program, specifically authorized in the Water Research and Conversion Act of 1977 (Public Law 95-84), is designed to demonstrate the engineering and economic viability of membrane and phase change desalting processes. A total of $40 million was authorized for the fiscal year ending September 30, 1978 to build no more than four plants. Legislation concerning OWRT currently before Congress is less ambitious. It repeals the section of the 1977 law concerning demonstration plants and only authorizes preliminary investigations

to develop recommendations for Federal participation in demonstration projects. The legislation would authorize $150,000 to conduct these studies. Funding for actual plants would be authorized later.

We support a more aggressive demonstration plant program. OWRT is currently looking at well developed but not yet commercial technologies such as high temperature reverse osmosis systems, high temperature electrodialysis systems, larger capacity desalination systems, and low pressure membranes. The plants are expected to demonstrate brackish water desalination, seawater desalination, water re-use and freezing desalination. OWRT also is developing a sophisticated system for evaluating candidate partner communities and technologies. The first plant is expected to begin operating in the Fall of 1980.

Though heartened by OWRT's commitment to a well planned demonstration program, we are concerned that the first planned demonstration plant will not begin operating until after the selection of technologies for several large seawater desalination plants in Hong Kong, Africa, the Middle East, and the Virgin Islands.

These plants will be built at an especially crucial moment in the growth of the world desalting market and the United States-based reverse osmosis industry. Currently, the competition for reverse osmosis is distillation, a technology in which the United States is not a significant factor and which is dominated by companies based in France, Japan, and the United Kingdom. Currently, the United States clearly is the leader in reverse osmosis. However, that lead is in danger of slipping as other countries recognize the long term potential for reverse osmosis. In particular,

Japan has embarked on a crash program to develop reverse osmosis membranes.

The large seawater desalination plants which are to be built soon must employ United States-developed reverse osmosis methods to insure that our country maintains its technological lead in reverse osmosis. Economically, export of reverse osmosis equipment and engineering services will help tilt our balance of trade with other countries in our favor. Strategically, as the disposition of resources increasingly affects the course of world politics, it is to the advantage of the United States to maintain a leadership position in reverse osmosis desalination technology, which is expected to be the preferred method of increasing fresh water supplies in the future. Furthermore, the critical role seawater desalination will play in the future development of Saudi Arabia makes the retention of our leadership position particularly vital to strengthen ties between that oil-rich country and the United States. Also, it is important for the United States to remain self-sufficient in desalination technology to supply our growing internal needs for fresh water.

OWRT can help persuade the world desalination market to accept seawater reverse osmosis desalination and strengthen United States desalting leadership by accelerating its demonstration plant program and building a seawater reverse osmosis demonstration plant. A large scale seawater desalination plant, built as soon as possible, dramatically would symbolize the government's confidence in reverse osmosis and permit the collection of performance data which

would be readily available for public inspection and analysis. The plant would also convincingly demonstrate that reverse osmosis, already performing in many small-scale seawater applications, is feasible for large-scale seawater desalination. And the plant would also be a working laboratory in which experiments would be conducted to discover ways to improve desalting technology.

The government's commitment to reverse osmosis since its inception has been crucial to its success. Early research helped to make it economical. Selection for use in the Yuma desalting plant established it as one of the best means for desalting brackish water. A large-scale seawater desalination demonstration plant would, in a similar way, serve as a catalyst to achieve commercial acceptance and, therefore, widespread application of reverse osmosis, the desalination method which experts predict will eventually be the most economical way to quench the thirst of our increasingly dry planet.

4/5/78

Senator DOMENICI. We thank the witnesses very much. We will not have additional hearings on this bill. If any of you have submittals, the record will be open 10 days.

We thank you very much.

The subcommittee will adjourn.

[Whereupon, at 12:11 p.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

[Prepared statements follow:]

TESTIMONY Before the Senate Subcommittee on Water Resources

Fiscal Year - 1979

April 7,1978

UNITED STATES WATER RESOURCES COUNCIL
2120 L STREET, N.W. • SUITE 800 • WASHINGTON, D.C. 20037

AUTHORIZATION TESTIMONY

FISCAL YEAR 1979

U. S. WATER RESOURCES COUNCIL

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AUTHORIZATION TESTIMONY

FISCAL YEAR 1979

U. S. WATER RESOURCES COUNCIL

APRIL 1978

OVERVIEW

The Water Resources Council (WRC) supports enactment of S-2701, a bill to authorize appropriations for the Council through Fiscal Year 1979. The President's Reorganization Project (PRP) is presently conducting programmatic reviews and developing recommendations concerning organization of Federal agencies and departments with responsibilities for developing, managing and conserving natural resources. The WRC is a focal point of their effort. Although it is presently anticipated that the PRP's recommendations will be forwarded to the President in mid-April, it is uncertain when the President will reach a decision and transmit his views to the Congress for consideration.

To preserve Congressional and Presidential options, the Administration requests that the Congress extend authorization of appropriations to support the WRC through Fiscal Year 1979. This additional year should suffice to permit the Executive Branch to formulate and communicate its recommendations for Congressional consideration. In addition, this extended authorization will preclude an untimely disruption in implementation of the important functions of the Council.

The Administration recognizes that the Water Resources Council has not completely satisfied several of the goals embodied in the Water

Resources Planning Act of 1965. The Council has already taken several significant steps to improve its performance. During the past year, the Council has streamlined its coordination and policymaking procedures to more closely involve Assistant Secretaries or their equivalents in Council deliberations and decisionmaking. The Council's effort to merge the requirements of the Principles and Standards and the National Environmental Policy Act to ensure more effective compliance, reduce agency costs and streamline review processes reflects a renewed emphasis on better management.

The Council has just completed the Second National Assessment. The final report will be available this summer. The Assessment data base, which includes estimated water supply and demand requirements for the years 1975, 1985 and 2000 in 106 subregions, will assist the Administration in evaluating water resource projects proposed for authorization, as well as the water resource agencies which plan, design and construct projects.

In the critical area of floodplain management, the Council has developed and published guidelines to implement Executive Order 11988. On the basis of the WRC guidelines, individual agencies and departments will publish rules and regulations militating against the location of federally supported activities affecting hazardous floodplain areas, thereby preventing loss of life and property damage from flooding.

During 1977, at Presidential direction the Council actively participated in the Water Policy Review, directing the Task Group on Conservation, summarizing the public comments, and conducting nine regional hearings. In March, the Council provided policy and technical assistance to the

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White House Drought Group which resulted in the President's recommendation to allocate $850 million in drought relief to the states and to submit several drought relief proposals to the Congress.

In May 1977, the Congress conferred a broader mandate upon the WRC in conducting the assessments of water resource requirements and water supply adequacy for nonnuclear energy technology development originally authorized pursuant to Section 13, P.L. 93-577. In cooperation with the U.S. Fish and Wildlife Service, the Council has already developed improved methodologies for determining minimum instream flow requirements for fish and wildlife. This methodology is especially important to those areas where energy development may reduce streamflows below the minimum necessary to support fish and wildlife. By November 1978, the Council expects to complete ongoing assessments of the water resource impacts associated with coal and oil shale development in the Upper Colorado River region. The State of Colorado, in cooperation with other Upper Basin states and several Federal agencies, is defining what will be necessary to provide adequate water supplies for projected energy production in this region as well as satisfy legitimate competing uses. Similar efforts are underway in the Ohio and Missouri river basins.

The Title II River Basin Commissions have made significant contributions in assisting state, Federal and regional entities in water resource management. For example, the Pacific Northwest River Basins Commission sponsored a study on the Hell's Canyon portion of the Snake River to determine the effects of low flows on fish, wildlife, water quality, navigation and recreation. The State of Idaho utilized the study results

in developing its State Water Plan. The Army Corps of Engineers incorporated its findings in the Columbia River and Tributaries Study. The Commission has also completed seven comprehensive regional water resource studies which form the technical and policy basis for several state water management plans, including that of Montana which amalgamated the Flathead River study into its State Water Plan. The Commission has coordinated the Federal technical assistance to the bi-State Columbia River Estuary Study, which is expected to result in a plan to allocate the estuary's land and water resources among the allowable uses and guide the development and conservation of those resources. Upon completion, this study will be incorporated into the Washington and Oregon Coastal Zone Management Plans.

The New England River Basins Commission's studies have resulted in the redesign of the cooling system for the Seabrook Nuclear Power Plant, improved HUD floodplain regulations, and a Federal/state agreement for disposal of dredged material. The remaining river basin commissions have also rendered similar substantive services to their respective regions. These are detailed later in this statement.

The Administration recognizes the importance the states attach to the Council's Title III grant program which provides financial assistance to the states to develop comprehensive water resources plans. During the past, with Title III grant assistance, the State of Arizona has completed and published a basic data inventory, specified the alternative development of levels on which the State Water Plan is predicted, and implemented a Statewide water conservation plan. The State of Washington has utilized its grants to formulate and implement water resource management programs

for the Okanogan, Methow, and Colville Basins; to press forward with management programs for 10 other basins; to enhance the State's role in the Pacific Northwest River Basins Commission's regional studies; and to combat the adverse effects of the recent drought.

With Title III funds the State of Oregon has augmented its planning capabilities; completed an analysis of groundwater conditions in the Harbor Bench area and the South Coast Basin; finished a Statewide analysis of water use on currently irrigated lands, and updated the water resource policy for the unappropriated surface waters of the South Coast Basin.

The Administration recognizes both the past accomplishments of the Council and its self-generated improvements. The Administration considers that an institution comparable to the Council is vitally needed to provide strong leadership in managing the Nation's water and associated land resources. Legislation to extend the authorization for appropriation is indispensable to the continued coordinated Federal effort to safeguard the Nation's natural resource base.

The Council's present and proposed efforts to fulfill more adequately its responsibilities under the 1965 Water Resources Planning Act are described below.

NATIONAL PROGRAMS

Introduction

In 1975, the Council found that 18 individual agencies within seven departments plus seven independent agencies had a total of 70 appropriation accounts for Federal water related activities. The 70 accounts contained approximately $10.2 billion for Fiscal Year 1976. Since some appropriation

accounts funded more than one program, it has been estimated that there are over 100 different nationwide programs within these 25 agencies. This excludes Federal water related research, data collection, licensing and permit activities. Obviously, there is as the Congress has recognized, a vital need for consistent, coordinated water management and elimination of duplication or overlap. Further, these programs have been designed to serve national needs that are occasionally in serious conflict with each other.

Congress created the Council to coordinate Federal activities and to look at the Nation's water resources from a broad perspective. Much of the day to day efforts of the Council are not visible nor measurable. For example, how does one measure the benefit of improved methodology for use by several Federal agencies where there had been inconsistent individual techniques before? Nor is it possible to quantify the countless number of improvements in Federal agencies' projects, programs, rules, regulations, procedures, guidelines, administration, coordination and communication that have come about as a result of the Council's work. Documents reflecting some of these activities are available, and many have been provided to the Congress in the past. However, this section of testimony concentrates on four national programs of the Council that we believe will be of interest to this Committee. The four ongoing programs are: the National Assessment, Flood Plain Management, Water and Energy, and Water Policy Review. Each of these four programs are discussed below.

The Second National Water Assessment

The 1965 Water Resources Planning Act calls for an assessment of the adequacy of water supplies in the Nation's water resource regions.

The Council published the First National Water Assessment in 1968. The Second National Water Assessment has been completed and evaluates the Nation's current and future water supplies and demands in much greater detail than has been done before.

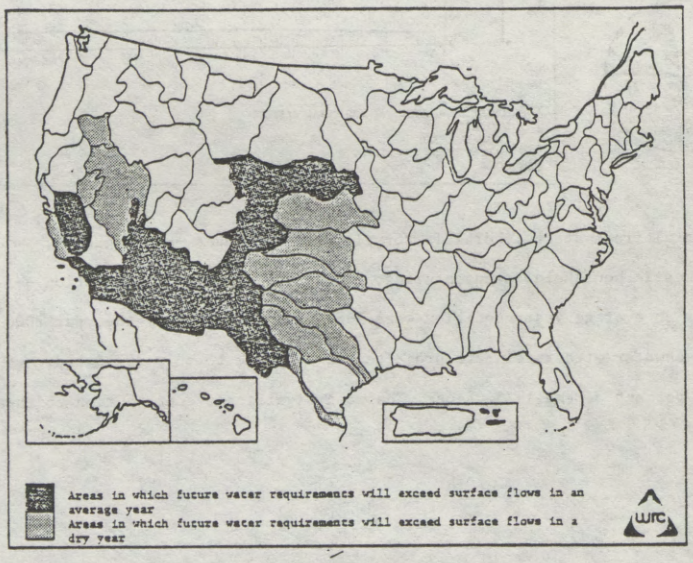
A comprehensive set of explicit State/Regional goals and objectives have been developed for each of the twenty-one water resources regions; these may serve as a guide in water resources management decisionmaking at all levels. Developed through extensive state and regional participation, these goals and objectives provide a valuable reference to show program managers: (1) the need for planning studies; (2) the need for research and data collection; (3) the need for changes in institutional or legal arrangements; and, (4) the Federal role in assisting the resolution of each of the high priority problems.

Another important product of the Second Assessment is a nationwide data base on flood damage, energy, recreation, land use, environment and water quality for 1975, 1985 and 2000. The information on water supply and use establishes a basis for a water balance analysis for each of the Nation's 21 water resource regions and 106 subregions. Information is provided for further analyses of offstream and instream water uses, ground water mining and impacts of water conservation, drought management and energy resource development. Those regions gaining or losing water resources can be identified.

The data base was used last March in preparing the President's Drought Study Report. That report, with other information, led to the Presidential decision to provide $850 million to drought assistance.

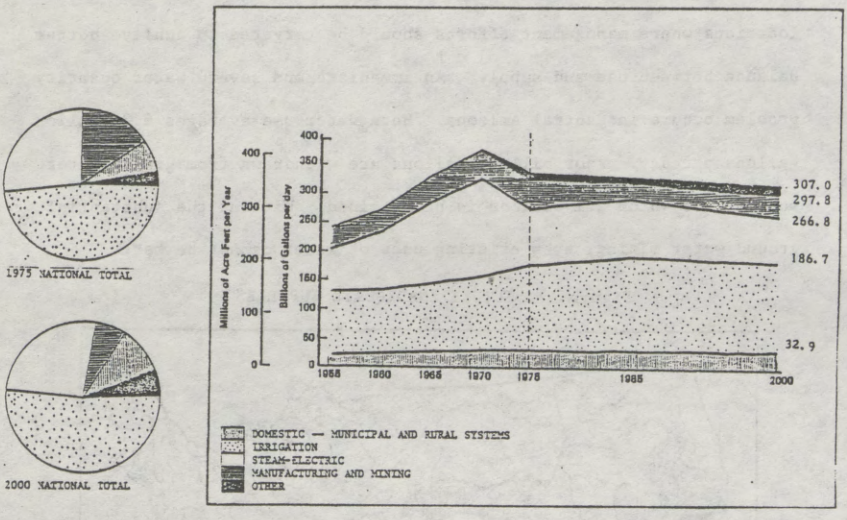
Water management problem areas are identified in the Assessment in terms of: inadequate surface and ground water supplies, poor water quality, wetlands loss, dredge and fill conflicts, flood damages, and bay and estuary degradation. For example, the 14 subregions which are now experiencing stress on water supplies are shown in Figure 1. By the year 2000, the number of stressed areas will increase to 24 and the problems will intensify in the areas shown in Figure 1. These findings indicate locations where management efforts should be targeted to achieve better balance between use and supply. An immediate and severe water quantity problem occurs in Central Arizona. Here water use averages 6.3 billion gallons per day. Four billion gallons are withdrawn from ground water sources, of which 2.1 billion is being mined. Without the substantial ground water mining, even existing uses of water cannot be met.

Figure 1: FUTURE INADEQUATE SUPPLIES



Figures 2 and 3 show past water use and future trends for the United States for the years 1975 and 2000. Trends in Figure 2 show withdrawals of water declining in the future due to more recycling, more efficient use, and improved water management. However, as shown in Figure 3 net water consumption will be increasing in the future due to greater evaporation from recycling and expanded use.

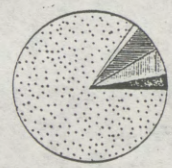
Figure 2: FRESHWATER WITHDRAWALS



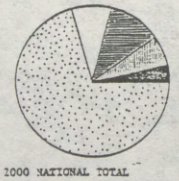
Total freshwater withdrawals for all offstream uses -- irrigation, domestic household, manufacturing, mining, steam-electric generation -- for an average year condition were 338.5 bgd in 1975. By the year 2000, freshwater withdrawals are projected to decrease to only 307.0 bgd, 90 percent of the 1975 value. The most significant contribution to these

reductions in offstream uses will be made in the manufacturing sector where freshwater withdrawals are projected to decline from 51.2 bgd, to 19.7 bgd, or from 15 percent of the offstream total to only 6 percent between 1975 and 2000. Offstream consumptive uses for the United States averaged 106.6 bgd in 1975 and are projected to increase by 26 percent to 135.0 bgd by 2000.

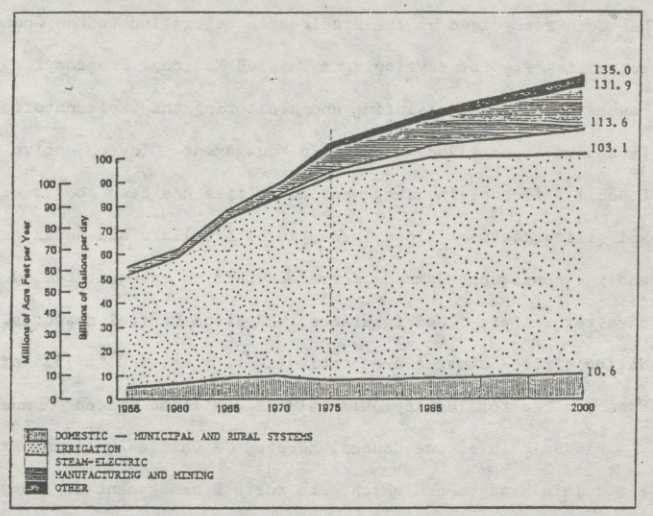
Figure 3: FRESHWATER CONSUMPTION



1975 NATIONAL TOTAL



2000 NATIONAL TOTAL



The Assessment sets forth an extensive body of detailed information in a consistent format that can provide improved support for decisionmaking at departmental levels within the Federal Government. This information should be especially useful in determining the need for existing or new programs for the resolution of present and emerging problems. The

Assessment provides an improved basis for formulating recommendations to the President and the Congress on the allocation of Federal resources. Implicit in the Assessment's products is the opportunity afforded the President, Congress, program administrators and general public to compare Federal, state/regional, and local viewpoints on problems.

Floodplain Management

The Council's policy and program coordination role under the Act has been recognized by the President's delegation to the Council of responsibility for developing a Unified National Program for Floodplain Management and for assisting and monitoring the implementation of Executive Order 11988, Floodplain Management. The objective of the Council's floodplain management activities has been to arrest the spiralling costs of flood losses in both dollars and human suffering, and the consequent demands for flood-related expenditures such as flood disaster relief, flood insurance, and flood control measures. The Nation's flood damages are continuing to rise, and in 1975 property damage alone totaled approximately $3.4 billion (Second Annual Assessment).

In July 1976, the Council adopted "A Unified National Program for Floodplain Management" which sets forth a management strategy for coordinating Federal flood loss reduction programs and recommends certain specific Federal actions. Consequently, in 1977 the President issued Executive Order 11988, Floodplain Management, directing that all Federal agencies issue implementing regulations incorporating the Council's Unified National Program and that agency regulations shall be evaluated by the Council. In 1978, to assist Federal agencies in developing

consistent regulations, the Council issued guidelines specifying procedures for avoiding floodplain locations and for minimizing flood losses. The Council is now providing consultation services to the agencies and reviewing regulations covering an estimated 200 programs. In the Fall of 1978, the Council intends to evaluate the effectiveness of Federal agency regulations.

The Council also has case studies underway in an effort to implement nonstructural floodplain management tools as provided for in Section 73, P.L. 93-251. The Council's two volume document "Regulations of Flood Hazard Areas" provides model regulations that have been utilized by state and local governments across the country.

Through these activities the Council is leading a coordinated and comprehensive Federal effort to reduce flood damages and the demand for flood-related Federal expenditures.

Water Resources and Energy

The Council has been assigned important responsibilities by the Congress regarding water resources and energy development in Section 13 of the Federal Nonnuclear Energy Research and Development Act of 1974. The responsibilities involve determination of the water resources implications of nonnuclear energy technology development, including proposed demonstration projects and commercial applications of the Department of Energy. The Congress increased the responsibilities assigned to the Council, through amendments to Section 13 by the Appropriations Authorization for the Energy Research and Development Administration for Fiscal Year 1977. This gave the Council a lead responsibility for water assessments of development of nonnuclear energy technologies and

a new role relative to water supply availability for demonstration projects.

The Council's current Section 13 program has evolved from the Second National Assessment program and the National Plan for Energy Research, Development and Demonstration. It includes water assessments of coal and oil shale technology development in the Upper Colorado River Basin, and coal technology development in the Missouri and Ohio River Basin. These assessments will be completed in November 1978. Additional assessments involving geothermal energy development and demonstration projects for coal technologies are currently being initiated.

The water requirements associated with deployment of energy technologies, which are the current subject of Federal research and development efforts, can be extensive. For example, the accelerated synthetic fuels development case, prepared by the Department of Energy for the assessment in the Upper Colorado River Basin, involves 2.5 million barrels per day of oil shale capacity and 2.75 billion cubic feet per day of coal gasification capacity. These levels of development would consume in excess of 500,000 acre feet of water annually. Conflict-free water supplies of this magnitude are not available in the Upper Colorado Basin today.

The Council's program will identify the steps necessary to assure (1) that the availability of water supplies is in concert with plans for meeting the Nation's energy needs; and (2) that energy plans are drafted with proper consideration of the water supplies which can be made available and the impacts associated therewith. Further, the program will provide important support to site selection involving major energy

development proposals, including those with Federal participation. This support will be based on information describing the water resources impacts associated with alternative locations for development, and the measures necessary for adequate water supplies. The assessments will also be useful to state and local interests in understanding the water resources implications of major energy development proposals, and the nature and extent of impacts on agricultural, recreational, municipal and other water users and facilities.

The Council program has additional benefits. For example, the assessments in the Upper Colorado Basin are being conducted under leadership of the State of Colorado, with strong participation of other Upper Basin states and several Federal agencies. Organized in this manner, the states are able to advance their water resources planning to match national and regional energy concerns on a more timely basis. Also, the program has enabled development of improved methodologies for determining minimum instream flow requirements for fish and wildlife. This is especially important in areas where energy development may reduce streamflows below those necessary for meeting both economic and environmental objectives.

The rapid progress of the water and energy program and its accomplishments have been facilitated by the Council's interagency composition, successful efforts in encouragement of Federal/state cooperation and other assessment and planning programs.

Water Policy Review

The Office of Management and Budget, the Council on Environmental Quality and the Water Resources Council were assigned the Water Resource

Policy Review in the President's Environmental Message of May 23, 1977. The purpose is to review issues facing Federal water resource policy-makers and present options for water resources management by this Administration and the Congress.

Major issues included in the Review deal with planning evaluation criteria, cost sharing, institutional arrangements, Federal reserve water rights, research, water quality and water conservation. Options on each topic will be considered by the President.

Three of the Council's programs point to a potential need for water conservation. Specifically, the National Assessment, Water and Energy, and Comprehensive Planning programs indicate that for water-short areas of the country conservation may be both economically and environmentally attractive and in some areas may be imperative. This is particularly true in the western part of the United States where coal and oil shale are attractive energy sources but generally where water is in relatively short supply. Consequently, the President's recommendations will probably have a strong conservation thrust.

The Review recommendations will require follow-up and the Council has a potential role to deal with suggestions relating to improvement of the Principles and Standards, additional work on the water conservation proposals, initiatives to strengthen state and regional planning, and assistance in implementing other recommendations by drafting legislative proposals and executive orders as appropriate.

COMPREHENSIVE PLANNING

Under the Water Resources Planning Act the Council is to encourage the conservation, development and utilization of water and related land resources on a comprehensive and coordinated basis. To achieve this Congressional mandate, the Council's comprehensive planning program is designed to aid Federal, state and local interests in the management of their resources in an efficient and timely manner. Comprehensive planning provides a basis for resolving complex issues over alternative or competing uses of water and related land resources.

One example of how comprehensive planning helped resolve water resources management issues is the Platte Level B study sponsored by the Missouri River Basin Commission. The study focused on those conflicts that could be resolved such as the need to manage ground and surface water together.

Some of the recommendations from the Platte study and the actions that are presently being taken are listed below.

1) The study recommended review and updating of Nebraska's water law.

   Several bills have been introduced and are now under consideration in this session of the state legislature.

2) The study recommended that the State of Nebraska quantify instream flow requirements and establish a policy.

   A state task force has been established and is now working toward establishing instream flow quantities and investigating the possibility of a protected river system.

3) The study focused on the surface and ground water interelationships in the Platte River Basin of Nebraska and made projections of trends in ground water declines under varying conditions of future ground water development.

Studies at the local and state levels have been initiated to acquire more detail for future ground water management in critical areas.

The Nebraska Legislature is addressing several proposals for ground water legislation in this session. Realization that ground water levels will continue to decline with future development has brought some urgency to action in this area.

4) The study found several urban areas with need for and possible feasibility of local flood protection projects.

The Corps of Engineers has initiated the implementation studies for the several locations identified as feasible in the Level B study.

5) The study included plan for allowing recreation access to the basin's rivers and streams.

Following the Level B study recommendations the State Fish and Game Commission has provided several access points and primitive canoe campsites.

6) The study found the need and possibility for a national recreation area at the confluence of the Platte and Elkhorn Rivers.

Based on these findings, the Federal Heritage, Conservation and Recreation Service is investigating the feasibility of such an area.

As illustrated in the results of the Platte Level B study, the objectives of comprehensive planning are, first, to identify and resolve issues and, second, to recommend that the responsible agencies and other entities implement the solutions that have been agreed to by the study participants. The recommended solutions can be implemented, however, only after the issues have been resolved by the number of interested and often conflicting agencies and public groups.

An example of how Level B study recommendations are directed to the resolution of issues can be found in the report of the Monongahela Level B study report. The report recommends the construction of Rowlesburg dam which would supply water to the Pittsburgh metropolitan area, reduce flood damage and provide surface water recreation including white water rafting throughout the summer through flow augmentation. This recommendation preserves the natural environment of the Cheat River Fork, upstream of the reservoir. The study participants have agreed to a resolution of the conflicts between water supply, recreation, environmental values and the loss of agriculture lands. It is now up to the responsible agencies and publics to see that the agreement is carried out, and that the recommendation is implemented.

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In these examples, comprehensive planning is fulfilling its Congressional mandate when it identifies and resolves the issues among competing users of water and related land resources and brings together the conflicting interests so that they can agree on solutions to their problems.

The comprehensive planning program is designed to address issues on three levels. The program includes frameworks and assessments, regional or river basin plans and detailed implementation studies.

Frameworks and assessments evaluate or appraise the needs and desires of people and identify areas with complex problems that require more detailed investigations analyses. The second National Water Assessment and the river basin commissions carry out this level of planning.

Regional or river basin planning is an intermediate level of planning for identifying and recommending action plans and programs. This level of planning is carried out by the river basin commissions as they develop their CCJP's and by the Council with its Level B and special studies programs.

Implementation studies are carried out by the member agencies of the Council and focus on program and project feasibility to authorize or begin implementation of all types of structural and nonstructural solutions.

Additional examples of the products of comprehensive planning are presented below in the section on river basin commissions. An example of an ongoing effort outside of the river basin commissions is the Southcentral Alaska Level B study. The City of Anchorage is currently experiencing a water supply shortage due primarily to a rapid increase in population. One solution to the problem is to provide more storage on the stream now used for Anchorage's water supply (Ship Creek) and to increase water withdrawals. Such a solution, however, will likely have adverse effects upon the streams anadramous fishery. This conflict is typical of the preservation (conservation) versus development type issues facing the region. The Level B study will bring together for a joint resolution of the issue such agencies as the Corps of Engineers and the U.S. Fish and Wildlife Service and similarly oriented state and local agencies such as the Alaska Department of Fish and Game and conservation groups.

Another problem currently facing the Southcentral Alaska region is that of energy development. The region has a choice between development of power sources such as the Corps' Susitna hydropower project and development of coal areas such as the Beluga coal field. The Native group interested in developing the Beluga coal field has the option of producing power for local consumption or exporting the coal to countries such as Japan. Either of the energy development options has conflicts inherent to it. Development of the Susitna project must consider environmental effects of flooding the areas behind the proposed dam, change in wildlife habitat, and effects of downstream releases on flooding and

water quality. Development of an area such as the Beluga coal field will certainly impact projects such as Susitna but also other developments and leases, state and local economies, and could result in the development of support communities where none exist today. Agencies involved in such energy development include the Corps of Engineers, the U. S. Fish and Wildlife Service, Alaska Department of Natural Resources, the Village and Regional Native Corporations and private developers.

Again, the objective of comprehensive planning is to aid in the resolution of complex issues, such as those in Southcentral Alaska, and to recommend the implementation of solution by the responsible agencies. It is in this way that the role of the Council's comprehensive planning program can be filled--to aid Federal, state and local interests in the management of their resources in an efficient and timely manner. This is a limited role for the Council, not always leading directly to implementation of solutions, but it is critical because these issues must be resolved before the participants will allow the implementation of solutions.

RIVER BASIN COMMISSIONS

Six river basin commissions have been established by Executive Order under the authority of Title II of the Water Resources Planning Act. The commissions were established at the request of the governors of the member states who share significantly in providing financial and other support to the operation of the commissions. These six Federal/state partnerships encompass all or part of 32 states comprising the northern portion of the Nation's 48 contiguous states.

Under the Act, the commissions are directed to:

(1) serve as the principal agencies for the coordination of Federal, state, interstate, local and private interests for the development of water and related land resources within their areas of jurisdication;

(2) prepare and maintain a comprehensive, coordinated, joint plan for resource development;

(3) recommend long-range schedules of priorities for collection and analysis of basic data and investigation, planning, and implementation of projects and programs; and

(4) foster and undertake such studies as are necessary for comprehensive river basin planning.

The action of the Congress providing authority for the establishment of river basin commissions and the ensuing administrative action of the Federal Government and the states demonstrate recognition of the need for regional means to achieve coordination of water and related resource planning management and facilitate resolution of water and related

resource problems and issues, particularly those requiring intergovernmental and interstate action. Though the setting in which those problems and issues occur has experienced considerable change since passage of P. L. 89-80, the need for a coordinated and comprehensive regional approach to their resolution has strengthened; in many cases, this approach may be the only one feasible.

Water resource problems and issues encompass a wide spectrum of concern involving the shared responsibilities of the Federal and state governments for water management, competing and conflicting demands for limited resources, and complex relationships between upstream and downstream interests. River basin commissions established under Title II can and do provide an effective and economical means for achieving resolution of these problems and issues. The commissions achieve resolution by:

- o serving as valued forums for exchange of information, expression of viewpoints, and negotiation of agreement,
- o jointly preparing and keeping up-to-date a comprehensive and coordinated regional plan for management of the region's water and related resources which guides water-related actions contributing to achievement of the region's goals and objectives,
- o preparing a long-longe schedule of priorities within an annual report for the various action elements deemed necessary from the region's point of view, and

- o carrying out various regional (Level B) and special studies which are critical to development of the regional plan and the annual priorities report.

River basin commissions offer further advantages of:

- o reduction of duplication and overlap among member agency activities,
- o identification of needed high priority actions (as well as relative priorities among all needed actions),
- o ability to undertake activities beyond the scope and/or authority of an individual Federal agency or member state, and
- o providing assistance to Federal and state efforts to plan and manage water and related resources.

Major Recent Accomplishments of River Basin Commissions

The major results of commission efforts are the actions taken by commission members and others to implement, on a consistent and coordinated basis, the recommendations of the commissions. The following examples of major recent accomplishments demonstrate the important role which the Congress intended, as well as the breadth and depth of the water and related problems and issues which are being addressed.

Pacific Northwest River Basins Commission

Hell's Canyon Controlled Flow Study - The controlled flow study was a major and nationally unique field effort, involving more than 30 state and Federal agencies and private entities. The objectives of the study were: (1) to determine instream flow requirements for fish and wildlife, water quality, navigation, and recreation purposes in the Hell's Canyon reach of the Snake River, and (2) to develop and test methodologies for determining such instream flow requirements. The interdisciplinary effort monitored the effects of controlled flows on biological resources and man's non-consumptive uses of the nationally significant reach of the Snake River. Successful completion of the study helped to overcome one of the major constraints to effective water planning and management for that river specifically and for other rivers generally. The study was a factor in the decision to create the Hell's Canyon National Recreation Area. Its findings were incorporated by the Army Corps of Engineers in The Columbia River and Tributaries Study, and were utilized by the State of Idaho in developing its State Water Plan.

Columbia River Estuary Plan - Commission involvement in the state-local effort to develop a management plan for the valuable Columbia River estuary stems from the requests of the Governors of Oregon and Washington. The Commission served as the vehicle to gain and maintain coordinated Federal agency participation in this bi-state program and is providing other vital support toward achieving the program's objective of developing a guide of wise use and conservation of the estuary's water and related land resources. The plan is nearing completion and activities associated

with program development already are contributing to resolution of conflicts in the estuary between environmental and developmental interests.

"Stewards of the River" Program - The Stewards program envisions an integrated system of facilities and activities reflecting wise stewardship of the Columbia River and its major tributaries. The program extends to scientific, historic, educational and cultural facilities and activities; recreational developments; conservation measures; and transportation modes - all expressing the stewardship theme. Beyond the scope and authority of any single state or Federal agency, efforts to date have resulted in a greatly increased interest in the history and future, as well as the public values, of the Columbia River system. The program is noteworthy for its attention to aspects not usually addressed in more traditional water resources planning and management efforts.

Level B Plans - Typical of the Commission's comprehensive planning for specific areas are the 7 Level B studies which were carried out during the past five years by State Study Teams operating under Commission management and state leadership. The studies and resultant plans are key contributions to the states' efforts to manage their water resources and to resolution of conflicting demands on the resources (such as anadromous fish vs. electric power). Illustrative of the Level B studies are the Flathead River Basin and the Snake River Basin Studies. The Flathead Basin plan was adopted by Montana as part of its State Water Plan, and the study has since served as a major catalyst in focusing more detailed and

effective efforts toward resolution of the critical water-related problems of the Basin. Similarly, the Snake River Basin Study provided the basis for the critical Snake River portion of the Idaho State Water Plan which is now before the state legislature for approval and implementation.

Missouri River Basin Commission

Missouri Main Stem Reservoirs - As a result of the efforts of a Commission interagency ad hoc committee on water marketing, the Secretaries of the Interior and the Army signed a Memorandum of Understanding (MOU) concerning the long disputed issue of marketing water to industrial users from the six Missouri River main stem reservoirs. Continuing Commission interest has enabled the original MOU, signed February 24, 1975, to be extended twice through December 1978. In addition to involving the two agencies, the issue relates closely to water rights management responsibilities of several basin states.

Platte Level B Study - Implementation of the Platte Level B Study recommendations resulted in (1) the State of Nebraska updating its water law; (2) the establishment of a state task force to develop policy and quantify instream flow requirements; (3) the initiation of state and local studies focusing on surface and ground water relationships and development of new legislation to address the issue of future ground water management; (4) development of river recreation access sites; (5) potential establishment of a National Recreational Area; and (6) the implementation planning for several local flood protection projects. The recommendations reflect integration of the programs of several Federal agencies and Nebraska.

Annual Electric Power Survey - An annual report on the status of electric power in the Missouri River Basin provides state, Federal and local decisionmakers with essential coordinated information on present and future interrelated aspects of electric power generation supply and demand and water resource management and utilization in the Missouri River Basin. The annual report is receiving increasingly wider attention in view of nationwide interest in the energy resources of the basin.

Ohio River Basin Commission

Wetland Preservation - Competing environmental and developmental interests have been sharply divided over the use of floodplain areas, wetlands and other lands adjacent to the Ohio River. Development interests opposed efforts to preserve areas with environmental value, while environmental interests were insistent that all floodplain areas, wetlands and adjacent lands be retained in a native state. Through efforts of the Commission, an information base describing and classifying undeveloped land areas was prepared. This base supported the development by the Commission of recommendations for a balanced program for preservation of wetland areas and floodplains and satisfaction of future needs for development of additional lands adjacent to the Ohio River. The states are now implementing these recommendations through wetland preservation and other regulatory programs.

Case Studies of Nonstructural Alternatives - In the Ohio Main Stem Study, the Commission undertook five case studies to define typical flood problems which lend themselves to nonstructural solutions. The

results of these studies indicated that the flood damages could not be addressed effectively by nonstructural solutions alone. A combination of structural and nonstructural approaches was found to provide the most effective means for significantly reducing damage potential.

ORBC Floodplain Management Activities - Over the last five years, the Commission has resolved many interstate issues on floodplain management on the Ohio River, through a permanent intergovernmental Floodplain Management Committee. In the past, widely different criteria have been used to determine floodway delineations. The Commission developed uniform criteria, including a 100 year flood profile for the entire Ohio River, which now provides a consistent data base for the six states and Federal agencies. Other issues have involved the effect of development in the floodplains outside the zoned floodway upon valley flood storage and downstream flood elevation. A special Commission study analyzed this problem and determined that loss of valley flood storage would not increase flood elevations downstream. The Commission's efforts have led to an effective mechanism for interstate coordination of floodplain regulatory activities.

New England River Basins Commission

Seabrook Nuclear Power Plant - At the request of the State of New Hampshire, the environmental impacts of the proposed Seabrook Nuclear Power Plant were evaluated by the Commission. The findings led to redesign of the cooling system and movement of the intake and outfall from the estuary to the open ocean.

Beach Erosion - A Commission study in Rhode Island, with multistate ramifications, concerned a contention that the National Flood Insurance Program was encouraging new development in areas subject to damage from coastal flooding and threatening the integrity of barrier beaches. The Department of Housing and Urban Development has since changed its regulations to increase the minimum elevation of new development to avoid damage from wave action, to require anchoring of all structures, and to prohibit any alteration of sand dunes.

Safety of Dams - A Commission report on small dam safety provided the basis for new legislation in Massachusetts to assure periodic inspection and maintenance of hundreds of private dams throughout the State.

Long Island Sound - The Commission's Long Island Sound Study led to agreement among the States of New York and Connecticut, the Corps of Engineers and the Environmental Protection Agency upon a dredged material disposal policy. In addition, recommended legislation to demonstrate the feasibility of using dredged material for the creation of artificial islands is being supported by several New York and Connecticut Congressmen.

Boston Metropolitan Water Supply - Examination of interbasin conflicts over proposed diversions to supply water for metropolitan Boston has led to agreement that local water supply sources must be fully utilized first and water consumption controlled. The Commonwealth of Massachusetts is now developing a water conservation plan.

Upper Mississippi River Basin Commission

Great River Environmental Action Teams (GREAT) - This Commission program established unprecedented inter-agency cooperation and coordination among state and Federal agencies in the Upper Mississippi River main stem area. This effort originated from adverse environmental impacts of Upper Mississippi River navigation channel dredging operations, and has resulted in suspension of legal actions brought against the U.S. Army Corps of Engineers. Implementation of the recommendations has led to significant improvements to the quality of fish and wildlife habitat areas in the waters, marshes, and sloughs associated with side channels of the Upper Mississippi River. Also, beneficial uses for nagivation channel dredged materials have been found through pilot studies.

Minneapolis/St. Paul Level B Study - This study, completed in early 1976, has focused public attention on Minnesota's surface water supply problems during severe drought conditions. In April 1977, Minneapolis financed a feasibility study of ground water sources thereby implementing a major study recommendation. The study contributed to various civic and governmental efforts leading to the Governor's designation in October 1976 of the Twin Cities Mississippi River Corridor as a State Critical Area - now subject to special planning provisions and land use regulations. The study developed an overall approach to waste water treatment requirements for Pool No. 2 of the Mississippi River; this approach has contributed significantly to the Minnesota Pollution Control Agency's current review and future revision of water quality standards. The study developed policy guidance and background information on non-

point source pollution which are now being used by the Twin Cities Metropolitan Council in its Section 208 Water Quality Management Plan.

Red River Flood Problems - A study of agricultural diking along the Red River, coordinated by the Commission's Souris-Red-Rainy Regional Committee, led to the resolution of interstate conflicts. Minnesota and North Dakota have now entered into a joint agreement concerning dike authorization on the Red and Bois de Sioux Rivers. The Commission is assisting the states in jointly formalizing dike authorization criteria.

Great Lakes Basin Commission

Drilling for Oil and Wet Gas Under the Great Lakes - The environmental impacts of drilling under the lakes have been of grave concern. Since questions of environmental security were first raised by the Commission in 1968, no drilling has taken place. In 1975, the U.S. Department of State asked the Commission to further study the impacts of drilling for oil and wet gas. Following Commission study, the Department of State accepted recommendations that regulations proposed by the Canadian Government be deferred.

Indian Tribal Governments Participation in Coastal Zone Management - The Coastal Zone Management Act of 1972 excludes Indian tribal government land (and therefore significant state shoreland) from coastal zone management programs. The Commission, through negotiation with the tribal governments, state governments, and Federal agencies developed an acceptable policy for funding by the Office of Coastal Zone Management for development of management plans by Indian tribes in a manner consistent with the states' coastal zone programs.

Implementation of the Flood Disaster Protection Act of 1973 - Problems have been encountered in the Great Lakes with the language, interpretation, and administration of the Act with ensuing delay of an effective erosion insurance program for the Great Lakes. For resolution of these problems, the Commission has organized an intergovernmental/ interstate task force to develop regional recommendations including necessary changes in wording of the Act and pertinent regulations.

STATE PROGRAMS

Introduction

Since the Council's establishment, it has endeavored to carry out the purposes of the Water Resources Planning Act - P.L. 89-80 including helping to increase the participation of the states in water and related land resources planning and has recognized the importance of providing a vehicle for state input on water resource policy, problems and issues. The general policy statement and specific provision of the Act require that water and related land resources planning should include non-Federal parties. The National Governors' Association Subcommittee on Water Management recently stated that the states' primary role in water management must be recognized. The Council recognizes the states' role and responsibility for management of water resources and will continue to work with the states as policies and programs emerge which affect them.

States actively participate as full members of river basin commissions and the State Vice Chairmen of the commissions serve as Observers to the Council. The Council participates in annual meetings of many state organizations, sponsors joint Federal/state and national conferences, and directly supports state planning through the Title III Grant Program. The Council has sought and continues to seek more formal ways to obtain state views and input to program considerations. Currently, action is being taken to establish a continuing arrangement with the National Governors' Association for that purpose.

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State Grant Program

Financial assistance to states through the Title III Planning Grant Program recognizes the importance of developing a comprehensive and coordinated planning approach at the state level. This is in keeping with the general Council program philosophy that water and related resource planning can only be effective if all interested parties, including the public, are part of that process.

While the Council encourages a comprehensive planning approach, a great deal of flexibility is built into its grant program to allow the states to establish their own priorities and processes for planning. This flexibility is one reason for the high participation rate in the program. In the first year of the program, Fiscal Year 1967, all but seven potential applicants chose to participate. Since then, not more than two have failed to submit an application for funds in any one year. For Fiscal Year 1978, all 50 states, plus the District of Columbia, Puerto Rico, Guam and the Virgin Islands are participating in the program. For Fiscal Year 1979, the Northern Marianas will be invited to participate.

In approving Title III grant applications, the Council requires that a grantee coordinate the comprehensive planning activities of his agency with the planning programs of other water planning agencies in the state. Further, the grantee must specifically coordinate activities funded under the program with other related Federal grant programs.

States' Use of Title III Grant Funds

In utilizing Title III funds, the states have the opportunity to develop the planning program around their perceived needs, and the

flexibility in the program enables the planning to be directed at major issues, and problems as they arise. From the annual reports and applications submitted to the Council, the diversity in water resources planning can be seen. California, for example, must occasionally cope with both drought and flood conditions in a single year, as they are now doing. Many states are in the process of developing comprehensive water management plans. For those states with completed or nearly completed plans, as in Texas, the Title III program supports the continuing evaluation and modification necessary in dynamic planning. Title III funds are being used in several states to integrate water quality planning under Section 208 of P.L. 92-500 (the Federal Water Pollution Control Act Amendments of 1972) into the state water plans. Funds are also used to develop and maintain data bases that support state water planning programs. Some states utilize Title III funds for specialized purposes, such as Idaho, in planning for data collection and analysis of its geothermal potential. While others, such as Indiana, are developing nonstructural floodplain management programs.

A number of states have used Title III to provide assistance to local governments, special districts and intrastate planning organizations, and the program has proven to be a catalyst for the creation of several advisory and/or planning groups such as the Land and Water Research and the Critical Areas Advisory Councils in the State of Maine. Such groups are vital to the comprehensive planning process so strongly encouraged by the Council. Guam, which is participating for the first time during Fiscal Year 1978, is taking the opportunity under the program to establish

the Territorial Water Facilities Planning Advisory Council and initiate work on the Territorial Water Facilities Plan. Phase I of the Plan will include a survey to locate and identify potential system health hazards and an inventory of existing facilities.

Many states are heavily involved in coordinating the multiplicity of efforts that have accelerated rapidly as a result of (1) the many new Federal direct and grant programs, (2) the increased activities of other state agencies which are caused in part by the new Federal programs, and (3) the creation of interstate coordinating entities to which states are members.

Planning Results

Availability of a state planning process and state plans has measurable positive effects on Federal and state investments. A coordinated state planning effort helps reduce duplicative, conflicting, and disjointed planning inputs. A plan adopted or approved for a state or portion thereof provides a framework for decisionmakers to select the best mix of preservation, conservation, and development measures most appropriate for an area. Briefly, the Title III grant program has:

1. Assisted states in their comprehensive planning program in direct response to the purposes of P.L. 89-80, for a total of about $38 million in the 12 years through 1978.
2. Encouraged and enabled states to participate more fully in coordinated interstate and Federal/state planning.
3. Benefited the Federal Government by having the states participate in the planning and decision processes relating to Federal and federally assisted programs.

4. Helped reduce overlapping and often conflicting planning efforts.
5. Made state agencies other than the Title III program recipient more aware of other water planning efforts.
6. Increased state comprehensive water planning efforts and reduced single purpose planning.
7. Made more efficient use of the limited number of water planning specialists available for state planning activities.
8. Improved analytical capabilities through use of common data and techniques.
9. Helped conserve, through comprehensive coordinated planning efforts, the Nation's finite water and related land resources.

Continued Need for Program

These planning efforts must be continued to meet the requirements associated with the rapidly accelerating use of our water and related land resources. Several states, because of limited resources, are for a large part dependent on the availability of Title III funds to provide staff support for water resource planning. Elimination of the program would in effect mean at least a 50% reduction in active participation for some states.

Should the Title III State Grant Program be authorized and funded in Fiscal Year 1979, the emphasis will be on:

- o Continued support for the development of comprehensive water and related land management programs and plans;

recognizing the states central responsibility in water management.

- o Continued support for interstate and intergovernmental planning and coordination efforts in the development of comprehensive water and related land resources plans; including conservation, floodplain management, integration of water quality and water quantity, etc.
- o Implementing the interest of P.L. 95-134 "An Act to Authorize certain Appropriations for the Territories of the United States, to Amend Certain Acts Relating thereto, and for Other Purposes," by elimination of cost sharing requirements for the Northern Marianas, Guam and the Virgin Islands.
- o Administrative improvements in the granting system including application and annual report simplification.

Guidelines for Future Planning

For the future, most of the states favor the continuation of the current thrust of the Title III program. The states' main recommendations are for acceleration of the current program, noting that rapid completion of coordinated detailed plans is viewed as a primary mechanism for helping resolve the pressing problems pertaining to the Nation's water and related land resources. With the Nation's water problems becoming more widespread and acute, increased attention should be directed to this problem by all levels of government. The Title III

program is a logical vehicle to focus on these matters. Without immediate attention many practical and currently reasonable solutions to problems may be lost if the opportunities are ignored because of the lack of planning effort.

STATEMENT BY MR. GUY R. MARTIN, ASSISTANT SECRETARY
LAND AND WATER RESOURCES, U.S. DEPARTMENT OF THE INTERIOR
BEFORE THE SENATE SUBCOMMITTEE ON WATER RESOURCES

APRIL 7, 1978

Mr. Chairman and Members of the Committee:

I am pleased to appear before you today to discuss the programs of the Office of Water Research and Technology.

With me are Deputy Assistant Secretary, Dan Beard, Gary Cobb and Manuel Morris, Director and Deputy Director respectively of the OWRT.

When I appeared before the House Subcommittee on Water and Power Resources on September 29, 1977, I outlined the goals and objectives of a new dynamic program for OWRT. Prior to those hearings, I made an extensive review of OWRT's programs, and shared my deep concerns about the program with this committee, along with new plans to make much needed improvements.

GOALS AND OBJECTIVES - 1977

At the September hearings, we promised:

- To develop and forward to the Congress new organic legislation broadening, strengthening and integrating the OWRT program in water resources research and saline water technology development;
- To identify key areas focused for greater effort and dedication of resources, such as water conservation, water for energy development, water problems of urbanization, floods and droughts, water reuse, groundwater management and water resources planning and management;
- To make the programs of OWRT problem-oriented and focused on national, as well as local and regional problems;
- To coordinate goals and objectives with regions, states and local entities, and other organizations, and to insure that the State Water Resources Research Institutes would play a major role in assisting OWRT in establishing such goals, objectives, and priorities;

- To broaden and increase this Administration's commitment to desalting research and development;

- To look critically at the FY 1978 program and to seek reprogramming, if necessary, to aid in the speedy implementation of new policy, goals and objectives;

- To strengthen and restructure the OWRT organization in accordance with the new policy.

ACTIONS TAKEN

Since September 1977, we have:

- Proposed reprogramming certain activities in FY 1978, responsive to the new goals;

- Revised Departmental budget requests that had been pending in OMB in November, to reflect new program goals;

- Developed, in cooperation with the water resources research and the desalination communities, our new organic legislation reflecting substantive changes in policy;

- Initiated a reorganization to align personnel with the new program objectives.

NEW ORGANIC LEGISLATION (Attachment 1)

The Department has proposed new organic legislation which, as you know Mr. Chairman, was introduced by you and Senator Domenici and printed as S. 2704, while in the House, it was introduced by Chairman Meeds and Mr. Lujan and printed as H.R. 11226. Current authorizations for the saline water program, other than demonstration, and for the water resources contract/grant program expire at the end of FY 1978. In addition to reauthorizing these programs, the new legislation would strengthen the saline water and water resources research program.

The bill mandates a comprehensive water research and development program directed to all aspects of water resources R & D, including quantity and quality, technology development and information transfer, including full recognition for the potentials inherent in the conversion of saline and other impaired waters into water for municipal, agricultural, industrial, recreational and other beneficial uses.

Mr. Chairman, we believe it is very important to have a comprehensive program for all aspects of water because most water research conducted by other Federal agencies is mission-oriented. Nowhere else is there a program that cuts across those varied missions and is directed toward the totality of water, its components in water management, R & D, planning and so forth.

TITLE I - WATER RESOURCES RESEARCH AND DEVELOPMENT

This title is in essence the program authorized under the Water Resources Research Act of 1964, but with some changes.

Institute Allotment Program and Institute Technology Transfer Program

The State Water Resources Research Centers and Institutes would be continued, but strengthened so that they may become the focal points for water resources research in their states. They are, after all, each designated by the state they serve. One new provision encourages Institutes to join together in working on related projects or to form more durable affiliations as, for example, regional Institutes, so as to benefit from the combined efforts and resources available to each under the Act. The allotment program is presently authorized at $250,000 per year per

Institute, but it was never funded higher than $110,000. This level at $110,000 would be continued and authorized for appropriations in FY 1979. However, the allotment funds will now require cost-sharing at two part Federal to one part non-Federal, cash or kind.

We added a new objective achievable through a Federal/State/university partnership which would provide important inputs to our annual program. This partnership, led by the State Institutes, would assist the Secretary in the production of five-year water resources research programs including goals and objectives. Each Institute would also receive and review all R & D proposals from the academic community within its State, and would subsequently forward these to the Secretary for consideration of funding.

And, for the first time, a technology transfer program to be carried out by the State Institutes would provide them the encouragement and funding to take their research findings out to the potential users. Funds would be awarded competitively; these would not be allotments but based on merit, and even at that, the funds would have to be matched: two part Federal, one part non-Federal, cash or kind. Incidentially, this program element is in addition to the presently authorized technology transfer program carried out directly by OWRT. I will have more to say on this.

Matching Grants and Water Resources Research

Section 105 of the Bill, water resources research, authorizes the Secretary to make grants to, contracts with, and/or enter into matching agreements with qualified educational, private foundations or other institutions, private firms and individuals, and local, state, and Federal government

agencies for water R & D. This Section replaces the matching grant program and the water resources research program provisions under Section 101 and Title II of the Water Resources Research Act of 1964. Under the new bill, matching grant and water resources research contract grant programs would be available to all qualified institutions or individuals, whereas, at present, matching grants are awarded exclusively to the university community. This is an important change, needed at this time to broaden the diversity of the research to be carried out and the nature of the approach which might be brought to pressing problems. The water resources contract grant program would not be limited to the programs of the Department of the Interior, as is now the case, but would be directed at the broad spectrum of water resources management. Matching grants would be administered to support high priority water research and development, and to seek solutions to specific water problems and issues at all government levels.

The research carried out under the water resources research contract grant program differs from the matching grant program; it focuses on the future, yet would respond to real water problems and needs, like water conservation, water reuse, floods and droughts, water problems of urbanization, water problems of energy development, groundwater management, planning and management, and saline water conversion.

Section 109 of the Bill authorizes demonstration of the water resources R & D. This is a new authority and an important one in the total program. This is for demonstration of water resources R & D as opposed to demonstration of saline water conversion R & D. Examples of the kind

of activity contemplated under this Section include pilot studies, field work, computer application, and other methods useful for showing how new procedures, technologies, and processes can be applied in water management.

TITLE II - WATER RESEARCH AND DEVELOPMENT FOR SALINE AND OTHER IMPAIRED WATERS

Title II continues the authority for saline water R & D and demonstration activities, and provides for a saline water converison demonstration program. We are committed to a strong saline water R & D program. The legislation would authorize the development of practical means to use saline water technology to convert impaired waters, of any type and from any source, to a quality suitable for some subsequent beneficial use. I must emphasize "of any type and from any source," because it is essential that the future of the desalination technology not be constrained. This technology may have its most beneficial use in wastewater management through facilitating reuse and recycling, rather than its traditionally held objective of conversion of sea and brackish water, without regard to water resources management.

Regarding demonstration, we have already begun the search for suitable demonstration projects. Mr. Chairman, I would like to submit for the record a copy of the letter and guidelines sent to the 50 states and territories, requesting preliminary information related to the demonstration program. Although formal replies have not yet been received, it is clear there is significant interest in the program.

The guidelines outline the program and indicate an objective of 50/50 cost-sharing for the three or four projects to be carried out over the next several years. The sources could be brackish water, seawater, and/or wastewater. It is very important, in our view, that the cooperators be strongly committed and involved in the planning of their demonstration project. A genuine need must exist for which no other solution is practical, and the project must fit into and become an integral part of the existing water system. When the goals of the demonstration are achieved in perhaps two or three years, the plant would be turned over to the cooperators. Planning for these projects will include consideration of responsibilities, risks and adjustments to insure that a usable plant will remain when the demonstration is ended.

Under these conditions, we feel that 50/50 cost-sharing of all costs, with full credit for such things as system connections, land, raw water, brine disposal, plant construction costs, and operation and maintenance during the prescribed demonstration period, is a reasonable approach. The legislation, as we prepared it, intended the cost-sharing formula to be flexible because we foresaw situations with ideal combinations of factors including real water supply problems, where a particularly effective demonstration might be carried out, but where our potential partner would simply be unable to match the cost-shares. We put language into the bill designed to assure that the Secretary would be able to make all the necessary adjustments to accommodate the specific situation without regard to a rigid formula for cost-sharing.

TITLE III - TECHNOLOGY TRANSFER AND INFORMATION DISSEMINATION

Title III provides language that strengthens our program in technology transfer and information dissemination. It also more explicitly reauthorizes our national center for the acquisition, processing and dissemination of information dealing with all areas of water research, technology development and demonstration.

The technology transfer carried out under this authority would be directed at major issues and problems of national significance and would use various avenues and networks for information dissemination. This program element is carried out directly by OWRT and would be complimented by that covered by the Institutes who would concentrate on transfers at the State, regional, and local levels in problems and issues at less than those that are national.

Mr. Chairman, we do not propose to duplicate the good programs of other Federal agencies but, to the contrary, we intend to work with these other Federal agencies and develop cooperative programs within which our efforts can be carried out, using systems already in place to the greatest extent possible. Mr. Chairman, I would like to emphasize that the transfer to the potential users of what we learn is one of the best measures we can have that we are doing our job. Technology transfer should be an integral part of planning and management research activities.

TITLE IV - GENERAL PROVISIONS

This is the housekeeping section of the bill, and provides for authorizing appropriations to carry out the program. The authorizations for FY 1979 and such sums as are necessary for FY 1980 are consistent with the President's budget request.

Mr. Chairman, several typographic errors have been uncovered in the bill, most of which are minor, and all probably already known to your staff. A list of these is attached to my testimony, and with it is another attachment in which we offer some suggestions for additional minor changes that we feel will help to express the intended sense more distinctly and positively. One is of such importance that I want to bring it to the Committee's attention at this time. It is with respect to Section 408, the provision on patent policy.

We would like to offer a clarifying amendment for as Section 408 now stands, it is limited to the terms of the 1976 OWRT Appropriations Act adopting for OWRT, the DOE patent policy legislation. Since the DOE legislation deals with only matters of inventions and patents, it leaves untouched the import of the bill upon established information and data policy based on the early OWRT statutes, which policy the bill is meant to carry forward. Thus, considering that the bill's Section 410(a) repeals these earlier statutes so as to possibly cast ambiguity on the status of the policy, it is necessary to expressly recognize this policy in the bill. Accordingly, Section 408 of the bill should be clarified by adding at the end of Section 408, on page 30, line 4 after the word "Act.", the following:

> *Further provided, however, that subject to the patent policy of this Section 408, all research or development contracted for, sponsored, cosponsored, or authorized under authority of this Act, shall be provided in such manner that all information, data and know-how, regardless of their nature or mediums, resulting from such research and development will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be usefully available for practice by the general public consonant with the purpose of this Act.*

The force of this amendment is to cause all the informational and instructional products of OWRT agreements to be reported fully, such that OWRT is enabled to bring such products to the attention of the public-at-large, i.e., in fulfillment of its mandate under the Bill's Title III for Technology Transfer and Information Dissemination. The amendment is also intended to insure a meaningful availability for the products by fostering the commercial availability of the supportive technology which may be owned or controlled by contractors, particularly in the fields of impaired water conversion and water resources.

OWRT ORGANIZATION/STAFFING

We have previously indicated our intention to reorganize OWRT so that it will be best able to implement the new goals and objectives. We now have such a plan, but it is not yet in operation. It has a simpler structure, one which does not segregate the many aspects of the program, but rather seeks to have the saline and water resources research programs work closely together. Three divisions carry out the programs: a Research Division, a Technology Development Division, and a Technology and Information Transfer Division. Two additional divisions provide support for the program: one for Program and Budget, and another for Administration.

The existing structure has a large number of subdivisions under such umbrellas as Research, and Saline Water Conversion. The subdivision will be abolished and professional and supporting staffs will instead form teams to carry out specific functions and the general activities of OWRT.

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Implementing the realignment of the OWRT staff has been delayed beyond our anticipated schedule by needed clearances from the Civil Service Commission. With the necessary clearances, now expected almost daily, staff now on board will be reassigned within the program taking into account their interests as well as the program needs. Announcements will then be issued to fill our vacancies and remaining staffing needs, at the lowest possible grade levels consistent with maintaining program quality and the desire to reduce the average overall grade level for the organization.

In the meantime, a schedule for making obligations is being followed to carry out the FY 1978 program. We are on schedule and, in fact, we may even be able to make an early start on obligating part of the carryover we programmed for FY 1979. This is a reflection of the changes we are beginning to see in a revitalized OWRT program. This is also a reflection of the strong leadership that now leads OWRT's programs. We are well aware of the inability and perhaps lack of will to carry the program foward in prior years. Director Cobb, in his statement, will outline in somewhat greater detail the proposed reprogramming and the application of carryover.

Additions to the staff can be anticipated, and I have indicated to Gary that, if necessary, he could count on my help in getting the positions he needs. It should be recognized, however, that building additional staff capability by bringing in new people will require training and leadership. In the short term, this can be expected to slow the program down because the burden for achieving the program still rests with the present senior staff. Despite all the recent past problems, they remain dedicated and are making extraordinary efforts to carry out the program.

This concludes my remarks. I will be happy to answer your questions.

Attachment #1 to Testimony of
Assistant Secretary Guy Martin
April 7, 1978

LEGISLATION FOR OWRT

Title I Water Resources Research and Development

Institutes - $110,000 Each for FY 1979 - Cost-Share 2 Federal - 1 Non-Federal

Institute Technology Transfer Program - $750,000 for FY 1979 - Cost-Share 2 Federal - 1 Non-Federal

Matching Grants - $4,000,000 for FY 1979 - Cost-Share 1 Federal - 1 Non-Federal

Water Resources Research - $3,200 000 for FY 1979 - Percent Cost-Share Up to Secretary & Participant

Demonstration Activities

Title II Saline Water Research and Development

Research

Technology Development

Demonstration Projects - Cost-Share Amount Up to Secretary & Participant

Total - $8,800,000 for FY 1979

Title III Technology Transfer and Information Dissemination

Title IV General Program Support

2-Year Authorization Appropriations with Such Sums as are Necessary for FY 1980

Program Authorization Open-Ended

Total - Technology Transfer, Information Dissemination and General Program Support - $4,464,000 for FY 1979.

Attachment #2 to Testimony of
Assistant Secretary Guy Martin
April 7, 1978

AMENDMENTS AND CLARIFYING ADDITIONS
TO
S. 2704

Language to be deleted is overstruck. Language to be added is shown in *Italics*.

Page 3, Section 3.(i), Lines 22 and 23

Line 22 be fully informed of ~~ongoing research, completed~~ re-

Line 23 search/ *activities* and other types of information necessary for them

Page 18, Section 205. (b)(3), Lines 9, 10, and 11

Line 9 during which, in either case, *the Secretary or his representative shall have* access to the project and its

Line 10 ~~operating data will not be denied to the Secretary or his~~

Line 11 ~~representatives~~/ *data.*

Page 20, Section 301. Line 9

Line 9 ing water resources activities including research *projects* accomplished

Page 30, Section 408. Line 4

Line 4 9 of such Act shall not apply to this Act. *Further provided, however, that subject to the patent policy of this Section 408, all research or development contracted for, sponsored, cosponsored, or authorized under authority of this Act, shall be provided in such manner that all information, data and know-how, regardless of their nature or mediums, resulting from such research and development will (with such exceptions and limitations, if any, as the Secretary may find to be necessary in the interest of national defense) be usefully available for practice by the general public consonant with the purpose of this Act.*

Attachment #3 to Testimony of
Assistant Secretary Guy Martin
April 7, 1978

TYPOGRAPHIC ERRORS AND SUGGESTED
CORRECTIONS TO
S. 2704

Page 4,	Line 25:	Change "1962" to "1862"
Page 7,	Line 1:	Insert comma following "regional"
Page 8,	Line 13:	Insert "(a)" following "Sec. 103."
Page 10,	Line 8:	Delete colon following "to"
	Line 16:	Insert comma following "acquisition"
Page 14,	Line 12:	Change "improvement or" to "improvement of"
Page 16,	Line 12:	Change "applications" to "application"
Page 22,	Line 5:	Change "Service" to "Services"
Page 24,	Line 20:	Insert comma following "per centum"
	Line 21:	Delete comma following "per centum"
		Note use of "lesser per centum" S.2704 versus
		"lesser percent" in HR 11226
	Line 22:	Delete "." following (a)
Page 28,	Line 7:	Change "title II" to "title III"
Page 30,	Line 1:	Insert comma following "Research"
	Line 6:	Change "or" to "of"

STATEMENT BY GARY D. COBB, DIRECTOR, OFFICE OF WATER RESEARCH AND TECHNOLOGY, U. S. DEPARTMENT OF THE INTERIOR, BEFORE THE SENATE SUBCOMMITTEE ON WATER RESOURCES
APRIL 7, 1978

Mr. Chairman and Members of the Committee:

I am pleased to be here today to discuss the programs of the Office of Water Research and Technology.

FY 1978 Reprogramming (Charts 1 and 2)

The first step in implementing the objectives and new direction mentioned by Assistant Secretary Martin, requires an adjustment in funding levels for certain elements of the FY 1978 program. We have submitted a proposal to the Appropriations Committee to reprogram $575,000 of the saline water research and development portion of the FY 1978 appropriation. This reprogramming increases support for saline water research by $375,000, with particular emphasis to be given to membrane processes, feedwater pretreatment, membrane fouling, freezing process energy conservation, new desalting techniques, technological applications, and fundamental research. Greater emphasis is being placed on the emergence of new concepts that can meet present and future problems. Among the latter is the need to reduce the energy requirements of current desalination processes. The remaining $200,000 proposed for reprogramming will enable us in FY 1978 to begin the process of identifying demonstration plant locations, and start the feasibility studies for determining the best opportunities.

The offsetting reductions resulting from the reprogramming occur in membrane development ($375,000), freezing ($100,000), and test facilities ($100,000). The reductions were carefully considered and do not materially

affect progress in these program elements in FY 1978. While the funds can be put to good use within the program as appropriated, we believe that a higher priority exists for use of these funds as we proposed them for reprogramming. This is part of our following through on our pledge for new efforts made by Assistant Secretary Martin in testimony last fall.

FY 1979 Budget Formulation (Chart 3)

When we appeared before the House Subcommittee on Water and Power Resources in September, our FY 1979 budget request was pending before OMB. We subsequently recommended changes to reflect the new policy, and these are in the President's FY 1979 budget for OWRT. And, in addition, we have scheduled the obligation of approximately $3.1 million of no-year funds for saline water conversion research and development projects in FY 1978 and 1979. Carryovers add $1.36 million to our 1978 program and $1.77 million to our '79 program. The resulting reprogramming and allocating of the carryover will, thus, provide program levels of $26.7 million in FY '78 and $28.9 million in FY '79.

FY 1979 Budget Request (Chart 4)

The budget is presented in a format that parallels our proposed legislation. The program should therefore be easier to track than in previous years. The FY 1979 budget request is $27,154,000, an increase of $1,847,000 over the FY '78 appropriation.

Our FY 1979 budget is presented in four major activities: water resources research and development, saline water research and development, technology transfer and information dissemination, and general program support, and it additionally contains information about our reimbursable program.

I. Water Resources Research and Development

We will need $13,890,000 to carry this out. This is an increase of $2.4 million over FY 1978, and it breaks down as follows:

A. State Water R&D Institutes

Equal funding for each of the 54 state institutes under the allotment program at $110,000, including Puerto Rico, the District of Columbia, the Virgin Islands, and Guam, totals $5.94 million. This will support research programs, and implement new objectives that call for identifying water problems, research needs and research priorities. The three newest institutes, Guam, Virgin Islands and District of Columbia, are being increased from the $40,000 each previously received. A change, under the proposed legislation, makes the program one of cost-sharing at 2 parts Federal to 1 non-Federal, cash or kind.

B. Institute Technology Transfer Program

The Institutes would compete for a share of $750,000 for a new technology transfer program to be carried out at the state or regional level. Research results are of no value if they are unknown and unused. Technology transfer takes the research to the user where it can do some good. Only the best programs can be funded since there isn't enough money to meet every institute's wants. Funds will require matching: 2 parts Federal to 1 non-Federal, cash or kind.

C. Matching Grants

An appropriation of $4 million is requested for matching grants, also awarded competitively, but at 1 part Federal, 1 non-Federal, cash or kind, in support of water research and development, where universities, states, or others are able to share the costs of the research. Eligible projects would include research on problems common to two or more states, or focus on national or regional problems and priorities.

In the past, research supported under this program took a broad view of water problems and issues. We will still want this broad view, but we now also focus more narrowly on specific water problems and issues having high priority research requirements.

D. Water Research Program

This is the contract/grant program; it looks at water resources research, generally, including focused areas and water reuse, and is divided into two categories.

1. Water Reuse

To focus on the potentials in the reuse of previously used water, $1.3 million is being requested for continuing research in water reuse with one of the focuses on high water-using industries. Research is needed in demineralization processes for renovating municipal and industrial wastewaters, and we want to do this initially in conjunction with membrane desalination. Some of the funds will support research in direct reuse, and for use in groundwater recharge for subsequent withdrawal and reuse, both important projects with significant public

application. There is a great need to broaden research into processes directed at energy reduction and by-product recovery, two factors that bear heavily on cost-effectiveness of reuse. Research on aquaculture and use of aquatic organisms as techniques for conversion of wastewater may reveal these are appropriate forms of reuse. Through use of some organisms it may be possible to concentrate certain of the contaminants to effect an improvement in water quality. Some work has already been done in this area, but not an amount sufficient for a final judgment. A considerable supply of water may evolve from research and development of systems for graywater recycling and from research into planning and management of reusable water, including the identification of institutional and other barriers inhibiting the reuse of rehabilitated wastewater. The success of a reuse program not only contributes to increased supplies, but to a reduction of wastewater discharge. After having invested vast sums on treating wastewater, we should use this water rather than throw it away.

2. Water Resources Research Planning and Management

We have requested $1,900,000 for research to improve planning procedures and methods focused on water conservation, water problems of urbanization, water problems of energy development, floods and droughts, and groundwater management. By focusing the research, we believe the program will be more responsive to real water problems and needs. High priority water problems and issues outside of the focused research areas will continue to be included in the program principally funded under the matching grant program.

There is a great need to improve planning procedures and methods used by the Federal agencies and others at the state and local levels of government. Research is needed to improve methods to identify water needs and problems, to formulate alternative plans or programs responsive to those needs and problems and for evaluation of the economic, environmental and social impacts, both beneficial and adverse. Additionally, research is needed to improve the presentation of information about impacts and assessing the significance of those impacts on decisionmaking processes. Improvement in this area would make the whole planning and decisionmaking process more effective, and should provide for resolution of conflicts within that structure, with less need for adjudication through the courts and suits related to environmental impact statements and other planning and legal procedures.

The President has said that water conservation shall be the cornerstone of the Administration's new water policy. A great deal of research is needed to identify techniques and approaches to reduce water consumption in irrigation, in industry and in the home. Research related to water conservation should also be directed at policies which have an effect upon demand and identify policies and institutional arrangements that will facilitate more efficient use of water. The benefits to be gained through conservation of water relate first to the water saved itself, but also very directly to savings of energy through reduced energy requirements for distribution of water and particularly treatment of wastewaters and other return flows.

In the area of water problems of urbanization we intend to itensify research on urban flood control, including accelerated runoff and erosion control, stormwater runoff and water quality in urbanizing areas. Research will be directed at water problems of energy development, including such areas as the economics of water use for energy and the environmental consequences of increasing energy development. Research will be continued on groundwater management systems, focusing particularly on the institutional aspects relating to use of groundwater and surface water.

In each of the research areas, substantial effort will be made to further develop integrated research programs directed to the needs in that area. Information related to these programs will be provided to other agencies and substantial efforts will be made to coordinate the programs of OWRT with other agencies in order that there will not be duplication with the research programs of other agencies. Further, through that process, efforts will be made to encourage other agencies to fund elements of the focused research areas that cannot be, because of funding constraints and other reasons, included in the OWRT program.

II. Saline Water Research and Development

A. Saline Water Research

We have set out a short-term and a long-term goal. For the first, meaning now, we must increase the efficiency and reliability of saline water conversion processes. Success in the conversion program requires that desalting be useful now; we are past the point when we must depend on promises for continuation of research into this technology.

Clearly, desalting as a technique for producing a usable supply of water is well established, but so is space travel. We can get to the moon but it is hardly a commonplace, economical form of transportation, at least not yet. Yet, there is every reason to hold out an expectation for new breakthroughs within known processes. The long term goal for saline water research is the discovery and development of new concepts in separation and this can best be expected to come from research into the fundamental properties and nature of aqueous salt solution.

Saline water conversion research will seek to advance the knowledge of the mechanisms of water transport and salt rejection by membranes, the effect of membrane structure on transport properties, the mechanisms of membrane stability and fouling, and the factors which limit the realization of the full potential for maximum energy efficiency in desalination processes.

1. Membranes

Membrane research will seek higher water output at lower costs of membranes, production, energy, and maintenance, while work in pretreatment of the feedwater can reduce the demand for greater improvements in membranes. It is conceivable that pretreatment alone may in some instances be sufficient to obviate the need for further desalination.

I should point out that the term "membranes" includes both reverse osmosis as well as electrodialysis.

2. Freezing

Research will also be conducted in freezing processes. The well-known concept of using the difference in freezing points of pure water and salty water has long been felt to hold promise of supplying low cost water. The hope is still there, and research may provide the way

to make it a reality. Further, freezing appears to have great potential for concentrating constituents in water as a final step in treating effluents of various kinds to achieve water quality objectives. While much can be said of the opportunities open to us in freezing, I would say that our small program does not measure the true research needs. A substantial review of freezing process experience pointed up the need for improved and innovative techniques in at least 10 distinct areas. Given our overall program priorities and matching budgetary constraints, we feel our research into freezing is at a low but adequate level.

3. New Concepts

Researching new concepts is not a new program. We have always had the door open to new ideas; we have always supported research that can possibly yield new processes. To encourage this part of our research program, we have "disclosed" it as an item in our program which may give the impression it is new. Previously, new concepts, basic research leading to new processes, had been carried out as part of other program elements. We could not have achieved any of our past successes without the discoveries revealed by basic or new concepts research. Consider what the effect would be if we overcome the energy barrier which now requires desalination processes to use energy in excess of what is theoretically required for the separation of salt from water. If we understand the nature of the forces that hold salts in solution, we may be able to control them and thus use less energy than is presently possible. New ideas are reaching us suggesting that distillation may offer opportunities resulting from esoteric research in thermodynamics and fluid mechanics. Some of these may fit the new concepts mold.

B. Saline Water Development

1. Membranes

Emphasis in saline water technology has in recent years been in reverse osmosis with other processes appearing to have been left behind. In the past, perhaps they were, but our development program, albeit a modest start under the new directions previously referred to, will give more attention to electrodialysis and freezing processes, as well as work in water reuse. We will give more attention to demonstration plants. All this extra effort will see an increase in activity at our test facilities. The program is structured to stress advancement of desalination technology responsive to the water problems and needs rather than a particular technology, but at the same time, we will continue with work on membrane processes while stepping up our efforts on other technologies.

We have been developing and testing membranes for use with the reverse osmosis process in seawater conversion and we will continue development and testing of new membranes and those associated system components needed to improve process reliability and economics. Brackish water desalting development will work harder on achieving high product water recoveries which will, of course, minimize the volume of waste brine discharge. We want to develop low pressure brackish water membranes and corresponding low pressure membranes suitable for industrial applications. Development of the high temperature electrodialysis process using seawater, will be continued through evaluation tests.

2. Freezing

Freezing development includes work in vacuum-freezing processes with both sea- and brackish waters, as well as other innovative freezing processes for brine concentration and wastewater reuse applications. Developments in secondary refrigerant processes are being tested at our Wrightsville Beach Test Facility.

3. Water Reuse

The water reuse development program makes extensive use of desalting technology for various reuse applications. Particular attention is being given to industrial and municipal wastewaters. Development of improved ultrafiltration membranes and associated modules for such applications, could increase reliability, service life, and economics of this process. Our joint program with the Orange County Water District at their facilities in southern California, is expected to develop detailed data on the District's 5mgd reverse osmosis plant, with tests in various pretreatment methods. We will have an opportunity to vary some of the components to produce new information on process variations as well as gain extensive information on bacterial and chemical quality, hence the health aspects, of reuse water.

4. Test Facilities

The test facilities at Roswell, New Mexico, and at Wrightsville Beach, North Carolina, will continue to be used for testing advanced technology. These facilities are important parts of the desalination technology development program not only for the testing done th[illegible], but

also because they contribute directly to development through the ability to make onsite adjustments within a well controlled environment. These facilities are unique laboratories used exclusively for testing technological advancements in saline water conversion. Centralized testing under direct Government supervision enhances the credibility of the data.

5. Demonstration Studies

Under this activity in Fiscal Year 1979 we will conduct feasibility studies on selected communities being considered for demonstration desalting plants. These studies will analyze the overall needs of the prospective communities, and identify desalting processes best suited to meet these needs.

III. Technology Transfer and Information Dissemination

A. Technology Transfer

The objective of this program is to provide for the transfer of technology to address water resources problems on the national level. This is necessary if we are to put to use the best of the research and development findings on real water problems. The program will examine the research that has been, or is being done, evaluate usefulness in meeting identified needs, delineate further research and development needs revealed by past findings, determine the requirements for demonstrations to bring about acceptance of the R&D, and undertake the dissemination of information to the user community, when warranted, using to the maximum extent possible existing institutions and networks for sharing information and knowledge.

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B. Water Resources Scientific Information Center

Our water resources scientific information center provides a facility for identifying research already done, results that have been achieved, and research currently being conducted; it identifies sources of topical information and locations of documents and reports in water resources-related research; it provides scientific and technical information to water resources managers, administrators and other users. Each year, about 13,000 published works are abstracted, indexed, processed and entered in machine readible form for access, nationwide, by the scientific and technical water resources community. This is an important means for transferring water resources knowledge to related agencies and other users in energy development and ecological preservation. The national water information center program aids in identifying duplication and overlap in water resources research. Over 10 years of water resources research efforts are retrievable from this information system now containing over 100,000 abstracts of water resources research worldwide.

IV. General Program Support

This activity provides the overall program support for carrying out the research and development programs of the Office of Water Research and Technology. The functions of this activity encompass all aspects of program management relating to OWRT research, technology development and demonstration and technology transfer programs.

Reimbursable Programs

OWRT is providing technical assistance to the Government of Israel in the design and construction of a desalting plant. OWRT's expenditures are fully reimbursed from funds appropriated to the Department of State. Technical assistance is also furnished to the Kingdom of Saudi Arabia under the Joint Economic Assistance Program with all costs fully reimbursed by the Saudis. Our assistance consists of providing experts from the OWRT staff. Three positions are allocated to the Israel project and five to Saudi Arabia.

Thank you. This concludes my remarks. I will be pleased to answer your questions.

CHART 1

ReProgramming Objectives

FY 1978

Implement New Policy Direction

*Increase Saline Water Research Efforts

**New Concepts - Low Energy-High Recovery

**Membrane - Low Energy-High Recovery

*Allocate FY 1977 Unobligated Funds Over 2-Years

**Membrane - Increased Efficiency

**Water Reuse - Industrial Applications

*Begin Demonstration Studies

OFFICE OF WATER RESEARCH & TECHNOLOGY

FY 1978 Proposed Reprogramming

(thousands of $)

Activity/Sub Activity	Approp.	Proposed Reprogramming	Revised FY 1978 Budget
I Water Resources Research & Dev.	11,520	--	11,520
A. State Water R&D Institutes	5,730	--	5,730
B. Institute Technology Transfer Program			
C. Matching Grants	3,500	--	3,500
D. Water Resources Research			
1. Water Reuse	1,290	--	1,290
2. Water Resources Planning & Mgmt.	1,000	--	1,000
II Saline Water Research & Dev.	9,975	--	9,975
A. Saline Water Research			
1. Membrane	1,200	+75	1,275
2. Freezing	300		300
3. New Concepts		+300	300
B. Saline Water Development			
1. Membrane	4,575	-375	4,200
2. Freezing	1,200	-100	1,100
3. Water Reuse	2,000	--	2,000
4. Test Facilities	700	-100	600
5. Demonstration Studies		+200	200
III Technology Transfer & Info. Dissem.	1,400		1,400
A. Technology Transfer	300	--	300
B. WRSIC	1,100	--	1,100
IV Administration	2,412		2,412
Total	25,307	--	25,307

Total Amount Reprogrammed - $575,000

CHART 2

OFFICE OF WATER RESEARCH & TECHNOLOGY

FY 1977 SWC Carry-Over Funds

Activity/Sub Activity	FY 1977 Carry-Over	(thousands of $) Allocated To FY 1978	Allocated to FY 1979
I Water Resources Research & Development	850	850	
A. State Water R&D Institutes			
B. Institute Technology Transfer Program			
C. Matching Grants			
D. Water Resources Research			
1. Water Reuse	850	850	
2. Water Resources Planning & Mgmt.			
II Saline Water Research & Dev.	2,270	235	1,770
A. Saline Water Research			
1. Membrane	300	225	
2. Freezing	10	10	
3. New Concepts			
B. Saline Water Development			
1. Membrane	1,190		1,400
2. Freezing	345		
3. Water Reuse	250		150
4. Test Facilities	175		100
5. Demonstration Studies			120
III Technology Transfer & Info. Dissemination	10	275	
A. Technology Transfer	10	275	
B. WRSIC			
IV Administration			
Total	3,130	1,360	1,770

CHART 3

OFFICE OF WATER RESEARCH AND TECHNOLOGY

Funding Level Comparison - FY 1978-79

(thousands of $)

Activity/Sub Activity	Total FY 1978 Program	Total FY 1979 Program	Incr.(+) Decr.(-)
I Water Resources Research & Development	12,370	13,890	+1,520
A. State Water R&D Institutes	5,730	5,940	
B. Institute Technology Transfer Program		750	
C. Matching Grants	3,500	4,000	
D. Water Resources Research			
1. Water Reuse	2,140	1,300	
2. Water Resources Planning & Mgmt.	1,000	1,900	
II Saline Water Research & Development	10,210	10,570	+360
A. Saline Water Research			
1. Membrane	1,500	1,700	
2. Freezing	310	300	
3. New Concepts	300	400	
B. Saline Water Development			
1. Membrane	4,200	4,400	
2. Freezing	1,100	700	
3. Water Reuse	2,000	2,300	
4. Test Facilities	600	500	
5. Demonstration Studies	200	270	
III Technology Transfer & Info. Dissemination	1,675	1,865	+190
A. Technology Transfer	575	750	
B. WRSIC	1,100	1,115	
IV Administration	2,412	2,599	+187
Total	26,667	28,924	+2,257

CHART 4

BIOGRAPHY

GARY D. COBB

Gary D. Cobb is a graduate Economist of the Colorado State University.

Prior to 1966, Mr. Cobb was employed with the Bureau of Reclamation at Grand Island, Nebraska, and Pueblo, Colorado. He also worked in the Planning Division of the Bureau's Washington Office.

In 1966, he joined the Office of Management and Budget as a budget examiner for review of aspects of the Civil Works Program of the Army Corps of Engineers, involving related legislative and policy actions, and a $1.4 billion program for research and development, planning, construction, and operation and maintenance. During this period, Mr. Cobb served as a staff observer for the Office of Management and Budget to the interagency Committee on Water Resources Research.

In 1969, Mr. Cobb was appointed Senior Staff Specialist with the United States Water Resources Council. One of his major assignments was development of the Council's "Principles and Standards for Planning Water and Related Land Resources." He also led the Council's interagency field team in testing these Principles and Standards.

He was appointed Assistant Director, Policy and Procedures, in January 1973, with responsibility for implementation of the Principles and Standards; review of the National Water Commission report; development of a unified national program for flood plain management; and other topics, such as economic projects and research liaison. He served as Chairman of the Council's Policy Committee.

Mr. Cobb was appointed to the position of Deputy Director of the Water Resources Council on November 1, 1974. Following the resignation of the Director in September 1976, Mr. Cobb assumed responsibilities as Acting Director of the Council.

During the period September 1976 - August 1977, Mr. Cobb directed the Council's efforts to organize and develop thermatic papers and U. S. positions, in cooperation with

the Department of State, for the United States participation in the United Nations Water Conference held in Mar del Plata, Argentina, in March 1977. He organized and carried out the National Conference on Water held in St. Louis, Missouri, May 1977. Mr. Cobb completed the final phases of the second national assessment of water and related land resources which has been prepared in cooperation with the States, river basin commissions, and other regional sponsors.

Mr. Cobb heads the United States Delegation to the Committee on Water Problems of the Economic Commission for Europe established under the auspices of the United Nations, and presently serves as Vice Chairman of the Committee which involves participation of both western and eastern European countries.

In August of 1977, Mr. Cobb was appointed by Secretary Andrus Director of the Office of Water Research and Technology, U.S. Department of the Interior.

April 1978

STATEMENT BY ASSISTANT SECRETARY - LAND & WATER RESOURCES
MR. GUY MARTIN, BEFORE THE SUBCOMMITTEE ON WATER
AND POWER RESOURCES, INTERIOR AND INSULAR AFFAIRS,
HOUSE OF REPRESENTATIVES, SEPTEMBER 29, 1977

Mr. Chairman and Members of the Committee:

I am honored to be here today to discuss with you the programs of the Office of Water Research and Technology. I am accompanied by the newly appointed Director of the Office of Water Research and Technology, Mr. Gary Cobb. Mr. Cobb has served with the Water Resources Council as Deputy Director and as Acting Director, and we are fortunate to have a man of his background as part of our organization.

I regard these as particularly important oversight hearings, Mr. Chairman, for several reasons. First, of course, is the timeliness and importance of the overall issue of water, both because of the current drought and shortage situations, and because the Administration has made water resources a subject of high priority. In addition, there is the recent history of the OWRT itself, which indicates problems and a need for a new direction and reconfirmation of mission.

The time is right for your inquiry, and I intend to be straightforward regarding the problems as I see them, as well as the direction the new Administration desires to take. It is my intent in this testimony to give you a rather complete picture of the water research situation at the Federal level, focusing on OWRT, and to proceed from a series of general observations to a point by point outline of the elements of the program we propose.

Over the years, water research in this country has not been a well directed activity, and the overall objectives of our total research effort have not been adequately defined. There has been little coordination among agencies and the work that has been done has tended to have an orientation relevant to the mission of the sponsoring agency. Although there has been successful mission-oriented research completed, no comprehensive approach to the overall program is evident.

The agency research activity includes a broad range of specific subjects aimed primarily at short range objectives. The EPA has concentrated on a number of waste water treatment technologies. The Bureau of Reclamation has concentrated on improved irrigation systems technology, including drip irrigation and irrigation scheduling. The Geological Survey has concentrated on groundwater modeling techniques. The Corps of Engineers has done much work on non-structural measures to achieve flood control. The work of NSF tends to include work on a number of scientific and related social problems in the water field.

Currently, there are twenty-two Federal agencies conducting programs in water resources research.[1/] There is little doubt that a better coordinated

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1/ Department of Agriculture (Agricultural Research Service, Cooperative State Research Service, Economic Research Service, and Forest Service); Department of Commerce (Bureau of Domestic Commerce, Maritime Administration, National Oceanic and Atmospheric Administration); Department of Defense (Army Corps of Engineers); Department of Housing and Urban Development; Department of Interior (Office of Water Research and Technology, Geological Survey, Fish and Wildlife Service, Bureau of Reclamation, and Bureau of Mines); Department of Transportation (Federal Highway Administration and U.S. Coast Guard); Energy Research and Development Administration; Environmental Protection Agency; National Aeronautics and Space Administration; National Science Foundation; Smithsonian Institution and Tennessee Valley Authority.

and more aggressive program structured to meet national objectives is necessary. In 1963, the Federal Committee on Water Resources Research (COWRR) was established for the purpose of coordinating Federal water research and developmental activities. While the Committee has been somewhat effective, particularly in view of its limited authority and personnel, its recommendations regarding level of funding and distribution of Federal research efforts have had little impact. We believe some stronger program for evaluation and direction of research will ultimately be necessary. Some way must be found to evaluate research programs and gain participation of the non-Federal sector.

We are not proposing this element of a new program today. Water resources research will be considered as part of the President's Natural Resources Reorganization Project initiated in August 1977, which is to be completed in about six months. In addition, water research is being considered as a part of the water policy review directed by President Carter in his Environmental Message, in May 1977.

Role of OWRT

The need for an agency to address water resources research problems in a comprehensive fashion has been long recognized. In 1973, the National Water Commission took note of the number of federal research agencies, and their mission orientation. It recommended that the Water Resources Research Act of 1964 be amended to remove the stipulation that Title II projects should be directed only to the mission of the Department of the Interior and that an Office of Water Technology (OWT) be established to direct a comprehensive water research and development program.

Although no legislation was proposed to implement the Commission's recommendation, the administrative reorganization that formed OWRT, by combining the Office of Saline Water and the Office of Water Resources Research, brought together two very broad authorities for water research and development.

The Water Resources Research Act of 1964, as amended, P.L. 84-379, provides for fifty-four state water resources research programs, the matching grant program, additional water resources research, transfer of research results, and the establishment of a water resources research scientific information center. The Saline Water Conversion Act of 1971, P.L. 92-60, as amended, provides for research and development of processes to convert saline or other chemically contaminated water to a quality suitable for municipal, industrial, agricultural, and other beneficial uses; for conducting basic scientific research and fundamental studies; for pursuit of research findings and studies having potential application to matters other than water treatment; for conducting engineering and technical work, including design and construction and testing of pilot plants, test beds, and modules; and for investigation of the feasibility and practicability of large scale prototype plants.

To a large extent, the potential of these Acts has never been met and the past few years have been, at best, frustrating for the OWRT. The commitment of the last Administration to the program was doubtful and this is reflected in many ways in the present program. It was reflected in greatly reduced budget requests, reductions in staff, lack of action

to update and continue authorizing legislation, and the severe cutbacks of the testing and development programs.

The consolidation of OSW and OWRR into a single office has not produced the results that were hoped for. These two programs should complement each other in arriving at solutions to water problems rather than compete with one another as has been the case.

Presently, objectives are unclear; users, industry, and the research community, have lost confidence in the program; U.S. leadership in desalting technology and commercial export has slipped; the agency's relationship to state water research centers, state water agencies, and water users has suffered; staff organization and funding is out of balance with research needs; staff expertise has been lost and morale of remaining personnel has been poor. And even more significant, the Congress lost confidence in the direction of the program, perceiving that merger of the two programs was an attempt to deemphasize and phase out saline water technology development.

I do not believe that combining the two programs is the reason for these problems, but believe a lack of commitment to a strong and balanced program is.

Accomplishments

Perhaps the best demonstration of the potential of a strong water research program is the accomplishments which have taken place even under the unfavorable circumstances of the past few years.

The saline water research and development program in the United States can be cited as being responsible for much of the desalting technology currently in use or being installed in the world today. This is especially true of the reverse osmosis process which includes highly successful brackish water membranes, the emerging sea water membrane program, many innovative membrane uses in medicine, and an emerging program of applications in the waste water field.

The land treatment process for waste water has now proven to be economical for application in some areas of the country. EPA is currently requiring that this alternative be evaluated along with more complicated capital intensive alternatives. The basic research on this process was developed and tested as a result of the OWRT university grant program.

The water resources institute in California, utilizing OWRT grant funds and funds from other sources, has contributed to development of an advance computer modeling technique to coordinate and improve the operations of the Central Valley Project and the state water project. In other states, successful water management models and computer programs are developing as well.

The OWRT, acting through the institutes, has succeeded in mobilizing the talent of the university community much more extensively behind the work of the government in the water resources area. Previously, universities only sporadically devoted their research and educational efforts to water problems of national concern. Now this occurs regularly and widely. Also, many more young men and women are being trained in water specialities of interest to Federal agencies at little cost to the Government.

Another accomplishment is the conduct of research into problems of interest to the states. With the support of OWRT, the water resources research institutes have planned and conducted their research in consultation with state, local and regional officials, a major objective of the program.

Additionally, the OWRT is actively participating with foreign countries (at no cost to U.S.) in the further development and application of desalting technology.

Considering these successes against the backdrop of the past few years, the pattern is mixed, but the long-term prognosis is not good unless this Administration clarifies the mission of OWRT and gives the sort of direction and commitment to the program it must have. OWRT is at a crossroad as an agency.

Legislative and Funding Problems

Most OWRT programs require annual authorization of appropriations. This has led to planning and management problems for the agency because of almost yearly uncertainty about program funding levels and objectives. The situation has been further complicated by major differences between the Congress and the past Administration concerning the direction and the funding of the saline water conversion program. For the past several years, Congress has intervened, developed programs and budgets, and appropriated funds accordingly for saline water conversion. Authorization and appropriation of saline water research funds has been specific in

terms of programs and has allowed little opportunity for discretionary action by OWRT. There have been instances where these constraints have resulted in reductions to other important water research programs.

The entire saline water conversion authorization and Title II of the water resources research act expire at the end of FY 1978. We are now examining the program and will present a new authorization bill to the Congress early next year. While our deliberations are not complete, we are looking at several new directions. One possibility is a two-year authorization with annual appropriations. An authorization of this nature would allow the Congress to exercise appropriate oversight and make appropriate changes. It would also give the Administration a firmer basis for planning and should result in a more efficient and effective program.

OWRT Program Objectives

Research and development objectives are often elusive, but this is a program which is in need of both general and specific direction and goals. While not exhaustive, the following list should adequately set out the course this Administration intends to follow:

- It will be a primary objective of OWRT to specifically identify the most significant national needs in the area of water research and technology development and either provide or seek support to meet them; and to do so in a manner which balances short, medium and long-term needs, but which emphasizes those programs having the most practical and foreseeable application.

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- It will be an objective of OWRT to be a leader in research and development regarding water supply, water reuse and recycling, water conservation, and water planning techniques and methodology.

- It will be a complimentary objective to coordinate closely with water research efforts devoted mainly to water quality and those programs which seek to assist local government and industry to apply existing and very new technology.

- It will be an objective to perform or sponsor that research which is most appropriately done at the Federal level, and to take extensive measures to prevent duplication of effort and spending between Federal agencies, among levels of government, or between the government and private enterprise. It will be a federal program only insofar as necessary, where the scale and complexity of the needs demand.

- It will be an objective to do a better job of identifying and targeting the key areas for greater effort and dedication of resources. Potential examples include: water conservation; water for energy development; land/water problems of urbanization; floods and droughts; water reuse; and water resources planning and management. These areas have been identified in the context of national, regional, state and local water problems. They will be coordinated with the entire water resources research and development community.

- It will be an objective, once priorities for research and technology development are set, to firmly apply them to the entire program of OWRT, whether it be basic research, university research and grants, desalting or international assistance. We will, in other words, attempt to find the key areas of need, and use all of our various programs to accomplish our goals, rather than allowing each program to pursue separate and sometimes contradictory goals.

- It will be an objective to achieve a modest reorganization of the OWRT to reflect new priorities and to insure a more dynamic, responsive, aggressive program.

- It will be a clear objective of this Administration to broaden and increase the commitment to desalting research and development, and to change and improve the approach of OWRT to the overall desalting issue. It will further be an objective to specifically set out a rationale for the desalting program which includes the following primary purposes: To develop reliable cost-effective desalination process technologies for conservation and/or augmentation of water resources through multiple reuse of waste waters; augmentation of local water supply systems for quality improvement through blending with high purity desalted product water; maintenance or improvement of water quality by concentrating and disposing of undesirable water constituents; water supply for locations where desalting of

sea or brackish water is the most practical alternative; and initiation of an aggressive research program to improve and discover new technologies for the same purposes, consistent with the national energy conservation policies.

- It will be an objective to give strong support to the university research program, but to sharpen its focus, its responsiveness to priorities, and its capability to make better use of research dollars. The emphasis for increases in support will be on research rather than institutional support.

- It will be a complimentary objective of the desalting program, the university program and the other OWRT programs, to substantially improve the information systems for sharing research results and for facilitating applications of research successes.

- It will be an objective to provide a comprehensive national water resources scientific and technical information center responsive to the needs of the national water resources community.

- It will be an objective to strengthen the Federal-state relationship and the role of the research centers in establishing a national research and development program.

- It will be an objective to support research and development proposals in the private sector based on merit and the contribution to national needs.

- It will be an objective to establish a strong national water research and development community for the future, and to broaden the base of new talent entering this field.

Objectives, of course, are hollow without actions to follow them up. Quite likely, past administrations would have cited many of these objectives. Nonetheless, I believe it is very important, in the first oversight hearing for this program in a new administration, to put such objectives out front. Let me now move to describe in greater detail some of the actions we propose to carry out these objectives.

Reorganization

To carry out a number of the general objectives of our program, various types of reorganizations are being considered, and one has already been decided upon. The issue of overall Federal reorganization is, of course, pending as a part of the President's reorganization study and the water policy review. Reorganization is being approached openly and proposals will be formulated during the first half of 1978.

Within the OWRT itself, we believe reorganization is immediately necessary for several purposes. These include:

- Strengthen and better align the OWRT structure and staff to be more responsive to new goals and objectives.

- Place greater emphasis on desalting research, development, and demonstration, and on technology transfer.

- Improve the ability of OWRT to coordinate and cooperate with the research and development community and other agencies.

- Improve overall staff effectiveness by broadening staff competence and composition by recruiting more junior professionals, arranging for short term assignments through temporary appointment, and exchange of personnel under the Intergovernmental Personnel Act.

A related change is the selection of the new Director, Mr. Cobb. He comes with a broad, general background in water resources management and policy rather than one which is technically-oriented. He was also chosen because he is a fine administrator. Overall, the choice is one intended to assist in moving water research much more into the mainstream of overall water resource policy and management and to increase its relevancy, its practical use, and its impact on policy.

Saline Water Research and Development

Within the program of OWRT, we specifically plan a greater emphasis on saline water research and development. This is, of course, a matter which has engendered some controversy over the past few years and one to which we have devoted substantial thought. It should, of course, be recognized that desalting is not recognized to provide a viable solution to water supply problems in the near future in most areas of the country. Even relatively large reductions in current desalting costs through

technological improvements will not bring cost to levels competitive with conventional water supply sources in most regions of the Nation. However, we do consider that this particular area of research and development is of great significance and that our effort must be substantially improved. To do so, we are taking several measures.

First, we are reorganizing within OWRT in such a way as to bring more professionals and a better organization to this area. Second, we are making it clear that saline water research and development occupies a priority in all areas, including university research, and that we anticipate seeing responses from across the spectrum of OWRT's program. Third, we intend to greatly improve the defined purposes of a saline water program, so that any work in this area relates to clearly set goals and firm judgments regarding the status and needs of various areas of saline water research, rather than the outside pressures that often affect government research and development programs in priority setting and funding.

In Fiscal Year 1978 we intend to:

- Give additional support to basic research to improve reverse osmosis (RO) membranes and improved feed-water pretreatment systems, and the RO systems. This is needed to make this process more cost effective, particularly for water reuse, sea water, and brackish water applications.

- Continue the research and orderly development of new concepts in freezing technology, which shows promise for reuse of industrial water by concentrating wastes.

- Initiate planning for appropriate demonstration of the various technologies as a part of a practical water solution. We believe that it would be a reasonable goal to initiate over the next few years as many as three or four well planned demonstration programs of various aspects (reuse, supply, water quality) of the desalting technology applications as a part of an on-going water management system. Further, cost sharing involving the Federal Government, state, local water management and/or private entities will be part of these demonstration activities.

We plan to submit a reprogramming request in FY 1978, to implement the above program. In addition, in connection with possible reprogramming actions, we will need approval to reprogram FY 1978 seawater membrane funds to continue the operation of the Wrightsville Beach Test Facility. We have assessed the future role of both the Wrightsville Beach and Roswell Test Facilities and find that they can be used effectively to carry out the objectives of the short-term saline water conversion programs. We will take measures to ensure that the level of operation of these facilities is consistent with program objectives. In FY 1978, operations will be reduced to some extent and some excess equipment will be either disposed of or set aside. Operations may expand in FY 1979 in support of program objectives.

In the past, the level of commitment to the saline water program has often been measured by the number of dollars requested or appropriated for full-scale development and demonstration projects. This has led, year after year, to confrontations between the Administration and the Congress, and we would like to achieve a more constructive atmosphere for this important area of research and technology development.

It is not dollars for the capital costs of demonstration plants which should measure commitment, but whether there exists a strong and balanced overall saline water program which seeks to move each of the various technologies forward to solve water problems consistent with their scientific status. It should be a program which engages in demonstrations only where there is need which is appropriate scientifically, where the private sector cannot or will not perform, and where the demonstration itself relates practically to the identified needs of a program, region, community or other public purpose. In all but exceptional cases, an entity with whom a demonstration is conducted should be a working partner including sharing of costs.

Some would say that this policy and approach will set back demonstration of saline water technology, but we disagree. We believe any demonstration project must be carefully planned and selected. In addition, future demonstration projects should seek opportunities to tie in with the business community or local governments to share mutual costs and benefits.

Further, on the subject of full Federal demonstration projects, we believe that the state of the saline water technology is such that it supports the approach we are recommending. A review of that technology from the perspective of the Department should be of help.

Desalination techniques — distillation, reverse osmosis, electrodialysis, and freezing — are all in different stages of development. Each technique has comparative strengths or weaknesses as pertains to sea water, brackish water, or waste water applications, and the best application in a specific situation might, in fact, involve combining different technologies into a single system.

Distillation is the oldest technology available for desalting of sea water and brackish water and is used in the majority of sea water desalting plants throughout the world. Multi-stage flash distillation (MSF) was introduced for shipboard use in the period following World War II. Energy requirements in the modern MSF plant have been continually reduced, but new technological advances will be required to keep pace with fuel cost escalation over the past few years. A notable achievement over the past twelve years was the introduction of vertical tube evaporators (VTE) with enhanced heat transfer surfaces. They have demonstrated capability to further reduce energy requirements. Vapor compression distillation (VC) is used throughout the world for small compact desalting plants. The process is highly efficient from an energy standpoint, but its full potential has never been exploited in large scale land based plants.

The combination of the vapor compression cycle with enhanced vertical tubes (VC/VTE) has been explored in the conceptual design stage and has the potential for large scale use in the future. The conventional distillation process is widely used in the Middle East, the Virgin Islands, and other water short areas. Distillation processes are not used extensively in the U.S. since established processes are not yet competitive with available alternatives. There is some support for continued basic research in this country to improve reliability, simplicity and overall efficiency of the newer distillation process concepts.

There is no need to demonstrate the established technology at taxpayer expense, and we do not see any need for Federal demonstration of the new distillation process concepts, although it may well emerge as a need from a more orderly program.

Both reverse osmosis and electrodialysis processes were largely developed under U.S. Federal programs. These are technically feasible for brackish water desalination. Both these techniques are being presently employed to produce high purity industrial process waters and potable quality waters for domestic and industrial uses. They are also being increasingly employed to recover valuable byproducts from industrial wastes. Typical examples include recovery of cheese whey from dairy wastes, plating chemicals from plating wastes, paints and other organic chemicals from chemical processing and petroleum refining industries. These processes are increasingly being used to desalt brackish waters for water supply in Florida, California, and Mid-Eastern countries. In the above

applications, further demonstration by the Federal Government is not necessary. However, basic research is needed to improve membrane and pretreatment processes.

There is, however, justification to demonstrate the application of membrane processes, particularly reverse osmosis techniques, for treatment of municipal and industrial wastes, and agricultural return flows for water reuse or recycling. Our studies will identify the problem areas of high potential need for this technology and locate partner(s) to participate in the more detailed design and possible construction activity that would be proposed in the future year programs. We believe these applications have significant water conservation potential and are worthy of active investigation.

The reverse osmosis technique has also shown potential for economic desalination of sea water. However, additional research and development efforts are needed to advance the reverse osmosis process for large-scale conversion of sea water to beneficial uses. We believe that the reverse osmosis technology will be ready for demonstration in one to two years and will be given high priority in our research program and in our feasibility study and demonstration program.

The electrodialysis technique has the potential for desalination of sea water. However, additional basic research is needed before any demonstration is considered, perhaps within the next three to five years.

Freezing technology is less well developed at this time. The process is based on the fact that ice crystals formed in the partial freezing of a saline solution reject salt and can be melted to form pure water.

Thermodynamically, freezing is superior to distillation. Freezing is a direct contact process (no metallic interface) which eliminates scale formation problems. Low temperature operation minimizes corrosion and permits use of less expensive materials. Although not commercially available at this time, freezing has great potential for application in industrial waste concentration. To simplify the process and improve its reliability, new process techniques should be developed and tested to eliminate the use of a hydro-carbon refrigerant in direct contact with the saline water and fresh water product. A demonstration program for this technology will have to await the appraisal of results of the research and developmental work of the next three to five years.

As you can see, each of these processes is at a different stage of advancement for various applications. As a result, it is neither necessary nor appropriate to demonstrate everything at once, but rather is desirable to be selective, share costs and sponsorship where possible, and always seek the option which appears, through interest of others, to have early and important application. With reprogramming, we would make preliminary identifications as early as March, 1978 and do so as part of a program which can document real needs for each demonstration project.

Water Resources Research

The Water Resources Research Program established in 1964 created a Federal-state relationship to identify research priorities and needs and to carry out research responsive to these needs. The water resources research institutes that have been established in each state, represent a mechanism for a strong partnership, featuring state and regional views. This Administration will continue to build and strengthen this intergovernmental relationship and mechanism, and intends to develop a strong, joint research program for the Nation. This is the only Federal-state institutional arrangement for the conduct of water resources research that has been established.

Since this program was authorized, the role of Federal, state, and local governments, and the university community in water resources has gradually evolved and changed. Accordingly, this program must be reviewed in light of these changing relationships and the growing complexity of water problems.

We are fully aware of criticism of this program which has been voiced in the past few years. As a result, we have devoted considerable time to a review of its structure, its record, and its leadership. We have also reviewed the record of support for the program by Congress and past administrations. This review was carried out not to assess the university research system or the water institutes as a separate segment of the OWRT, but to determine the role such a program has played and can play in a more comprehensive and integrated overall water research program.

Our conclusions are encouraging and point to an important future role for the university water community. The solid involvement of the academic community in the water resources research area, is as important to solving the nation's water problems as the involvement of private enterprise or local or state governments. The successes resulting from institute work I outlined earlier are significant and continuing.

The university program is beneficial in that it does produce, perhaps more than other elements of water research, a future core of young talent in the water area. University research has certainly had mixed results, but important work has been completed, and the establishment of state institutes has created a strong cooperative Federal/state relationship for water resources research.

The Department is fully prepared to support the continuation and enhancement of this program, but believes that increased support should be based on changes to reflect the new objectives of the overall program as we are setting them out today.

First, we believe that substantially increased Federal funding for the allotment program for basic institute support is not desirable at this time. A number of institutes have clearly demonstrated their ability to gain additional university, state or private funds beyond Federal appropriations to sustain and enhance their role, all of which strengthens the underlying Federal/state partnership.

The Department will give priority to Federal funding for research, particularly in the matching program, and believes that such increased support should clearly be directed toward identified high priority areas. It will be our intention to work cooperatively with the institutes to bring state and regional views into the process of setting such priorities.

Where such increased support is provided in excess of the basic allotment for support of the institutes, it should be made available on a competitive basis, based on merit of proposals among all institutes and universities, or combinations of them formed to submit proposals. We believe that this will maximize the quality and relevance of important research projects and make any increases in budget go as far as possible to meet key water research needs. An automatic fifty-four way division of the new budget will not provide equal benefits and as such, will not be supported by the administration.

We also believe that the present structure of the university institute system is acceptable, but we want to make it clear as a policy that we would be receptive to proposals for combining several state institutes into regional or sub-regional institutes capable of utilizing the combined assets of its members. Such a choice would be voluntary among institutes, but would, we believe, increase the common support level in areas where state water problems are in many ways similar, and would build on the varied strengths of the participants.

Concluding on this subject, Mr. Chairman, we should reiterate the belief that the academic community has, and will continue to be, a key element in water research. Our fondest hope is that we can provide a structure and a process for making this community a more closely related element to the overall program than it has been in the past and will be further developing our views as we develop new legislation.

New Legislation

The authorization for Title II, Additional Water Research Program and the Saline Water Conversion authorization, as you know, will expire on September 30, 1978. We intend to work with the Congress and others to develop new authorizing legislation. Our specific proposal will be the result of our experience with OWRT over the coming months, the outcome of the water policy review and the reorganization study. It will be our intention to submit new legislation shortly after Congress reconvenes which brings into statute the many new ideas we are developing now.

Other Initiatives

Mr. Chairman and members of the Committee, these points basically outline the most important of the specific initiatives we anticipate at OWRT. At this time, I would like to mention others of somewhat lesser scale, but still of importance and interest to the Committee.

1) We intend to organize a major national conference on water resources research and development. This conference will involve a wide spectrum of topics and a wide range of participants from throughout the Nation. Its primary objective will be to set out a water research agenda for the

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Nation. It will review where we are and where we should go, and would include identification of high priority research needs, and sharing of information about on-going research activities. The results of the conference would be incorporated appropriately into the national goals and objectives and legislative proposals for the OWRT programs for the coming years.

2) The Office of Water Research and Technology has been requested to provide assistance to the State Department in their program to assist Israel in the development, design, and construction of large-scale sea water desalting plants of advanced concepts. We have also been requested to participate with the U.S./Saudi Arabia Joint Economic Commission to provide technical assistance to the Government of Saudi Arabia. Initially, the emphasis will be on technology transfer to Saudi Arabia. We have been allotted eight positions to support these two activities. Through our participation, we hope to gain insights into advanced technology and make it available to the United States. All costs associated with these activities are fully reimbursable.

Conclusion

Mr. Chairman, this concludes the outline of the present status, proposed objectives, and planned actions for the Office of Water Research and Technology, as viewed from September, 1977. We believe there is a change in attitude and approach to this program, and hope that you sense it. We are neither uncertain nor tentative about water research, but rather, see it as an important and growing program at the Department of the Interior.

We believe we can make the program more aggressive, better integrated within the research area, substantially better oriented to stated goals, and more relevant to the mainstream of water resource problems in the United States. We look forward to a dialog with you and the members of the Committee, and support for a continuing effort.

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

HUGH L. CAREY
GOVERNOR

April 5, 1978

Dear Mr. Chairman:

We urge extension of the Water Resources Planning Act by the Congress for FY 1979. We believe the extension is absolutely necessary to maintain the momentum gained in the present Title III grant program to the states, in the activities of the Title II River Basin Commissions, the Water Resources Council, and federal-interstate compact commissions.

We strongly support authorization of $5 million for the Title III grant program for FY 79. This level of funding is the minimum required by the states to provide for progress in the development of much-needed state water plans and to participate adequately in interstate water resource planning.

In New York State the Title III funds support professional staff who are developing the state water plan, which specifically includes major programs to increase the safe yield of urban water systems and to supplement our water resource developments with non-structural measures. The funding also assists the state's participation in the activities of three Title II River Basin Commissions, the Delaware River Basin Commission, and the Susquehanna River Basin Commission.

We believe the three Title II River Basin Commissions in which we are members have provided the needed forum for the states and Federal agencies to resolve critical interstate issues. The quality of work done by these commissions is steadily improving and good results have been accomplished for our interstate waters such as in improvement of water management in Lake Champlain, national water policy, and dam safety.

New York State, in cooperation with the two federal-interstate compact commissions, has made major advances in improved management of the state's largest reservoirs and in low flow management of the Delaware and Susquehanna Rivers.

The Hudson River Basin, Level B, Study funding is scheduled to terminate in FY 1978. This study, which has a direct impact on 12 million New Yorkers, has already greatly influenced water management and water supply in the Hudson Basin area. The Congress has appropriated $1,008,000 for the conduct of this important work. We request authorization and appropriation of an additional $135,000 in FY 1979 for study completion which will allow this joint New York State/federal effort to provide recommendations and leadership needed to bring about an integrated water conservation program for the greater New York City area, expedite construction of critical stages of much-needed new components for the New York City water supply system, and strengthen overall water resource mangement in the reservoirs and streams in southeastern New York.

In connection with the recent review of National Water Policy, New York actively participated in the development of the National Governors' Association (NGA) policy statement which includes strong support for expansion of fiscal support for water resource programs of the states. The NGA statement expressed the need for a stronger fiscal commitment on the part of the Federal Government to ensure high quality water planning and more complete implementation of regional and state water resource plans. A national coordinating entity reporting directly to the President and with provision for adequate state and public input, such as a strengthened and reconstituted Water Resources Council, was recommended to accomplish these objectives.

We appreciate the opportunity to testify on this important Act which provides the only thread of continuity in regional and national water resource planning and management. We cannot abandon these programs at a time when our water needs are critical to our national welfare.

Sincerely,

Hugh L. Carey

Honorable Mike Gravel
Chairman, Subcommittee on
Water Resources
Senate Committee on Environment
and Public Works
4204 Dirksen Senate Office Building
Washington, D. C. 20515

NEW ENGLAND RIVER BASINS COMMISSION

53 STATE STREET • BOSTON, MASSACHUSETTS 02109
PHONE (617) 223-6244

April 4, 1978

The Honorable Mike Gravel
Chairman, Subcommittee on Water Resources
Senate Committee on Environment and
Public Works
4204 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

On behalf of the state members of the New England River Basins Commission (NERBC) representing Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island and Vermont, I wish to express our collective support for the U.S. Water Resources Council, the New England River Basins Commission, and the Title III Grant Program to the States. We request that the Congress provide authorization to continue these programs through FY 1979 as proposed by S.2701.

TITLE I: THE U. S. WATER RESOURCES COUNCIL

The incremental growth of federal and federally-supported programs for the conservation and development of the nation's water and related land resources has resulted in a bewildering -- and often conflicting -- array of grants, loans, and direct federal actions. The Congress recognized the need for a unifying force capable of coordinating federal and federally-assisted programs when it drafted Title I of the Water Resources Planning Act of 1965. The U. S. Water Resources Council, the agent for federal coordination, has not, however, functioned as well as was expected.

In their water policy recommendations to Secretary Andrus and the President, the New England/New York governors, and also the National Governors' Association, recognized the difficulties the Water Resources Council has had in carrying out its functions. At the same time they strongly endorsed the intent of Congress in creating the agency and called for changes in the way the Council operates so that it might function more effectively in the future as the integrator of water programs in the executive branch.

To strengthen the Council's ability to carry out its Congressional mandate, the governors have recommended

that the Chairman or chief administrator be appointed by and report directly to the President, serving as his principal advisor and spokesman on water resources. The governors have also recommended review and revision of some of the Council's major programs and responsibilities and have called for a greater state voice in Council decisions.

The governors explicitly did not recommend that the WRC be dissolved, and with good reason. While the Council's potential for leadership in policy making and planning has not been fully realized, this has largely been the result of the member agencies' failure to fully utilize the mechanism and staff of the Council to resolve interagency difficulties and the ambiguous leadership position of the Director, as currently structured. Nevertheless, the central thesis of the Council as an interagency mechanism for policy formulation and conflict resolution and as a catalyst for comprehensive, multi-purpose water resource planning and management is a good one. We urge your support for strengthening and continuing the Council so that it may accomplish the vital work which the Congress intended.

In addition, we request that the authorized level of funding of Title I be increased by $150,000 to allow an additional appropriation for completion of a national pilot study on the Connecticut River by NERBC on behalf of the Council on ways of implementing nonstructural flood plain management under Section 73 of the Water Resources Development Act of 1974, P.L. 93-251. Earlier phases of this study have been funded through appropriations to the Council's administration and coordination budget.

A central feature of this Section 73 pilot study is the use of Level C authorization studies by the Corps of Engineers and USDA Soil Conservation Service, as "laboratories" for the analysis of Section 73a planning procedures and Section 73b cost sharing and institutional options in a real-world, case study setting. The Corps has requested additional funding for its own work. The Soil Conservation Service now estimates that its Level C studies will extend well into FY 79. Since the agencies' and NERBC's study schedules must be closely coordinated, an extension of NERBC's studies and additional funding in parallel with the agencies' studies will be necessary; and we urge the Congress to add $150,000 to the authorized level of Title I for this purpose.

TITLE II: RIVER BASIN COMMISSIONS

The proposed authorization levels in S.2701 are based on the Administration's Budget, which represents a substantial reduction in the federal match of state funding for the FY 1979

operating budgets of the Title II River Basin Commissions. In the case of New England, the reduction is $54,500, or 16% of the federal match originally requested. Failure of the federal government to match fully the funds which the states have already committed to river basin commissions for FY 1979 would create an extremely difficult and disruptive situation for all states.

We strongly support the work of the New England River Basins Commission. We feel the Commission has done outstanding work in many areas, and we invite your attention to its more recent projects, which have national as well as regional significance.

- Preparation of the Factbook, a reference work detailing the characteristics, requirements, and impacts of each of the principal facilities involved in outer continental shelf (OCS) development. The Factbook was prepared in close collaboration with working committees of the offshore oil and gas industry and the American Petroleum Institute and is being used throughout the country to guide the development of onshore facilities related to offshore oil and gas activities.

- Investigation of the feasibility and implications of hydropower expansion in New England. This project has been funded by the Congress and will stress the examination of small-scale hydropower development. Viewed as a potential model for other regions of the country, this project will be carried out in close collaboration with the region's public utilities as well as federal and state agencies.

If the authorized level of Title II for NERBC is not raised by $54,500, we are faced with an inadequate regional response in providing the necessary measures to alleviate the serious coastal flood damage experienced this February. Specifically, severe economic losses occurred, calling for aggressive public action through the Commission to identify and implement new policies and programs for coastal flood plain management in New England.

TITLE III: FINANCIAL ASSISTANCE TO THE STATES FOR WATER RESOURCE PLANNING

The authorization levels proposed in S.2701 are based on the Administration's budget request, which is for only $3 million in FY 1979 instead of the $5 million for Title III, which was authorized by the act for fiscal years 1977 and 1978. We strongly support the Title III program. The Title III grant is a must for the states and serves as the vital catalyst for development of state water resource policies and plans,

which are integrated and coordinated with federally supported water resource management programs. There are currently underway a variety of important Title III-supported activities in New England states. These states have reported the following:

- In Connecticut, Title III funds are being used to develop a planning process for managing the state's water resources so that conflicts between various demands will be resolved with minimum environmental impact and economic expense. The planning capability being developed with Title III assistance allows for better coordination and cooperation with federal, regional and interstate agencies in their water resource efforts.

- Maine uses Title III funding to coordinate the water resource activities of state agencies and to develop water policy and articulate goals, needs and issues. Water management activities are assisted through the use of Title III funds to employ an executive secretary of the Maine Land and Water Resources Council.

- Title III funding in Massachusetts supports water planning positions which contribute not only to statewide planning, but also to interstate studies conducted by the New England River Basins Commission and other federal agencies. The current emphasis is on water supply policy and flood plain management policy.

- In New Hampshire, Title III funding provides the only source of support for coordinating all state water resource activities. It has proved to be essential to providing a rational and non-duplicative approach to water resource planning and management by the state.

- In New York, Title III funding assists in the development of the state water resource plan, which is currently addressing water supply for New York City. It also assists the state's participation in the activities of three Title II river basin commissions. In connection with the activities of the New England River Basins Commission, Title III funding helps support state activities in the Long Island Sound region and the Lake Champlain basin.

- Title III funds are used in Rhode Island to support the operating staff of the Water Resources Board. Although the Board coordinates water-related activities of state agencies, the level of Title III funding has not permitted comprehensive water resource planning of the kind contemplated by the Water Resources Planning Act. Increases in the amount granted to the State under this program could permit the State to prepare comprehensive

plans for management of its water resources encompassing water quality, water supply, flood protection, wetlands programs, dredging and port development, erosion and sedimentation, water-based recreation, and other water-related uses.

- The Title III program has helped Vermont coordinate water resources policy issues of particular concern to the state, including flood plain management, lake restoration, and management of non-point source pollution. Funds from the Title III program have also strengthened Vermont's capabilities for participating in several key water resource planning projects, such as the Lake Champlain Level B Study and the International Joint Commission investigation on the regulation of Lake Champlain.

In their water policy statement, the New England/New York governors recommended a series of actions which recognize the primary state role in water planning and management and which strengthen state capability to integrate all federal and federally-assisted programs in a comprehensive framework. They also stressed the need for federal support for water resource management to be flexible, and adequately and dependably funded. Increased federal support should come with a mandate from the federal government for development and implementation of state water resource management plans. To maintain a minimal program, we urge that the FY 1979 authorization level for the Title III grant program remain at least at the $5 million level.

LEVEL B AND SPECIAL STUDIES

The level of funding authorization proposed in S.2701 makes no allowance for any new study starts in FY 1979. The New England Port and Harbor Study, a proposed new study start, is important to our region. This study has been proposed as a result of the conclusion of the five coastal states -- Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut -- that important environmental and economic benefits can be realized from a cooperative assessment of port and harbor problems and opportunities in New England which have resulted from changes in shipping technology, offshore oil and gas development and expansion of the commercial fishing industry. The coastal states have each stated their desire to participate in a special study of New England's ports and harbors, and they have committed the required 25% in-kind contributions. The study is intended to be completed in 18 months at an estimated total cost of $600,000. Although recommended by the New England River Basins Commission to the Water Resources Council, no new study starts appeared in the Administration's

budget. We ask that the authorized level of Level B and special studies be increased by $308,000 in order that an appropriation in that amount can be made for the purpose of beginning this important project in FY 1979.

In summary, Mr. Chairman, we see a need for more, not less, attention to state and regional planning and management of our water and related land resources in New England and New York. We urge continuation of the Title III Program and the activities of the New England River Basins Commission and the Water Resources Council. This extension is absolutely necessary to maintain the momentum of the vital programs which I have described. The attached table summarizes the FY 1979 authorization levels which we feel are necessary for this purpose.

Sincerely,

Sydney H. Frink
State Vice Chairman

SHF/n

Attachment

WATER RESOURCES PLANNING ACT

(75 Stat. 244, as amended)

Summary of Changes Requested by the State Members of the New England River Basins Commission in Authorization Levels for FY 1979 (in thousands of dollars)

	S. 2701	Changes Requested
Section 401(a) (Title II)	$2,886	+ 54.5 (1)
Section 401(b) (Title I)	3,328	+ 150 (2)
Section 401(c) (Level B and Special Studies)	1,299	+ 308 (3)
Section 301(a) (Title III)	3,000	+ 2,000 (4)

Notes:

(1) For New England River Basins Commission operating budget.
(2) For Extension of Connecticut River "Section 73" Study.
(3) For New England Port and Harbor Study.
(4) For all states.

STATE OF UTAH
OFFICE OF THE GOVERNOR
SALT LAKE CITY
84114

SCOTT M. MATHESON
GOVERNOR

April 4, 1978

The Honorable Mike Gravel, Chairman
Water Resources Subcommittee
Environment and Public Works Committee
Dirksen Office Building
Washington, D.C. 20510

Dear Senator Gravel:

The National Governors' Association strongly supports the extension of the Water Resources Planning Act through FY 1979. The programs covered by the Act are too vital to the states and the nation to allow their termination without adequate replacement.

The governors of the nation have been concerned about future federal water resource efforts and policies that are now being discussed by the President and his Cabinet. I serve as chairman of the Water Management Subcommittee of the Natural Resources Committee of the National Governors' Association and have been involved in national water policy considerations for more than a year. The National Governors' Association has adopted an eleven-principle position that relates to water policy that is enclosed for your review and examination.

The National Governors' Association, in its position paper on national water policy, clearly recognizes the need for and supports the development of a comprehensive national water policy which truly addresses state water and related resource problems. This policy includes realistic and dependable finanical support for states to integrate management activities through extension of provisions for state assistance, such as a revised Water Resources Planning Act of 1965 or similar legislation.

The states have been particularly supportive of the continuation of Title III of P.L. 89-80 and the funds that it provides to the states for coordination and communication with regional and federal entities. Without congressional action, Title III would terminate at the end of this fiscal year and important state water resource planning programs would be jeopardized.

The National Governors' Association statement expresses the need for a means for resolution of conflicts or competition among federal programs and coordination of agency activities through a national coordinating entity and with provision for adequate state and public input such as a strengthened and reconstituted Water Resources Council.

Many states have used the vehicle of Title II to create river basin commissions. Where these commissions exist it is important that they be allowed to continue to function for the next year while the President and the Congress are debating water policy reform. Without congressional action, these river basin commissions that effectively exhibit a state-federal water planning partnership in an area that covers 40 percent of the nation will terminate.

I, therefore, in behalf of the National Governors' Association urge that the Senate Water Resources Subcommittee of the Environment and Public Works Committee, favorably and expediently act on S. 2701.

Sincerely,

Governor

SMM: jb

Enclosure

FUNDAMENTAL PRINCIPLES FOR A NATIONAL WATER POLICY

PREAMBLE

THE NATIONAL GOVERNORS' ASSOCIATION SUBCOMMITTEE ON WATER MANAGEMENT CLEARLY RECOGNIZES THE NEED FOR AND SUPPORTS THE DEVELOPMENT OF A COMPREHENSIVE NATIONAL WATER POLICY WHICH TRULY ADDRESSES STATE WATER AND RELATED RESOURCE PROBLEMS. THE PRESIDENT, IN HIS MAY 1977 ENVIRONMENTAL MESSAGE, CALLED FOR A NATIONAL WATER POLICY STUDY WHICH INCLUDES GREATER SENSITIVITY TO ENVIRONMENTAL VALUES IN WATER MANAGEMENT AND DEVELOPMENT PROGRAMS; ECONOMIC EFFICIENCY; WATER CONSERVATION; MORE EQUITABLE ALLOCATION OF COSTS AMONG BENEFICIARIES; AND BETTER INTEGRATION OF WATER QUANTITY AND WATER QUALITY OBJECTIVES AND PROGRAMS.

THE SUBCOMMITTEE CONCLUDES THAT ANY NEW NATIONAL WATER POLICY SHOULD BE THE RESULT OF A COOPERATIVE NATIONAL, NOT PRIMARILY FEDERAL, EFFORT: THAT IT SHOULD RECOGNIZE THE STATES' PRIMARY ROLE IN WATER MANAGEMENT; THAT THE NEW POLICY SHOULD STRENGTHEN THE STATES' CAPABILITIES TO MANAGE; THAT THE FEDERAL GOVERNMENT MUST BE MORE FLEXIBLE IN ITS RESPONSE TO STATES; AND THAT MANAGEMENT SHOULD RECOGNIZE HYDROLOGIC SYSTEMS. ESSENTIAL TO ANY NATIONAL POLICY ON WATER MANAGEMENT IS THE INTEGRATION OF CONCERNS FOR WATER QUANTITY AND WATER QUALITY WITH THE RELATED RESOURCES DEPENDENT THEREON. ANY NATIONAL WATER POLICY MUST RECOGNIZE REGIONAL DIFFERENCES IN WATER PROBLEMS AND ENSURE FLEXIBILITY AND EQUITY IN FUTURE FEDERAL WATER INVESTMENTS.

STATE REPRESENTATIVES WHO PARTICIPATED IN THE NATIONAL WATER POLICY REVIEW EFFORTS WERE AND ARE AGREED THAT COHERENT GOALS AND GUIDELINES TO PROVIDE A COMMON PURPOSE TO THE PROCESS HAVE NOT BEEN FORTHCOMING FROM THE FEDERAL GOVERNMENT. THIS STATEMENT, THEN, IS INTENDED TO GIVE THAT DIRECTION.

THE NATION'S WATER AND RELATED RESOURCES ARE INCREASINGLY REGARDED AS CENTRAL TO ITS ECONOMIC AND ENVIRONMENTAL WELL BEING. IT SHOULD BE THE GOAL OF A NATIONAL WATER POLICY TO FOSTER A JOINT FEDERAL/STATE AND LOCAL WATER MANAGEMENT PROGRAM TO MEET CURRENT AND FUTURE WATER QUANTITY, QUALITY, DEVELOPMENT AND RELATED RESOURCE NEEDS TO THE EXTENT POSSIBLE CONSISTENT WITH ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS.

SOME OF THE SERIOUS NATIONAL AND REGIONAL PROBLEMS WHICH INDICATE THE SCOPE OF ISSUES THAT NEED FURTHER ATTENTION TO MEET THIS GOAL INCLUDE:

- PUBLIC HEALTH CONCERNS
- LOSS OF VALUABLE WETLANDS
- RESOURCE RESTORATION AND MANAGEMENT
- LAKE EUTROPHICATION
- GROUND WATER DEPLETION
- ESCALATING ANNUAL FLOOD LOSSES
- ANTIQUATED WATER SYSTEMS IN URBAN AND RURAL AREAS
- WATER STORAGE FACILITIES
- FEDERAL REGULATION OF WATER RESOURCE STRUCTURES
- CLARIFICATION OF STATE, FEDERAL, AND NATIVE AMERICAN RESOURCE RIGHTS
- CONTAMINATION BY TOXIC AND HAZARDOUS MATERIALS OF SURFACE AND GROUND WATERS
- JURISDICTIONAL CONFLICT REGARDING WATER RIGHTS ADMINISTRATION AND MANAGEMENT
- INADEQUATE WATER SYSTEMS

THESE AND SIMILAR PROBLEMS SUGGEST TWO DIRECTIONS OF RESPONSE. FIRST, STATES MUST BE EQUIPPED TO MANAGE THEIR WATER RESOURCES BETTER. AND, SECOND, WATER RESOURCES POLICY MUST BE DEVELOPED IN CONCERT WITH AND AS AN INTEGRAL PART OF NATIONAL ECONOMIC, ENVIRONMENTAL, URBAN, AGRICULTURAL AND ENERGY POLICIES.

PRINCIPLE #1: THE STATES HAVE THE PRIMARY AUTHORITY AND RESPONSIBILITY FOR WATER MANAGEMENT

PRIMARY AUTHORITY AND RESPONSIBILITY FOR WATER MANAGEMENT FUNCTIONS INCLUDING PLANNING, DEVELOPMENT, AND REGULATION REST WITH THE STATES AND IN SOME CASES THEIR DELEGATED INTERSTATE AGENCIES. WATER MANAGEMENT ACTIVITIES RELATING TO WATER QUALITY, WATER SUPPLY, GROUNDWATER, WETLAND PROTECTION, COASTAL ZONE MANAGEMENT, AND SOIL CONSERVATION SHOULD BE CLEARLY DELINEATED BY CONGRESS AS THE PRIMARY RESPONSIBILITY OF THE STATES AND THEIR DELEGATED INTERSTATE AGENCIES.

NAVIGATION AND FLOOD CONTROL AND OTHER ISSUES AT THE PREROGATIVE OF THE STATE SHOULD CONTINUE TO BE SHARED WITH THE FEDERAL GOVERNMENT TO THE DEGREE APPROPRIATE.

FEDERAL POLICY MUST RECOGNIZE AND RESPECT THE RIGHTS OF THE STATES TO ADMINISTER THEIR INDIVIDUAL WATER LAWS AND MANAGE THEIR WATER RESOURCES.

PRINCIPLE #2: THE PROPER ROLE OF THE FEDERAL GOVERNMENT IS THREEFOLD: (1) TO ESTABLISH THE FRAMEWORK OF NATIONAL OBJECTIVES AND CRITERIA DEVELOPED IN CONSULTATION WITH THE STATES; (2) TO PROVIDE ASSISTANCE TO THE STATES IN THE DEVELOPMENT OF PROGRAMS TO MEET STATE NEEDS WITHIN SUCH FRAMEWORK; AND

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(3) TO BE CONSISTENT WITH SUCH STATE PROGRAMS TO THE MAXIMUM EXTENT POSSIBLE WHEN UNDERTAKING DIRECT FEDERAL ACTIONS PURSUANT TO NATIONAL INTERESTS

THE RESPONSIBILITY OF THE FEDERAL GOVERNMENT IS TO ESTABLISH IN FULL CONSULTATION WITH STATES AND OTHER APPROPRIATE INTERESTS NATIONAL OBJECTIVES AND CRITERIA FOR THE PROTECTION, MANAGEMENT, RESTORATION, DEVELOPMENT, AND USE OF WATER AND RELATED RESOURCES TO MEET NATIONAL ECONOMIC, ENVIRONMENTAL, AND SOCIAL OBJECTIVES AND TO ASSIST IN IMPLEMENTING SUCH POLICIES IN FEDERAL ACTIONS AND THROUGH ASSISTANCE AND SUPPORT FOR STATE ACTIONS.

HOWEVER, THE NATURE OF FEDERAL ACTIVITIES IN WATER MANAGEMENT INVOLVING DIRECT ACTIONS BY FEDERAL AGENCIES, AN ARRAY OF NARROW CATEGORICAL GRANT PROGRAMS FOR SPECIFIC MANAGEMENT PURPOSES, AND A SIMILAR RANGE OF REGULATORY PROGRAMS HAS BEEN A MAJOR BARRIER TO COMPREHENSIVE MANAGEMENT AND APPROPRIATE ACTION AT THE STATE, LOCAL, OR BASIN LEVEL.

THE ESSENTIAL STEPS TOWARD ORDERLY, EFFICIENT, AND BALANCED WATER MANAGEMENT ARE TO RECOGNIZE THE PRIMARY RESPONSIBILITY OF THE STATE AND TO PUT EACH STATE IN THE POSITION TO DEVELOP COHERENT MANAGEMENT STRATEGIES IN COOPERATION WITH LOCAL GOVERNMENTS, OTHER STATES, AND THE FEDERAL GOVERNMENT.

IT IS THE RESPONSIBILITY OF THE STATE TO RELATE NATIONAL OBJECTIVES AND CRITERIA TO ITS MANAGEMENT PROGRAMS. FEDERAL POLICY SHOULD BE DIRECTED TOWARD STRENGTHENING THE CAPABILITY OF THE STATE TO ACT AS THE INTEGRATOR AND MANAGER OF ALL PROGRAMS AFFECTING THE WATER RESOURCES OF THE STATE. TO DO SO EFFECTIVELY, STATES NEED:

- REALISTIC AND DEPENDABLE FINANCIAL SUPPORT FOR STATES TO INTEGRATE MANAGEMENT ACTIVITIES THROUGH EXPANSION OF PROVISIONS FOR STATE ASSISTANCE SUCH AS A REVISED WATER RESOURCES PLANNING ACT OF 1965, OR SIMILAR LEGISLATION;
- FULL FUNDING OF AUTHORIZED PROGRAMS CONSISTENT WITH CONGRESSIONAL INTENT;
- TECHNICAL ASSISTANCE FROM FEDERAL AGENCIES, SUCH AS EPA, SCS, USBR, USGS, BLM, OR THE CORPS, POSSESSING EXTENSIVELY DEVELOPED EXPERTISE;
- ADDITIONAL RESEARCH ASSISTANCE, AS FOR EXAMPLE FROM THE WATER RESOURCE RESEARCH CENTERS ESTABLISHED UNDER THE WATER RESOURCES ACT OF 1964, OR SIMILAR LEGISLATION; AND
- ASSURANCE THAT DIRECT FEDERAL ACTIONS WILL BE RESPONSIVE TO NATIONAL POLICY, CONSISTENT WITH STATE PROGRAMS AND PRIORITIES AND CAREFULLY EVALUATED AGAINST MUTUALLY AGREED UPON STANDARDS SUCH AS PRINCIPLES AND STANDARDS ADOPTED PURSUANT TO THE WATER RESOURCES PLANNING ACT, SUITABLY REVISED.

PRINCIPLE #3: <u>WATER MANAGEMENT MUST BE APPROACHED IN A MORE COMPREHENSIVE AND COORDINATED MANNER AT FEDERAL, STATE, LOCAL, AND INTERSTATE LEVELS</u>

THE FEDERAL GOVERNMENT SHOULD SUPPORT A MANAGEMENT SYSTEM WHICH PROVIDES FOR DEFINED STATE AND NATIONAL OBJECTIVES AND CRITERIA IN THE MANAGEMENT OF WATER RESOURCES. SUCH A SYSTEM SHOULD GUIDE RESULTING STATE, LOCAL AND FEDERAL IMPLEMENTATION ACTIONS, WITH DUE REGARD FOR EFFICIENCY IN PUBLIC INVESTMENT, ENVIRONMENTAL QUALITY, EQUITY, AND THE INTEGRITY OF HYROLOGIC AND RELATED NATURAL SYSTEMS.

- AT THE FEDERAL LEVEL, THIS MEANS RESOLUTION OF CONFLICTS OR COMPETITION AMONG FEDERAL PROGRAMS AND COORDINATION OF AGENCY ACTIVITIES, THROUGH A NATIONAL COORDINATING ENTITY REPORTING DIRECTLY TO THE PRESIDENT AND WITH PROVISION FOR ADEQUATE STATE AND PUBLIC INPUT, SUCH AS A STRENGTHENED AND RECONSTITUTED U.S. WATER RESOURCES COUNCIL.
- AT THE STATE LEVEL, THIS MEANS PREPARATION AND MAINTENANCE OF COMPREHENSIVE STATEWIDE WATER AND RELATED RESOURCE PROGRAMS DEVELOPED WITHIN NATIONAL OBJECTIVES AND CRITERIA ESTABLISHED IN CONSULTATION WITH THE STATES, APPROPRIATELY FUNDED, WITH SPECIFIC FUNDING SUPPORT FOR LOCAL AND FEDERAL PARTICIPATION.
- AT THE INTERSTATE LEVEL, WHERE STATES DETERMINE THAT FEDERAL/STATE COLLABORATION IS DESIRABLE, INSTITUTIONS SUCH AS RIVER BASIN COMMISSIONS, INTERSTATE COMPACTS, OR OTHER MECHANISMS AGREED UPON BY THE PARTICIPANTS SHOULD BE SUPPORTED.

PRINCIPLE #4: FEDERAL ACTIONS MUST BE CONSISTENT WITH ADOPTED STATE AND INTERSTATE WATER AND RELATED RESOURCES PLANS AND PROGRAMS

A MAJOR FRUSTRATION AMONG REGIONAL, STATE AND LOCAL WATER RESOURCE DECISION MAKERS IS THE PROBLEM OF SECURING CONSISTENCY OF FEDERAL PROJECTS WITH STATE WATER PLANNING PROGRAMS. ALL DIRECT FEDERAL ACTIONS, GRANTS, AND REGULATIONS MUST BE SHOWN TO BE CONSISTENT WITH ADOPTED STATE AND INTERSTATE WATER AND RELATED RESOURCES PLANS DEVELOPED WITHIN THE FRAMEWORK OF THE NATIONAL OBJECTIVES AND CRITERIA. IN THE ABSENCE OF SUCH PLANS, FEDERAL ACTIONS SHOULD BE CONDUCTED FOLLOWING AGREEMENT WITH THE AFFECTED STATES.

PRINCIPLE #5: THERE MUST BE CONTINUITY IN FEDERAL SUPPORT FOR WATER MANAGEMENT PROGRAMS

EFFECTIVE SCHEDULING OF LOCAL AND STATE GOVERNMENT APPROPRIATIONS PROCESSES AND PERSONNEL RECRUITMENT IS MADE EXTREMELY DIFFICULT BY SHARP VARIATIONS IN FEDERAL FUNDING LEVELS AND BY THE FAILURE TO FULLY FUND AUTHORIZED PROGRAMS.

CONTINUITY OF FEDERAL SUPPORT IS CRITICAL IN TWO RESPECTS: IN RELATIVE DEPENDABILITY IN FUNDING LEVELS OVER TIME; AND IN THE ENTIRE SEQUENCE OF ACTIONS FROM PLANNING THROUGH IMPLEMENTATION. WITH CONTINUITY IN FEDERAL SUPPORT GUARANTEED, NON-FEDERAL CONTRIBUTIONS CAN BE MORE EASILY ASSURED.

PRINCIPLE #6: THERE MUST BE GREATER FLEXIBILITY IN THE ENTIRE FEDERAL SUPPORT SYSTEM FOR WATER MANAGEMENT

SOURCES OF FEDERAL ASSISTANCE FOR WATER PLANNING IN GENERAL AND PROGRAM MANAGEMENT AND PROJECTS IN PARTICULAR ARE NOT ADEQUATELY RESPONSIVE TO WATER PROBLEMS AT THE STATE, REGIONAL, OR NATIONAL LEVEL. INHERENT BIASES TOWARD SPECIFIC COURSES OF ACTION EXIST THROUGHOUT THE SYSTEM AND ARE PRINCIPALLY CAUSED BY (1) THE FAILURE TO FUND (OR FUND ADEQUATELY) SPECIFIC SECTIONS OF APPROVED FEDERAL LEGISLATION; (2) THE NARROW FOCUS OF SOME CATEGORICAL GRANTS; (3) THE VARIATIONS IN THE FEDERAL CONTRIBUTIONS IN COST SHARING FORMULAS; AND (4) AUTHORITIES WHICH PRECLUDE AGENCIES FROM PARTICIPATION IN CERTAIN PROJECTS AND PROGRAMS. SUCH BIASES RENDER THE SYSTEM OF FEDERAL ASSISTANCE INFLEXIBLE, REDUCE THE NUMBER OF OPTIONS STATE AND LOCAL DECISION MAKERS CAN CONSIDER, AND EFFECTIVELY PRECLUDE ACHIEVEMENT OF THE GOAL OF COMPREHENSIVE PLANNING AND MANAGEMENT.

TO ELIMINATE THE INFLEXIBILITY WHICH HAS EVOLVED AND PROMOTE A MORE FLEXIBLE SYSTEM CAPABLE OF RESPONDING TO PERCEIVED WATER PROBLEMS, WHETHER NATIONAL OR REGIONAL IN SCOPE, THE SUBCOMMITTEE RECOMMENDS FOUR BASIC POLICY CHANGES:

- FIRST, BROADEN THE APPLICABLITY OF EXISTING CATEGORICAL PROGRAMS, OR FULLY FUND UNDERFUNDED PROGRAMS, TO MAKE THEM MORE RESPONSIVE TO STATE AND REGIONAL NEEDS;
- SECOND, BEGIN THE ESTABLISHMENT OF A SUPPLEMENTAL GRANT PROGRAM FOR WATER MANAGEMENT ACTIONS THAT ARE NEEDED BUT DO NOT QUALIFY UNDER EXISTING CATEGORICAL GRANT PROGRAMS OR DIRECT FEDERAL PROJECTS. GUIDELINES WOULD BE DESIGNED WITHIN BROAD NATIONAL OBJECTIVES DEVELOPED IN CONSULTATION WITH THE STATES;
- THIRD, GIVE EQUITABLE TREATMENT TO ALL ALTERNATIVE SOLUTIONS TO WATER-RELATED PROBLEMS BY UPGRADING FUNDING ASSISTANCE FOR NON-STRUCTURAL PROGRAMS; AND
- FOURTH, ESTABLISH FEDERAL AGENCY AUTHORITY AS NEEDED TO PARTICIPATE IN AND FUND A WIDER VARIETY OF WATER MANAGEMENT SOLUTIONS SUCH AS FOR WATER SUPPLY AND WATER RESTORATION PROGRAMS.

PRINCIPLE #7: CRITERIA FOR PLANNING AND EVALUATING FEDERAL AND FEDERALLY ASSISTED WATER PROJECTS AND PROGRAMS MUST BE REFINED AND APPLIED UNIFORMLY

A SPECIAL EFFORT SHOULD BE MADE TO REVIEW AND REVISE THE PRINCIPLES & STANDARDS TO BETTER RECOGNIZE, QUANTIFY AND DISPLAY THE ENVIRONMENTAL AND SOCIAL AND REGIONAL IMPLICATIONS OF FEDERAL WATER PROGRAMS AND PROJECTS. THE GENERAL INTENT OF THE P & S SHOULD APPLY TO ALL FEDERALLY ASSISTED AS WELL AS DIRECT FEDERAL WATER AND RELATED RESOURCE PROGRAMS.

- THE PUBLIC PARTICIPATION REQUIREMENTS OF PROJECT PLANNING AND EVALUATION CRITERIA SHOULD BE AGRESSIVELY CARRIED OUT.
- PROJECTS SHOULD BE SELECTED USING A SYSTEM WHICH INCLUDES COST/BENEFIT ANALYSES, COST EFFECTIVENESS ANALYSES, AND ECONOMIC, ENVIRONMENTAL AND SOCIAL ANALYSES.
- THE APPLICATION OF APPROPRIATELY REVISED PRINCIPLES & STANDARDS TO WATER QUALITY PROGRAMS IS AN EXAMPLE OF EFFECTIVE AND EQUITABLE ASSESSMENT OF SUCH PROGRAMS: SUBSEQUENTLY, PROJECTS WHICH ARE PART OF SUCH PROGRAMS WOULD BE EVALUATED BY COST-EFFECTIVENESS.
- STEPS MUST BE TAKEN TO ENSURE THAT EVALUATIONS OF ALL FEDERAL WATER PROGRAMS AND PROJECTS ARE CONDUCTED AND REPORTED UNIFORMLY TO THE MAXIMUM EXTENT POSSIBLE; AND
- THE PRESENT METHOD OF ESTABLISHING THE DISCOUNT RATE FOR FEDERAL PROJECTS--BASED ON THE COST OF FEDERAL BORROWING--APPEARS TO BE THE MOST APPROPRIATE. DISCOUNT RATES SHOULD BE UNIFORM AND RELATIVELY STABLE.

PRINCIPLE #8: FEDERAL PROJECT FINANCING, COST SHARING, AND COST RECOVERY POLICIES SHOULD BE REVIEWED AND SIMPLIFIED TO ELIMINATE INEQUITIES AND INHERENT BIASES TOWARD SPECIFIC SOLUTIONS TO WATER PROBLEMS AND PROMOTE EQUAL CONSIDERATION OF STRUCTURAL AND NON-STRUCTURAL SOLUTIONS

EXISTING FEDERAL POLICIES PRESENT A BEWILDERING ARRAY OF FINANCING, COST-SHARING, AND COST RECOVERY OPTIONS FOR DIRECT FEDERAL AND FEDERALLY-ASSISTED WATER PROJECTS AND PROGRAMS. INEQUITIES EXIST AMONG THOSE WHO PAY FOR AND THOSE WHO BENEFIT FROM SUCH PROJECTS AND PROGRAMS. MOREOVER, MANY EXISTING PROGRAMS CREATE INHERENT FINANCIAL BIASES WHICH FAVOR CERTAIN

SOLUTIONS TO WATER PROBLEMS OVER OTHERS, SOMETIMES RESULTING IN THE APPROVAL OF PROJECTS OF ONLY MARGINAL UTILITY. ACCORDINGLY, THE SUBCOMMITTEE URGES THAT:

- COST-SHARING POLICIES SHOULD BE CONSISTENT AMONG ALTERNATIVE MEANS FOR ACHIEVING THE SAME PURPOSE. THIS MEANS UNIFORMITY AMONG COST-SHARING POLICIES FOR BOTH STRUCTURAL AND NON-STRUCTURAL ALTERNATIVE SOLUTIONS TO A PROBLEM UNDER EXISTING AGENCY AUTHORITIES AND BROADENING SOME AGENCY AUTHORITIES TO PERMIT CONSIDERATION OF MORE ALTERNATIVES;
- COST-SHARING POLICIES SHOULD BE CONSISTENT AMONG FEDERAL AGENCIES FOR THE SAME PURPOSE. THERE SHOULD BE NO FINANCIAL BIAS MAKING ONE AGENCY'S PROGRAM MORE ATTRACTIVE THAN ANOTHER'S ON FINANCIAL GROUNDS, FORCING NON-FEDERAL PARTICIPATNTS TO "SHOP AROUND" FOR THE BEST DEAL;
- WHERE URGENT ACTION IS CALLED FOR AND NON-FEDERAL PARTICIPANTS CANNOT PROVIDE THEIR "FRONT END" SHARE IN TIMELY FASHION, THERE SHOULD BE PROVISION FOR FEDERAL FINANCING BEYOND THE ULTIMATE FEDERAL COST-SHARING LEVEL, WITH SUBSEQUENT COST RECOVERY;
- COST RECOVERY POLICIES SHOULD PROMOTE CONSERVATION AND EQUITY. PROJECT COSTS SHOULD BE RECOVERED FROM IDENTIFIABLE BENEFICIARIES WHENEVER POSSIBLE THROUGH SYSTEMS SUCH AS USER CHARGES, AD VALOREM TAXATION, AND SALE OF VENDABLE PRODUCTS, WITH DUE REGARD TO BENEFITS DERIVED AND FOR ADMINISTRATIVE PRACTICALITY AND FINANCIAL CONSTRAINTS ON DIRECT BENEFICIARIES AND COMMUNITIES.

PRINCIPLE #9: WATER CONSERVATION MUST BE THE FUNDAMENTAL CONSIDERATION IN WATER MANAGEMENT PROGRAMS

A NATIONAL WATER CONSERVATION INITIATIVE REFLECTING REGIONAL VARIATIONS AND AS DEFINED BELOW MUST BE THE CORNERSTONE OF NATIONAL WATER POLICY. WATER CONSERVATION INVOLVES: (1) DAY-TO-DAY USES; (2) RESOURCE ALLOCATION INCLUDING CONJUNCTIVE USES; (3) DROUGHT RESPONSE; AND (4) EFFECTIVE USE OF SEASONAL WATER INCLUDING STORAGE WHERE APPLICABLE. THE ISSUE IS BOTH ECONOMIC AND ENVIRONMENTAL. THE ECONOMICS AND ENVIRONMENTAL IMPACTS OF WATER CONSERVATION VARY BY REGION AND ARE OFTEN SITE SPECIFIC. NATIONAL POLICY MUST BE FLEXIBLE ENOUGH TO ACCOMMODATE THESE DIFFERENCES. ACCORDINGLY, THE SUBCOMMITTEE RECOMMENDS:

- A NATIONAL WATER CONSERVATION INITIATIVE IMPLEMENTED BY THE STATES AS PART OF THEIR TOTAL WATER MANAGEMENT PROGRAMS WITH FEDERAL FINANCIAL AND TECHNICAL ASSISTANCE INCLUDING A COMPONENT FOR EVALUATION OF THE TRUE BENEFITS AND COSTS OF CONSERVATION.
- ENCOURAGING COMPREHENSIVE MANAGEMENT OF INTERMITTENTLY AVAILABLE FRESH WATER RESOURCES TO MAXIMIZE THE AVAILABILITY OF SURFACE AND GROUNDWATER SUPPLIES;
- REQUIRING CONSIDERATION OF MAXIMUM WATER CONSERVATION CONTRIBUTIONS IN PROJECT AND PROGRAM PLANNING AND EVALUATION CRITERIA, SUCH AS THE P & S, FOR ALL WATER PROGRAMS AND PROJECTS;
- EXAMINING CLOSELY THE INCENTIVES AND DISINCENTIVES FOR ENCOURAGING RECYCLING AND REUSE OF WATER, WITH DUE CONSIDERATION FOR PUBLIC HEALTH.

- EXAMINING AND PROMOTING WHERE FEASIBLE THE PRACTICE OF CONJUNCTIVE USE OF WATER SUPPLIES--I.E., USE SURFACE WATER SUPPLIES DURING HIGH STREAM FLOWS THEREBY CONSERVING GROUNDWATER SUPPLIES, AND USE GROUNDWATER SUPPLIES DURING LOW STREAM FLOWS.

PRINCIPLE #10: FEDERALLY SUPPORTED WATER RESEARCH SHOULD BE EXPANDED, COORDINATED, AND TIED CLOSELY TO THE PLANNING AND MANAGEMENT CONCERNS OF THE STATES

THE FEDERAL GOVERNMENT CURRENTLY SUPPORTS A WIDE VARIETY OF WATER RESEARCH PROGRAMS, BOTH THROUGH THE INDIVIDUAL FEDERAL WATER AGENCIES AND THROUGH THE STATE WATER RESOURCES RESEARCH CENTERS CREATED UNDER THE WATER RESOURCES RESEARCH ACT OF 1964 AND COORDINATED BY THE OFFICE OF WATER RESEARCH AND TECHNOLOGY IN THE DEPARTMENT OF THE INTERIOR. THROUGH THESE VEHICLES, IMPORTANT RESEARCH HAS BEEN CONDUCTED IN ALL PHASES OF WATER MANAGEMENT. HOWEVER, LITTLE COORDINATION EXISTS AMONG THESE PROGRAMS AND NO EFFECTIVE MECHANISM EXISTS WHICH CAN FOCUS THE WATER RESEARCH ESTABLISHMENT ON THE PLANNING AND MANAGEMENT CONCERNS OF THE NATION'S PRINCIPAL WATER MANAGERS--THE STATES. THE SUBCOMMITTEE RECOMMENDS THAT:

- AT THE FEDERAL LEVEL, PROVIDE COORDINATION AMONG THE MANY MISSION-ORIENTED FEDERAL AGENCY RESEARCH PROGRAMS BY, FOR EXAMPLE, TYING THEM AND THE OFFICE OF WATER RESEARCH AND TECHNOLOGY MORE CLOSELY TO A NATIONAL COORDINATING ENTITY SUCH AS A RECONSTITUTED AND STRENGTHENED U.S. WATER RESOURCES COUNCIL.
- AT THE STATE AND REGIONAL LEVEL, REQUIRE THAT THE RESEARCH AGENDAS OF BOTH THE FEDERAL AGENCIES AND THE FEDERALLY-SUPPORTED WATER RESEARCH CENTERS BE DEVELOPED IN CONJUNCTION WITH THE EXPRESSED MANAGEMENT NEEDS OF THE STATES; AND

- PROVIDE SUBSTANTIALLY INCREASED SUPPORT, PERHAPS THROUGH AMENDMENT TO THE WATER RESOURCES RESEARCH ACT, FOR RESEARCH PROGRAMS IN SUPPORT OF STATE NEEDS, AND INCREASED SUPPORT FOR PROGRAMS OF TECHNOLOGY TRANSFER AND PUBLIC INFORMATION BY THE WATER CENTERS TO INCREASE THE VALUE OF THEIR WORK.

PRINCIPLE #11: ANY CLAIMS TO FEDERAL RESERVED WATER RIGHTS INCLUDING THOSE FOR INDIANS MUST BE INITIALLY ADDRESSED WITHIN THE FRAMEWORK OF ESTABLISHED STATE SYSTEMS

TO INSURE THAT THERE IS EQUITY AND THAT PROCEDURES ARE PROMPT AND ORDERLY, THE PROCESSES FOR THE IDENTIFICATION AND QUANTIFICATION OF FEDERAL RESERVED WATER RIGHTS, INCLUDING THOSE MADE ON BEHALF OF INDIANS, SHOULD BE STREAMLINED AND ACCELERATED IN COOPERATION WITH THE STATES, WITH ORIGINAL JURISDICTION IN STATE COURTS SUBJECT TO NORMAL APPEAL. THE SUBSEQUENT ADMINISTRATION OF SUCH RIGHTS SHOULD BE WITHIN STATE SYSTEMS.

THE SUBCOMMITTEE RECOMMENDS THAT:

- ANY FEDERAL CLAIMS TO WATER ASSERTED UNDER THE RESERVATION DOCTRINE OR OTHER THEORY OF PARAMOUNT RIGHT INCLUDING THOSE MADE ON BEHALF OF INDIANS SHOULD INCLUDE A SPECIFIC RECITAL OF THE PURPOSE, LOCATION, EXTENT AND PRIORITY DATA OF EVERY WATER RIGHT CLAIMED, AND SHOULD RELATE SUCH CLAIMS TO THE EFFECTUATION OF THE ORIGINAL PURPOSE OF THE RESERVATION.
- FEDERAL LEGISLATION IS NEEDED TO PROVIDE FULL COMPENSATION TO THE OWNERS OF WATER RIGHTS VESTED UNDER STATE LAW, IF (1) THOSE RIGHTS ARE LATER TAKEN BY THE UNITED STATES OR INDIAN TRIBES OR (2) THE EXERCISE OF THOSE RIGHTS IS PRECLUDED BY ACTIONS OF THE UNITED STATES.

TESTIMONY
of the
WESTERN STATES WATER COUNCIL
Concerning
TITLE III OF THE WATER RESOURCES PLANNING ACT
Presented at the hearings of the
WATER RESOURCES SUBCOMMITTEE
of the
ENVIRONMENT AND PUBLIC WORKS COMMITTEE
of the
UNITED STATES SENATE
April 7, 1978
Washington, D.C.

The Western States Water Council appreciates this opportunity to appear before this committee concerning the Water Resources Planning Act. My name is Craig Bell, and I am Assistant Director of the Council.

For your information, the Western States Water Council is an organization created by the eleven western governors and which has been in existence for thirteen years. The Council meets quarterly to discuss water resource matters that are of keen interest to the western states and their governors. Representatives of the governors of the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming are in attendance at these meetings as western water resource policies are discussed and formulated.

The western states all have viable, ongoing, water planning programs. The financial assistance received over the years from the federal government through Title III of the Water Resources Planning Act has greatly assisted the states in developing and maintaining their water resource planning efforts and providing them with the funds and capability to enter into discussions with federal counterparts. This has been particularly valuable during the last year, when western water administrators were concerned about an unprecedented drought, about controversies concerning federal funding of water resource projects, amendments to the Clean Water Act (P.L. 92-500), and about the present Administration's review of water resource policies in general.

Although Title III of the Water Resources Planning Act has assisted the states in developing a water resource planning capability, we do not believe that this was the sole purpose intended by Congress when Title III was drafted. In fact, a close review will disclose that the concept of building state planning capabilities is not discussed in Title III of the Act. Instead, the Act provides

that the funds will be used in developing and participating in the development of comprehensive water and related land use planning. If the states are to continue to participate with the federal government in comprehensive water and related land use planning, continuing funds will be needed for this purpose.

Demonstrating the states' commitment to ongoing water resources planning, western states have consistently appropriated from state funds many times the amount of money necessary to match the federal funds offered under Title III of the Water Resources Planning Act.

The western states, through the Western States Water Council, have on several occasions expressed unanimous and strong support for the full $5 million authorized annually under Title III of the Act. At this time, we urge your support for extending the authority for Title III funding through the next fiscal year by recommending passage of S. 2701. In so doing, we further urge that you amend the proposed legislation by increasing the amount it authorizes under Title III from $3 million to $5 million as is now authorized under the Act. We would also recommend that you support a full $5 million appropriation as funding for Title III is considered.

We believe that for continuity and consistency of state water planning efforts, funding should be continued this year so that a hiatus is not created as initiatives, yet to be recommended by the White House for water policy reform and reorganization of natural resource agencies, are considered by the Congress. Passage of the legislation would continue the Act in its present form and allow Congress to fully consider any recommended revisions to the Act.

If funding is terminated, we feel there could be some significant harmful effects. Some states would find it difficult under current economic pressures to convince state legislatures that state funds should be continued without the matching federal dollars and that the level of state appropriation should be increased to compensate for federal withdrawal of support. As a result, funds for states' use in water resource planning would be available in smaller quantities. Very capable planners would have to be terminated from state employment. States would find that they could not be responsive to requests from federal agencies to participate in planning efforts, to travel to Washington, D.C., and to comment on the multitude of natural resource hearings and forums that are, and will be occurring.

The first sentence of the Water Resources Planning Act concludes by stating that the Act is to provide a "financial assistance to the States in order to increase State participation in such planning." Curtailment of these funds would reduce state participation; and we believe that in the interest of the nation, reduced state participation should not be contemplated at this time.

In addition to the interstate and federal coordination and participation effort, Title III funds are used specifically in states to develop a better understanding of the water resources available, and to plan for the best use and management of those resources.

In conclusion, the Western States Water Council finds that Title III of the Act has been successful. Water resource planning does not result in a final product. Planning efforts must be ongoing as natural resource issues become more complex, and must be extended and modified as needs and desires shift in areas such as food and energy production. There is today, even more than thirteen years ago, a need for a concerted effort to coordinate water resource planning with other planning. These coordinated efforts require significant input from private interest groups and local governments. These coordinated efforts also require a free and open exchange between states and water users in various river basins and between the Federal Government and the fifty independent states. For this reason, the Western States Water Council urges passage of S. 2701.

Again, I would like to express the appreciation of the Western States Water Council for this opportunity to testify. I would be happy to convey any questions or requests to the appropriate committees of the Council's, or to the individual states that are members of the Western States Water Council.

TESTIMONY FOR THE APRIL 7, 1978 HEARINGS
SUBCOMMITTEE ON WATER RESOURCES OF THE SENATE COMMITTEE
ON ENVIRONMENT AND PUBLIC WORKS

PRESENTED BY

DR. THOMAS G. BAHR, DIRECTOR
NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE
NEW MEXICO STATE UNIVERSITY
LAS CRUCES, NEW MEXICO

INTRODUCTION

I am Thomas G. Bahr of the New Mexico Water Resources Research Institute, New Mexico State University at Las Cruces, New Mexico. I am appearing before you today to present my general reaction to the new Water Research and Development Bill (H. R. 11226/S.2704). I am testifying on behalf of the New Mexico Water Resources Research Institute although I know my views are shared by other Water Institute Directors in the U.S.

Water resources research, education, management and technology transfer has been my profession for over 10 years. I served on the faculty at Colorado State University for 2 years conducting research and teaching in the water sciences. Before recently accepting my current post in New Mexico, I served as Director of the Institute of Water Research at Michigan State University for 5 years and was also Assistant Director of the same Institute for 3 years. I also serve on a number of national committees on water resources and the focus of my technical expertise has been in the area of water quality management and water research administration.

At the outset let me tarnish my credibility somewhat as a New Mexico witness by saying that I have only been in my new position for just over one month. Although I am rapidly gaining familiarity with New Mexico's water problems and water research program I have seen enough to reinforce my earlier notions of what constitutes an effective State-Federal partner-

ship in research programs to solve our pressing water problems. Having just come from the most water-rich state in the country to one of most water-scarce gives me a unique opportunity to compare sharply contrasting water problems and an opportunity to identify those common denominators which characterize the elements of a responsive and effective water research program.

COMMENTS

The new Act being considered in these hearings represents a move in the direction of imposing greater quality control and promoting increased competition among participants in the OWRT program. This is evidenced, for example, by opening the availability of the Matching Grant program to qualified non-University participants. The legislation also places increased responsibility on the state institutes by requiring significant non-Federal cost sharing in both the Allotment Grant and Technology Transfer programs. This new direction will, in my opinion, strengthen the National program. It will provide stronger incentives to improve the programs of those Institutes which have been less aggressive in assembling the resources needed to adequately solve our more urgent water problems. For those Institutes which have been more aggressive and have developed a better track record than others in this regard, I think this legislation is a significant step in providing them with the opportunity to strengthen their programs even further.

The Title I, Section 101 Allotment Grant program authorizes a fixed amount of funding ($110,000) to each participating state Institute. Most directors would, of course, like to see this base level of funding increased. I too would like to see increased funding in this portion of the program but feel strongly that the additional funds should be competitive and

allocated on the basis of merit of the institute. It is not reasonable to expect that all institutes are equal when judged on the strengths of their programs. Some are better than others! The better ones should be appropriately rewarded for their efforts in developing high quality programs. A basic allotment to each institute of $110,000 or $150,000 provides for the basic needs of institute administration, technology transfer staffing and a small amount for carrying out a few modest research projects. This amount however, is not adequate to fund many much needed larger projects of state and regional significance.

Provisions in this bill for an additional allotment in the neighborhood of $100,000 on a competitive basis for meritorious programs would be an excellent investment of public funds in water research. The research payoffs would be more certain since these funds would be allocated to those institutes with a proven record of good performance. I would strongly recommend incorporation of an amendment that would provide such a supplement to qualified institutes.

The proposed funding authorization for Technology Transfer is also a step in the right direction. Although I think the funding level proposed in this bill is grossly unadequate for a comprehensive program, it will provide at least a start to get a few much needed "outreach" programs off the ground.

The proposed change in the Matching Grant program that I mentioned earlier can only serve to strengthen the program if selections are made on merit and the ability to comply with the matching requirements.

Another feature of this bill is the integration of the saline water program into the theme of total water management. In the state of New Mexico, problems of brackish and saline waters are of special concern. Many small communities are seriously constrained in their development by

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having unadequate supplies fresh water for municipal uses. In fact a few must use water in excess of 2000 ppm total dissolved salts for drinking supplies. In view of more stringent standards for drinking water quality, communities such as these in several states, will have to turn to advanced water treatment technology. It is in situations such as these where desalting processes may have distinct advantages over other water supply alternatives. It is absolutely essential, however, to initiate full scale demonstrations of the more recent developments in this technology in order to provide both users and equipment suppliers with the confidence they need to make firm commitments to this technology in a practical way. I would hope that the language of this bill and its subsequent administration would not abandon the earlier commitment to this program established under the 1977 Water Research and Conversion Act (P.L. 95-84).

I should also mention that there are very large supplies of brackish to saline groundwaters in our region which if put to beneficial use could be of great benefit to the economic development of the southwest. We have initiated through funds available from OWRT and the State of New Mexico projects designed to test the feasibility of using these lower quality water supplies for such purposes as irrigation of salt tolerant crops and the development of new plant varities that are resistant to salt. Furthermore, we are now developing what I consider to be some very exciting ideas on the use of brackish and saline waters for intensive aquiculture of such things as shrimp, fish and economically important seaweeds. Some of these concepts are in part proven and others are at this time in need of far more investigation.

In recognition of the opportunities for the beneficial use of brackish and saline water, the New Mexico Water Resources Research

Institute is entering into cooperative agreement with OWRT on the use of various blends of saline water from the desalting plant at the Roswell, New Mexico Test Facility. At this facility researchers from around the region will have a unique opportunity to test these concepts and using results of this research hopefully be able to apply them in a real world setting. Although I may have spent a disproportionate amount of time discussing the saline water program because it represents a relatively new element in the direction for the New Mexico Institute, I should point out that it is only one of many activities in our total program.

I have seen from my Michigan experiences how innovative thought when supported in the early stages by the OWRT can cascade into multi-million dollar research programs with substantial payoff to the public. I think that under this new legislation the opportunities for similar successes are even better.

ALTERNATIVE CALIFORNIA WATER SUPPLIES BY DESALTING

By
Guy Fairchild
Department of Water Resources
The Resources Agency
State of California

Mr. Chairman -- My name is Guy Fairchild and I am an engineer with the California Department of Water Resources and I have been assigned for a one year period to the United States Water Council in Washington, D. C. This statement provides the Department's views on HR 11226 and S 2704, "Water Research and Development Act of 1978", especially as it related to converting saline and other impaired waters to better quality water suitable for municipal, agricultural, industrial, recreational and other beneficial uses. In our testimony we will discuss our experience in water supply, water conservation, water reclamation and the role that water reuse and water quality improvement must play to meet our water needs in California. Through our experience with waste water reclamation and improvement of the quality of water supplies and based on our anticipated future water needs in California, we believe that the demonstration desalting plant authorization in HR 11226 and S 2704 will be a particularly important part of the Department of Interior's authority and is supportive of California's water quality and quantity objectives. We have a strong interest in participating as a cooperator with the Federal Government in planning, constructing and operating a demonstration desalting plant in California.

The recent drought years in California have sharpened our focus on a wide variety of options available to manage and utilize our water resources to meet future water needs. These options included desalting of saline and other impaired waters, and conservation of water supplies.

During the past 20 years the California Department of Water Resources has studied the feasibility of desalting and continues to assess the role that desalting can play in providing California's future fresh water supply. In 1965 the Department was granted authority by the California Legislature through the Cobey-Porter Saline Water Conversion Law to cooperate with others, including the Federal government, to make studies and evaluations in the field of saline water conversion. Also after specific authorization from the Legislature our Department may cooperate with others including the Federal government to finance, construct and operate saline water conversion facilities.

Recent water conservation efforts in California have reduced the rate of water use for urban and agricultural purposes. In 1977 the California Legislature appropriated $600,000 to our Department to test various household water conservation devices and methods to effectively distribute those devices. Distribution of these devices were made in six communities of different types to test distribution

methods and acceptance of the devices. If a state-wide distribution of these devices resulted in a 30 percent use of the devices the Department estimates that the annual savings would be $30 million in energy cost and 136 cubic hectometres (110,000 acre-feet) of water. Studies are being continued to determine means to reduce the quantity of water used for agriculture.

In some parts of California municipal and agricultural waste water, brackish ground water and sea water are available and hold the potential for a new water supply if it is economically feasible to reduce the concentration of salts and other impairing substances in these waters. We are continuing to study the role desalting can play in the future water supply for California.

Large quantities of municipal waste water are generated in California due to its large population and industrial development. Waste water from inland municipalities returns to ground water bodies or surface streams and is reused. Most of the waste water from coastal municipalities is discharged into the ocean or tidal estuaries and not reused. Reclamation of this coastal waste water including removal of dissolved minerals in some cases would provide a new water supply. The Department has participated in pilot plant and testing studies for reverse osmosis treatment of municipal waste water in San Diego, Orange and Marin Counties and desalting of Colorado

River water delivered to Southern California. The waste water studies also evaluated the removal of virus and stable organic materials by reverse osmosis membranes.

California is one of the few states where there are significant quantities of agricultural waste water. This is water reused for irrigation until it contains too much salt or other contaminants which make it unusable for agricultural purposes. Most of this agricultural waste water occurs at inland areas in the San Joaquin Valley and the southeastern part of the State. To maintain agricultural production in these areas water management is necessary to maintain a proper salt balance. Desalting technology, reverse osmosis in particular, may be an important step in an overall water management plan. To develop reverse osmosis technology for this application, our Department has for several years been operating pilot plants to desalt agricultural waste water in the San Joaquin Valley.

Many isolated communities in California obtain their water supply from brackish ground water which contains concentrations of minerals significantly higher than the maximum levels recommended in drinking water standards. If economically feasible, reverse osmosis technology could be used to improve the quality of these water supplies.

We have participated before with the Federal Government in funding and site selection for demonstration desalting plants. Twenty years ago we participated in selecting the site for a one million gallon per day sea water demonstration

desalting plant. The plant was constructed at Point Loma, San Diego, California in the early 1960's. The State of California contributed one half of the plant construction cost. In 1964 this plant was moved by the Federal Government to the U. S. Naval Base at Guantanamo Bay, Cuba. This plant is still producing fresh water from sea water.

After 1964 the Federal Government constructed a sea water desalting test facility near the south end of San Diego Bay. The State of California continued to cooperate by building a pipeline to convey the desalted water. During the five years the desalting plants and pipeline were in operation, over four million cubic metres (one billion gallons) of desalted water was delivered for domestic use.

In the early 1970's we cooperated with the Federal Government in studying the feasibility of a 40 million gallon per day sea water distillation desalting plant. This plant known as the Diablo Canyon Desalting project was to have been located on the Pacific coast adjacent to a large nuclear power plant. The use of steam from the nuclear facility would have demonstrated the practical application of nuclear energy to desalt large quantities of sea water. This project did not proceed beyond the feasibility study phase due to lack of funding.

Mr. Chairman, I have described these accomplishments to bring to your attention the long and continued interest of the State of California in desalting as a means of providing

new water supplies. During the past 20 years the State has engaged in desalting feasibility studies, pilot plants and demonstration plants.

Recent changes have occurred in California related to waste water reclamation and reuse. The State of California is preparing plans for the second major phase of the State Water Project. These plans which are presently being considered by the State Legislature would implement a policy to partially meet the water supply needs for the State Water Project through water conservation and waste water reclamation. Also, in October 1977, Governor Brown established the Office of Water Recycling and directed this new office to take all reasonable steps to promote recycling and reclamation of waste waters in California, including all efforts necessary to achieve the goal of "construction of facilities to make available an additional 493 cubic hectometers (400,000 acre feet) of reclaimed water per year in California by 1982".

The application of desalting technology will be necessary to implement the reclamation and reuse of some of this waste water.

In California we must make every effort to conserve and reuse our water supplies. We wish to participate in a cooperative effort with the Federal Government to site, construct and operate a demonstration desalting plant in California under the provisions of HR 11226 and S 2704. Our

principal interest is in the application of reverse osmosis desalting technology to the reclamation of agricultural and municipal waste water. We believe that the variability of the quality of waste water in California from one source to another and from one season of the year to another make these waters more difficult to treat. There is much less experience in reverse osmosis desalting of agricultural and municipal waste waters where the quality of the feed water varies, than for the desalting of conventional brackish ground water.

I want to emphasize our State's long interest in the role desalting technology can play in the future fresh water supply for California; our past participation with the Federal Government in desalting studies, pilot plants and demonstration plants; and our interest in participating with the Federal Government in a demonstrating desalting plant under HR 11226 and S 2704.

We urge that your Committee support authorization and appropriation of funds for the demonstration plants under HR 11226 and S 2704.

CITY OF VIRGINIA BEACH

VIRGINIA

WATER RESOURCE MANAGEMENT

April 6, 1978

City of Virginia Beach

April 5, 1978

Honorable Mike Gravel
United States Senate
Chairman, Subcommittee on Water Resources
Committee on Environment and Public Works
United States Senate
4204 Dirksen Building
Washington, D.C. 20510

Dear Mr. Chairman and Members of the Subcommittee:

It is a privilege to have this opportunity to present to you the viewpoint of the City of Virginia Beach relative to the Desalting Technology Demonstration Program proposed under the provisions of Public Law 95-84 which was enacted into law August 2, 1977.

We in Virginia Beach are delighted that the Office of Water Research and Technology has been authorized to undertake a Desalting Technology Demonstration Program, the intent of which is (1) to sponsor water resources and saline water conversion research, and (2) to sponsor three or four demonstration projects over the next several years under a program that can include treatment of brakish water, sea water and waste water.

We appreciate this opportunity to publicly support the Demonstration Program. As you know, the unavailability of acceptable fresh water supply sources has become a nationwide problem that needs immediate solution. It is clear to those of us who are in immediate need of new sources of drinking water that traditional solutions for water supply problems are no longer acceptable or available.

This is especially true in Virginia Beach. We have a year-round population of 250,000; additionally, over 2,000,000 tourists visit our City each year. Major military, tourist, commercial, agri-business, and housing industries

are located in our City, and their rapid expansion over the past fifteen years has been the cause of our City's rapid growth. At this point in time, Virginia Beach is the fastest growing City on the east coast and is the fourth fastest growing City in the entire United States.

Historically, we have depended upon a neighboring jurisdiction for our water supply. Our present water supply contract stipulates that only surplus supplies of water may be purchased. This is a condition which makes the quantities of water available to us to be very unreliable. During high water demand periods, this unreliability of water supply is causing critical health and safety problems in the operation of our water distribution system.

Since 1969, Virginia Beach, together with our sister cities and a multiplicity of other state and federal governmental agencies, has been energetically involved in a far-ranging but fruitless search for new water supply sources. One example of the high level of study effort that has occurred is the 1975 Corps of Engineers Northeastern Water Study which listed our area as one of the more critical water-short areas in the country.

However, after all of this investigation, a new and adequate water supply source has still not yet been identified, nor are there any prospects for one even in sight. Major legal and environmental problems are stalling decisions related to interstate and interbasin transfers and impoundments that are necessarily involved in the creation of a major new water supply source. As responsible City officials, we recognize that we now have no choice but to fully explore the feasibility of using desalting technology to solve our water supply problems, both short as well as long-range.

In that regard, our most critical need now is to have access to the expertise developed over the years by the staff of the Office of Water Research and Technology. We have retained the engineering firm of Wiley and Wilson, Inc. of Lynchburg, Virginia, and they in turn have associated themselves with a consortium of engineering and groundwater hydrology firms familiar with desalting technology; consequently, we are now developing a solid in-house capability. However, in terms of the application of this technology in

the most cost-effective manner possible, the Office of Research and Technology is undoubtedly "light years" ahead of the private engineering and manufacturing industry; so without question we will need their active advice, participation, and support if our effort to apply this technology is to be successful. We believe the Demonstration Program will be the best way for us to obtain their active involvement so that is why we are desirous of being selected for the first demonstration project.

As a result of living with this major problem for a very long time and of making every conceivable effort and commitment to solving the problem, but as yet to no avail, we in Virginia Beach have now evolved in our "learning-frame" to the point in time where we can agree with all the statements of purpose and objectives made by Mr. Guy Martin, Assistant Secretary for Land and Water Resources, Department of Interior, in his appearance on September 29, 1977 before the House Subcommittee on Water and Power Resources to discuss the programs of the Office of Water Research and Tehcnology.

However, two statements that Mr. Martin made appeared to us to capture and focus what we understand to be the "heart" of O.W.R.T.'s Desalting Technology Demonstration Program, so I will end my remards by repeating these two statements, in pertinent part:

> 1st, "The Saline Water Conversion Act of 1971 . . . provides for research and development of processes to convert saline or other chemically contaminated water to a quality suitable for municipal . . . and other beneficial uses; . . . (and) for conducting engineering and technical work, including design and construction and testing of pilot plants, test beds, and modules; and for investigation of the feasibility and practicability of large scale prototype plants."
>
> 2nd, "It should be a program which engages in demonstrations only where there is need which is appropriate scientifically, where the private sector cannot or will not perform, and where the demonstration itself relates practically to the identified needs of a program, region, community or other public purpose. In all but exceptional cases, an entity with whom a demonstration is conducted should be a working partner including sharing of costs."

Mr. Chairman, the Demonstration Program will advance this important transfer of desalting technology, so it needs and deserves the support and funding of the Congress and the Administration now. If real support from the federal government is forthcoming now, then selection of Virginia Beach for the first demonstration project will complete the circle and all the major ingredients mentioned by Mr. Martin, which are necessary to achieve a successful large scale pilot plant within the framework of a genuinely working federal-municipal partnership, will be satisfied.

On behalf of the Mayor and City Council of the City of Virginia Beach, I encourage the immediate funding of this necessary demonstration program; and I offer you the financial and organizational commitment of our City to work with the Office of Water Research and Technology to make the program succeed.

Sincerely yours,

George L. Hanbury
City Manager

GLH/kcf

COMMONWEALTH of VIRGINIA

JAMES B. KENLEY, M.D.
COMMISSIONER

Department of Health
Richmond, Va. 23219

March 31, 1978

Mr. Gary D. Cobb, Director
Office of Water Research and Technology
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Cobb:

The City of Virginia Beach has informed us that they have made application to the Department of the Interior for a grant to design and construct a desalinizing plant with a capacity between two and ten million gallons per day.

It is our understanding that the City would utilize the pilot facilities for desalinizing groundwater for the production of drinking water. Drinking water sources are critical in extreme southeastern Virginia. A desalinizing plant utilizing groundwater would be a pioneering effort and, if successful, would provide a partial answer to the water supply needs of the area. Therefore, this Department fully supports the efforts of the City of Virginia Beach.

If you have any questions or if I can be of any further assistance, please contact me.

Sincerely,

James B. Kenley, M.D.
State Health Commissioner

shh

cc: Mr. Aubrey Watts, Director
Public Utilities - Virginia Beach

Norfolk Regional Office

COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD
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Mr. Gary D. Cobb, Director
Office of Water Research and Technology
Washington, D. C. 20240

Dear Mr. Cobb:

This is in response to your letter of February 15, 1978 in which assistance is sought in the development of a Desalting Technology Demonstration Program. We are appreciative of your having provided the opportunity to become more familiar with the saline water program of the Office of Water Research and Technology. Additionally we are pleased to be able to assist in the identification of potential sites and potential cooperators to be considered for inclusion in the authorized Saline Water Technology Demonstration Program, the objective of which is to demonstrate adequately the effectiveness, reliability and economics of current fully developed saline water conversion technology in a situation where real benefits will accrue.

After much study and analysis of Virginia's available water resources and water supply needs, which span the past several years, we are without doubt convinced that the City of Virginia Beach, Virginia, amply satisfies every criterion which the Office of Water Research and Technology will employ in the process of selecting a saline water conversion demonstration plant site in a real world situation with real water resources problems.

With respect to the significance of water supply problems as viewed by the legislative branch of government in Virginia, we invite your attention to the fact that the 1977 General Assembly provided for the creation of a State Water Study Commission to address water supply problems in the State including specifically the geographic area in which the City of Virginia Beach lies. The 1978 General Assembly has provided for continued activity of the State Water Study Commission and has noted that critical water supply problems will continue unless immediate corrective action is taken.

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GENERAL STATEMENT OF THE PROBLEM

Established in 1963 from a relatively rural county and a resort community, the City of Virginia Beach now comprises over 300 square miles and contains a population in excess of 250,000. The City is the nation's fourth fastest growing jurisdiction and soon will be the largest city in Virginia. Its rapid and diverse growth is being caused by rapid expansions of the major military, tourist, commercial, agri-business, and housing industries that are located there.

Although it is blessed with an abundance of favorable attributes, the City and region are plagued with an inadequate water supply. This condition is related to the relative youth of the City and the basic shortage of water in the broad Southern Tidewater Virginia locale. Special consideration of this latter condition was given by the Corps of Engineers in its 1975 Northeastern Water Study in which Tidewater Virginia was listed as one of the more critical water-short areas in the northeastern United States.

The City is bounded on the east by about 28 miles of shoreline along the Atlantic Ocean on the north by Chesapeake Bay, on the south by North Carolina, and the Cities of Norfolk and Chesapeake on the west.

The City lies in the Coastal Plain physiographic province underlain primarily by unconsolidated sands and clays with numerous permeable strata in the nearly 3,000 feet of sediments that overlie basement rock in the area. Wells deeper than 1,000 feet have been drilled in the City at several locations. One 1,693 foot well at Virginia Beach obtains water from screened intervals between 345 and 1,307 feet below land surface. This well was tested to yield more than 830 gallons per minute and produces large volumes of water suitable for cooling but water from the deep aquifers system is too saline for most uses.

Since there are no significantly large fresh water streams in the City of Virginia Beach, there are extremely limited surface water resources available for development. The main surface water streams are Little Creek, Lynnhaven Bay and tributaries, North Landing River and its main tributary, West Neck Creek.

Developing surface fresh water supplies in Virginia Beach is difficult to most improbable. Large supplies of non-saline surface water would best be developed by long pipelines reaching into areas to the west of Virginia Beach, and west of the Cities of Chesapeake and Norfolk

The critical nature of the water supply question in this City of basic significance to both the Commonwealth and to the national defense installations located therein cannot be overstated.

Virginia Beach and several military installations located within the boundaries of Virginia Beach are supplied with potable water on a contractural basis by another jurisdiction's municipally owned water system, the raw water supply sources of which consist of interconnected reservoirs situated on small streams of limited drainage area with augmentation by diversions from the Blackwater and Nottoway Rivers at locations approximately 40 miles and 50 miles westward, respectfully. These sources are supplemented by groundwater wells located about 40 miles to the west of Virginia Beach.

Tidewater (or southeastern) Virginia comprises some five separate cities, all of which have, or are in the process of developing, separate water sources. The unique position of Virginia Beach as the easternmost jurisdiction, makes developing a separate freshwater supply extremely difficult. Virginia Beach historically has depended on another jurisdiction for its water supply, and presently has a water supply contract, which extends to 1993, to receive the surplus supplies of the other jurisdiction. Water demand projections indicate that the safe yield of the existing water sources will be reached during the 1980's. However, peak period demand problems are being experienced now. This results in a very unreliable water supply situation. Regional efforts to solve the water shortage problem have not resulted in a solution to this problem. This is essentially due to the serious riparian issues involved in most solutions to the problem, including potential interstate and interbasin transfers of water. Earlier and current prospects for augmenting water supply sources for this area of the State which includes the City of Virginia Beach have not been and are not good; further, we see little reason to be encouraged that significant change will take place in sufficient time to deal effectively with the anticipated shortage by utilizing conventional approaches to water supply problem solution. This view is held due in part to the following:

1. The groundwater situation is not good in the prolific cretaceous aquifers producing essentially potable water west of Norfolk, Chesapeake and Virginia Beach, and which are utilized heavily by industrial and municipal water systems. Water in these aquifers has been allocated to such extent that mining would begin to occur in about 15 years if all existing users begin now and continue withdrawing the quantities of water to which they now are legally entitled.

2. Those impoundments now being utilized in furnishing water to the systems are not hydrologically capable of producing increased safe yields of significance.

3. Those surface streams from which water is now being diverted to existing systems are apparently not capable of producing more water for additional diversion without extensive impoundments and extremely complex water management systems to ameliorate potentially adverse effects on uses in reaches downstream from the diversion sites.

4. Potentially unfavorable economic, environmental, social and equity implications involved in interbasin transfer of water from those hydrologic systems remote from the geographical area of need are substantial.

In view of the foregoing, and in view of the fact that saline water, both ground and surface, is available within the boundaries of Virginia Beach City in quantity and quality sufficient to support saline water conversion technology and processes now currently available to gain first-hand on-location data for enlightened decision making, it is our considered opinion that utilization of that technology in Virginia Beach is a most viable alternative for application in modular fashion to augment existing sources of water supply to meet incremental water supply deficits that are projected to occur in the area during the 1980's.

In recognition of this serious problem, Virginia Beach commissioned an extensive study and analysis of developing a water source which would meet present and future water demands. This study has indicated that the City must avail itself of converting its broad range of brackish and salt water to potable water. This conclusion is based on the fact that the potential for developing significant surface water sources in the area does not exist; that only limited quantities of potable groundwater are available; and that extreme difficulty in obtaining approval for a major water impoundment in the Eastern United States exists due to major legal, sociological, jurisdictional, environmental, and riparian issues.

Elected officials of the City have given strong support to the desalting concept. It is the contention of Virginia Beach that the City is in a unique position for benefitting from a long-range desalting program due to:

1. The youth, competence, and vitality of the City's management.

2. The City's ability to properly plan and implement an evolving program responding to interim and medium-range water shortages, as well as an ultimate program responding to long-range water needs.

3. The existence within the City of various types of brackish water which could lead to the demonstration of new desalting technology.

4. The existence of a strong desalting commitment of both citizens and elected officials.

5. The positive financial posture of the City.

6. The desire of the City to work closely with the Department of the Interior to utilize its saline water conversion technology.

In view of the City's long-range planning and commitment to desalting, it is suggested that Virginia Beach is in a unique position to participate and assist in developing vital information and expertise in a desalting demonstration project as set forth in PL 95-84.

DESALTING TECHNOLOGY DEMONSTRATION PROGRAM GUIDELINES

We understand that the objective of the Desalting Technology Demonstration Program is to demonstrate the effectiveness, reliability and economics of the latest fully developed desalting technology sited where real benefits can be a collateral goal. We further understand that it is essential that each plant be set in a real world situation with real problems in water quality and/or quantity and with an active partner willing to share in the responsibilities and risks. Successful demonstrations can greatly shorten the delays which precede the acceptance of new technologies.

We have provided comments below for seven of the guideline items attached to your letter of February 15, 1978. These comments are intended to provide background information on the situation in Virginia Beach with respect to the objectives of the OWRT desalting technology demonstration program.

1. The project proposed must be set in a real water quality/quantity problem situation with potential of becoming an integral part of an operating system.

   Southeastern Virginia including Virginia Beach experienced severe water shortages during 1977.

   The City of Virginia Beach purchases all of the water it uses from the City of Norfolk with quantitative amounts available to Virginia Beach from Norfolk based on water surplus to Norfolk's needs. Water demand projections indicate that the safe yield of Norfolk's water supply will be reached during the 1980's. However, peak period demand problems are being experienced now. This results in a very unreliable water supply situation.

   Virginia Beach is the fourth fastest growing city in the United States and has a population of 250,000 persons. Its rapid and diverse growth is being caused by rapid expansions of the major military, tourist, commercial, agribusiness, and housing industries that are located there.

   Major surface water supply projects require twelve to fifteen years for development. Most future water supply alternatives for southeastern Virginia require the construction of a large dam and could be delayed or postponed indefinitely because of interbasin and interstate water transfer questions and because of involved environmental impact statement requirements.

The Engineers studying the water supply problem for Virginia Beach have developed a plan of action to insure that the water supply needs of Virginia Beach are met. This plan of action includes the construction of a demonstration plant for desalting saline waters. The demonstration plant will become an integral part of the City's water system with planned expansions to take advantage of future technology and to meet present and future water demands.

2. The process, one or more of its integral parts, or a combination of processes, should be something new but thoroughly tested, and not as yet available as a product that is commercially marketed for the purpose addressed by the demonstration. Alternatively a commercial product or process could be utilized on a previously untested water or wastewater stream.

Desalting brackish groundwater using membrane techniques is the demonstration program proposed in the plan of action contained in the Water Resources Study for Virginia Beach.

The desalting technologies proposed for demonstration include higher capacity and longer life membranes contained in larger modules.

Other areas proposed for demonstration with the potential for reducing operating costs include improved pumps and pumping efficiencies, alternatives to pre-treatment, and reduced chemical requirements.

Reduction in overall energy requirements will be demonstrated using energy recovery systems.

3. The demonstration plant size should be sufficient to demonstrate potential application but flexible enough to meet siting conditions, and product water receiving conditions, present and future.

The demonstration plant size of 2 MGD or larger would permit direct scale up to larger facilities which may be required as early as 1985.

A demonstration plant size of 2 MGD or larger will contribute to meeting the existing average water demand which was 20 MGD last year and to the ultimate demand of 70 MGD.

4. Cooperator must be willing to assume a 50-50 cost sharing based upon total project cost over the period of demonstration.

Virginia Beach has indicated that they are now willing and able to assume a 50-50 cost sharing for the demonstration project; and are capable of operating the plant as part of its utility system as soon as it is on line.

Virginia Beach has already appropriated funds to initiate a groundwater production/testing program to determine specific information on brackish groundwater quality and well yields and to determine how that water quality might be affected by prolonged pumping.

5. Cooperator would assume an active responsible role in the full range of proposed project activity from pre-planning to construction, and to operation and maintenance.

Virginia Beach has indicated that it intends to assume an active responsible role in the demonstration project.

Virginia Beach has demonstrated through projects such as the computerized control center for its water distribution center, its ongoing independent water supply study, and its leadership role in regional solutions to solid waste, transit, and health services problems that it would in fact assume an active responsible role in the demonstration project.

Desalting of saline waters appears to be the only viable water supply alternative applicable to Virginia Beach which can guarantee the water quantities required for solving the long-term water supply problem at Virginia Beach. This fact supports the City's stated commitment to the project.

6. The primary OWRT role would be as technical adviser and include project oversight and evaluation of results.

Virginia Beach has indicated its acceptance of OWRT's role as project advisor and in fact has stated its need for OWRT technical assistance and will solicit that assistance.

7. Steps involved in the conduct of demonstration project include:

(Cooperator) Prepare a summary report on status of water resources quality/quantity situation in area of potential demonstration plant site. The report should also indicate alternative solutions and an indication that a desalting technology resource may be a viable solution.

Phase I Report: Project Planning Assistance prepared by Wiley & Wilson, Inc. as part of the Virginia Beach Water Resources Study has been completed. Phase II Report: Engineering Analysis is to be completed on May 1, 1978. We anticipate that copies of these reports will be made available to you by the City of Virginia Beach at the time of their formal letter of intent to cooperate or shortly thereafter.

During the development of Phase I and II Reports, specialists such as Geraghty & Miller, Inc., Groundwater Hydrologists, provided analyses of potential water supply sources. Contacts with representatives from consultants currently involved in desalting projects were also made; i.e. Burns & Roe, Inc; Black, Crow, and Eidsnes, Inc; Toups Engineering Company; and James M. Montgomery, Inc. Geraghty & Miller, Inc. will be used in subsequent phases of the project, and one or more desalting specialists such as those listed above will be used as required.

Leading membrane suppliers such as Universal Oil Products, duPont, and Ionics provided preliminary computer designs for desalting processes based on water quality data supplied during development of Phase I and II Reports.

It appears that reverse osmosis is the process that will be used. However, other desalting processes are still under investigation.

Most of the data required for the summary report can be taken from the existing Phase I and II Reports.

CONCLUSIONS

The City of Virginia Beach represents an ideal location for a fully developed desalting facility. In addition to advancing desalting technology, the initiation of such a program would aid in the short-term and long-range solution to a critical water supply situation.

The regional water studies conducted for southeastern Virginia have not resulted in the solution of the water supply problem. This lack of solution impacts heavily on Virginia Beach due to its lack of freshwater sources. The availability of sea water, brackish surface water, and brackish groundwater makes the application of desalting technology most applicable.

The City of Virginia Beach is both capable and willing to share the cost, responsibility and risk in a demonstration desalting project. Virginia Beach is most interested in being an active member of such a program and recognizes the importance and potential of desalting technology to the solution of their water supply situation. The activities to date by the City of Virginia Beach not only indicate to this agency that the governing body of the City would authorize the City to become a cooperator within your demonstration program but further, that the City actively desires to be the first demonstration site selected.

Please be assured that the staff of the State Water Control Board has recorded its enthusiastic support of the efforts of the City of Virginia Beach to pursue the selection of a saline water conversion demonstration plant project site to be located within its boundaries.

Should you require more information and detail for use in your appraisal and evaluation of candidates being considered as cooperators in a saline water demonstration project, please call upon us.

Sincerely yours,

R V Davis

R. V. Davis
Executive Secretary

sc

CC: Mr. Jack C. Jorgensen, Assistant Director
Technology Transfer
Office of Water Research and Technology
Department of the Interior
Washington, D. C. 20240

Dr. William R. Walker, Director
Virginia Water Resources Research Center
Virginia Polytechnic Institute and
State University
Blacksburg, Virginia 24061

COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD
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APR 3 1978

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Honorable Mike Gravel
United States Senate
Chairman, Subcommittee on Water Resources
Committee on Environment and Public Works
United States Senate
4204 Dirksen Building
Washington, D. C. 20510

Attention: Ms. Ann Garrabrant

Dear Senator Gravel:

This is with reference to the public hearing scheduled to be held on April 7, 1978 by your Subcommittee on Water Resources relative to the development of the Desalting Technology Demonstration Program authorized under the provisions of Public Law 95-84 enacted August 2, 1977 to extend certain authorities of the Secretary of the Interior with respect to Water Resources Research and Saline Water Conversion Programs.

Ms. Garrabrant has graciously indicated that the Subcommittee has agreed to hear a joint presentation to be made by the State Water Control Board and the City of Virginia Beach on April 7 concerning the subject of the Desalting Technology Demonstration Program.

We are most appreciative of the opportunity afforded by the Subcommittee to us so that we may publicly support the Desalting Technology Demonstration Program.

We are providing herewith six copies of an oral presentation to be made at the referenced hearing together with supplementary detailed comments to accompany the oral statement. An additional thirty copies of this material will be provided for the use of the Subcommittee at the time of our presentation on April 7.

Should you have special instructions relative to our appearance and the conduct of the hearing which you feel would be helpful, please let us know.

Sincerely yours,

R. V. Davis

R. V. Davis
Executive Secretary

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Enclosures

STATEMENT OF MICHAEL A. BELLANCA, DEPUTY EXECUTIVE SECRETARY, OF THE VIRGINIA STATE WATER CONTROL BOARD, TO BE PRESENTED APRIL 7, 1978, BEFORE THE SUBCOMMITTEE ON WATER RESOURCES, ENVIRONMENT AND PUBLIC WORKS COMMITTEE OF THE UNITED STATES SENATE

Mr. Chairman and gentlemen of the committee . . . It is indeed a privilege to have the opportunity to present to you our views relative to the development of the Desalting Technology Demonstration Program under the provisions of Public Law 95-84 enacted into law August 2, 1977 to extend certain authorities of the Secretary of the Interior with respect to water resources research and saline water conversion programs, and for other purposes.

We in Virginia are delighted that the Office of Water Research and Technology has been authorized to undertake a Desalting Technology Demonstration Program and that the intent is to sponsor three or four demonstrations over the next several years under a program that can include treatment of brackish water, sea water and waste water.

In brief, it is our purpose here today to express to you our conviction that the City of Virginia Beach, Virginia, amply satisfies every criterion which we believe to be pertinent in the appraisal and evaluation of candidates to be considered as potential cooperators in a saline water conversion demonstration plant site in a real life situation with real water resources problems.

The City of Virginia Beach now comprises more than 300 square miles in area with a population in excess of 250,000 and is the nation's fourth fastest growing jurisdiction and soon will be the largest city in Virginia.

Although blessed with an abundance of favorable attributes, the City and the region in which the City lies is plagued with an inadequate supply of fresh water.

The City lies in the Coastal Plain physiographic province and is underlain primarily by unconsolidated sands and clays with numerous permeable strata which yield water in large volumes suitable for cooling water but with a chloride content in excess of acceptable limits for most uses. There are no significantly large fresh water streams in the City of Virginia Beach, thereby limiting extremely the fresh water resources available for development. The development of surface fresh water supplies in Virginia Beach is difficult to most improbable.

The critical nature of the water supply question in this City of basic significance to both the Commonwealth and to the national defense installations located therein, in our opinion, cannot be overstated.

Virginia Beach historically has depended on another jurisdiction for its water supply and presently receives the surplus supplies of the other jurisdiction. Water demand projections indicate that the safe yield of existing water sources will be reached during

the 1980's. Peak period demand problems are being experienced now. This results in a very unreliable water supply situation. Earlier and current prospects for augmenting water supply sources for this area of the State which includes the City of Virginia Beach have not been good and are not good; further we see little or no reason to be encouraged that significant change will take place in sufficient time to deal effectively with the anticipated shortage by utilizing conventional approaches to water supply problem solution.

In view of the foregoing and in view of the fact that saline water, both ground and surface, are available within the boundaries of Virginia Beach City in quantity and quality sufficient to support saline water conversion technology and the processes now currently available to gain first-hand on-location data for enlightened decision making, it is our considered opinion that utilization of that technology in Virginia Beach is most viable for application in modular fashion to augment existing sources of water supply to meet incremental water supply deficits projected to occur during the 1980's.

In summary, it is our opinion that the City of Virginia Beach, Virginia, represents an ideal location for a fully developed desalting facility. In addition to advancing desalting technology, the initiation of such a program would aid in the short-term and long-range solution to a critical water supply situation. The availability of sea water, brackish surface water, and brackish groundwater makes the application of desalting technology most

pertinent in Virginia Beach.

The City of Virginia Beach is both capable and willing to share the cost, responsibility and risk in a demonstration saline water conversion project. Virginia Beach is most interested in being the first active cooperator in such a program and recognizes the importance and potential of desalting technology to the solution of their water supply situation.

The activities to date by the City of Virginia Beach indicate to us that the governing body of the City is committed to authorize the City to become a cooperator within such a demonstration program the objective of which we understand is to demonstrate the effectiveness, reliability and economics of the latest fully developed desalting technology sited where real benefits can be realized as a collateral goal.

We are pleased to assure you that the staff of the State Water Control Board has recorded its enthusiastic support of the efforts of the City of Virginia Beach to pursue the selection of a saline water conversion demonstration plant project site to be located within its boundaries.

It is our hope that it will be the pleasure of this committee to approve the necessary appropriations to support the authorized desalting technology demonstration program and that the deliberations of the committee will lead to accelerated funding to support the program during the Fiscal Year 1979 to include at the earliest

time possible the City of Virginia Beach, Virginia, as an active cooperator in the desalting technology demonstration program of the Office of Water Research and Technology of the United States Department of the Interior.

We are appreciative to the Chairman and to the other gentlemen of the committee for the opportunity to present to you our views relative to this subject which we believe to be most important to the City of Virginia Beach, the Commonwealth of Virginia, and indeed to the nation. Additional detailed comments are provided for your consideration and for the record of this hearing. Thank you for your kind attention.

SUPPLEMENTARY DETAILED COMMENTS TO ACCOMPANY THE ORAL STATEMENT OF MICHAEL A. BELLANCA, DEPUTY EXECUTIVE SECRETARY, VIRGINIA STATE WATER CONTROL BOARD, PRESENTED APRIL 7, 1978 TO THE SUBCOMMITTEE ON WATER RESOURCES, ENVIRONMENT AND PUBLIC WORKS COMMITTEE OF THE UNITED STATES SENATE.

INTRODUCTION

Mr. Chairman and gentlemen of the committee . . . . It is indeed a privilege to be afforded this opportunity to present to you additional detailed comments thought to be pertinent to the development of the Desalting Technology Demonstration Program under the provisions of Public Law 95-84 enacted into law August 2, 1977.

We in Virginia are most pleased that there has been authorized a Desalting Technology Demonstration Program to sponsor several demonstration projects over the next several years under a program that can include treatment of brackish water, sea water and waste water.

After much study and analysis of Virginia's available water resources and water supply needs, which have spanned the past several years, we are without doubt convinced that the City of Virginia Beach, Virginia, amply satisfies every criterion pertinent in the process of selecting a saline water conversion demonstration plant site in a real world situation with real water resources problems.

With respect to the significance of water supply problems as viewed by the legislative branch of government in Virginia, attention is invited to the fact that the 1977 General Assembly provided for the creation of a State Water Study Commission to address water supply problems in the State including specifically the geographic area in which the City of Virginia Beach lies. The 1978 General Assembly has provided for continued activity of the State Water Study Commission and has noted that critical water supply problems will continue unless immediate corrective action is taken.

GENERAL STATEMENT OF THE PROBLEM

Established in 1963 from a relatively rural county and a resort community, the City of Virginia Beach now comprises over 300 square miles and contains a population in excess of 250,000. The City is the nation's fourth fastest growing jurisdiction and soon will be the largest city in Virginia. Its rapid and diverse growth is being caused by rapid expansions of the major military, tourist, commercial, agri-business, and housing industries that are located there.

Although it is blessed with an abundance of favorable attributes, the City and region are plagued with an inadequate water supply. This condition is related to the relative youth of the City and the basic shortage of water in the broad

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Southern Tidewater Virginia locale. Special consideration of this latter condition was given by the Corps of Engineers in its 1975 Northeastern Water Study in which Tidewater Virginia was listed as one of the more critical water-short areas in the northeastern United States.

The City is bounded on the east by about 28 miles of shoreline along the Atlantic Ocean, on the north by Chesapeake Bay, on the south by North Carolina, and the Cities of Norfolk and Chesapeake on the west.

The City lies in the Coastal Plain physiographic province underlain primarily by unconsolidated sands and clays with numerous permeable strata in the nearly 3,000 feet of sediments that overlie basement rock in the area. Wells deeper than 1,000 feet have been drilled in the City at several locations. One 1,693 foot well at Virginia Beach obtains water from screened intervals between 345 and 1,307 feet below land surface. This well was tested to yield more than 830 gallons per minute and produces large volumes of water suitable for cooling but water from the deep aquifers system is too saline for most uses.

Since there are no significantly large fresh water streams in the City of Virginia Beach, there are extremely limited surface water resources available for development. The main surface water streams are Little Creek, Lynnhaven Bay and tributaries, North Landing River and its main tributary, West Neck Creek.

Developing surface fresh water supplies in Virginia Beach is difficult to most improbable. Large supplies of non-saline surface water would best be developed by long pipelines reaching into areas to the west of Virginia Beach, and west of the Cities of Chesapeake and Norfolk.

The critical nature of the water supply question in this City of basic significance to both the Commonwealth and to the national defense installations located therein cannot be overstated.

Virginia Beach and several military installations located within the boundaries of Virginia Beach are supplied with potable water on a contractural basis by another jurisdiction's municipally owned water system, the raw water supply sources of which consist of interconnected reservoirs situated on small streams of limited drainage area with augmentation by diversions from the Blackwater and Nottoway Rivers at locations approximately 40 miles and 50 miles westward, respectfully. These sources are supplemented by groundwater wells located about 40 miles to the west of Virginia Beach

Tidewater (or southeastern) Virginia comprises some five separate cities, all of which have, or are in the process of developing, separate water sources. The unique position of Virginia Beach as the easternmost jurisdiction, makes developing a separate fresh water supply extremely difficult. Virginia Beach historically has depended on another jurisdiction for its water supply, and presently has a water supply contract, which extends to 1993, to receive the surplus supplies of the other jurisdiction. Water demand projections indicate that the safe yield of the existing water sources will be reached during the 1980's. However, peak period demand problems are being experienced now. This results in a very unreliable water supply situation. Regional efforts to solve the water shortage problem have not resulted

in a solution to this problem. This is essentially due to the serious riparian issues involved in most solutions to the problem, including potential interstate and interbasin transfers of water. Earlier and current prospects for augmenting water supply sources for this area of the State which includes the City of Virginia Beach have not been and are not good; further, we see little reason to be encouraged that significant change will take place in sufficient time to deal effectively with the anticipated shortage by utilizing conventional approaches to water supply problem solution. This view is held due in part to the following:

1. The groundwater situation is not good in the prolific cretaceous aquifers producing essentially potable water west of Norfolk, Chesapeake and Virginia Beach, and which are utilized heavily by industrial and municipal water systems. Water in these aquifers has been allocated to such extent that mining would begin to occur in about 15 years if all existing users begin now and continue withdrawing the quantities of water to which they now are legally entitled.

2. Those impoundments now being utilized in furnishing water to the systems are not hydrologically capable of producing increased safe yields of significance.

3. Those surface streams from which water is now being diverted to existing systems are apparently not capable of producing more water for additional diversion without extensive impoundments and extremely complex water management systems to ameliorate potentially adverse effects on uses in reaches downstream from the diversion sites.

4. Potentially unfavorable economic, environmental, social and equity implications involved in interbasin transfer of water from those hydrologic systems remote from the geographical area of need are substantial.

In view of the foregoing, and in view of the fact that saline water, both ground and surface, are available within the boundaries of Virginia Beach City in quantity and quality sufficient to support saline water conversion technology and processes now currently available to gain first-hand on-location data for enlightened decision making, it is our considered opinion that utilization of that technology in Virginia Beach is a most viable alternative for application in modular fashion to augment existing sources of water supply to meet incremental water supply deficits that are projected to occur in the area during the 1980's.

In recognition of this serious problem, Virginia Beach commissioned an extensive study and analysis of developing a water source which would meet present and future water demands. This study has indicated that the City must avail itself of converting its broad range of brackish and salt water to potable water. This conclusion is based on the fact that the potential for developing significant surface water sources in the area does not exist; that only limited quantities of potable groundwater are available; and that extreme difficulty in obtaining approval for a major water impoundment in the eastern United States exists due to major legal, sociological, jurisdictional, environmental, and riparian issues.

Elected officials of the City have given strong support to the desalting concept. It is the contention of Virginia Beach that the City is in a unique position for benefitting from a long-range desalting program due to:

1. The youth, competence, and vitality of the City's management.

2. The City's ability to properly plan and implement an evolving program responding to interim and medium-range water shortages, as well as an ultimate program responding to long-range water needs.

3. The existence within the City of various types of brackish water which could lead to the demonstration of new desalting technology.

4. The existence of a strong desalting commitment of both citizens and elected officials.

5. The positive financial posture of the City.

6. The desire of the City to work closely with the Department of the Interior to utilize its saline water conversion technology.

In view of the City's long-range planning and commitment to desalting, it is suggested that Virginia Beach is in a unique position to participate and assist in developing vital information and expertise in a desalting demonstration project as set forth in PL 95-84.

DESALTING TECHNOLOGY DEMONSTRATION PROGRAM GUIDELINES

We understand the objective of the Desalting Technology Demonstration Program is to demonstrate the effectiveness, reliability and economics of the latest fully developed desalting technology sited where real benefits can be a collateral goal. We further understand that it is essential that each plant be set in a real world situation with real problems in water quality and/or quantity and with an active partner willing to share in the responsibilities and risks. Successful demonstrations can greatly shorten the delays which precede the acceptance of new technologies.

Provided below are comments which are intended to provide background information on the situation in Virginia Beach with respect to the objectives of the OWRT Desalting Technology Demonstration Program as we understand those objectives:

1. The project proposed must be set in a real water quality/quantity problem situation with potential of becoming an integral part of an operating system.

   Southeastern Virginia including Virginia Beach experienced severe water shortages during 1977.

   The City of Virginia Beach purchases all of the water it uses from the City of Norfolk with quantitative amounts available to Virginia Beach from Norfolk based on water surplus to Norfolk's needs. Water demand projects indicate that the safe yield of Norfolk's water supply will be reached during the 1980's. However, peak period demand problems are being experienced now. This results in a very unreliable water supply situation.

Virginia Beach is the fourth fastest growing city in the United States and has a population of 250,000 persons. Its rapid and diverse growth is being caused by rapid expansions of the major military, tourist, commercial, agri-business, and housing industries that are located there.

Major surface water supply projects require twelve to fifteen years for development. Most future water supply alternatives for southeastern Virginia require the construction of a large dam and could be delayed or postponed indefinitely because of interbasin and interstate water transfer questions and because of involved environmental impact statement requirements.

The engineers studying the water supply problem for Virginia Beach have developed a plan of action to insure that the water supply needs of Virginia Beach are met. This plan of action includes the construction of a demonstration plant for desalting saline waters. The demonstration plant will become an integral part of the City's water system with planned expansions to take advantage of future technology and to meet present and future water demands.

2. The process, one or more of its integral parts, or a combination of processes, should be something new but thoroughly tested, and not as yet available as a product that is commercially marketed for the purpose addressed by the demonstration. Alternatively a commercial product or process could be utilized on a previously untested water or wastewater stream.

Desalting brackish groundwater using membrane techniques is the demonstration program proposed in the plan of action contained in the Water Resources Study for Virginia Beach.

The desalting technologies proposed for demonstration include higher capacity and longer life membranes contained in larger modules.

Other areas proposed for demonstration with the potential for reducing operating costs include improved pumps and pumping efficiencies, alternatives to pre-treatment, and reduced chemical requirements.

Reduction in overall energy requirements will be demonstrated using energy recovery systems.

3. The demonstration plant size should be sufficient to demonstrate potential application but flexible enough to meet siting conditions, and product water receiving conditions, present and future.

The demonstration plant size is estimated to be 2 to 10 million gallons per day (MGD).

A demonstration plant size of 2 MGD or larger would permit direct scale up to larger facilities which may be required as early as 1985.

A demonstration plant size of 2 MGD or larger will contribute to meeting the existing average water demand which was 20 MGD last year and to the ultimate demand of 70 MGD.

4. Cooperator must be willing to assume a 50-50 cost sharing based upon total project cost over the period of demonstration.

   Virginia Beach has indicated that they are now willing and able to assume a 50-50 cost sharing for the demonstration project; and are capable of operating the plant as part of its utility system as soon as it is on line.

   Virginia Beach has already appropriated funds to initiate a groundwater production/testing program to determine specific information on brackish groundwater quality and well yields and to determine how that water quality might be affected by prolonged pumping.

5. Cooperator would assume an active responsible role in the full range of proposed project activity from pre-planning to construction, and to operation and maintenance.

   Virginia Beach has indicated that it intends to assume an active responsible role in the demonstration project.

   Virginia Beach has demonstrated through projects such as the computerized control center for its water distribution center, its ongoing independent water supply study, and its leadership role in regional solutions to solid waste, transit and health services problems that it would in fact assume an active responsible role in the demonstration project.

   Desalting of saline waters appears to be the only viable water supply alternative applicable to Virginia Beach which can guarantee the water quantities required for solving the long-term water supply problem at Virginia Beach. This fact supports the City's stated commitment to the project.

6. The primary OWRT role would be as technical adviser and include project oversight and evaluation of results.

   Virginia Beach has indicated their acceptance of OWRT's role as project advisor and in fact have stated their need for OWRT technical assistance and will solicit that assistance.

7. Steps involved in the conduct of demonstration project include:

   (Cooperator) Prepare a summary report on status of water resources quality-quantity situation in area of potential demonstration plant site. The report should also indicate alternative solutions and an indication that a desalting technology resource may be a viable solution.

Phase I Report: Project Planning Assistance prepared by Wiley & Wilson, Inc. as part of the Virginia Beach Water Resources Study has been completed. Phase II Report: Engineering Analysis is to be completed on May 1, 1978.

During the development of Phase I and II Reports, specialists such as Geraghty & Miller, Inc., Groundwater Hydrologists, provided analyses of potential water supply sources. Contacts with representatives from consultants currently involved in desalting projects were also made; i.e. Burns & Roe, Inc.; Black, Crow, and Eidsnes, Inc.; Toups Engineering Company; and James M. Montgomery, Inc. Geraghty & Miller, Inc. will be used in subsequent phases of the projects, and one or more desalting specialists such as those listed above will be used as required.

It appears that reverse osmosis is the process that will be used. However, other desalting processes are still under investigation.

Most of the data required for the summary report can be taken from the existing Phase I and II Reports.

CONCLUSIONS

The City of Virginia Beach represents an ideal location for a fully developed desalting facility. In addition to advancing desalting technology, the initiation of such a program would aid in the short-term and long-range solution to a critical water supply situation.

The regional water studies conducted for southeastern Virginia have not resulted in the solution of the water supply problem. This lack of solution impacts heavily on Virginia Beach due to its lack of freshwater sources. The availability of sea water, brackish surface water, and brackish groundwater makes the application of desalting technology most applicable.

The City of Virginia Beach is both capable and willing to share the cost, responsibility and risk in a demonstration desalting project. Virginia Beach is most interested in being an active member of such a program and recognizes the importance and potential of desalting technology to the solution of their water supply situation. The activities to date by the City of Virginia Beach not only indicate to us that the governing body of the City is committed to authorize the City to become a cooperator within your demonstration program but further that the City actively desires to be the first demonstration site selected.

Please be assured that the staff of the State Water Control Board is recording with the committee its enthusiastic support of the efforts of the City of Virginia Beach to pursue the selection of a saline water conversion demonstration plant project site to be located within its boundaries.

It is our hope that it will be the pleasure of this committee to approve appropriations necessary to support the authorized Desalting Technology Demonstration Program and that the deliberations of the committee will lead to accelerated funding to support the program during the Fiscal Year 1979 to include at the earliest time possible the City of Virginia Beach, Virginia, as an active cooperator in the Desalting Technology Demonstration Program of the Office of Water Research and Technology of the United States Department of the Interior.

We are appreciative to the Chairman and to the other gentlemen of the committee for the opportunity to present to you these additional comments relative to this subject which we believe to be most important to the City of Virginia Beach, the Commonwealth of Virginia, and indeed to the nation. Thank you for your kind consideration.

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VIRGINIA BEACH WATER RESOURCES STUDY

PHASE I REPORT:

PROJECT PLANNING ASSISTANCE

WILEY & WILSON, INC.

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January 5, 1978

Mr. Aubrey V. Watts, Jr.
Director, Department of Public Utilities
City of Virginia Beach
Municipal Center
Virginia Beach, Virginia 23456

Re: Phase I – Project Planning Assistance
Virginia Beach Water Resources Study

Dear Mr. Watts:

We are pleased to submit the following report on the Project Planning Assistance Phase of the Virginia Beach Water Resources Study. The report outlines the results of our investigations and presents our recommendations on the work to be accomplished during the Engineering Report Phase of the water resources study.

The purpose of this report is to provide the necessary planning to enable subsequent phases of the investigation to focus on only the most feasible water supply alternatives for the City of Virginia Beach. A detailed study and comparison of alternatives will be made during the Engineering Phase of the water resources study.

We would be most appreciative of any comments you may have on this report and we would like to receive your comments by January 20, 1978. We are continuing with our work which includes preparation of a desalting project for the U.S. Department of Interior, and commissioning a nationally prominent groundwater specialist to assist in the groundwater evaluations.

We thank you for the opportunity to prepare and submit this report and look forward to continuing this important work. If you have any questions or need additional clarification of any part of this report, please contact us.

Sincerely,

WILEY & WILSON, INC.

L. Preston Wade, PE
President

LPW/ac

VIRGINIA BEACH WATER RESOURCES STUDY

PHASE I REPORT – PROJECT PLANNING ASSISTANCE

A. INTRODUCTION

B. CONCLUSIONS AND RECOMMENDATIONS

C. REPORT

I. PROBLEM DEFINITION

II. PLANNING CRITERIA

III. WATER SUPPLY ALTERNATIVES

IV. PLAN OF STUDY

D. APPENDIX

A. INTRODUCTION

The severe drought conditions experienced in 1977 have caused the previously serious water supply problem of southeastern Virginia, and especially of the City of Virginia Beach, to be considered a critical problem. The drought, with its subsequent water use ordinances and threat of water rationing, has clearly illustrated the vulnerability of the City to water supply shortages. Such shortages not only affect the present residents of the area, but also play a large role in the restriction of the development potential of the area.

Although regional studies of the problem have been conducted, and other studies are under way, a solution suitable to the City has not surfaced. Alternatives which may well be adequate for a solution to the City's problem have been eliminated because they have failed to meet the demands anticipated for a regional solution.

In response to the potential threat of a water crisis as well as the limited objective of the regional studies, the City has taken the steps to begin investigating the water supply issues from a jurisdictional standpoint. This report concerns the first phase of that investigation and focuses on the project planning necessary to build a foundation for such a study. Phase II of the study will focus on an engineering analysis of the remaining alternatives. Schematic and preliminary designs will be accomplished in phases III and IV.

B. CONCLUSIONS AND RECOMMENDATIONS

1. **Conclusion:** Previous studies of the southeastern Virginia water supply problem have had a regional focus which has precluded a jurisdictional focus. Virginia Beach's rapid growth has contributed significantly to the regional need for additional water and as such, Virginia Beach's water supply problem can be considered to be the regional problem. The previous regional studies have not produced recommendations acceptable to all parties and with the development of a major water supply project requiring approximately 12 years to implement, Virginia Beach faces the prospect of running out of water in the near future.

   Recommendation: Virginia Beach should continue their independent jurisdictional approach toward a solution of their water supply problems. This will help to ensure that an implementable solution to their water supply needs is identified and will act as a catalyst for regional action.

2. **Conclusion:** Physical criteria have been used as a primary method for the selection of water supply alternatives in the past regional studies. The importance of legal and political constraints on the implementation of a given alternative has generally been secondary. Problems such as interstate and interbasin transfer of water, riparian rights doctrine, and local approval of impoundments may be strong enough to eliminate many major alternatives. This is especially applicable to water supply alternatives located in North Carolina and those requiring new impoundments.

   Recommendation: The water supply alternative of Lake Chesdin/Lake Genito should be evaluated in Phase II. Four basic reasons underlie this recommendation. Lake Chesdin is an existing impoundment and since it is located in Virginia it would not involve interstate transfer of water. The Appomattox River Water Authority represents an existing organization with which to negotiate and the past planning by the Appomattox River Water Authority should aid substantially in the future development of Lake Genito.

3. **Conclusion:** The present level of data interpretation with respect to groundwater resources in the vicinity of Virginia Beach makes it difficult to eliminate this source as an alternative. Both shallow and deep groundwater appear to have potential for development – shallow as an augmentation source and deep as a potential total supply source. Groundwater specialists have indicated that many of the questions regarding groundwater can be answered in the Engineering Report phase of this project.

Recommendation: The potential of shallow and deep groundwater in the vicinity of Virginia Beach should be more fully investigated in Phase II. Existing data will be analyzed by groundwater consultants and if required field verification by test drilling will follow at a later date.

4. **Conclusion:** There are inexhaustible quantities of seawater available to Virginia Beach which could be desalted to obtain freshwater. Also, brackish water is available to Virginia Beach and the economical advantages of desalting brackish water makes it an attractive water supply alternative. Federal grants for large projects involving the desalting of either seawater or brackish water appear to be available.

   Recommendation: The Phase II — Engineering Report should evaluate desalting of both seawater and brackish water as a water supply alternative. The securing of a federal grant for a desalting facility should be persued in Phase II.

5. **Conclusion:** The jurisdictional approach to water resources will allow the examination of several individual water sources that are either individually or collectively not capable of supplying the total Virginia Beach demand. A combination of multiple water sources within the boundaries of Virginia Beach could provide a valuable augmentation supply.

   Recommendation: Existing surface water sources within Virginia Beach should be evaluated for their potential as augmentation supplies. These sources should be investigated for cost effective combinations in meeting the total or partial water demand of Virginia Beach.

6. **Conclusion:** The Corps of Engineers' water supply study for southside Hampton Roads is a powerful regional influence. Also, the General Assembly's State Water Study Commission could have sufficient impact on the solution to the southeastern Virginia water supply problem. Although this state legislative commission is presently waiting on the Corps of Engineers recommended solution, its active involvement in the regional study could affect any regional solution.

   Recommendation: Part of the Phase II effort should be to monitor the Corps of Engineer regional water supply study and to monitor the activity of the State Water Study Commission as to the impact of each on Virginia Beach. If a Corps of Engineers

alternative that has been eliminated by this report becomes the recommended water supply alternative for the region and also becomes implementable, then the Phase II report should address its impact on the jurisdictional solution.

C. REPORT

I PROBLEM DEFINITION

A. Background

B. Current Situation

C. Future Condtions

D. Statement of the Problem

I PROBLEM DEFINITION

A. BACKGROUND

A project as complex as the investigation of potential water supply sources for Virginia Beach demands that the study be carefully planned. Such planning begins with the identification of existing and anticipated water supply problems and involves the clarification of the water supply goals of the City. A clear understanding of the issues involved in the water supply problem is a prerequisite to finding an adequate solution. Previous water resource planning efforts have focused on the traditional engineering approach that deals primarily with numbers, requirements, demands, and other quantifiable data. Such an approach is an attempt to solve a very complex problem with a procedure that is just too simple, and one that ignores some very real constraints that are not quantifiable in the traditional sense. While demand projections and safe yields must certainly be met, it is clear that other considerations, such as political and legal constraints, environmental constraints, and economics may carry as much weight, or more, than traditinal factors. In addition, these considerations are intensely issue oriented, which makes incorporating them in a solution more judgmental than objective. The purpose of this section is to focus on the current factors and future conditions, both objective and subjective, which have a direct relationship to the problem definition.

B. CURRENT SITUATION

The population of the City of Virginia Beach has increased from 172,106 in 1970 to a current estimated level of approximately 250,000. While many of the present residents use individual wells as their primary source of water, the remainder of the city places an average demand of 18.6 mgd on the public water system. This average daily demand has fluctuated during 1977 from a low of 15.4 mgd to a high of 20.8 mgd. Maximum daily demand reached 27.4 mgd during July 1977. These figures must be viewed in the context of a severe general water shortage in the area and mandatory restriction on certain water uses.

The City water system consists of transmission and distribution facilities only, with no existing provisions for treatment. Treated water is obtained from the Norfolk water system according to a long-term water supply contract with the City of Norfolk. This contract, negotiated in April 1973 and running for 20 years from July 1, 1973, stipulates that the City of Norfolk will furnish bulk water to the City of Virginia Beach. Guarantees of a specific quantity of water to Virginia Beach are not included. The contract does

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stipulate that prior to June 1988, Norfolk will make $24 million worth of capital improvements aimed at expanding their system to meet the needs of Virginia Beach.

The general growth trends of the tidewater area, combined with recent water shortages, have dictated that the whole water supply issue for the area be investigated. In response to the anticipated water crisis, a number of agencies and organizations have studied the potential availability of water, the ease or difficulty of providing for future demands, and the legal and political realities involved in the issue. Of the greatest significance regarding these recent studies is the ongoing U.S. Army Corps of Engineers' study to resolve the water supply problems on the southside of Hampton Roads. Their work has resulted in narrowing a wide range of alternatives to five surface alternatives in Virginia and North Carolina. The focus of the Corps' study is toward a single source regional solution which, therefore, precludes groundwater alternatives, desalting, and a number of other small sources which could potentially be used for supplying individual jurisdictions or augmenting present supplies. Of these remaining alternatives most would involve interbasin and interstate transfer of water, or at least have the potential for affecting jurisdictions outside of the tidewater region. These jurisdictions, whether they are North Carolina, or Richmond, or Chesterfield County, all have legitimate concerns over the potential withdrawal of water from their regions for use by another region. Although the desalting alternative has been eliminated by the Corps for a number of reasons, many feel that the newer techniques of desalting offer a potential that has not been fully appreciated in the Corps' study.

Unfortunately all of the recent and ongoing water supply studies are being pursued within a regional context, and do not allow an adequate assessment of an independent water system that would meet only the anticipated needs of Virginia Beach. Therefore, the role of Wiley & Wilson in this study is that of a technical advisor to Virginia Beach, as well as a catalyst for action, in the clarification of the water supply goals of the City, in the determination of whether an independent water supply system is feasible, and in the analysis of alternatives that prove most promising.

C. FUTURE CONDITIONS

The second element of the problem definition involves the future conditions that are anticipated to occur in the Virginia Beach area. This element must address the prevailing philosophy concerning future growth and regionalism, questions of the City's need for self-sufficiency, the anticipated need for water restrictions, and the potential offered by changing technology.

1. Growth

The basic ingredient in any plan is the people for whom the plans are made. One must know how many there will be, what their needs and characteristics will be, and their spatial distribution. The answers to these questions are affected by a number of factors including the local philosophy regarding growth as well as the development potential of subareas of the region. Given the extremely high growth rate of Virginia Beach, and the amount of land being developed, it is clear that the City has a very positive attitude toward growth. This attitude is reflected in the various population growth projections that have been made by the City, the local planning district, and the state. While there are significant differences in the ultimate population levels that have been projected, it is clear that the City can expect to at least double in population over the next half century. In this regard the City is expected to account for over 40 percent of the regional population. Given such an outlook, and the prospects of water demand exceeding the local capacity, it is important to examine the various forces affecting growth rates and ultimate population levels.

It is not the purpose of this report to place a value judgment on growth versus no-growth, but to anticipate the inevitable and plan for it. In so doing it is necessary to examine the legal and moral implications of a local versus regional approach to growth in general, and to water supply in particular.

2. Regionalism

In our highly industrialized culture, the regionalization of water systems if often seen as a necessity in order to obtain economies of scale, to better plan for the allocation of resources, and to achieve regional equity. However, regional management of water systems demands a philosophical and political commitment to deal with water resource problems in a nonlocal context. Such a commitment implies regional control and regional government, which are difficult to obtain when subareas of the region are competing for resources, and when individual jurisdictions have, and wish to maintain, complete control over certain resources. As soon as there is an imbalance in resource equity, the ideal regional ethic breaks down. The spreading out of costs implied by regional economies of scale are essentially lost when one jurisdiction sells a service to another jurisdiction at a profit. In addition, the trend toward a nonlocal focus is further hampered by the political implications of cooperation among jurisdictions which have a history of reluctant, even though necessary, cooperation.

The key element in the effectiveness of a regional system is regional control, and control implies governmental power. Regional government is virtually imposssible under the traditional definition we have given regions in Virginia. By law the Planning District Commissions are advisory in nature and without governmental power, yet we view regions as having the same boundaries as the PDC's. Such a view is overly restrictive regarding the definition of a region. In fact, by altering the traditional ideas about regions, we can remove many of the obstacles mentioned above. If we define a region as having a single central governing body, then the City of Virginia Beach can be viewed as a region. Given the large area of the City and its anticipated population, the City could function as a region in itself, and benefit from many of the economies of scale that are normally associated with regionalism. This is a logical view since the future population growth of Virginia Beach is essentially the future growth of the PDC.

Although a jurisdictional approach is being pursued, it is recognized that PDC implications and needs, as well as jurisdictional needs outside of the PDC, must be considered. Clearly the needs of Norfolk, Richmond, Chesterfield County, as well as the areas near Gaston, Kerr, and Roanoke Rapids lakes, must be taken into account when viewing water sources near those areas. It will be impossible to withdraw water from such areas until it is demonstrated that both the local and Virginia Beach demands can be met without adverse consequences.

3. **Self-Sufficiency**

Crucial to the issue of whether the City can function as a region is the question of self-sufficiency. In most respects the City can provide the necessary ingredients to facilitate the orderly development of its area. However, the essential element of water supply is not under the City's control. The City's dependence on Norfolk as its primary source of water greatly reduces the ability of Virginia Beach to act independently in its development and expansion. It could conceivably be at the mercy of the City of Norfolk due to the water supply arrangements between the two jurisdictions.

Virginia Beach must be guaranteed sufficient amounts of water to facilitate its growth. While this guarantee could come from Norfolk, it has not, and it appears that the prudent course of action for Virginia Beach is to find a water source of its own and essentially guarantee their own supply. The main issue is whether Virginia

Beach will be willing to pay a potentially higher price for water in order to be more in control of its own destiny. In this regard the cost of increasing the City's control and self-sufficiency could be measured by an increased cost for water. Such an increase may or may not be dramatic, but at least it would be known, which is a condition that is not guaranteed by the present arrangements with Norfolk.

4. **Restrictions**

Quite possibly restrictions of certain activities will play a major role in the future water supply planning for Virginia Beach. These restrictions may spread into areas not normally associated with the availability of water, such as land use and environmental factors, as well as affecting the traditional concepts of water conservation.

a. **Land Use** – In the past, little attention has been given to the relationship between land use patterns of the City and water supply availability. Such a perspective must change when water becomes a scarce commodity or when the water supply is sensitive to land use arrangements and densities. For example, if shallow groundwater were to become a primary water supply source, it could be developed in a number of ways. Whether a municipally owned well field is developed or individual privately owned wells are used could make a big difference in the manner in which the land near those sources is used. High density development may be precluded in favor of low density sprawl. Other land use and environmental factors could come into the picture and be controlled because of the choice of a particular water source. The potential for groundwater contamination must be examined to determine if centralized wastewater facilities will be needed in place of septic tanks. In short, a wide range of land use factors may have to be examined within a new context.

b. **Conservation** – Conservation of water must be viewed from several perspectives ranging from the traditional view of water saving devices, to the more recent mechanism of broad water use ordinances and policies.

The forecasting of future water conservation is not a simple undertaking. The impact of water cost on the implementation of other water conservation measures and on reduced water consumption is readily apparent. Research also indicates that public awareness programs stressing water conservation are

important to successful results. Thus the commitment of local government to water conservation measures in the form of demand management, plumbing code requirements, and public relations cannot be underestimated. While physical devices clearly offer savings, more important consideration must be given to policies, and both must be incorporated into the long-range program of supplying water to the City.

The prediction of the impact of water conservation on future consumption should be approached conservatively. The reaction and commitment of the Virginia Beach government to water conservation must be determined. Any predictions made with respect to the amount of water conservation attainable, should be accompanied by a complete program in which rate schedules and prices reflect the value of water service, and plumbing code modifications ensure the use of watersaving devices. The governing assumption of water conservation should be that people will not save water voluntarily (in a nonemergency situation) without an outside influence. That influence can take the form of demand pricing, legislative restrictions, or civil penalties for nonessential use.

5. **Technology**

Perhaps the potential offered by changing technology will be the prevailing factor in the eventual resolution of the long-term water needs of the City. Whether new and less expensive means of desalting water will be found, or whether wastewater reuse will ever become widespread is difficult to determine. Indications are that desalting brackish water with reverse osmosis or other membrane techniques may reduce anticipated costs considerably, however, certain questions can only be answered over time. Even the cost considerations associated with traditional desalting may look overwhelming at times, unless you view them in the context of having no other choice. Similarly the health and social implications of using wastewater as a source of potable water are such that wastewater is not seen as an acceptable solution at this time. However, it is important to recognize the potential these sources offer so that they can be drawn from as technology changes.

D. STATEMENT OF THE PROBLEM

After careful consideration of the various issues and factors outlined above, a concise statement of the purpose of this study could be stated as:

To study and evaluate the factors affecting the long-term requirements, availability, and best means of providing water to the City of Virginia Beach in order to allow growth.

II PLANNING CRITERIA

A. Time-Frame

B. Demand Factors

C. Limitations of System Alternatives

D. Legal and Political Constraints

E. Environmental Constraints

F. Economic Constraints

II PLANNING CRITERIA

In order to effectively evaluate alternatives, a systematic method has to be developed by which each alternative can be measured according to a common set of conditions. The procedure for such a comparison must account for all of the factors which might affect project feasibility. Most techniques for evaluating alternatives are based on a quantitative approach to measurement that use tried and true criteria such as population levels, demand projections, and other physical data. While such factors must be considered, a more subjective approach must be taken if certain significant, but non-quantifiable, areas are to be considered. Clearly the previous water supply studies have focused on the quantifiable factors, and have neglected the very real limitations that politics, or environmental constraints can place on a project. The approach taken in this study is centered around identifying the crucial factors, whether physical, social, political, or economic, and subjectively comparing each alternative to these criteria. Where direct numbers can be used to compare alternatives they will be. Where numbers alone cannot show the total picture a more judgmental approach will be taken. The planning criteria established for evaluating alternatives have been grouped into six major headings. Sample questions and issues involved in each of these groups include:

A. TIME-FRAME

– Can the alternative be developed by 1993?

– Will the alternative serve immediate, short-term needs?

– Will the alternative serve the needs projected for 2030 or beyond?

– What is the lead time and construction period necessary for the alternative?

– Is the technology presently available for the alternative?

– What is the anticipated lead time for significant technological development related to the alternative.

B. DEMAND FACTORS

– What population levels are expected over the design period?

– Will population trends change?

– What level will consumption rates reach?

– Will consumption rate trends change?

– What effect will regional growth have on the growth of Virginia Beach?

C. SYSTEM LIMITATIONS

– Can the alternative meet the demand?

– Can the alternative be combined with other sources to meet the demand?

– At what point is augmentation infeasible, feasible or necessary?

– Can the existing infrastructure respond to various alternatives?

– Is the system sensitive to growth patterns?

– Does availability of technology limit the alternative?

D. LEGAL AND POLITICAL CONSTRAINTS

– Will choice of the alternative precipitate a legal battle?

– Can the City's position be defended?

– Does Norfolk's ownership of the water system alter the regional ethic?

– Will SEPSA be able to purchase the regional system?

– Is the alternative locally supported/opposed?

– Can opposition be overcome?

– Does the source involve other jurisdictions?

– Does the source preempt the supply of other jurisdictions or users?

– Is interbasin or interstate transfer of water involved?

– Are Federal permits involved?

E. ENVIRONMENTAL CONSTRAINTS

– Will wetlands be affected/dewatered?

– Will mining of groundwater occur?

– Is mining of groundwater a significant problem?

– What are the sources and requirements for energy?

– Will waste disposal be a problem (ash, brine, ...)?

– Will terrestrial or aquatic habitats be reduced or affected?

F. ECONOMIC CONSTRAINTS

– What will the alternative cost?

– Can the jurisdiction economically afford the price?

– Are there economies of scale involved with the alternative?

– Does the regional solution offer more savings than the alternative?

III WATER SUPPLY ALTERNATIVES

A. General

B. Surface Water
   1. Sources Located in Virginia Beach
   2. Sources Located in Virginia
   3. Sources Located in North Carolina
   4. Icebergs
   5. Conclusions

C. Groundwater
   1. Geology
   2. Existing Wells
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   4. Salt-water Intrusion
   5. Conclusions

D. Desalting
   1. General
   2. Seawater Conversion
   3. Brackish Water Conversion
   4. Conclusions

E. Wastewater Reuse
   1. Background
   2. Obstacles to Potable Reuse
   3. Future of Potable Water Reuse
   4. Conclusion

III WATER SUPPLY ALTERNATIVES

A. GENERAL

Water supply alternatives proposed for southeastern Virginia have in the past looked at regional solutions or have been keyed to the expansion of the existing water suppliers in the area. This approach has discarded some water supply alternatives useful to Virginia Beach and has included some that are not realistic in fulfilling Virginia Beach's future need for water.

This report will take a fresh look at available water supply alternatives and arrive at conclusions based on Virginia Beach as a jurisdictional user rather than simply a part of the southeastern Virginia region. Water supply alternatives that are investigated include surface water, groundwater, desalting and wastewater reuse. Specific conclusions are presented on each of these potential sources in this section of the report.

B. SURFACE WATER

To focus the surface water supply alternatives on the City of Virginia Beach, the potential sources are divided into three categories: those located within the boundaries of Virginia Beach, those located in Virginia and those located in North Carolina.

Table 1 Surface Water Sources, provides a summary of major sources considered by other studies. The information was compiled from existing documents with the exception of the distance from Virginia Beach, which is based on straight line measurements from the Beach Borough.

1. Sources Located in Virginia Beach

The primary sources within the City of Virginia Beach are Redwing Lake, Lake Tecumseh, and the combination of North Bay and Back Bay. Although the potential yields of Redwing Lake and Lake Tecumseh are small and the yield of North Bay/Back Bay is unknown, the use of these surface waters as an augmentation supply cannot be overlooked. Two additional reasons make the evaluation of these sources desirable. First, their location within Virginia Beach makes their

TABLE 1
SURFACE WATER SOURCES

	Source	Estimated Safe Yield (mgd)	Distance from Virginia Beach (mile)	Water Surface Area (sq. mi.)	Drainage Area (sq. mi.)
Located in Virginia Beach	Redwing Lake	.65	4	.15	6.6
	Lake Tecumseh	.65	6	.42	6.0
	North Bay/Back Bay	Unknown	15	40	107
Located in Virginia	Northwest River & Va. Rte. 168	6 – 10	30	–	93
	Northwest River Impoundment	25 – 35	30	Unknown	93
	Lake Drummond	6	40	3.9	113
	Blackwater River @ Burdette	30	60	–	612
	Nottoway River @ Courtland	48	75	–	1,586
	Blackwater River Impoundments + Nottoway River Augmentation	70 – 75	Reservoir: @ Franklin = 60 @ Zuni = 60 @ Unity = 60	8.9 5.1 3.8	654 410 97
	James River above Richmond	216	120	–	6,700
	Lake Chesdin	75 – 100	110	4.8	1,335
	Lake Genito	150 – 190	135	18.8	715
	Lake Gaston	650+	125	31.7	8,339
	Kerr Reservoir	650+	155	76.5	7,800
Located in North Carolina	Chowan River @ Winton, N.C.	70 – 75+	75	–	4,200
	Roanoke River @ Roanoke Rapids, N.C.	70 – 75+	115	–	8,410
	Roanoke Rapids Reservoir	650+	115	7.2	8,395

development and control much easier. Second, numerous questions have been raised about the use of these sources and answers are needed to make meaningful decisions.

The fact that wastewater is currently discharged to Lake Tecumseh will require investigation of its present and future potential as a source. The problem of induced saltwater intrusion into North Bay/Back Bay due to a water withdrawal will be a limiting factor in determining the safe yield of this source. The past practice of adding seawater to Back Bay to increase its natural salinity will reflect favorably on this environmental impact question.

Other surface water sources within Virginia Beach are the existing borrow pits. Correspondence from Mr. Grayson Whitehurst to the City of Virginia Beach noted that approximately 145 acres of borrow pit are available in the vicinity of Oceana. These borrow pits plus additional surface water areas within the City should be evaluated for their potential as augmentation sources. A City of Virginia Beach report, *Virginia Beach Lake Study*, October 1974, should be useful in this evaluation.

The development of two other types of surface water sources are closely associated with borrow pits. Off-stream storage ponds for the collection of storm water and infiltration ponds to increase shallow groundwater yield may be economical water supply augmentation alternatives. The interaction of the groundwater table on existing borrow pits, off-stream storage ponds and infiltration ponds will affect the usefulness of any of these surface water supplies as an augmentation source.

As part of the evaluation of the various surface water supply alternatives within the City of Virginia Beach, water quality and treatability analysis will be performed on representative sources.

2. **Sources Located in Virginia**

The existing withdrawal of water by municipalities from several of the sources listed in Table 1 makes these same sources unavailable to Virginia Beach as a single municipality. This is applicable to the Northwest River, the Blackwater River at Burdette, the Nottoway River at Courtland, and the James River above Richmond. Although more water is available from the Blackwater River, the Nottoway River and the James River than is currently being withdrawn by Norfolk or Richmond, the

possibility of Virginia Beach being allowed to make an additional withdrawal is unlikely. The proposed Northwest River impoundment is also unavailable to Virginia Beach since development would require the approval of the City of Chesapeake, which is also in need of additional water supply sources.

Lake Drummond in the Dismal Swamp has been envisioned as a potential water supply for many years by many localities. The water quality is generally good; however, it is very high in color which is undesirable. The principal obstacle to development of Lake Drummond as a water supply source is the environmental questions raised. The impact of a water withdrawal on the hydrology and the environment of the Swamp is an extremely complex question and could result in countless delays in obtaining federal permits. Both the Corps of Engineers and the Fish and Wildlife Service would have to approve the withdrawal of water from Lake Drummond.

Of the remaining water supply sources located in Virginia, the majority are sources contained the corps of engineers water supply study for southside Hampton Roads as alternatives selected for further consideration. The Blackwater River Impoundments with Nottoway River augmentation, Lake Chesdin/Lake Genito and Lake Gaston are among the alternatives being considered by the Corps of Engineers. Lake Gaston was officially added to this list of alternatives on December 22, 1977. A withdrawal from Kerr Reservoir offers little advantage over Lake Gaston and is farther from Virginia Beach.

The alternative of the Blackwater River impoundments with Nottoway River augmentation has the implementation obstacle of dam construction. There presently exists general opposition to any new dams within Virginia. Also, Southampton County, in which the impoundments would be located, has noted its opposition to this alternative. Under the existing Code of Virginia, Southampton County must approve any impoundment within its boundaries.

Withdrawal from Lake Gaston has been recommended as a potential supply source in past studies as well as the Corps of Engineers study. Opposition has been intense in the past and will probably continue. Implementation of this alternative will be a major task since the Roanoke River is an interstate river and since Lake Gaston functions as a power generating facility.

The Lake Chesdin/Lake Genito alternative is represented by an existing impoundment at Lake Chesdin, an existing authority through which water purchases can be negotiated, and an existing plan for the construction of a future reservoir. The existence of this plan should reinforce the future development of Lake Genito. Implementation of this alternative is aided by the presence of the Appomattox River Water Authority and by the fact that the James River/Appomattox River basin is entirely within the state of Virginia.

3. **Sources Located in North Carolina**

The sources located in North Carolina include the Chowan River at Winton, the Roanoke River at Roanoke Rapids, and the Roanoke Rapids Reservoir. The first two alternatives are included in the Corps of Engineers regional study for further consideration with withdrawal from the Chowan River representing the least costly alternative. Legal and political problems encountered with a water withdrawal from North Carolina make these water supply alternatives essentially impossible to implement. Governor Hunt of North Carolina has voiced his opposition to any Virginia withdrawal from North Carolina streams and has urged private citizens to join the state in a legal battle. A withdrawal from the Chowan River is further hampered by Union Camps' wastewater discharge upstream at Franklin during December to March and by a eutrophic condition downstream. The downstream problem has generated a North Carolina study called the Chowan River Project and the United States Geological Survey has recently completed a river flow model to aid in the evaluation of the problem.

4. **Icebergs**

Icebergs represent a potential source for vast amounts of freshwater and are investigated in this report to determine their feasibility for use at Virginia Beach. Although icebergs have recently received a great deal of publicity as a water supply alternative, there are numerous technical difficulties in developing the resource. A question as basic as whether to use arctic or antarctic icebergs remains to be answered. Transportation problems such as towing methods, hydraulics of iceberg towing, iceberg insulation, heavy seas and the legal impact of large icebergs on shipping lanes need to be resolved. Once the iceberg is at its destination, methods to regulate the melting rate and to collect the freshwater are required and as yet, undeveloped. Due to the technical infancy of iceberg utilization, this form of water supply is not recommended for Virginia Beach.

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5. Conclusions

The surface water sources located in Virginia Beach should be evaluated for their use as an augmentation source. Since these sources are within the boundaries of Virginia Beach, the City can more easily control their development and usage. The use of existing borrow pits and future off-stream storage ponds and infiltration ponds should be evaluated as a potential augmentation source. Their interaction with the shallow groundwater system should also be determined.

Of the water supply sources located in Virginia, only the Lake Chesdin/Lake Genito alternative is recommended to be investigated in the Engineering Report. The existing impoundment and authority make this alternative the most likely to be implemented by Virginia Beach. The past planning with respect to Lake Genito also makes its ultimate development more likely. Although this alternative is also being investigated by the Corps of Engineers, the Engineering Report will focus on Virginia Beach as a single municipality and not the entire southeastern Virginia region. The other Virginia alternatives considered by the Corps of Engineers are not recommended due to implementation difficulties. If the Corps of Engineers cannot manage to implement a given alternative, there is little hope that Virginia Beach, as a single municipality, can achieve its implementation.

It is recommended that all the proposed surface water alternatives located in North Carolina be eliminated from future consideration due to the legal and political problems associated with their development.

The technical difficulties and uncertainties involving iceberg utilization make this alternative undesirable for Virginia Beach.

C. GROUNDWATER

1. Geology

It is more than 2,000 feet from the land surface at Virginia Beach to granite bedrock. The alternating sands, clays, and sandy clays of the Potomac Group of the Lower Cretaceous Age rest upon this granite bedrock. The sands of the Potomac Group are prolific water bearers. The granite bedrock and the Potomac Group sediments slope gently upward from Virginia Beach to the Fall Zone. The Fall Zone

in Virginia extends roughly north and south and passes through Emporia, Petersburg and Richmond. Along the Fall Zone the granite bedrock is close to the surface of the land. The sands of the Potomac Group are saturated with water and extend westward back to the higher elevations at the Fall Zone. The water in these saturated sands is under pressure and the water will rise in wells that penetrate the Potomac Group Formation. Waters demonstrating this characteristic are known as Artesian waters. The Artesian waters in the Potomac Group at Virginia Beach have a high chloride content because the Potomac Group has never been completely flushed of the seawater with which it was once saturated.

Above the Potomac Group of sediments are the inferior water bearing sands and clays of the Upper Cretaceous Age. The Pamunkey Group of Eocene formations rests upon the upper cretaceous sediments. Sands of the Pamunkey Group are commonly developed as a source of groundwater in the area north of the York River. The Columbia Group of terrace sands and clays of Pleistocene Age are the upper sediments and thousands of shallow wells obtain small supplies of water from these terrace sediments at Virginia Beach.

2. **Existing Wells**

In 1966 the City of Norfolk completed four wells near Lake Prince and Burnt Mills. These wells are near the boundary line separating the City of Suffolk and Isle of Wight County. These wells have a maximum capacity of 17.8 mgd but Norfolk is limited by a court order to pumping a monthly average of 15 mgd during any two consecutive months. The amount of well water that can be pumped into the City of Norfolk's system is also limited by fluorides which must be diluted by a ratio of 5 to 1.

A recent demonstration project conducted by the U.S. Geological Survey at Norfolk's Moore's Bridge Water Filtration Plant indicated the feasibility of injecting and recovering fresh water from a deep brackish water aquifer. The project concluded that an injection well field at the Moore's Bridge Water Filtration Plant would ideally have at least four wells approximately 900 feet deep and with a minimum spacing of 600 feet between wells. Assuming an aquifer thickness of 150 feet approximately 100 million gallons (mg) of freshwater could be stored by each well before well interference became serious.

In 1964 a 1,700 foot deep well was drilled to provide water for a heating system in The Virginia House, a 13-story cooperative apartment at Virginia Beach. The well test indicated a yield of 831 gallons per minute (gpm) or 1.2 million gallons per day (mgd) and the chemical analysis showed a chloride content of approximately 5,000 milligrams per liter (mg/l).

Significant quantities of groundwater are being withdrawn from the area in and around the City of Franklin in Southampton County. The following pumpage rates are averages for the period from January 1976 to June 1976. The City of Franklin had an average pumpage of approximately 1.2 mgd. Hercules Powder Company, west of Franklin has a 610-foot well that was test pumped at 1,600 gpm. The Hercules Powder Company was using almost 5.1 mgd. Union Camp Corporation, located just east of Franklin and supplied by a well field, owns several wells that exceeded 2,000 gpm during pumping tests. Union Camp was withdrawing an average of 35.8 mgd. About 42 mgd of water was pumped from large-yield industrial and municipal wells within a five mile radius of the City of Franklin. Chemical analyses from selected wells in the Franklin area show a chloride content from 1.5 to 26.6 mg/l and a fluoride content from 5.0 to 7.5 mg/l.

3. **Water Quantity and Quality**

At Virginia Beach limited quantities of freshwater are obtained from wells less than 100 feet deep. In spite of the proximity of these wells to the rivers, bays, and oceans almost all the small well installations yield water containing very little chlorides. However, the danger of chloride contamination is real in coastal areas. Wells should be located at least a mile from the shore and wells should be aligned parallel to the shore. Generally several moderate yield wells are preferred to fewer larger yield wells.

Total yields of 20 to 30 mgd from one or more deep well fields in Virginia Beach could be possible. The high chloride content, greater than 5,000 mg/l, would require desalting or dilution before the groundwater could be used as a domestic water supply.

Large yield deep wells, greater than 3.0 mgd per well, in the Franklin and Lake Prince areas are providing industrial water and are augmenting domestic surface water supplies. The high fluoride content, greater than 5.0 mg/l, of these groundwater supplies would require defluoridation or dilution before it could be used as a domestic water supply.

4. Saltwater Intrusion

The different characteristics of the shallow, water table aquifer and of the deep, confined aquifer result in different potentials for saltwater intrusion in the Virginia Beach area. Intrusion of seawater from the coast and of brackish water from beneath is likely to occur if the safe yield of the shallow aquifer is exceeded. Saltwater intrusion in the deep, confined aquifer is less certain. The saline water present in the deep aquifer is probably due to the incomplete flushing of the saltwater by freshwater. A State Water Control Board (SWCB) report indicates that increased pumping in the Franklin area may cause the present saline zone to move west and thus increase the salinity of the aquifer in the Virginia Beach area. This concept of a westerly moving saline zone is not universally held which further complicates the question of saltwater intrusion in the deep, confined aquifer.

The best method to control saltwater intrusion is by not exceeding the safe yield of the aquifer. There are several methods to control saltwater intrusion if the safe yield of the aquifer is exceeded. One method is to increase the aquifer recharge by spreading or ponding of water on the ground surface. In the pumping trough method saltwater is intercepted as it moves landward from the sea. This method requires a line of pumping wells which parallel the coast. The hydraulic ridge method is the reverse of the pumping trough. Freshwater is injected into the aquifer by a series of wells parallel to the coast. This forms a pressure barrier to the movement of saltwater. Another control method is the combination of the pumping trough and the hydraulic ridge. California appears to be the leader in saltwater intrusion controls for deep aquifers. Both pumping troughs and hydraulic ridges have been or are in operation now in California.

5. Conclusions

Individual deep wells at Virginia Beach could produce 2.0 to 3.0 mgd and one or more deep well fields could produce 20 to 30 mgd. Although the chloride content of water from deep wells is high when compared with drinking water standards, 5,000 mg/l versus 250 mg/l, it is significantly lower than the 35,000 mg/l chloride content of seawater. Desalting brackish water is, except in a few special cases, more economical than desalting seawater. Based on the projected water quantities available and the potential savings in desalting costs the use of brackish groundwater from deep wells should be investigated during the Engineering Report Phase.

Although the quantities are small and there is a potential for chloride contamination there is freshwater available from wells less than 100 feet deep in most of Virginia Beach. This shallow groundwater could be a valuable source for augmenting other water sources and shallow groundwater should be investigated during the Engineering Report Phase.

Large quantities of groundwater, 42.0 mgd, are currently being withdrawn from deep wells in the Franklin area. Significant drawdown has occurred in this area and the water contains a high fluoride content. There are also complex legal and political constraints associated with this groundwater supply and no additional investigation of this source is planned during the Engineering Report Phase.

D. DESALTING

1. General

There are two categories of saline waters. The first is undiluted seawater which has a total dissolved solids (TDS) concentration of 35,000 parts per million (ppm). The second category is diluted seawater or highly mineralized groundwater with a TDS range of 1,000 to 10,000 – 15,000 ppm and is sometimes termed "brackish" water.

The use of desalting by water utilities has been found to be more practical in developing countries outside the United States than in the United States. The desalting processes used most frequently are distillation for seawater and electrodialysis (ED) for brackish water. In the United States brackish water supplies have been used when water supply selection was based on economic comparisons of alternatives. The treatment of brackish waters is less expensive at any scale than the treatment of seawater except under the most unusual circumstances.

The use of desalting has advanced from small applications where costs ranged upwards from 5 dollars per thousand gallons of freshwater produced to the present large seawater conversion plants producing freshwater at costs of about 1 dollar per thousand gallons and in smaller brackish water conversion plants at costs of about 50 cents per thousand gallons. The reductions in the cost of saline water conversion have been so great in the last decade that saline water conversion processes are now beginning to merit serious considerations as alternatives for some large-scale water supplies in the United States.

The following items are generally considered to be advantages of saline water conversion over conventional freshwater treatment:

a. Lower capital cost.

b. Less subject to safe-yield uncertainties.

c. Minimizes legal and political delays thus minimizing impact of inflation.

d. Predictable and controllable quality of finished water.

e. Minimizes right-of-way acquisition, field surveying, and geological uncertainties associated with the construction of dams and raw water transmission lines.

f. Facilities have a high manufacturing component and a low labor component which results in less time to complete construction. The modular components are readily expanded and excess capacity due to over building initially can be avoided.

Because of the lower capital costs, higher operating and maintenance (O&M) costs, and modular components economic comparisons of a desalting process with conventional treatment are especially sensitive to (1) the rate at which capital is charged; (2) rate at which future O&M costs are discounted; and (3) percent utilization or load factor of the project. It should be noted that load factors are rarely very high because of seasonal water demand fluctuations, excess facility capacity as a safety factor, and allowances for future growth water demand.

2. **Seawater Conversion**

The political objections associated with new large-scale freshwater supply projects such as interbasin and interstate water transfers and properties flooded by impoundments are minimized with seawater conversion. The seawater conversion alternative becomes more attractive as the distances to freshwater supplies increase and the costs for large raw water transmission lines increase. Ocean disposal of wastes from a seawater conversion facility is an acceptable, low cost, and convenient waste disposal alternative. Temperature rise and salinity rise must be considered when ocean disposal of wastes from large, 20 to 50 mgd seawater distillation plants is used.

3. Brackish Water Conversion

A significant percentage of the groundwater in Virginia Beach is highly mineralized or brackish. The brackish groundwater from deep wells is generally a desirable water supply source since it is usually low in organic content, color, taste, and odor, Its quality is stable and it is usually protected from natural and man-made pollution. It is relatively unaffected by rainfall fluctuations and since the groundwater is contained in aquifers, raw water storage facility costs are minimized.

Diluted seawater in estuaries is also brackish water. Since desalting technology now makes it possible to consider salt as a pollutant with a predicted removal cost, water resources can be developed further downstream in estuaries closer to existing water distribution systems.

Brackish water conversion is most frequently accomplished by the electrodialysis process. The low capital or first costs make the process attractive for standby, peaking or low load factor use. The energy consumption for the process is relatively low, about 5 – 15 kilowatt hours (kwh) per thousand gallons for 1,000 – 3,000 ppm TDS. The process uses electrical energy and not heat energy as in the distillation processes used on seawater. This permits maximum flexibility in the location of the electrodialysis plant. The membranes used in the process must be replaced periodically which means the process can profit from continuing technological improvements to the membranes used.

Waste streams from saline water conversion plants, especially brackish groundwater conversion plants will be virtually free of chemical oxygen demand (COD), biochemical oxygen demand (BOD), turbidity, color, odor, and organic materials. For a 1,000 – 3,000 ppm TDS feed water the waste quantities will be 10 to 30 percent of the feed water flow and the waste will have a 5,000 – 10,000 ppm TDS concentration.

4. Conclusions

Because of the size and importance of the coastal community of Virginia Beach and because of the inexhaustible quantities available, seawater should be considered as a major water resource and investigated during the Engineering Report Phase.

Recent U.S. Department of Interior reports state that there is a need for large-scale saline conversion demonstration facilities in the United States and contain recommendations that the following facilities be constructed during the next 10 years:

a. Three municipal, revenue-producing, prototype distillation facilities (Two 2.0 mgd and one 50 mgd).

b. One 10 mgd reverse osmosis and one 10 mgd electrodialysis plant operating with seawater feed and located in suitable water-short coastal locations.

c. One 10 mgd ion-exchange plant used for the production of municipal water from brackish water or for stream salinity control.

d. One 10 mgd combination membrane process and thermal process (distillation or freezing) plant operating on brackish feed water.

The City of Virginia Beach should determine if federal funds are available for a saline water conversion project. This effort should be a part of the Engineering Report Phase. The City of Virginia Beach should study the feasibility of saline conversion during the Engineering Report Phase. Saline water supplies to be investigated should include brackish groundwater and estuary brackish water in addition to seawater.

The following variables for brackish water conversion must be adequately evaluated before accurate cost estimates can be made during the Engineering Report Phase:

a. Desalting Process Type.

b. Plant Size.

c. Chemistry and Termperature of Feedwater.

d. Mineral Removal Requirements.

e. Unit Electrical Energy Costs.

f. Percent Utilization or Load Factor of Plant.

g. Interest Rate.

h. Membrane or Tube Life.

i. Pretreatment Requirements.

j. Operation and Maintenance Costs.

E. WASTEWATER REUSE

1. Background

Wastewater reuse is being and has been practiced under isolated conditions. In the municipal field, wastewater reuse as nonpotable industrial process water, industrial cooling water, or agriculture irrigation is being practiced in Baltimore, Singapore, Colorado Springs, and South Lake Tahoe. Recharge of aquifers for protection against saltwater intrusion is also being considered in California and New York.

Effluent reuse as potable water is not presently practiced in the United States. Potable reuse has been practiced since the late 1960's at Windhoek, the capitol of South Africa, where a wastewater reuse plant produces a high quality effluent conforming to World Health Organization Standards. Epidemiological studies have indicated no significant changes in public health status of that area. Strict monitoring of treated water quality and segregation of toxic industrial discharges from the system are judicially practiced.

2. Obstacles to Potable Reuse

The major obstacles to reuse of wastewater effluents as potable water are as follows:

a. **Public opinion** — Public opinion will have to favor reuse as a solution to a critical problem prior to its implementation. An intense public relations campaign will be necessary to educate the public on the practical, economical, technological and public health aspects and merits of wastewater reuse as potable water.

b. **Legal and Regulatory** – Prior to enaction of the Clean Water Act, the United States Public Health Service (USPHS) Drinking Water Standards served as a yardstick by which water sources and treated water effluents were deemed acceptable. Under the USPHS standards, sewage effluents were strictly excluded as a public water source. Currently the American Water Works Association (AWWA), Water Pollution Control Federation (WPCF) and U.S. Environmental Protection Agency (EPA) support all conscientiously applied uses of wastewater except potable reuse.

c. **Technological** – The greatest present obstacle to wastewater reuse is technological. Standards need to be developed for critical parameters such as viruses and pathogenic organisms. State of the art advances will have to demonstrate suitable analytical procedures, reliable treatment process and sensitive epidemiological techniques to insure public safety against such critical wastewater components as viruses, pathogenic organisms, asbestos fibers, chlorinated hydrocarbons, and radioactive elements.

3. **Future of Potable Water Reuse**

Many places in the world are evaluating reclaiming wastewater as a potable water source. The City of Denver, Colorado is planning the construction of a demonstration project to develop the data and operating experience required for the implementation of a 100 million gallon a day wastewater reclamation plant by 1990 to supplement present water sources.

4. **Conclusion**

It is concluded that wastewater reuse is not presently an alternative for attaining the water supply goals of the City of Virginia Beach and should not be investigated during the Engineering Report Phase. This conclusion is based on the current technological obstacles to reuse for potable water and on the fact that there are no existing industries in Virginia Beach with sufficient nonpotable water demands. However, wastewater reuse should not be discounted as a possible alternative to the ultimate water supply needs of Virginia Beach.

The Virginia Beach Public Utilities Department should create a wastewater reuse advisory committee consisting of both technical and managerial personnel to keep

abreast of current legislation and technology, survey the implications of reuse in Virginia Beach, visit demonstration projects, advise the city council and public on current reuse state of the art, and recommend applicable reuse projects when sufficient breakthroughs have been made.

IV PLAN OF STUDY

A. General

B. Alternative Screening Criteria

C. Cost Estimating Assumptions

D. Phase II — Engineering Report Outline

E. Phase II — Engineering Report Schedule

IV PLAN OF STUDY

A. GENERAL

The final element of Phase I of this project is concerned with the manner in which the project should be continued through Phase II – the Engineering Report Phase.

B. ALTERNATIVE SCREENING CRITERIA

The manner in which alternatives are evaluated, compared, and eventually eliminated can be a crucial consideration in a complex project. From a preliminary standpoint a number of alternatives have essentially been eliminated in Phase I. In Phase II, efforts will be made to evaluate the remaining alternatives both quantitatively and qualitatively. The screening criteria which are to be used basically follow the ideas and issues discussed under the previous Planning Criteria. A matrix approach will be incorporated so that all screening criteria will be considered for each alternative. The primary emphasis of the matrix will be on the relative values for each alternative rather than on absolute values.

C. COST ESTIMATING ASSUMPTIONS

The alternative construction costs presented in the Engineering Report will be based on 1978 costs. As a means of up-dating construction costs in the future, the *Engineering News Record* average construction cost index (ENR 20-cities) for January 1978 will be provided. The allowance for construction contingency costs, engineering costs, legal and administrative costs, and interest costs during construction is assumed to equal 35 percent.

Annual operation and maintenance costs will be determined for all alternatives. For conventional water treatment plants, Virginia Health Department manpower requirements and 1978 operator salaries including fringe benefits will be used. The staffing experiences of pilot desalting facilities will be used to determine the manpower requirements of any proposed desalting plant at Virginia Beach. The 1978 salaries and fringe benefits will be used in determining the costs. Energy costs for water pumping and water treatment operations will be based on a rate of 3.5 cents per kilowatt-hour. Presently Virginia Beach is charged approximately 1 cent per kilowatt-hour plus fuel adjustment. The existing contract with the Virginia Electric and Power Company

(VEPCO) is scheduled to expire in 1982. The City of Norfolk recently negotiated a new municipal contract with VEPCO at an increased rate of approximately 300 percent. Virginia Beach will shortly be faced with the same alternative and inclusion of the fuel adjustment allowance does not make a charge of 3.5 cents per kilowatt-hour unrealistic. Also, future municipal power contracts will be short term contracts which will enable VEPCO to pass its increased costs on to the City much more readily. To aid in the updating of operation and maintenance costs, the January 1978 Wholesale Price Index for Industrial Commodities, as published by the U.S. Bureau of Labor Statistics, will be provided.

Since water line construction will be an essential part of any alternative developed in the Engineering Report, the following table of construction costs for various size lines has been prepared. The average January ENR 20-cities cost index will also apply to this table.

WATER LINE CONSTRUCTION COSTS

Line Size (Inches)	Cost ($/foot)	Type of Cover	
		Cut & Replace Pavement ($/foot)	Reseed ($/foot)
6	13.70	5.90	0.45
8	15.65	5.90	0.45
10	18.30	5.90	0.45
12	21.00	7.00	0.45
14	23.05	7.20	0.50
16	26.60	7.70	0.55
18	29.80	7.70	0.55
20	32.70	8.20	0.60
24	40.55	8.20	0.60
30	60.05	8.80	0.65
36	78.35	9.40	0.70
42	100.65	10.00	0.75
48	124.35	10.60	0.80

The costs shown in this table are based on slip-on, class 52 ductile iron pipe with at least three feet of cover. All excavation and backfill costs include an allowance of $3.00 per foot for dewatering. Contractor's overhead and profit is assumed to equal 20 percent. The costs for surveying and plat preparation are included in the 35 percent allowance for contingency costs, engineering costs, etc.

The development of alternative costs will include both construction costs and annual operation and maintenance costs. In order to compare alternatives on an equal basis, total alternative costs will be analyzed and presented as both present worth costs and equivalent annual costs. The interest rate used during this analysis will be 7 percent. This value approximates the 1978 fiscal year interest rate of 6-3/8 used by the U.S. Water Resources Council.

D. PHASE II – ENGINEERING REPORT OUTLINE

The following outline is proposed for the Phase II – Engineering Report:

Chapter I	Introduction
Chapter II	Summary
Chapter III	Conclusions and Recommendations
Chapter IV	Requirements
Chapter V	Alternative Descriptions
	A. Surface Water Alternatives
	B. Groundwater Alternatives
	C. Desalting Alternatives
Chapter VI	Alternative Evaluations
	A. Economic Analyses
	B. Implementation Considerations
	C. Environmental Considerations
Chapter VII	Selected Plan
	A. Description and Reasons for Selection
	B. Cost Estimates
	C. Environmental Considerations
	D. Implementation Arrangements and Schedule
Chapter VIII	Work Plan
	A. Phase III – Schematic Design Outline
	B. Phase III – Schematic Design Schedule
Chapter IX	Appendix

1. **Description of Engineering Report Chapters**

   a. **Introduction** – This chapter contains a statement of the problem and gives a general view of the Engineering Report contents. The scope and limits of the problem, the purpose of the report, and the objectives of the report are also included in this chapter.

   b. **Summary** – This chapter is an abstract which presents the essentials of the report. It permits a reader to grasp the significant facts, conclusions, and recommendations.

   c. **Conclusions and Recommendations** – This chapter puts the purpose of the Engineering Report to work. Conclusions are based upon supporting data contained in the report. Recommendations deal with action to be taken in the future and the recommendations are supported by conclusions.

   d. **Requirements** – This chapter will include the basic numerical parameters to be used in the Engineering Report. Population projections, consumption rates, anticipated savings through conservation measures, and total water demand are elements to be covered.

   e. **Alternative Descriptions** – This chapter provides physical descriptions of the surface water, groundwater, and desalting alternatives investigated. Information presented will include the safe yield of water sources, treatment facility capacities, and water transmission line sizes. Maps and sketches will be used to illustrate the alternatives investigated. A groundwater specialist will be retained to assist in the evaluation of the groundwater alternatives.

   f. **Alternative Evaluations** – Water supply alternatives will be compared using economic, implementation consideration, and environmental consideration criteria. Capital costs and annual operation and maintenance costs will be provided for each alternative. Alternatives will be compared on an annual cost and on a present worth cost basis. Implementation considerations include legal, political, and social criteria. Environmental considerations will address the permanent and the temporary impacts of alternatives with criteria presented in a matrix format.

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g. **Selected Plan** – This chapter will include the reasons for the selection of the water supply plan or plans to be carried in to the schematic design (Phase III) phase of the project. Also included in this chapter will be expanded information on costs, environmental considerations, and implementation considerations.

h. **Work Plan** – This chapter outlines the proposed Phase III schematic design portion of the project and provides a schedule for completing that phase.

i. **Appendix** – The appendix will contain material not needed for understanding the main conclusions and recommendations of the engineering report. Also contained in the appendix will be any large maps, drawings, or other illustrative material.

E. PHASE II – ENGINEERING REPORT SCHEDULE

1. Project Duration

The estimated project duration of the Phase II – Engineering Report is 4 to 6 months. The following tabulation contains estimates of the duration for the major report activities:

Activity	Duration
Alternative Description	1-1/2 – 2 months
Alternative Evaluations	1-1/2 – 2 months
Selected Plan	1/2 – 1 month
Report Preparation	1/2 – 1 month
	4 – 6 months

2. Progress Meetings and Report Presentations

Two progress meetings with the Public Utilities Department and two presentations of the Engineering Report are planned. The Engineering Report presentations proposed are one public meeting and one city council meeting.

D. APPENDIX

REFERENCES:

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Work, Stephen W. and Hobbs, Noel, "Management Goals in Successive Water Use", *The Journal of the American Water Works Association,* February 1976.

PERSONAL COMMUNICATIONS

	Initial Contact
1. Rear Admiral C. Heid, U.S. Naval Facilities Engineering Command, Norfolk, Virginia.	August 1977
2. Mr. G. L. Baliles, Va. Delegate, Richmond, Virginia	September 9, 1977
3. Mr. Badi Azas and Eddie Barls, Office of Saline Water Conversion (ERDA), Washington, D.C.	September 22, 1977
4. Dr. William E. Cox, VPI&SU, Blacksburg, Virginia	September 27, 1977
5. Mr. Robert Nordstrom, Norfolk District Corps of Engineers	September 30, 1977
6. Mr. Arthur L. Collins, SEPDC, Norfolk, Virginia	September 30, 1977
7. Mr. Tom Johnson, Va. Water Resources Research Center, Blacksburg, Virginia	October 3, 1977
8. Mr. Gene Siudyla, Virginia State Water Control Board, Virginia Beach, Virginia	October 12, 1977
9. Dr. James E. Hackett, VPI&SU, Blacksburg, Virginia	October 15, 1977
10. Mr. Cobb, Office of Water Research and Technology, U.S. Dept. of Interior, Washington, D.C.	October 28, 1977
11. Mr. John Kemper, Director of Utilities, Norfolk, Virginia	November 1, 1977
12. Mr. Persons, HRSD, Norfolk, Virginia	November 2, 1977
13. Mr. Charles Kleeman, EPA, Philadelphia, Pennsylvania	November 11, 1977
14. Mr. Harry Butler, North Atlantic Division, Corps of Engineers, New York	November 11, 1977
15. Mr. Oscar Adams, State Department of Health, Richmond, Virginia	November 16, 1977

16. Mr. McIver Watson, Coastal Plains Commission, Charleston, South Carolina — November 16, 1977

17. Mr. Rick Bower, Virginia State Water Control Board, Richmond, Virginia — November 18, 1977

18. Mr. Herb Hopkins, U.S. Geological Survey, Richmond, Virginia. — November 18, 1977

19. Mr. Fred Fisher, Virginia Assistant Attorney General, Richmond, Virginia. — November 18, 1977

20. Dr. John K. Costain, Virginia Polytechnic Institute & State University, Blacksburg, Virginia — November 21, 1977

21. Mr. Charles Martin, Virginia State Water Control Board, Richmond, Virginia — November 22, 1977

22. Ms. Pat Gammon, U.S. Geological Survey, Dismal Swamp, Virginia. — November 22, 1977

23. Mr. James Daniels, U.S. Geological Survey, Atlanta, Georgia. — November 28, 1977

24. Mr. Charles Daniels, U.S. Geological Survey, Raleigh, North Carolina. — November 30, 1977

25. Mr. L. A. Register, North Carolina Department of Natural Resources and Community Development, Raleigh, North Carolina — November 30, 1977

26. Mr. Fran Kohout, U.S. Geological Survey, Woodshole, Massachusetts — November 30, 1977

27. Mr. Charles Sorrell, Virginia Electric and Power Company, Richmond, Virginia — November 30, 1977

28. Mr. Robert Cannaday, Virginia State Water Control Board, Roanoke, Virginia — December 16, 1977

29. Mr. John Carlock, SEPDC, Norfolk, Virginia — December 20, 1977

30. Mr. Glenn Bond, Back Bay Wildlife Refuge, Virginia — December 30, 1977

31. Mr. Russell Hatchett, Former City Manager, Virginia Beach, Virginia — January 2, 1978

HEARINGS AND CONFERENCES

September 30, 1977	COE Presentation at Virginia Beach City Hall
October 14, 1977	Multiple Permits Public Hearing, Roanoke, Virginia
October 25 – 27, 1977	Interstate Conference on Water Problems, Altanta, Ga.
October 28, 1977	COE Workshop, Roanoke Rapids, North Carolina
November 21, 1977	COE Public Hearing, Roanoke Rapids, N.C.
December 6 – 7, 1977	Land and Water Resource Management Conference, Charlottesville, Virginia
December 9, 1977	COE presentation to Crater PDC and Appomattox River Water Authority, Petersburg, Virginia

VIRGINIA BEACH WATER RESOURCES STUDY

STATUS REPORT

FEBRUARY 1, 1978

In response to several comments regarding our Phase I Report we feel that certain project elements should be clarified and updated. In this "white paper" we provide a brief summary of our approach, assumptions, and results regarding the determination of population levels, consumption rates, and average daily water demand. We also include a brief status report, or update, regarding desalting, groundwater, and surface water sources.

I. Population, Consumption, and Demand

In Virginia Beach many different population projections have been used for many purposes - some of which dependent on the end result derived. There is no single projection that is accepted as the projection for all Virginia Beach purposes. Nor has any projection method been chosen as that which best describes the Virginia Beach situation.

The more complex methods of projection are hampered by the necessity for large amounts of data as well as their proven inaccuracy regarding small scale jurisdictional projections. Cohort-survival techniques, ratio methods, and step-down techniques are difficult to use when certain variables are hard to define, or when variables dominate the growth characteristics. Not only must one define

which variables are most significant, one must also define just how significant, before a projection can be made by these methods. For instance, in Virginia Beach, in-migration is one of the chief components of population growth, yet one that is least capable of being predicted over a long period.

On smaller scale projections it is common practice to relate population growth to zoning classification or the holding capacity of the land. The saturation levels obtained, however, may be quite unrealistic in areas such as Virginia Beach where zoning classifications change quite readily under pressures of developers, or the holding capacity of the land is changed through structural or physical alterations. Methods that involve curve fitting to historical data fail to directly take into account changes in birth rates, death rates, migration rates, or other variables. However, the other methods require subjective judgements regarding the change or stability of these variables. In this study, we are concerned with only a few basic demographic characteristics and we, therefore, feel that the extropolation of historic data, based on curve fitting and judgemental decisions, offers sufficient accuracy. Basically we wish to determine:

1. the overall population level for 1990 and 2030;
2. the distribution of population according to residential type (including tourists and the military);
3. the consumption rates by residential types;
4. the total water demand for 1990 and 2030.

Each of these characteristics requires its own set of assumptions and calculations.

A. Overall Population Levels

1. Assumptions:

a. Existing population growth of 1000 people per month will continue through 1979, and then gradually decline. The 1980 figure of 280,000 is used as the base year estimate for the new projections.

b. A positive, but gradually reducing rate (percentage) of growth will continue with no sharp breaks. (Actual population numbers will increase.)

c. The anticipated saturation population for Virginia Beach will approach 700,000 at some unknown future date.

2. Estimates:

Using the above assumptions and historic data a set of new population curves were generated and analyzed. Corps of Engineer projections, SVPDC projections, HRSD projections, and State Planning projections were each subjected to linear regression analyses to determine if they converged at any point. The regression lines converged near year 2030 with a population between 579,000 and 595,000. The higher value was for a curve using a constant rate of growth, while the lower value was for a curve with a gradually declining rate of growth. The lower value more closely fitted the traditional, smooth growth curve and was chosen as the target year population level. Through the use of the above assumptions, the base year assumption, and the target year assumption, another single population curve was generated. The estimates obtained from this curve are:

NEW PROJECTIONS

Year	Population	Rate of Growth
1980	280,000	2.835%
1985	322,000	2.199%
1990	359,000	1.930%
1995	395,000	1,618%
2000	428,000	1.320%
2005	457,000	1.238%
2010	486,000	1.048%
2015	512,000	0.958%
2020	537,000	0.806%
2025	559,000	0.706%
2030	579,000	-

B. Distribution of Population

Assumptions:

1. Existing distribution of residential types will remain constant at approximately 85% of total population for single family and 15% of total population for multi-family.
2. The Beach Borough permanent population will remain a constant percentage of the total population at the current 5% level.
3. Military levels will remain constant.

4. The 1975 percent of total population that is not on the city system is approximately 28%. This accounts for over 62,000 people who depend on individual wells. With the mandatory hook-up policy of the city this total is expected to be reduced by 1/2 by 1985 and remain at a constant level of approximately 31,000.
5. The population on the city system but outside of the Beach Borough will be determined by subtracting the Beach Borough population from the total on-system population. (To determine to water quantity.)

C. Consumption Rates

Long range consumption rates will be affected by a wide range of factors to include water saving devices, new water using devices, availability of water, general economics, the cost of producing water, and the general attitude of society towards water use.

Assumptions:

1. Standard of living increases in per capita consumption (from more dishwashers, garbage disposals, etc.) will gradually decrease and level-off by 1990. The rate of increase will be:

Year	Consumption Rate Increase (gallons per capita per day per year)
1975-1980	1.0 gpcd
1980-1985	0.5 gpcd
1985-1990	0.0 gpcd
Beyond 1990	0.0 gpcd

2. Conservation techniques ranging from public relations, to retrofitting existing structures, to code changes and enforcement on new structures will reduce consumption by approximately the following percentages:

a. existing single family consumption	10%
b. existing multi-family consumption	5%
c. existing Beach Borough (motels)	15%
d. new single family consumption	15%
e. new multi-family consumption	15%
f. new Beach Borough (motels)	20%

3. The existing reductions are applied only one time. Reductions for new construction are applied in five year increments until 1990 when they approximate the consumption rates for existing categories. In increments prior to 1990 single consumption rates are used for each category based on the weighted averages of new and existing consumption rates. For 1990 and subsequent years the consumption rate is assumed to remain constant for each category. The above yields the following:

CONSUMPTION RATES

		Outside Beach Borough	
Year	Beach Borough	S. F. Res.	M. F. Res.
1975	163 gpcd	93 gpcd	98 gpcd
1980	171	96	100
1985	176	99	103
1990	177	100	105
Beyond	177	100	105

4. The consumption rate for the Beach Borough permanent population accounts for the increase in demand from the seasonal tourist trade.

D. Total Water Demand

The above calculations and assumptions yield the following:

Year	Average Daily Water Demand (MGD)
1980	22.7
1985	30.2
1990*	34.4
1995	38.2
2000	41.6
2005	44.7
2010	47.7
2015	50.4
2020	53.0
2025	55.3
2030*	57.4

*Target years

II. Desalting

Regarding desalting, our Phase I Report consisted of data summarized from many research efforts - all of which were general in nature and not correlated to the specific conditions at Virginia Beach. Future work (Phase II) on the desalting alternatives will more directly focus on the specific conditions at Virginia Beach. Until the more detailed results are obtained, a clear indication of the acceptability of or selection of various processes cannot be made.

Presently distillation is the desalting process most feasible for seawater, however, advances in reverse osmosis (RO) technology are moving fast. Although RO is not thought to be commercially feasible for desalting seawater at this time it could become feasible in a couple of years. The freezing process for desalting seawater shows good potential but will probably not be commercially feasible for at least five years.

Desalting brackish water by distillation is generally not competitive with RO and electrodialysis (ED). Brackish waters with a total dissolved solids (TDS) up to 5,000 milligrams per liter (mg/l) can be desalted by the ED process. RO is generally used on brackish waters with a TDS up to 10,000 mg/l.

The following tabulation presents some generalized cost ranges for desalting processes based on work to date:

Process (Saline Water)	Construction Cost ($/Gallon)	Operation and Maintenance Cost ($/1000 Gallon)
Distillation (Seawater)	$4 - $12	$1.50 - $2.00
Reverse Osmosis (Brackish Water)	$1 - $3	$0.40 - $2.00

Note: The wide range of costs presented reflect the following variables:

1. Variations in a general process
2. Economies of scale
3. Variations in energy costs
4. Pretreatment requirements, especially as required for RO
5. Total dissolved solids (TDS) variations in brackish water supplies

Future work on the desalting alternatives will narrow the cost ranges for processes by focusing on the specific conditions in Virginia Beach.

III. Groundwater

Applications for groundwater withdrawals of 10 MGD from shallow wells and 30 MGD from deep wells were filed with the State Water Control Board (SWCB) in January 1978. The SWCB determined that the proposed withdrawals were exempt from the SWCB groundwater regulations and the applications and fees were returned to the city.

As indicated in the Phase I Report, the potential of shallow and deep groundwater should be more fully investigated. In response to this need nationally prominent groundwater specialists have been retained to collect and analyze existing data and to determine if test drilling or other field verification should be a technical element of Phase III. These specialists have been briefed on the project and have begun their research efforts.

IV. Surface Water Within Virginia Beach

To aid in the investigation of surface water sources within Virginia Beach, the city has been divided into a northern section and a southern section by using the Virginia Beach Expressway as a dividing line.

Evaluation of the lakes and borrow pits has resulted in the elimination of many of these sources. Elimination criteria included:

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1. Lakes owned by Norfolk.
2. Lakes owned by Virginia Beach which have restrictions based on deed transfer from Norfolk.
3. Lakes of less than 10 acres surface area.
4. Lakes receiving Navy waste discharges.

The remaining available surface area in the northern section is approximately 335 acres of which approximately 40 percent are borrow pits. Based on surface area, drainage area, and safe yields of Lake Redwing and Stumpy Lake, the safe yield of the lakes in the northern section has been estimated to be 2 to 3 MGD. The extent of difficulty involved in the extensive property acquisition necessary for developing these sources has not yet been determined.

A similar analysis for the southern section produces an estimated safe yield of approximately 1.5 MGD. These sources will be reviewed in comparison with the yields available from Back Bay and the North Landing River.

It should be emphasized that the water in the shallow lakes and borrow pits is primarily the result of groundwater seepage and reflects the water table elevation. The use of this same water may be accomplished easier through the use of shallow wells. Such wells would eliminate the necessity of purchasing entire surface sources, and if properly placed no drawdown effects would occur within the surface sources.

Statement of William Whipple, Jr.
Chairman of the Universities Council Water Resources
before the Senate Committee on Environment and Public Works

My name is William Whipple, Jr. I am the director of the Water Resources Research Institute of Rutgers University in New Jersey, and the Chairman of the Universities Council on Water Resources, an association of 84 public and private universities. I am pleased to have the opportunity to present our views as to S2704 which I will do as briefly as possible.

Most importantly we are gratified that for the first time in a number of years there appears to be a real and informed interest in water resources research on the part of the Administration, not only in the Office of Water Research and Technology, but also in the Office of the Secretary, and in the Office of Management and Budget. This does not mean that the universities will get everything they want; far from it. There is obviously a firm hand at the wheel; and a hard-headed commitment to obtaining real solutions to the most urgent problems, which is making some of our university faculty rather uncomfortable as they view the increasingly competitive prospects for research funding.

However, the Universities Council on Water Resources itself had already begun to feel a year ago that major research opportunities were being missed, and we urged in a resolution passed last summer that the OWRT program be expanded to include large research activities directed at problems of an interagency nature, and funded with really substantial amounts. This view coincided with policies of the new Assistant Secretary Martin and Director Gary Cobb, who have now stated the policy of emphasizing focussed research areas. We strongly urge that this policy be supported, since there are a number of major problem areas urgently needing research, which have not been adequately encompassed either by previous OWRT research or other Federal agency research programs. The first of these areas, which has already been adopted by the Congress, is water re-use. Two other are.

water conservation and the water problems of urbanizing areas. I will make a special plea for the urbanizing area research a little later. Of course, it is important to remember that, if a focussed area program is to be more than a collection of individual projects under a common title, special procedures must be adopted to insure that the planning, management and reporting of such a program will be well coordinated. With 54 institutes and many other institutions involved, each with individual intellectural responsibilities of participating faculty, this presents a challenging organizational problem; but it is one that must be faced. The focussed areas provide the means of obtaining comprehensive solutions to some major national problems; and this opportunity must no longer be neglected.

At the same time, on behalf of the universities, I must enter a plea that in enthusiastically pushing for focussed research, we do not allow the erosion of a very useful mechanism, the allotment research programs of the institutes. Some of the small allotment projects have produced excellent results, in solving problems which are local in scope, problems of improving methodology, which pay off later, and problems which are mainly conceptual. Also, the assured continual support of research, even though small, maintains the universities in the position of supporting Federal objectives, and gradually builds up expertise, so that participating faculty members are qualified to undertake major research projects for the states and for other Federal agencies which have more money than OWRT. Also the graduate students supported are an asset to the nation. The present administration budget of $110,000 per institute is a niggardly allowance, especially as the bill contemplates that this small sum should now support technology transfer functions* and certain data gathering and coordination activities on behalf of the Department of the Interior. A minimum of $150,000 per institute is required to support a small but viable allotment fund research program in addition to the other activities

* This is in addition to the competitive technology transfer functions recommended by the bill, with a specific budget item.

now mandated. We agree that two-for-one cost sharing should be required for this program. This only gives recognition to the reality of cooperation which has long existed.

Other sums recommended by the bill for authorization include matching fund research projects and activities authorized by Sections 105 and 109. Our colleagues testifying before you are recommending that these amounts be raised to $10,000,000 for each of the two activities. We agree with these amounts from a somewhat longer view point, but for the fiscal year 1979, we would particularly urge that a more moderate increase of $1,000,000 be provided in each of the two items, to allow for new initiatives which we are urging in connection with focussed areas.

It is noted that it is now proposed that matching fund projects be open to all organizations and individuals. The universities which I represent feel that many Federal research programs are designed in such a way that universities are almost precluded from participating in them, and that this matching fund program might well be preserved for the universities, leaving the additional research under sections 105 and 109 open to everyone.

We consider that technology transfer is important, and we are glad to note that the bill makes better provision for its support at both national and state institute level. It is important to note that the information made available in each state by technology transfer should not be restricted to research accomplishments of the water resources institute of that state, but should include information from any sources available. We are glad to note the provision for competitive technology transfer at state level, which will allow special efforts for a year or two to meet especially important situations; but we feel that even more important is the continued service of providing the information in all states, every year, so that it will become known throughout the state that the institute can provide such a service. Under the present bill, the only way such a continued service can

be supported is by the allotment fund; but if inadequate provision is made for the allotment fund it will be impossible to do this and still carry on a viable research program.

I have said nothing so far about the saline water program. We consider this to be a worthwhile program, and we wish it well; but we have relatively little familiarity with the details and therefore we will avoid expressing opinions which could only be uninformed. We have no sound basis for commenting upon the administrative budget for OWRT.

I would like to take just a little time to discuss the focussed area "Water Problems of Urbanizing Areas", which I feel warrants the attention of the committee. As regards this item, I am talking for an "ad hoc" committee including water institute directors from Massachusetts, Virginia, Illinois, Texas, Colorado, and California, as well as my state of New Jersey. Briefly, we find that the water and related land problems of rapidly urbanizing areas are complex, and we find that they have been somewhat neglected by Federal Programs. This was brought out in the National Water Conference in St. Louis last spring, and by the National Assessment of the Water Resources Council. In urbanizing areas, the counties, townships, towns and small cities are exposed to pressures from developers and industrialists to build large housing developments, shopping centers and industrial complexes, with increasingly serious consequences in the form of accentuating floods and channel erosion, reductions in groundwater recharge and low stream flows, and deteriorating quality of the water in streams and lakes. The areawide planning under Section 208 of PL 92-500 has brought many of these problems to light, without, in most cases, providing adequate solutions to them. These are inter-related problems which involve water quality along with urban drainage and flood management, surface and groundwater flows, and channel erosion, along with related problems of land-use planning. Some of these problems involve major Federal programs; but there has been a tendency for

Federal interest to center in the major rivers, in the large sources of pollution, and in the large cities, particularly as some of the key responsibilities in the urbanizing areas rest primarily upon the local communities. However, the research function of the Federal government can and should extend out to functions which are the management responsibility of lower echelons. We consider that a major Federal research effort is needed in this field. We know that this is included as one of several focussed areas within an item proposed for $1.9 million appropriation in FY 1979; but we would ask that the authorization be increased by $1 million in FY 1979 and $1.5 million for FY 1980 in order to provide more adequately for this program. We are working closely with OWRT to develop methods to assure close coordination in this program, so that assurance can be given that real progress will be made. Since time is short, I request that our more detailed explanation of this program be included in the record for the information of the committee.

Recently the importance of the water problems of urbanizing areas has been recognized by the agreement to conduct a research conference on this subject in New Hampshire this July. The co-sponsoring agencies include the Water Resources Council, EPA, Office of Water Research and Technology and, tentatively, the Soil Conservation Service. At this conference we intend to define the problems further and to prepare for the forthcoming research effort. I hope that this committee will authorize one of its staff members to attend this conference.

STATEMENT OF MILLARD W. HALL, DIRECTOR OF THE WATER RESOURCES CENTER, UNIVERSITY OF NEBRASKA-LINCOLN; AND EXECUTIVE SECRETARY, UNIVERSITIES COUNCIL ON WATER RESOURCES: PRESENTED AT THE LEGISLATIVE AUTHORIZATION HEARINGS ON WATER RESOURCES RESEARCH CONDUCTED BY THE SUBCOMMITTEE ON WATER RESOURCES OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS, WASHINGTON, D. C., APRIL 7, 1978.

SUMMARY

This testimony offers general support to the programs outlined in S 2704. Comments are offered regarding a number of areas wherein it is felt this proposed bill could be strengthened. Basically, these involve making provision for additional resources. Also, a description of the activities of the Nebraska Water Resources Center is offered as an illustration of the positive results that the federal programs being discussed here have had vis-a-vis state, regional and national water problems.

INTRODUCTION

I am Millard W. Hall, Director of the Water Resources Center, University of Nebraska. Since 1975, I have also served as Executive Secretary of the Universities Council on Water Resources (UCOWR). I am here to offer comments regarding S 2704, in which it is proposed to continue, in a slightly altered fashion and a slightly expanded way, programs of the Office of Water Research and Technology (OWRT), U.S. Department of Interior. Although I will speak largely in the context of the Nebraska Water Resources Center and its relationship to the programs of OWRT, I believe my views also reflect those of the membership of UCOWR.

I would like to emphasize at the outset my admiration for the energetic, constructive way that the current Administration has addressed the set of problems confronting water resources research and education. This appreciation extends to those persons in the Congress, including members of this Subcommittee, who have shown a high degree of interest in this subject.

The bill being considered today was drafted following countless hours of discussion between Administration officials and the university community. While I feel it does not adequately address all of my concerns, in general, I am most pleased with its philosophy and content.

The bill expresses an increased emphasis on the state/federal partnership in water resources research and education as exemplified through the state water resources institutes and centers. It is my understanding that these institutes will be asked to take on additional responsibilities in coordination and collaboration with other agencies, administration of matching grant and other research granting programs, and in technology transfer and information dissemination. I applaud this move, but feel that the accompanying authorization of $110,000 per state institute is inadequate for these purposes. In my opinion, this fund should be at least $150,000 per institute--the minimum level of support required for the institutesto exercise their overall responsibilities and to provide some seed money for initiating research on pressing state water problems.

I am also concerned about opening up the matching grant program to agencies outside of the universities. I am not concerned about possible increased competition for these funds. However, I am alarmed at the expression of the view that universities should not occupy a special place in research circles. This is counter to the philosophy of the federal government over the last several decades, a philosophy which has been extraordinarily effective in harnessing the research experience and expertise of the universities to the problems faced by this nation. I suggest that there still is a special place for universities in such endeavors, and that the matching grant program is an appropriate vehicle by which this concept can be further implemented.

More to the point, however, I am concerned with what I consider to be inadequate funding for both the matching grant and the research, development and demonstration portions of the proposed bill. As requested by the Administration, these total

$7.2 million--approximately $140,000 per state. This is hardly adequate to address the kind of focussed research programs that are presently being emphasized by OWRT. My counsel is to increase this sum by at least $2 million in fiscal year 1979 and to continue to increase it, as needed, for addressing critical water problems in the years ahead.

I also find inadequate the sum requested for support of institute technology transfer programs under Title I of the proposed act. There is a definite need for a programmatic approach to technology transfer at the institute level. If state water institutes, and indeed the federal government, are to respond quickly to critical water problems, then we must have in place a continuing technology transfer program. Basic support for this should be included in the authorization for state institute programs, supplemented materially by a competitive project approach. Then, when we are beset by special problems such as nation-wide drought, money can be funneled into existing programs to address these problems. However, $750,000 per year, as the total for a competitive-grant technology transfer program including 50 states, and four non-state institutions, will make it extremely difficult to develop and administer a program that will have more than a token impact on the nation's water resources problems. The approach is a good one. It simply needs more funding in both the long-term and year-by-year competitive grant support areas.

I have refrained from commenting here on those sections of the bill dealing with saline water research and development, demonstration plant development, and general program support. This is not because I am disinterested in these aspects, but because I feel that my experience and expertise is inadequate to address these topics in a constructive way. It suffices to say that I consider the saline water program an important part of the efforts of OWRT--important to the states and to the nation. This part of the program should be given your most thoughtful consideration.

NEBRASKA EXAMPLE

Many times in appearing before a body such as this, I have been questioned about what the OWRT program has produced and what it has meant to the states and to the nation. In considering this, I decided to outline for you today what this program has meant to Nebraska, in the hope that I could illustrate what I consider to be its very favorable positive results.

The Nebraska Water Resources Center began its efforts in 1965 with the $100,000 per year state institute funding authorized under P.L. 88-379 and one project. Essentially, there was no office and no staff, as the program was administered on a part-time basis by an existing agency. Today the Water Resources Center is a separate agency with eight full-time professional staff members and appropriate technical and clerical support. It currently administers 25 projects having a total annual budget of approximately $2 million. These projects are funded from more than a dozen sources including OWRT, the Old West Regional Commission (OWRC), the Environmental Protection Agency (EPA), the U. S. Bureau of Reclamation, the Nebraska Natural Resources Commission (NRC) and private concerns. In addition, the Center Director is responsible for the administration of the water-related research projects of the Nebraska Agricultural Experiment Station--some 20 projects with a net annual budget of approximately $1.5 million.

The mission of the Nebraska Water Resources Center is to foster, coordinate, administer and conduct research, information dissemination, educational and training activities which are responsive to the water resources needs of Nebraska, the surrounding region and the nation. Its major role is in catalytic coordination--to stimulate and guide the efforts of those with interests and responsibilities in water resources research and education and to assist them in building stronger programs. As such, the Center works with all federal water agencies in the region, with state and local water agencies, with all branches of the University of Nebraska, with other institutions of higher education in the state and with private interests.

The major thrust of the Center's current program is in the definition of water resources policy alternatives and the development of procedures and methodologies for facilitating decision making on these alternatives. Historically, the Center has played a major role with regard to development of the state's water resources policies and programs. It was involved as a member of the State Water Advisory Team in the effort that produced the state's 1971 Water Planning Framework Study. It was also involved directly in the 1975 "Level B" Planning Study of the Platte River, conducted by the state and the Missouri River Basin Planning Commission.

Center staff have been actively involved in the debate and deliberations concerning the National Water Policy Review. Testimony on aspects of this Review have been offered at various public hearings, and the Center was represented on two major national panels which critiqued the various Water Policy Review Task Force efforts. In addition, the Center was asked to review and comment on a Water Research Policy Statement prepared by the Office of Science and Technology Policy.

The Director of the Center, by law, serves as an advisor to the Nebraska Natural Resources Commission and as a member of the State Water Advisory Team. He also serves as a member of the Governor's Task Force on Drought and is a member of the Nebraska Water Data Coordination Committee. Through these bodies, the University is able to offer direct advice and assistance to the state's water policy makers.

The Center administers a number of efforts directly related to policy considerations. These include the development of surface and groundwater hydrologic models and economic models to be used by decision makers for evaluating alternative water policies, institutions, regulations and management options. The Center is also assisting the State Office of Planning and Programming in using these models to examine the hydrologic and economic effects of Nebraska's Groundwater Control Act.

A major effort is underway with regard to the mechanics and potential of artificial recharge of groundwater. Such information will be very beneficial to those debating the policy question of interbasin transfer of water. Another major study, this one relating to groundwater legislation and institutions in the Missouri River Basin states, has just begun. This effort should have great impact on the groundwater management policies and institutions of each of the Basin states, and indeed, of all states which have to deal with the problem of groundwater allocation.

A third area of technical endeavor is in irrigation scheduling and management. It has been shown that much of the water and energy currently being utilized in irrigation agriculture could be saved with more rigorous management procedures. This information is likely to have major impact on future decisions at the national, regional and state levels regarding the use of water for irrigation purposes. For example, this past year, these technologies were applied to 800,000 of Nebraska's seven million irrigated acres--yielding a savings in energy of $6.1 million. If these techniques were utilized on all the state's irrigated lands, it could produce a direct energy savings of $47 million per year in 1977 dollars, and a reduction in water use of 1.4 billion gallons per year. Incidently, much of this technology was developed at Nebraska through the support of the OWRT program.

The Center also is actively engaged in technology transfer and information dissemination efforts. These include seminars, institutes and workshops on water problems; speaking to farm groups, Natural Resource Districts and others interested in water resources; publication of various articles for popular use; serving on task forces for state and local agencies; and working with the Nebraska Unicameral on proposed water-related legislation. We also publish a bi-monthly newsletter which outlines water resources activities in Nebraska and elsewhere. The Center

maintains a small water resources library and periodically distributes a publications list describing recent water resources related library acquisitions available for loan.

A Water Resources Seminar series is sponsored during the spring semester each year for students and other interested persons, and the proceedings of this seminar are widely distributed. Annually the Center sponsors a two-day "Research Overview" outlining its research program. The Center also arranges, at appropriate times, a neutral setting wherein those with divergent views on the state's important water issues may come together and discuss their mutual concerns. In addition, the Center yearly holds a national conference on water-related issues and publishes and distributes conference proceedings.

In the area of training, we recognize the need for several kinds of individuals cognizant of water problems and their solutions. We have, of course, been concerned with students of water resources and have involved approximately 220 as research associates and assistants on our projects throughout the years. In addition, the Center had a hand in the advanced training of more than 65 faculty members representing 25 departments through their participation in our research and technology transfer programs. These persons have added materially to the expertise available for solving water resources problems in Nebraska and the nation. Their interest and skill in water resources, in many cases, can be directly attributable to the OWRT program. Furthermore, we have contributed to elevating the technical competence and expertise of countless decision makers in Nebraska who are involved in water resources issues.

In recognition of the importance of water to the state, the University of Nebraska's past high quality performance in this area, and the possibility of an even greater return to the state if excellence could be attained in water resources management, the 1975 Nebraska Unicameral designated Water Resources Management as one of the University's "Areas of Excellence."

The program directly involves five separate administrative units of the University--the Water Resources Center, the Conservation and Survey Division, the Department of Agricultural Economics, the Department of Agronomy and the Department of Agricultural Engineering. The Water Center Director chairs this program. The program's legislation recognized the basically sound efforts of these units in dealing with Nebraska's water problems, and it recognized the need for additional resources to make these efforts more nearly fit the magnitude of the problems. The new faculty and staff positions provided by this program have had a stimulating effect on the conduct of research, teaching and public service efforts in water resources.

All of the activities outlined above are illustrations of the Nebraska Water Resource Center's efforts in meeting water resources research and educational needs. It is expected that these and similar efforts will produce significant payoffs of several kinds, including new knowledge, improved resource management, a strengthened economic base for the state and region, and a more comprehensive and equitable national water policy.

Part of the success of the Nebraska Water Resources Center can be measured by the fact that the Nebraska Foundation, a private non-profit organization devoted to providing needed resources for the University of Nebraska, has recently embarked on a major capital fund drive. An integral part of this drive is the seeking of $5 million in contributions to endow an additional $300,000 per year for the Nebraska Water Center's on-going programs. I think this exemplifies and illustrates quite well the fact that the Nebraska Water Resources Center, initially created pursuant to federal action and supported for some time solely with federal funds, has now become a true partner with the federal government in support of water resources research and education. I would argue strongly that the hopes held by the framers of the Water Resources Research Act of 1964 have been realized in Nebraska.

I appreciate very much the opportunity to place this testimony before you.

STATEMENT BEFORE
THE SUBCOMMITTEE ON WATER RESOURCES
OF THE SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
HEARINGS ON S. 2704, A BILL TO REAUTHORIZE THE WATER SCIENCES
AND DESALINATION PROGRAMS, OFFICE OF WATER RESEARCH AND TECHNOLOGY
April 6, 1978, Washington, D.C.

Presented by Neil M. Cline on behalf of the
National Water Supply Improvement Association

Mr. Chairman and members of the Committee. My name is Neil M. Cline and I am here today representing the National Water Supply Improvement Association. NWSIA was organized six years ago for the purpose of promoting and supporting the use of desalination and others of the new water sciences in the conservation, improvement and extension of our water supplies for municipal, industrial and other beneficial purposes.

NWSIA is composed of three classes of members. Division I is made up of public agencies interested in domestic water supply. Division I members under our bylaws have a majority on the Board of Directors at all times, and therefore control the policy determinations that guide NWSIA. Division II members are manufacturers and companies that plan, design, manufacture and construct projects and equipment in the water desalination and wastewater reclamation and reuse industry. There are 39 Division II members. Division III members are individuals who are interested in or experts in the programs of NWSIA. Many of them are scientists, engineers, or specialists in direction and management of water resources programs. There are 250 Division III members.

Our association continuously since its organization has monitored the desalination programs of the Federal, state and local governments in the United States. For the last several years NWSIA has been disappointed and chagrined as the old Office of Saline Water has been reduced, dismantled and finally discarded by the Department of the Interior under the previous administration. The progressive reduction of staff and program that accompanied the submergence of OSW in OWRT distressed us. We came before Senate committees each year and discussed the disastrous effects of the de-emphasis on the program.

NWSIA has pointed out that the world leadership in desalting technology the OSW had established is being defaulted. We noted that many promising programs were curtailed, suspended, and some of them terminated before they were completed. The investments that were made in the start-up of those programs were sacrificed.

Hopefully there is a residual confidence in the eyes of foreign clients in the United States capacity to develop improved water desalination techniques. Last year representatives of 25 foreign countries participated with our association in an International Desalting Trade Fair in which the United States Departments of Commerce, State and Interior cooperated. The fair featured a tour of the Yuma Test Center of the Bureau of Reclamation where the world's largest desalter is being readied to freshen the drainage water of the Wellton-Mohawk project in order to satisfy the United States obligation to deliver Colorado River water to Mexico under the 1944 Water Treaty. The widespread interest in

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the Yuma work can be interpreted as a not so subtle reminder that the United States should not abdicate its position of technical leadership and abandon the foreign market to others.

NWSIA is encouraged now by the apparent change of attitude of the Department of the Interior as reflected in the statements of the leadership of the Department. S. 2704 as submitted by the Department seems to cover most of the points that NWSIA has made with respect to the revitalization of the desalination program. NWSIA is in support of the proposed legislation, but we have some suggestions to make which we respectfully request the Committee to consider.

Authorized funding levels in the bill are considered by NWSIA to be too low in some categories, especially with respect to demonstration projects. As proposed the amounts hardly seem to bear out the forecasts of the revival of a hard-hitting program. While the reorganization of the OWRT is not appropriately before this committee in the bill under consideration, a new organization chart has been supplied by the Department in connection with the 1979 budget justification. We are not convinced that sufficient staff is being sought to carry the program forward at desirable levels.

We miss in the language of the reauthorization of the program a direct and succinct statement of mission for desalination. A prior Saline Water Act said:

> "In view of the increasing shortage of usable surface and ground water in many parts of the Nation and the importance

of finding new sources of supply to meet its present and future water needs, it is the policy of the Congress to provide for the development of practicable low-cost means for the large-scale production of water of a quality suitable for municipal, industrial, agricultural, and other beneficial consumptive uses from saline water, and for studies and research related thereto."

That mission is clearly before us unfulfilled today. The 1975-77 Western drought, now fortunately broken, made the water industry realize how close its margins were and how desperately new resources were needed. Consultants to the OWRT have reported the prospective need for great expansion of desalination in the United States in the years ahead. NWSIA has been aware of the increasing demands. A restatement of mission would serve as useful guidance to the OWRT as it rededicates itself to desalination.

NWSIA has long contended that in order to provide an adequate Federal desalting effort: (1) the program should be reauthorized on a multi-year basis; (2) desalination research, development and demonstration, and technology transfer should be included in the reactivated program and funding should be authorized for each phase of the program at substantial and appropriate levels; and (3) the demonstration program should be placed for implementation in an action-oriented agency.

S. 2704 would reauthorize the program on a two-year basis. NWSIA considers two years better than one, but recommends that the period be extended by the Congress to five years.

Annual authorization by the Congress proved to be an ineffective means of applying the will of the Congress to the administration of the desalination program. Action on the annual budgets frequently preceded completion of action on the annual authorization bills. The advice of the policy committees with regard to funding levels and program directions, therefore, were not influential. The necessary delays in establishing new programs authorized each year led to reduced accountability on the part of the Department to the Congress. Lack of program executions were not revealed in time to supply remedies. As a result the efforts of the policy committees to set the course for and dictate the pace of the desalination program were repeatedly and systematically frustrated. In our view, the Congress would be better served if it laid out the course of the program for longer periods -- five years -- and conducted meaningful oversight hearings at shorter intervals to assure that the program was on track.

The bill before you does include authorization of demonstration projects, an inclusion which we applaud. The suggested limit on funding is too low, however. A main failure in recent years of the desalination program is traceable to lack of demonstration of practical application of new technologies to real life water resources development problems. The municipality or water district, oriented to other sources of supply and unfamiliar with the new water sciences, will need something more than an article in a journal to persuade it to risk a costly investment in a desalter. We have made some progress in the United States

in installation of desalters of various types, but other countries have gone much farther than have we in building desalination plants as integral parts of their water supply systems. The irony of it is that they use technology that the OSW developed and often machinery manufactured in Japan, Germany or France on models developed by United States technology.

While there is an intriguing increase in the overseas desalting demands, we in NWSIA are convinced that water supply agencies in the United States provide the greatest market for the new desalting processes. In a recent report by Fluor Corporation, one of the great engineering and construction firms in the world, it is estimated that by the year 2000 the domestic market will be six times the size of the foreign market. We are pleased to submit, to be included as a part of our statement today, this excellent report: DESALTING PLANS AND PROGRESS AN EVALUATION OF THE STATE-OF-THE-ART AND FUTURE RESEARCH AND DEVELOPMENT REQUIREMENTS.

The immense United States demand was predicated on many assumptions, the biggest of which is the continuing active implementation of the Federal Water Pollution Control Act of 1972, and the pursuit of the Safe Drinking Water Act. NWSIA heartily endorses the Federal effort through EPA and others to clean up and maintain this Nation's water supply, but we maintain the United States should at the same time stimulate the necessary research to develop and improve the technical methods to make the pollution control economically and mechanically achievable.

We need to have desalination programs demonstrated and institutionalized in order to meet the water supply requirements of the next decade. The Interior Department 75 years ago demonstrated and institutionalized reclamation in the arid Western states with a vigorous new Federal Reclamation Program. The irrigation districts that Reclamation Service sponsored have made the West an agricultural empire. We sorely need today in the water supply improvement field the kind of initiative that was displayed by the Reclamation Service two generations ago. Under the proposed bill, it would be possible for the OWRT to give us this service. Language is provided under which OWRT working through the appropriate agencies can help the water supply industry to adopt desalination and incorporate the new sciences in their institutions. The suggested funding levels do not indicate that a sufficiently vigorous program is envisaged.

NWSIA believes the demonstration program should be conducted by an action-oriented agency. We note that under this bill, the OWRT would be empowered to conduct its demonstration through and in cooperation with other agencies, some of which might participate in the costs. The Secretary would determine how costs would be shared. It would be a mistake at the outset to make the requirements for local participation too high. It will be more important to get a number and a variety of demonstrations underway than to penny-pinch at the outset.

The Congress turned to the Bureau of Reclamation to carry out the program of salinity control on the Colorado River. We in NWSIA do not believe it will be necessary to place all desalination demonstrations in the Bureau, but we are not impressed with the past record OWRT has made since it succeeded the OSW. We are in agreement with the present proposed language in the bill, but hope that the Congress will make it clear they will expect action in accord with the language. There must be a determination on the part of the Department to see that its projects are carried through. The demonstration will be of little value to the water supply industry otherwise. We need to provide models which can be copied by other water suppliers and alternatives upon which the whole water supply industry can build.

The submergence of OSW into OWRT a few years ago resulted in a sliding decline of the desalination program. As we approached the deadline for reauthorization of the desalination program in this Congress, NWSIA opinion hardened into a position that the desalination program should some way be treated separately. We felt that the water research activities of OWRT -- included here under Title 1 -- had little part to play in desalination and had come to dominate the entire activity of the Office to the detriment of the desalination program. The Research Institutes are in no sense opposed by NWSIA. NWSIA simply came to believe that the activities that here are included in Title 1 required the full attention of the staff that remained available in OWRT at Interior with the result that the OSW effort was virtually abolished.

NWSIA adopted a position, therefore, that desalination should be separately authorized, funded, organized and staffed. The bill before you, through the device of separating the activities under several titles, goes part way toward our objectives. We are not unwilling to accept this proposed solution, though we reserve some doubts that can be dispelled only by future performance in OWRT.

The presentation of an organization chart by the Department as a part of its justification of the 1979 OWRT appropriation request likewise goes only a part of the way toward meeting our objectives. We recognize that this chart is not before the Committee officially today, for the appropriations will be considered by another committee. However, we feel the chart is significant. It shows OWRT divided below the Director's Office into two columns, one housing the Institute research program and another the desalting research, development and demonstration program. Whether this partial separation will permit desalination to regain an identity and stature within the Department sufficient to meet what we believe to be the challenges of the times, we do not know. We are willing to be convinced. We suggest that, here again, the Congress should consider regular reviews of progress in oversight hearings of the manner in which these separate programs are being conducted, so that if doubts remain something constructive can be done about the matter before the life again ebbs out of the desalination program.

In Section 404 authority is granted to participate in and sponsor training of "water resources scientists and engineers." The terms used seem to be unnecessarily restrictive. We suggest that managers and operators also be included, since our experience shows that many managers, who as directors and operators would be primary targets for such training, may not be scientists or engineers and they need not be.

In closing, let me say that NWSIA is more than ever convinced of the need for a forceful Federal program of research, development and demonstration of desalting technologies. We hope to see a revival of the program under the reauthorization that the committee will report out. The world leadership in the technology once attained by the United States can be recovered. The water supply industry in the United States, we believe, is ready now to accept new technologies and alternatives to traditional water service. We are hopeful that this legislation will furnish the stimulus to reestablish significant Federal leadership for this vital work.

Statement

of the

Chairman of the Council of Representatives
National Association of Water Institute Directors

on

S. 2704

before the

Subcommittee on Water Resources

of the

Senate Committee on Environment and Public Works

April 7, 1978

This statement by William R. Walker, Chairman of the Council of Representatives, National Association of Water Institute Directors and Director of the Virginia Water Resources Research Center, comments on S. 2704 and recommends the adoption of amendments proposed by the National Association of State Universities and Land-Grant Colleges.

Mr. Chairman and Members of the Subcommittee:

I am William R. Walker, Chairman of the Council of Representatives, National Association of Water Institute Directors, and Director of the Virginia Water Resources Research Center. I appreciate this opportunity to comment on S. 2704.

In the early 1960's Congress recognized a need for a commitment at the federal level to solving the nation's water and land-related problems. It understood both the complexity of the problems and the commingling of responsibilities among those levels of government associated with water and land management. Specifically, Congress recognized that: (1) many significant water problems are not being addressed by the mission agencies of the Federal government; (2) water laws and institutions affecting water are primarily state in nature; (3) land-use decisions affecting water generally are made at the local level; and (4) state and local governments usually do not have the financial resources or the expertise to develop the information base to manage water and land-related problems in a comprehensive manner.

As a partial response to this water/land dilemma, Congress passed the Water Resources Research Act in 1964. The integrated plan devised by Congress was ingenious. The legislation recognized that:

1. A federal-state partnership was essential to resolving water and land-related problems.

2. A significant commitment of federal funds would be needed on a sustained basis to create and maintain this partnership.

3. Universities are well suited to develop new information on a sustaining basis. Since originality and innovation are not the exclusive provinces of large universities, the program authorized by Congress made all institutions of higher learning potential participants.

4. Many water and land-related problems could be solved if there were a "pipeline" for delivering existing information to decisionmakers in a usable form and a timely fashion.

5. The decisionmaking process is scattered among the various levels of government--federal, state, and local. Decisions related to technical matters or those involving land usually are local or regional in nature. Any institution designed to manage these complex water and land problems must be structured to serve the locality or the region.

6. If decisionmakers are to act responsively, their information needs must be considered. Information must be

formulated in terms of their perception of the problem. Thus, the institutional arrangement should make it possible for the decisionmakers to participate in the initial problem analysis and in formulating the approach to the solution.

7. Highly trained people are needed to solve those problems which involve all levels of government.

8. Flexibility should be allowed, so that priorities can change as problems change.

9. The expertise of the private sector should be utilized.

As established by Congress, the network of state water institutes is the focal point for resolving many state and regional water and land-related problems, many of which may require the bridging of political boundaries between state and local governments. The institutes play major roles in helping state and local governments resolve such water and land-related issues as: developing state water plans; evaluating legal and institutional arrangements for allocating water; developing institutional as well as technical solutions for controlling stormwater runoff and sediment control; identifying implementing alternatives for "208" areawide waste treatment plans; assessing social and economic consequences of various "208" regulations; and pricing water and wastewater services.

The National Association of Water Institute Directors therefore support the amendment submitted by the National Association of State Universities and Land-Grant Colleges. This amendment provides $150,000 for each institute in the national network. When factors such as inflation are considered, this figure is quite compatible with the $100,000 originally authorized in 1964. It represents the critical mass necessary to maintain institutions to address regional water and land-related problems. It enables each Center/Institute to maintain, on a continuing basis, a minimum of research, information dissemination, and training on which to operate a federal-state partnership. The proposed amendment also provides for an additional $100,000 to each Center/Institute which has an approved program designed to address special problems in that state or region. This clause is significant because: (1) it recognizes that water and land-related problems are not uniform throughout the United States, and it supports the work in those states which have more significant problems; and (2) it also addresses the concern of many--that there is no accountability at the Federal level for these funds. State approval of the program is implicit since these additional funds are also contingent on the states' providing one non-Federal dollar for every two Federal dollars. This amendment makes explicit and visible the state's contribution. However, it should be noted that, according to OWRT figures, all states in the past have contributed to the allotment program on approximately a dollar-for-dollar basis. This procedure probably will continue with the $150,000 authorized for each institute/center, since the host institutions recognize the value rendered to the states, and Federal funds would not by themselves sustain a minimum program.

The next major modification in the proposed amendment increases the authorization for Matching Funds to $10 million so that the institutes, in cooperation with the Department of the Interior, can mount a significant program to address larger problem areas which are national in scope, but which have strong state and regional implications. Several examples would be:

1. The problem of water conservation. In the western states this would be concerned primarily with agricultural and irrigation efficiency; in the East, with domestic and industrial uses.

2. The water and land-related problems associated with urbanized areas along the East, Gulf, and West coasts are increasing and becoming more severe. These problems are putting tremendous strains on local governments which have neither the expertise nor the resources to address them in a competent manner. These governments need the information that could be developed with a concentrated program.

3. Recent droughts and flooding emphasize the need for developing contingency plans. These problems have national concern as well as state and regional impact.

The amendment calls for Title II of the program to remain at its current level of funding. There are several aspects of water resources research where the private sector is better able to address the problem than are universities. The private sector has the capability to develop data and information in a short time frame, an advantage which may be important in resolving certain water and land-related problems. This encourages research either as a joint university/private sector effort or by the individual entities separately.

The last important change concerns technology transfer. In the past, technology transfer has been authorized under the legislation, but funds have not been provided specifically for this function. The institutes, in providing a focal point for water and land-related problems, probably make the greatest contribution to their solutions in getting information, from whatever sources, to the various public or private decisionmakers. The proposed NASULGC amendments, therefore, provide for a minimum of $75,000 and a maximum of $125,000 to institutes with an approved program, and a match of $1 non-Federal for each $2 Federal funds. We estimate that 44 institutes would need the minimum funding of $75,000 in order to have a viable program in technology transfer and information dissemination, and that there are probably 10 institutes with additional capability which would qualify for the allotment of funds in the amount of $125,000.

The National Association of Water Institute Directors supports the legislation authorizing research and demonstration projects to increase the nation's capabilities for using saline water conversion as a tool in managing our total water resources. Most of the institute/center programs have not concentrated on this very specialized technical area so it would be inappropriate to recommend specific levels of funding. We would, however, question the advantage of joining a program that is national in scope and designed to address a wide

range of problems--legal, institutional, economic, technical, and political--with one concerned primarily with technical problems associated with one type of technology, namely saline water conversion. The Office of Water Research and Technology is quite capable of administering both programs and providing such coordination as deemed desirable without the necessity of combining organic legislation of both into one bill. There is the possibility that a reorganization plan might suggest that the two activities be separated. With individual organic acts, a transfer could be accomplished with a minimum of complications.

Attached is a comparison of (1) the current legislation, (2) the National Association of State Universities and Land-Grant Colleges (NASULGC) amendments (S. 2826), and (3) H.R. 11226. We believe that a yearly authorization of $36.5 million dollars to assist the nation in addressing its water and land-related problems is very realistic in terms of magnitude and complexities of these problems.

As a member of the Water Resources Committee of the National Association of State Universities and Land-Grant Colleges, I would like to submit for the record a copy of S. 2704 modified to include the amendments recommended by the Association and a copy of the statement by Dr. John Calhoun, a member of the NASULGC Water Committee and a Vice President at Texas A&M. These amendments are now reflected in S. 2826 which was introduced by Senator McClure on April 4th. The National Association of Water Institute Directors supports the provisions of S. 2826 and urges that the subcommittee act on them favorably.

COST COMPARISONS FOR WATER RESOURCES RESEARCH CENTERS

	Current Act	NASULGC Amendments (S. 2826) 1979	NASULGC Amendments (S. 2826) 1980	H.R. 11226 or S. 2704
Allotment	$13,500,000[1]	$ 8,000,000[2]	$ 8,100,000[2]	$ 5,940,000[3]
		4,000,000[4]	4,000,000[4]	
Matching Grant	5,000,000	10,000,000	10,000,000	4,000,000
Title II	10,000,000	10,000,000	10,000,000	3,200,000
Technology Transfer	+ [5]	4,550,000[6]	4,550,000[6]	750,000
Subtotals	$28,500,000	$36,550,000	$36,650,000	$13,890,000
Saline Water	+ [7]	+ [7]	+ [7]	8,800,000
Admin. (Incl. WRSIC)	4,464,000[8]	4,464,000[8]	4,464,000[8]	4,464,000
Totals	$32,964,000	$41,014,000	$41,114,000	$27,154,000

1/ Based on $250,000 authorized for 54 institutes.

2/ Based on 50 institutes at $150,000 and 4 institutes, at $125,000 each for FY 1979, (Puerto Rico, Virgin Islands, Guam and Washington, D. C.), 54 institutes at $150,000 in fiscal year 1980.

3/ Based on $110,000 for 54 institutes.

4/ Assuming 40 institutes will qualify for the additional $100,000 allotment, with an approved program and a match of $1 non-Federal for each $2 Federal.

5/ Technology transfer is mentioned in current Act, but no specific funds are authorized.

6/ Assuming 44 institutes will receive the minimum $75,000/yr allotment, and 10 institutes will qualify for the $125,000/yr. allotment, with an approved program and a match of $1 non-Federal for each $2 Federal.

7/ Saline water research and demonstrations were authorized under separate legislation and not included under the current act or the NASULGC proposal.

8/ Authorized amount not specified in current legislation, nor in NASULGC amendments, but assumed for comparison purposes to be the same as the Interior proposed legislation.

95th Congress
2nd Session

S.2704

In the Senate of the United States
March 9, 1978

A BILL

To establish water resources research centers, to promote a more adequate and responsive national program of water research and development, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Section 1. This Act may be cited as the "Water Research and Development Act of 1978".

FINDINGS

Sec. 2. The Congress finds and declares that -

(a) providing for the protection of the Nation's water resources, assuring an adequate supply of water of good quality for the production of food, materials, and energy for the Nation's needs and increasing the efficient use of the Nation's water resources are essential to national economic stability and growth, and to the well-being of our people;

(b) the Nation's capabilities for technological assessment and planning and for policy formulation for water resources must be strengthened at both the Federal and State levels;

(c) there should be a continuing national investment in water-related research and technology which is commensurate with growing national needs; and

(d) the manpower pool of scientiests, engineers, and technicians trained in fields related to water resources constitutes an invaluable natural resource which whould be increased, fully utilized, and regularly replenished.

STATEMENT OF PURPOSE

Sec. 3. It is the purpose of this Act to assist the Nation and the States through water resources science and technology -

(a) to create a nationwide capability, including a network of state institutes, which will provide a state and regional and national focus for

resolving water and water-related land problems;

~~(a)~~(b) to provide a supply of water sufficient in quantity and quality to meet the Nation's expanding needs for the production of food, materials, and energy;

~~(b)~~(c) to preserve and enhance our water resources and the water-related environment;

~~(c)~~(d) to promote conservation and efficient use of the Nation's water resources;

~~(d)~~(e) to promote research and development, demonstration, and technology transfer dealing with both quality and quantity of water resources;

~~(e)~~(f) to identify and find practical solutions to the Nation's water and water ~~resources~~ related land problems;

~~(f)~~(g) to promote the training of scientists, engineers, and other skilled personnel in the fields related to water resources;

~~(g)~~(h) to foster and supplement present programs for the conduct of research, technology development and transfer, and innovative water resources management, conservation, and operating practices;

~~(h)~~(i) to provide for research, development, technology demonstration, and transfer with respect to converting saline and other impaired waters to waters suitable for municipal, agricultural, industrial, recreational, or other beneficial uses;

~~(i)~~(j) to disseminate information through the maintenance of a water resources scientific information center with adequate information bases so that the Nation's water research community, by utilizing the center, can be fully informed of ongoing research, completed research, and other types of information necessary for them to effectively conduct their work;

~~(j)~~(k) to better coordinate the Nation's water resources and development programs; and

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~~(k)~~ (1) to enhance the capacity of the Federal water establishment, and of water interests nationwide, for recommending to the President and the Congress changes in national water resources research and technology policy as appropriate.

TITLE I - WATER RESOURCES RESEARCH AND DEVELOPMENT

Sec. 101. (a) The Secretary of the Interior (hereinafter in this Act referred to as the "Secretary") is hereby authorized and directed to assist in carrying on the work of a competent and qualified water resources research and technology institute, center, or equivalent agency (hereinafter referred to as "institute") at one college or university in each State, which college or university shall be a college or university established in accordance with the Act approved July 2, 1862 (12 Stat.503; 7 U.S.C.301ff), entitled "An Act donating public lands to the several States and territories which may provide colleges for the benefit of agriculture and the mechanic arts" or some other institution designated by Act of the legislature of the State concerned: Provided, that (1) if there is more than one such college or university in a State established in accordance with said Act of July 2, 1862, funds under this section shall, in the absence of designation to the contrary by act of the legislature of the State, be paid to the one such college or university designated by the Governor of the State to receive the same, subject to the Secretary's determination that such college or university has, or may reasonably be expected to have, the capability of doing effective work under this title; (2) two or more States may cooperate in the designation of a single institute or regional institute, in which event the sums assignable to all of the cooperating States shall be paid to such institute; (3) ~~a designated college or university may arrange with other colleges and universities within the State to participate in the work of the institute.~~ the designated State institute shall cooperate closely with other colleges and universities in the State with demonstrated research, information dissemination,

and graduate training capabilities in developing a statewide program directed to resolving state and regional water and land related problems; (4) the designated state institute shall cooperate closely with regional consortia, as may be designated by the Secretary, to increase the effectiveness of the nationwide network of institutes and for the purpose of regional coordination, particularly with regional river basin commissions and other interagency river basin organizations as may be established by Congress.

(b)(1) It shall be the duty of each such institute to plan and conduct and/or arrange for a component or components of the college or university with which it is affiliated or other qualified colleges or universities within the State, to conduct competent research and development including investigations and experiments of either a basic or practical nature, or both, in relation to water resources, to promote dissemination and application of the results of these efforts, and to provide for the training of scientists and engineers through such research, investigations, and experiments;

(2) The research, investigations, experiments, and training may include, without being limited to, aspects of the hydrologic cycle; supply and demand for water; saline water conversion; conservation and best use of available supplies of water and methods of increasing such supplies; water reuse; and economic, legal, social, engineering, recreational, biological, geographic, ecological, and other aspects of water problems; scientific information dissemination activities, including identifying, assembling, and interpreting the results of scientific and engineering research on water resource problems; and providing means for improved communication of research results, having due regard for the varying conditions and needs of the respective States and regions, for water research and development projects now being conducted by agencies of the Federal and State governments, the agricultural and engineering experiment stations, and other university research centers and for the need to

avoid undue displacement of scientists and engineers elsewhere engaged in water resources research and development;

(3) The annual program submitted by the State institutes to the Secretary for approval shall include assurances, satisfactory to the Secretary, that such programs were developed in close consultation and collaboration with leading water resources officials within the State and region to promote research, training, information dissemination and other work meeting the needs of the State. Additionally, it shall be the duty of each State institute to provide the Secretary with periodic information, at the Secretary's discretion, on water resources research and development activities, needs, and priorities within the State which shall be coordinated with State, local, regional, and river basin entities, and to cooperate with the Secretary in preparing periodic reports of ongoing research within the State and its funding by both Federal and non-Federal organizations. Institutes are required to see that notices of research projects are submitted to the center referred to under title III, section 302;

(4) The designated State institutes shall cooperate with the Secretary in the development of five-year water resources research and development goals and objectives; and

~~(5) The designated institutes will receive and review all research and development proposals from the academic community for technical merit and relevance to priorities and forward all such proposals to the Secretary for consideration and funding.~~

(c) There is further hereby authorized a program of technology transfer and/or information dissemination to be carried out by the State institutes. Such funds, as are appropriated for this purpose, shall be made available ~~on a competitive basis~~ to the State institutes based on the merit of project or program proposals submitted to the Secretary, for the purpose of transferring

research and development results to other organizations for further development, demonstration, and practical application.

Sec. 102. Funds appropriated pursuant to this title, in addition to being available for expenses for research and development experiments, demonstrations, technology transfer and training conducted under authority of this title, shall also be available for printing and publishing the results thereof in the furtherance of technology transfer and for planning and direction. The institutes are hereby authorized and encouraged to plan and conduct programs financed under this title in cooperation with each other, with other colleges and universities, and with such other agencies and individuals as may contribute to the solution of the water and related land problems involved, and funds appropriated pursuant to this title shall be available for paying the necessary expenses of planning, coordinating, and conducting such cooperative research and information dissemination.

Sec. 103. (a) The Secretary is hereby charged with the responsibility for the proper administration of this title and, after full consultation with other interested Federal agencies, may prescribe such procedures, rules, and policies as may be necessary to carry out its provisions. He shall require a showing that institutes designated to receive funds have, or may reasonably be expected to have, the capability of ~~doing effective work.~~ developing a comprehensive program of research, information dissemination and training designed to resolve water and land related problems in a timely manner. He shall furnish such advice and assistance as will best promote the purposes of this title, participate in coordinating research initiated by the institutes under this title, indicate to them such lines of inquiry as to him seem most important, and assist the establishment and maintenance of cooperation among the institutes, other research organizations, the United States Department of the Interior, and other Federal establishments.

(b) The Secretary shall develop a five-year water resources research program in cooperation with the institutes and appropriate water entities, indicating goals, objectives, priorities, and funding requirements.

(c) The Secretary shall annually, on or before the 1st day of October in each year after the passage of this Act, ascertain that the requirements of subsection 101(b) have been met as to each institute, whether it is entitled to receive its share of the annual appropriations for water resources research and development, information dissemination and training under section 401(a) of the Act and the amount which it is entitled to receive.

Sec. 104. Nothing in this title shall be contrued to impair or modify the legal relation existing between any of the colleges or universities under whose direction an institute is established and the government of the State in which it is located, and nothing in this title shall in any way be construed to authorize Federal control or direction of education at any college or university.

Sec. 105. The Secretary is authorized to make grants to, and finance contracts and matching or other agreements with qualified educational institutions; private foundations or other institutions; and with private firms and individuals whose training, experience, and qualifications are adequate in his judgment for the conduct of water research and development projects; and with local, State, and Federal Government agencies to undertake research and development concerning any aspect of water and water related land problems which he may deem desirable in the national interest and are not otherwise being studied.

Sec. 106. Water resources research and development programs carried out in accordance with this title may include, without being limited to water use conservation and efficiencies; water and related planning; saline water conversion; water reuse; management and operations; legal systems; protection and enhancement of the water-based environment; institutional arrangements;

salinity management; and economic, social, and environmental impact assessment. Due consideration shall be given to priority problems identified by water and related land resources planning, data acquisition, and like studies conducted by other agencies and organizations.

Sec. 107. As used in this title, the term "State" includes the Commonwealth of Puerto Rico, the District of Columbia, and the territories of the Virgin Islands and Guam.

Sec. 108. Contracts or other arrangements for water resources work authorized under this title with an institute, educational institution, or nonprofit organization may be undertaken without regard to the provisions of section 3648 of the Revised Statutes (31 U.S.C. 529) when, in the judgment of the Secretary, advance payments of initial expenses are necessary to facilitate such work.

Sec. 109. (a) The Secretary is authorized to study, design, implement, operate, and maintain water resources programs and activities demonstrating the technical and economic viability of processes, systems, or techniques for the purpose of improving the water or water-related environment and to demonstrate the application of water resources research and development results and technology for beneficial purposes.

(b)(1) Funds appropriated pursuant to the authority provided by sections 401(c) and 403 for use under this section may not be expended until thirty calendar days (including days on which either the House of Representatives or the Senate are not in session because of an adjournment of more than three calendar days to a day certain) have elapsed following transmittal of a report to the chairman of the Committee on Interior and Insular Affairs of the House of Representatives and the chairman of the Committee on Environment and Public Works of the United States Senate.

(2) Such report shall present information that includes, but is not

limited to, the location of the demonstration activities, the characteristics of the water and water-related problem, the processes or concepts to be demonstrated, the estimated initial investment cost of the demonstration, the estimated annual operating cost of the demonstration, the source of energy for the demonstration and its cost, environmental consequences of the demonstration; and the estimated costs associated with the demonstration considering the amortization of all components of the demonstration.

(3) Such report shall also be accompanied by a proposed contract or agreement between the Secretary and a duly authorized Federal or non-Federal public or private entity, in which such entity shall agree to share cost to the extent deemed important to the purposes of the activity as determined by the Secretary. Such proposed contract or agreement may provide that either the contractual entity or the United States will develop the activity described in the report and that the United States will either operate and maintain the activity or may participate in the operation and maintenance during which, in either case, access to the activity and its operating data will not be denied to the Secretary or his representatives.

(4) The Secretary is authorized to include in the proposed contract or agreement a provision for conveying all rights, title, and interests of the Federal Government to the Federal or non-Federal, public or private entity, subject to a future right to reenter the activity for the purpose of financing at Federal expense modifications for advanced technology and for its operation and maintenance for a successive term under the same conditions as pertain to the original term.

TITLE II - WATER RESEARCH AND DEVELOPMENT FOR SALINE AND OTHER IMPAIRED WATERS

Sec. 200. Consistent with the Federal responsibility for water resources development and conservation by means of comprehensive planning

water resources development projects, protection of water quality standards, and other measures for the beneficial use of water from various sources, the Congress finds it necessary to provide for the development of technology for the conversion of saline and other impaired waters for beneficial uses. It is the policy therefore to assist and encourage the development of practical means to utilize saline water technology to convert impaired waters of any type from any source to a quality suitable for municipal, industrial, agricultural, and other beneficial uses to transfer research and development results.

Sec. 201. The Secretary is authorized and directed to -

(a) conduct, encourage, and promote basic scientific research and fundamental studies to develop effective and economical processes and equipment for the purpose of converting impaired water into water suitable for beneficial uses;

(b) pursue the findings of research and studies authorized by this title having potential practical applications, including application to matters other than water conversion, and to other supply sources such as brackish waters, staged development, and use with energy sources;

(c) conduct engineering and technical work including the design, construction, and testing of various processes, systems, and pilot plants to develop saline water conversion processes to the point of demonstration;

(d) study methods for the recovery, beneficial uses and disposal of residuals, and marketing of byproducts resulting from the improvement or conversion of impaired water in an environmentally acceptable manner;

(e) undertake economic studies and surveys to determine present and prospective costs of producing water for beneficial purposes in various parts of the United States by saline water conversion processes and, by means of models or other methodologies, prepare and maintain information concerning the

relation of such conversion processes and systems to other aspects of State, regional, and national comprehensive water resources planning.

Sec. 202. (a) The Secretary is authorized to conduct preliminary investigations and explore potential cooperative agreements with non-Federal utilities and governmental entities in order to develop recommendations for Federal participation in the design, construction, operation, and maintenance of demonstration and prototype plants utilizing advanced saline water technologies for the production of water for beneficial use.

(b) In carrying out the provisions of this section, the Secretary shall utilize the expertise of the water and power marketing agencies of the Department of the Interior or of other Federal agencies to insure that the recommended project and the supporting agreements are fully integrated and compatible with the water and power systems of the region.

(c) The Secretary is authorized to accept financial and other assistance from any State or public agency in connection with studies or surveys relating to impaired water and facilities and to enter into contract with respect to such assistance.

Sec. 203. The Secretary may issue rules and regulations to effectuate the purposes of this title.

Sec. 204. As used in this title -

(a) the term "saline and other impaired water" includes but is not limited to seawater, brackish water, mineralized ground or surface water, irrigation return flows, and other similarly contaminated waters;

(b) the term "United States" extends to and includes the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, Guam, the Virgin Islands, and other locations under the jurisdiction of the United States;

(c) the term "pilot plant" means an experimental unit of sufficient size used to evaluate and develop new or improved processes or systems and

to obtain technical and engineering data;

(d) the term "demonstration" means a plant of sufficient capacity and reliability to demonstrate on a day-to-day operating basis that the process or system is feasible and that such process or system has potential for applications to water system improvement;

(e) the term "prototype" means a full-size, first-of-a-kind production plant used for the development and study of full-sized technology, energy, and process economics.

Sec. 205. (a) The Secretary is authorized to study, design, construct, operate, and maintain water resources projects demonstrating the feasibility of utilizing saline water conversion processes or systems for the purpose of processing saline or other impaired water to a quality suitable for municipal, industrial, agricultural, and other beneficial uses, and to demonstrate research and technology for other beneficial purposes.

(b)(1) Funds appropriated pursuant to the authority provided by section 402(a)(3) of this Act for use under this section may not be expended until thirty calendar days (excluding days on which either the House of Representatives or the Senate is not in session because of an adjournment of more than three calendar days to a day certain) have elapsed following transmittal of a report to the chairman of the Committee on Interior and Insular Affairs of the House of Representatives and the chairman of the Committee on Environment and Public Works of the United States Senate.

(2) Such report shall present information that includes, but is not limited to, the location of the demonstration project, the characteristics of the water to be processed, the process or processes to be utilized, the water supply problems confronting the area in which the project will be located, alternative sources of water and their probable costs, the characteristics of the project, the estimated initial investment cost of the demonstration project, the estimated annual operating cost of the demonstration

project, the source of energy for the project and its cost, environmental consequences, and the estimated unit cost of water, or other costs associated with the demonstration project considering the amortization of all components of the demonstration project.

(3) Such report shall also be accompanied by a proposed contract or agreement between the Secretary and a duly authorized Federal or non-Federal, public or private entity, in which such entity shall agree to share cost to the extent deemed important to the purposes of the project as determined by the Secretary. Such proposed contract may provide that either the contractual entity or the United States will construct the project discribed in the report and that the United States will either operate and maintain the project or may participate in the operation and maintenance during which, in either case, access to the project and its operating data will not be denied to the Secretary or his representatives.

(4) The Secretary is authorized to include in the proposed contract a provision for conveying all rights, title, and interest of the Federal Government to the Federal or non-Federal, public or private entity, subject only to a future right to re-enter the facility for the purpose of financing at Federal expense modifications for advanced technology and its operation and maintenance for a successive term under the same conditions as pertain to the original term.

TITLE III - TECHNOLOGY TRANSFER AND INFORMATION DISSEMINATION

Sec. 300. The Secretary is authorized to conduct a research assessment and technology transfer program which transfers research and development results to other organizations and individuals for further development and practical application to water and water-related land problems.

The Secretary may enter into agreements with the State and local governments and with other public and private organizations and individuals, including

cost-sharing or cost-participation agreements, for the transfer or application of research results for the solution of water-related problems and to further the transfer developed by programs authorized under this Act. The Secretary may issue publications and may conduct seminars, conferences, training sessions, or use other such techniques he deems necessary to expedite the transfer of research results and technology development. The technology transfer activities will be coordinated with activities undertaken under titles I and II of this Act.

Sec. 301. The Secretary is further authorized to maintain a national center for the acquisition, processing and dissemination of information dealing with all areas of water resources research, technology development, and demonstration. Each Federal agency engaged in water resources including research, technology development, and demonstrations, shall cooperate by providing the center with documents and other pertinent information. The center shall: (a) maintain for general use a collection of water resources information provided by Federal and non-Federal government agencies, colleges, universities, private institutions, and individuals; (b) issue publications or utilize other media to disseminate research, technology development and demonstration information for the purposes of this Act and enter into agreements with public or private organizations or individuals to stimulate acquisition and dissemination of information, thus contributing to a comprehensive, nationwide program of research and development in water resources and the avoidance of unnecessary duplication of effort; (c) make generally available abstracts and other summary type information concerning water resources activities including research accomplished and in progress by all Federal agencies and by non-Federal agencies, private institutions, and individuals, to the extent such information can be obtained, and reports completed on research projects funded under provisions of this Act; and (d) in carrying out

the information dissemination activities authorized by this section, the Secretary shall to the extent feasible use the resources and facilities of other agencies and of the clearinghouse for scientific, technical and engineering information established in the Department of Commerce pursuant to sections 1151 through 1157 of title 15, United States Code.

Sec. 302. There shall be established, in such agency and location as the President determines to be desirable, a center for cataloging current scientific research in all fields of water resources. Each Federal agency doing water resources research shall ~~cooperate by providing the~~ submit quarterly to such cataloging center ~~with~~ information on ~~work~~ research underway, scheduled, and completed. The cataloging center shall classify and maintain for general use a ~~file~~ printed catalog and computer search system of water resources research and investigation projects in progress or scheduled by all Federal agencies. ~~and by such~~ The cataloging center shall also establish a program to facilitate and encourage non-Federal agencies of government, colleges, universities, private institutions, firms, and individuals ~~as~~ to voluntarily ~~may~~ make ~~such~~ similar information available concerning in-house research and research supported by grants and contracts on a systematic basis.

TITLE IV - GENERAL PROVISIONS

Sec. 400. (a) As used in this Act, the term "Secretary" means the Secretary of the Interior.

(b) In carrying out his functions under this Act, the Secretary may:

(1) make grants to educational institutions and scientific organizations, and enter into contracts with institutions and organizations and with industrial or engineering firms;

(2) acquire the services of chemists, physicists, engineers, and other personnel by contract or otherwise:

(3) utilize the facilities of Federal scientific laboratories;

(4) establish and operate necessary facilities and test sites to carry on the continuous research, testing, development, and programing necessary to effectuate the purposes of this title;

(5) acquire processes, technical data, inventions, patent applications, patents, licenses, land and interests in land (including water rights), plants and facilities, and other property or rights by purchase, license, lease, or donation pursuant to the Federal Property and Administrative Services Act (40 U.S.C. 471) as amended, where applicable;

(6) assemble and maintain pertinent and current scientific literature, publications, patents, licenses, land and interests in land (including water rights thereto);

(7) cause on site inspections to be made of promising projects, domestic and foreign, and in the case of projects located in the United States, cooperate and participate in their development when the purposes of this title will be served thereby;

(8) foster and participate in regional, national and international conferences relating to water resources;

(9) accept financial and other assistance from any local, State, Federal, or other agency or entity in connection with studies or surveys relating to water problems and facilities, and enter into contracts with regard to such assistance;

(10) coordinate, correlate, and publish information with a view to advancing the development of practicable water conversion projects; and

(11) cooperate with other Federal departments and agencies, with State and local departments, agencies, and instrumentalities, and with interested persons, firms, institutions, and organizations.

Sec. 401. (a)(1) There are hereby authorized to be appropriated for

the purposes of implementing section 101(a) of this Act such sums annually as are sufficient to provide an amount not to exceed ~~$110,000~~ $150,000 to each participating institute, ~~on a cost-sharing basis~~, for the fiscal year ending September 30, 1979, ~~and such sums as are necessary for the fiscal year ending September 30, 1980~~.and each subsequent year thereafter. Provided further, That for fiscal year 1979 not more than $125,000 shall be appropriated for each of the District of Columbia, the Virgin Islands, Puerto Rico, and Guam, and for fiscal year 1980 not more than $150,000 shall be appropriated for each of such areas.

(2) There shall be authorized to be appropriated to the Secretary of the Interior for fiscal year 1979 and each year thereafter sums adequate to provide an additional $100,000 to each state institute to support water resources research in the institutes provided these funds are approved only for specific projects and only if the institute has shown to the satisfaction of the Secretary that is has developed a comprehensive research plan focused on water problems of high priority and of importance to more than one State in its region and provided further that the institute shows that the research projects supported have at least one dollar of non-Federal contribution for each two dollars of Federal support under this section.

~~(2)~~ (3) There is further authorized to be appropriated ~~an amount not to exceed $750,000 on a cost-sharing basis for the purpose of implementing section 101(c) of this Act for the fiscal year ending September 30, 1979, and such sums as are necessary for the fiscal year ending September 30, 1980, all such sums to remain available until expended;~~ for the fiscal year 1979 and each year thereafter sums adequate to provide to each State institute a minimum of $75,000 and no more than $125,000 for the purpose of organizing and carrying out an approved program of technology transfer and/or information dissemination so that the results of research are put into practical use at the earliest

feasible time, and provided further that the institute shows that the technology transfer and/or information dissemination program have at least one dollar of non-Federal contribution for each two dollars of Federal support under this section. This technology transfer program must comprise a comprehensive plan to provide scientific information dissemination activities, such as identifying, assembling, and interpreting the results of scientific and engineering research deemed potentially significant for solution of water resource problems, providing means for improved communication regarding such research results, including prototype operations, ascertaining the existing and potential effectiveness of such for aiding in the solution of practical problems, and for training qualified persons in the performance of such scientific information dissemination.

~~(3)~~ (4) ~~Cost-sharing under sections 101(a) and 101(c) shall be on the basis of two federal shares to not less than one non-Federal share.~~ Federal funds made available under ~~this~~ section 401(a) shall not be used for support of indirect costs as defined by current Federal regulations; however, such indirect cost may be credited as a non-Federal contribution to the total cost of activities to be carried out pursuant to the Federal grant or contract.

(b) There is authorized to be appropriated ~~for carrying out the purposes of section 105 of this Act~~ for the fiscal year ending September 30, 1979, and for each subsequent year thereafter, ~~the sum of $4,000,000, and such sums as are necessary for fiscal year 1980, to remain available until expended~~ sums not in excess of $10,000,000, to match, on a dollar-for-dollar basis, funds made available to institutes by States or other non-Federal sources to meet the necessary expenses of specific water resources research and development projects and information dissemination projects which are of high priority to one or more States in the region or which have national significance and which could not otherwise be undertaken. Included are expenses of planning and coordinating regional water resources research projects

by two or more institutes. Such high priority projects shall be identified by the Secretary of the Interior in consultation and collaboration with the institutes, including regional institute consortia as designated by the Secretary. Federal funds provided under this subsection shall be available on a competitive basis to the institutes. ~~and shall be available to any organization or individual~~.

(c) There is authorized to be appropriated for purposes of carrying out the research, development and demonstration activities authorized by sections 105 and 109 of this Act for the fiscal year ending September 30, 1979, and for each of the fiscal years 1980-1988 inclusive, the sum of ~~$3,200,000~~ $10,000,000, ~~and such sums as are necessary for fiscal year 1980, available until expended,~~ which shall be available on a competitive basis to any organization or individual to finance grants, contracts, matching grants or other arrangements which equal 100 per centum, or any lesser percent of the total cost of the projects involved.

Sec. 402. (a) There is authorized to be appropriated to carry out the provision of title II of this Act for the fiscal year ending September 30, 1979, the sum of $8,800,000, and such sums as are necessary for fiscal year 1980, to remain available until expended. The categories for which such funds are authorized are as follows:

(1) research,

(2) development, and

(3) demonstration.

The funds appropriated pursuant to such authorization shall be distributed to the foregoing categories as determined by prevailing budgetary priorities.

(b) Not more than 5 per centum of the funds to be made available in any fiscal year for research under the authority of this title may be expended for foreign activities subject to the approval of the Secretary of State to

assure that such activities are consistent with the foreign policy objectives of the United States, in cooperation with public or private agencies in foreign countries for research useful to the programs in the United States.

Sec. 403. There is authorized to be appropriated the sum of $4,464,000 for the fiscal year ending September 30, 1979, and such sums as are necessary for the fiscal year ending September 30, 1980, to carry out the sections of titles I, II, III and IV of this Act other than those for which special specific authorizations are made.

Sec. 404. Each application for a grant, pursuant to this Act, shall, among other things, state the nature of the project to be undertaken, the period during which it will be pursued, the water problem it addresses, the qualifications of the personnel who will direct and conduct it, the importance of the project to the water-related economy of the Nation, the need for and expected utilization of the results, the extent to which potential users of the research findings have been involved in formulation of the research plan and method for user involvement during the study period, the region and State concerned, its relation to other known research projects previously conducted or currently being pursued, the procedures by which the results can be disseminated, and the extent to which it will provide opportunities for the training of water resources scientists and engineers. No grant shall be made except for projects approved by the Secretary and all grants shall be made upon the basis of the merit of the project, the need for the knowledge it is expected to produce when completed, and the opportunities it provides for the training of water resources scientists and engineers.

Sec. 405. (a) Sums appropriated pursuant to this Act may be paid at such times and in such amounts during each fiscal year as determined by the Secretary and upon vouchers approved by him. Except as may be otherwise specified by this Act, funds received pursuant to such payment may be used for any allowable costs within the meaning of the Federal procurement regulations that establish princi-

ples for determining costs applicable to research and development under grants and contracts with educational institutions (41 CFR 1-15.3), including future amendments thereto: Provided, That the direct costs of the programs of each State institute, as distinguished from indirect costs, are not less than the amount of the Federal funds made available to such State institute pursuant to section 401 of this Act.

(b) Each state institute operating pursuant to title I of this Act shall have an officer appointed by its governing authority who shall receive and account for all funds paid to the institute under the provisions of this Act and ~~who shall provide~~ shall make an annual report to the Secretary on or before the 1st day of December of each year, ~~an annual statement of the amounts received under any of the provisions of this Act~~ on the total program of the institute in research; technology transfer and information dissemination and training toward the resolving of water and water-related land problems of each State and region during the preceding fiscal year, and ~~of its disbursement~~ on amounts disbursed, on schedules prescribed by the Secretary. If any of the moneys received by the authorized receiving officer of any State institute under the provisions of this Act shall, by any action or contingency, be found by the Secretary to have been improperly diminished, lost, or misapplied, it shall be replaced by the State concerned and until so replaced no subsequent disbursement of Federal funds shall be made to any institute of such State.

Sec. 406 (a) The Secretary shall cooperate fully with, and shall obtain the continuing advice and cooperation of, all agencies of the Federal Government concerned with water problems, State and local governments, and provate institutions and individuals, to assure that the programs conducted under this Act will supplement and not duplicate other water research and technology programs, will stimulate research and development in neglected areas and will provide a comprehensive, nationwide program of water resources research and development. In order to further these purposes, as well as to

assure research undertaken by the Secretary on wastewater treatment and treatment of water for potable use is most responsive to needs in implementing the Federal Water Pollution Control Act, as amended (Public Law 92-500), and the Safe Drinking Water Act, as amended (Public Law 93-523), the Secretary will consult with the Administrator of the Environmental Protection Agency in developing and implementing programs in these areas. The Secretary will encourage utilization of the center referred to in title III, section 302, for cataloging current research projects in order to assure that programs conducted under this Act will supplement and not duplicate other research and technology programs and will encourage other Federal agencies to do likewise.

(b) The President shall, by such means as he deems appropriate, clarify agency responsibilities for Federal water resources research and development and provide for inter-agency coordination of such research, including the research authorized by this Act. Such coordination shall include (1) continuing review of the adequancy of the Government-wide program in water resources research and development and identification of technical needs in various water resources research categories, (2) identification and elimination of duplication and overlaps between two or more programs, (3) recommendations with respect to allocation of technical effort among the Federal agencies, (4) review of technical manpower needs and findings concerning the technical manpower base of the program, (5) recommendations concerning management policies to improve the quality of the Government-wide research effort, and (6) actions to facilitate interagency communication at management levels. The President shall submit to Congress on December 1 of each year a report on the progress being made to effectuate the coordinating function described in this section and the need for legislation to implement the objectives of this section.

Sec. 407. (a) Property acquired by the Secretary under this Act for use in furtherance of the purposes of this Act may be conveyed to a cooperating institute, educational institution, or nonprofit organization in accordance with the Federal Property and Administrative Services Act of 1949, as amended.

(b) The Secretary may dispose of water and byproducts resulting from his operation under this Act. All moneys received from dispositions under this Act shall be paid into the Treasury as miscellaneous receipts except where such operations may be undertaken as a part of a Federal reclamation project in which case the financial provisions of the reclamation laws (32 Stat. 388 and Acts amendatory thereof and supplementary thereto) shall govern.

Sec. 408. With respect to patent policy and to the definition of title to, and licensing of inventions made or conceived in the course of, or under any contract or grant pursuant to this Act, and notwithstanding any other provision of law, the Secretary shall be governed by the provisions of sections 9 and 10 of the Federal Nonnuclear Energy, Research and Development Act of 1974 (Public Law 93-577; 88 Stat. 1887, 1891; 42 U.S.C.5908,5909): Provided, however, That subsections (l) and (n) of section 9 of such Act shall not apply to this Act.

Sec. 409. The institutes shall submit a summary report to the Secretary on or before January 31 of each year ~~which highlights research and development work accomplished~~ on the total program of the institute during the preceding fiscal year in research, technology transfer and information dissemination and training toward the resolution of water and water-related land problems of each state and region, the status of projects underway, and recommended future projects. This report is in addition to such other reports as may be required by sections 101(b) and 405(b) of this Act. The Secretary shall submit a comprehensive summary report to the President and the Congress

on or before April 1 of each year ~~which summarizes program activities of the preceding fiscal year and projects for the future.~~ on contributions which the total institute program has made toward resolving water and related land problems during the preceding fiscal year. The report shall also include a detailed statement of the water and related land problems to be given priority attention during the next fiscal year. This statement shall be developed in consultation and collaboration with the network of State institutes. In addition, the Secretary's annual report to the President and Congress shall indicate the contribution made to resolving water and land related problems of a national interest by contract and grant award approved under subsections (b) and (c) of section 401.

Sec. 410. (a) The Water Resources Research Act of 1964 (Public Law 88-379, 78 Stat. 329; 42 U.S.C. 1961 et seq.), as amended, the Saline Water Conversion Act of 1971 (Public Law 92-60, 85 Stat. 159; 42 U.S.C. 1959 et seq.), as amended, and the Water Research and Conversion Act of 1977, (Public Law 95-84) are hereby repealed.

(b) Nothing elsewhere in this Act is intended to repeal, supersede, or diminish existing authorities or responsibilities of any agency of the Federal Government concerning water resources.

(c) Nothing in this Act shall be construed to alter existing law with respect to the ownership and control of water.

STATEMENT OF DR. JOHN C. CALHOUN, JR.; EXECUTIVE VICE CHANCELLOR FOR PROGRAMS, THE TEXAS A&M UNIVERSITY SYSTEM REPRESENTING THE NATIONAL ASSOCIATION OF STATE UNIVERSITIES AND LAND-GRANT COLLEGES; COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS SUBCOMMITTEE ON WATER RESOURCES, APRIL 7, 1978.

Mr. Chairman and members of the Subcommittee, I am pleased to have the opportunity to speak briefly concerning S. 2704 I am John Calhoun, Executive Vice Chancellor of The Texas A&M University System. I am here representing the National Association of State Universities and Land Grant-Colleges and its 142 member institutions. I have been a member of the Water Resources Committee of the Association for eight years and today I speak for that Committee. President Glenn Terrel of Washington State University is President of the Association, and he had hoped to be here today to represent the Association, but commitments at home prevented him from coming. However, I have a letter from him to you which I will provide for the record.

Our Association represents all of the land-grant colleges and major public universities in the nation. Our institutions have been the leaders in water resources research and education. We are grateful for this opportunity to speak to you.

First, I want to say that we are pleased at the progress that we see being made in trying to bring about improvements in the effectiveness of the partnership between the water research institutes and the Office of Water Research and Technology. We view this activity as a cooperative federal-

state program. Several aspects of S. 2704 are steps in strengthening that direction. Recognizing the importance of technology transfer to achieve better use of water resources is a case in point although the planned support for this worthy program in S. 2704 appears inadequate.

The research of the water institutes needs to be carefully focused on the water programs of most critical importance to the state and nation. We believe that strengthened cooperation among the nation's universities is valuable not only in addressing these problems but in identifying them. We want to work with the Congress and OWRT to see that this is done. We recognize the need for support to help maintain strong, viable water institutes in each state. We are told that the programs of some institutes are perceived as not being as strong or as carefully focused on real world problems as they might and we want to work with Congress and with the Department of Interior to bring about improvement in the programs of institutes. I understand that OWRT and the institute directors are presently working on an institute improvement program. While we remain convinced that the institutes have done a good job in their states, we know there is always room for improvement. I understand that you were provided considerable information concerning the results of the research programs of the water institutes by the report on the Water Resources Research Act of 1964 to the Committee on Interior and Insular Affairs, March, 1976.

In order to give its view of needed legislation, the Water Resources Committee of the Association developed some draft amendments to the existing Water Resources Research Act. We did this to illustrate the areas where we believe the water research portion of the program of the Office of Water Research and Technology could be improved. We did not address the legislation concerning saline water and I want to stress that this was only because we were focusing our attention on the parts of the program in which we have had the greatest historical involvement. We support the improvements in the saline water program which are presented in S. 2704. The institutes pledge their support of the saline water research program.

I will leave with you the proposed set of amendments to S. 2704 which incorporate the elements which concern us and I ask that these recommended amendments be made part of the record. I understand that a version of this legislation with the changes we propose has been introduced as S.2826. I will devote the remainder of my testimony to a brief summarization of the changes in the water research portion of the Act which we submit.

At several points we suggest that the existence and strength of a nation-wide network of Water Resources Research Institutes be recognized. We think the legislation should stress the value of cooperative work among the institutes with other colleges and universities. We introduce in our suggested wording the concept of regional consortia, as may be designated by the Secretary of the Interior, as a way of increasing the effectiveness of the nation-wide network of institutes.

Concerning funding, we recognize that the existing $250,000 authorized for support of the state institutes may not be realistic because appropriations are still only at the level of $110,000. We believe that many of the institutes need and could effectively use more money, but we no longer support a fixed total amount of $250,000 without certain conditions being applied. The Water Resources Committee of the Association recommends that there be authorized $150,000 to support the core research program and to help maintain the institutes in performing the necessary functions which each has in relation to programs with the Department of the Interior and to other institutions within its state.

We further recommend that there be provided an additional $100,000 to each state institute to expand its core program for water resources research, but this additional money would be available only if the institute has shown to the satisfaction of the Secretary of the Interior that it has developed a comprehensive plan focused on water problems of high priority which are of importance to at least one state and preferably more than one state in the region. Further, the institute must show that the research projects to be supported have at least one dollar of non-Federal contributions for each two dollars of Federal support under this section. In short, we recognize that the institutes are not necessarily equal and do not have the same needs for the

states core program of water research. We provide a cost-sharing provision and other stipulations before an institute would qualify for the additional $100,000 which might be available. We do believe that $150,000 is a reasonable base of support for each institute, but some can effectively use more.

On the issue of technology transfer, we wish to emphasize its essential importance for achieving long-term goals in effective water use. We are pleased that S. 2704 provides some funds for technology transfer, but we sincerely believe the $750,000 provided for competitive grants to institutes is inadequate to meet the Nation's needs. We believe that it is highly important that each institute play a lead role in assuring that the results of research, whether done at that institute or at any other place in the Nation or the world, be made availalbe readily to the public. The information should be provided in the most convenient form for ready use. For this to be achieved most effectively, each institute must have a good water resource technology transfer program in operation in its state, and there must be a nominal base of support to the institute for this purpose. We recommend that this minimum base of support be $75,000 per state and that those states which qualify with exceptionally comprehensive programs should compete for an additional $50,000. The technology transfer program must comprise a comprehensive plan to provide scientific information

dissemination activities such as identifying, assembling and interpreting results of scientific and engineering research deemed potentially significant for solution of water resources problems to the state region which the institute serves.

We further believe that the existing matching grant program of the Water Resources Research Act authorized at $5,000,000 is inadequate. We recommend that the authorization for this program, which requires a dollar-for-dollar match, be increased to $10,000,000 in order to address adequately the large number of regional and national problems that exist.

The Title II program in the original Water Resources Research Act was a valuable part of that program because it provided money for private research organization, industries, and other groups to seek research funding on a competitive basis without the absolute requirement for matching the Federal monies with non-Federal monies. We believe this program is a balanced National water resources research effort. We recommend that the funding authorization level be at $10,000,000.

To summarize our recommendations, we ask that the minimum support for research and operation of each state institute be $150,000. We further suggest that under certain conditions money be provided which could increase this support level by $100,000.

We also believe that the technology transfer program is essential and that each institute should be required to develop and implement such a program. We recommend that $75,000 be provided to each institute for this, with an additional $50,000 being available for those institutes whose programs merit it as determined by the Secretary of the Interior.

We recommend that both the dollar-for-dollar matching grant program and the Title II non-matching program of the existing Water Resources Research Act be authorized at $10,000,000 each.

If one assumes that half the state institutes would qualify for funding at the maximum level, one can estimate that the total authorization in this bill for water resources research would be approximately $36,000,000. In this calculation, I have not considered the saline water program or costs for administering the Office of Water Research and Technology. Considering the importance of water resources to our Nation's future, this is a reasonable amount to invest in water research and in the transfer of research information directly to users in our Nation.

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