

# NEWS

## WATER RESOURCES RESEARCH INSTITUTE

### OF THE UNIVERSITY OF NORTH CAROLINA

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#### CONTENTS

	Page
Earle C. Hubbard Retires . . . . .	1
Who Is Doing What in Water Resources Research . .	2
National Safe Drinking Water Act Enacted . . . . .	2
New Institute Publications . . . . .	8
Lewis R. Martin New Director of North Carolina Pollution Control Agency . . . . .	9
Chowan River Project . . . . .	9
Southeastern Water Resources Scientific Information Center . . . . .	11
Municipal Bonds for Pollution Control Unconstitutional . . . . .	13
New Water Rate Structure Encourages Conservation .	15
University Scientist Exchange Program . . . . .	16
Dates to Remember . . . . .	17
Water Resources Conditions in North Carolina . . .	17
Water Resources Legislation in the Congress. . . .	18
New Publications . . . . .	19

#### EARLE C. HUBBARD RETIRES AS DIRECTOR OF NORTH CAROLINA POLLUTION CONTROL AGENCY

Mr. Earle C. Hubbard, Director of North Carolina's Division of Environmental Management since its formation on July 1, 1974, retired December 31 after almost four decades of state service.

Since 1951 when he became Executive Secretary in charge of the Stream Sanitation Program for the State Stream Sanitation Committee, Mr. Hubbard has been, through numerous agency reorganizations, the professional director of the State's pollution control programs. In the pre-Earth Day years of the 1950's and early 1960's, Mr. Hubbard and the State Stream Sanitation Committee, chaired by the late State Senator J. Vivian Whitfield, held public hearings on water quality and pollution control in every river basin of the State, organizing a state program widely copied throughout the country. State Secretary of Natural and Economic Resources, James E. Harrington, lauded Mr. Hubbard on his retirement, saying, "No man in any state government in this nation knows more about water resources than Earle Hubbard."

Hubbard's ability has not gone unnoticed by his professional colleagues. He has held virtually every office in the North Carolina Water Pollution Control Federation; has served as a National Director of the Water Pollution Control Federation, receiving its Arthur Sidney Bedell Award in 1968; has held similar offices in the North Carolina

Section of the American Water Works Association, receiving its Fuller Award in 1958; has served as President of the Professional Engineers of North Carolina, receiving its Outstanding Service Award in 1954; and was past Director for the Southeast Region of the Association of State and Interstate Water Pollution Control Administrators. Governor Holshouser has officially proclaimed Mr. Hubbard a "Distinguished Citizen of North Carolina."

Mr. Hubbard, a native of Fayetteville, holds a B.S. degree in civil engineering at North Carolina State University and an M.S. degree in public health engineering from the University of North Carolina at Chapel Hill, under the tutelage of Dr. H. G. Baity.

Mr. and Mrs. Hubbard, the former Mary Alice Bullock, reside at 2613 Churchill Road in Raleigh. They have a son, Dr. William C. Hubbard of Raleigh, and two grandchildren.

#### WHO IS DOING WHAT IN WATER RESOURCES RESEARCH

For the past nine years the Water Resources Research Institute has been publishing annual reports of Water Resources Research Interests in the Colleges and Universities of North Carolina (Report No. 3) and an Inventory of Active Water Resources Research Projects in North Carolina (Report No. 4). The purpose has been to provide a rapid and current means of locating faculty research interests and familiarization with on-going research throughout all universities of the State, Federal and State agencies, and private industry. The information has been considered of importance to water agencies as well as to university research units and faculty.

Because of the costs associated with annual publication of these two reports, the Institute has decided to mimeograph a limited number of the January 1, 1975, issues and restrict automatic distribution to key agencies and university centers where they will be available to all concerned. Individual copies will be provided, however, upon request to the Institute.

All university faculty members submitting proposals to the Institute must check the current issue of Report No. 4 to determine related research so that appropriate steps can be taken to prevent overlap and duplication.

#### NATIONAL SAFE DRINKING WATER ACT ENACTED

Following a long gestation period through several sessions of Congress, the Safe Drinking Water Act (P.L. 93-523) was enacted by the Congress on December 3 and signed by President Ford on December 17, 1974. Many of its supporters feared that the bill would again die with adjournment of the 93rd Congress but opportune publicity on possible carcinogenic (cancer-causing) chemicals in drinking water in several cities seemed to sway a heretofore apathetic Congress. The Act will be administered by the United States Environmental Protection Agency (EPA).

The Act is far too complex to readily or fairly summarize in the space available in the News. However, a few observations illustrate the potential scope and impact of the Act.

The Act applies to public water systems "for the provision to the public of piped water for human consumption, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals." (Section 1411 places specific limitations on coverage, for example national primary drinking water regulations do not apply to systems which do not sell water; a problem often observed by the NEWS is that mobile home parks and mill villages renting space or houses with water and sewer services included in the rental fee have escaped regulation). North Carolina alone has over 3000 public water systems.

#### National Drinking Water Regulations

EPA must publish proposed national interim primary drinking water regulations within 90 days of enactment, and promulgate same, as amended, within 180 days of enactment, to take effect eighteen months after promulgation. Primary regulations establish maximum contaminant levels for substances adversely affecting health, secondary regulations specify maximum levels for contaminants or properties affecting the public welfare, e.g., odor or appearance. Secondary regulations must be published within 270 days after enactment and promulgated within 90 days after publication.

EPA is to arrange with the National Academy of Sciences for a study of recommended contaminant levels with the findings to be reported to Congress not later than two years after enactment. Maximum contaminant levels proposed in the NAS study must be published by EPA within 10 days of submittal of the report to Congress. Within 90 days thereafter EPA "shall by rule establish and publish recommended contaminant levels" at a level for which "no known or anticipated adverse effects on the health of persons occur and which allows an adequate margin of safety." Promulgation of these proposed regulations (or revisions of the earlier regulations) must follow within 180 days, to take effect within eighteen months of promulgation. These regulations should be in effect by early 1979. Established regulations shall be reviewed at least once every three years.

An important element of these regulations, sometimes overlooked even by practitioners in the field, is that they will apply not only to contaminant levels but will include "quality control and testing procedures to insure compliance with such levels and to insure proper operation and maintenance of the system, and requirements as to (i) the minimum quality of water which may be taken into the system and (ii) siting for new facilities." (That is, source approval).

"No national primary drinking water regulation may require the addition of any substance for preventive health care purposes unrelated to contamination of drinking water." (That is, fluoridation is not required).

A frequent comment by communications media has been, to the effect:

"Incredible as it seems in the space age, we have no national drinking water standards." Actually we have had national standards since 1914 with the most recent revision in 1962. These standards, however, applied only to water on interstate carriers, presumably on the legal basis (perhaps more widely held in 1914?) that federal powers in this field derived only from the interstate commerce clause of the Constitution. In practice, all or nearly all state regulatory agencies (generally health departments) had incorporated the U.S. Public Health Standards into their own state health or sanitation codes by reference or by duplication.

Unfortunately, the decline of public attention and support for drinking water quality - at state and federal levels - vis-a-vis water pollution control has been reflected in meagre, inadequate support for water supply research, training, personnel recruitment, and state surveillance programs, accentuated by competition with rapidly expanding pollution control programs for the same talent and resources. Ironically, the catalyst for this movement may well have been the removal of water supply and pollution control activities from the U.S. Public Health Service, accompanied by outspoken conservationist and media attention to esthetic and wildlife values.

#### State Primary Enforcement Responsibility

States can continue regulatory enforcement responsibility for public water systems provided they (1) adopt drinking water regulations no less stringent than current federal regulations, (2) adopt and implement adequate enforcement, monitoring, and inspection procedures and regulations, (3) maintain required records, (4) permit variances and exemptions under conditions and in a manner at least as stringent as under federal regulations, (5) adequately plan for water supply during emergencies, and (6) obtain program approved from EPA.

Failure to comply with any national regulation may result in an EPA civil action. The court may impose civil penalties not to exceed \$5,000 for each day of violation. Each owner or operator of a public water system shall notify its consumers of any failure to meet established quality, treatment, testing, or monitoring requirements.

#### Variances and Exemptions

Variances from national primary regulation may be granted under prescribed circumstances when "the variances will not result in an unreasonable risk to health." Within one year, a compliance schedule must be filed. Public notice is also required.

Under somewhat similar procedures as above, exemptions of up to seven years with respect to contaminant levels or treatment techniques may be granted to existing works, in no case not later than January 1, 1983, for interim regulations or nine years for the revised regulations.

### Protection of Underground Sources

EPA must publish within 180 days of enactment and promulgate within 180 days thereafter proposed regulations for state underground injection control programs "to prevent underground injection which endangers drinking water sources." State policy in North Carolina opposes any disposal of wastes through wells.

### Emergency Powers

EPA may take corrective action in any situation presenting an "eminent and substantial" public water supply health hazard and where the EPA Administrator has information that state and local authorities have not acted.

### Assuring Availability of Treatment Chemicals

EPA, on application from a user of chemicals in a public water supply system stating that a chemical(s) is not "reasonably available" may issue a "certification of need" to the applicant. Within seven days the President, or his delegate, may order chemical suppliers to provide such chemicals. Such orders must weigh equitable apportionment among suppliers, established geographical and commercial relationships, and in the case of chlorine, historical supplier-user relationships, and the producer's share of annual U.S. chlorine production.

### Research

The Act authorizes research, studies, and demonstrations relating to the causes, diagnosis, treatment, control, and prevention of physical and mental diseases and other impairments of man resulting directly or indirectly from contaminants in water, or to the provision of a dependably safe supply of drinking water including:

- (1) improved methods to identify and measure the existence of contaminants in drinking water (including methods which may be used by State and local health and water officials) and to identify the source of such contaminants;
- (2) improved methods to identify and measure the health effects of contaminants in drinking water;
- (3) new methods of treating raw water to prepare it for drinking, so as to improve the efficiency of water treatment and to remove contaminants from water;
- (4) improved methods for providing a dependably safe supply of drinking water, including improvements in water purification and distribution, and methods of assessing the health related hazards of drinking water; and
- (5) improved methods of protecting underground water sources of public water systems from contamination.

Also, EPA is to:

- (6) conduct studies, and make periodic reports to Congress, on the costs of carrying out regulations;
- (7) survey and study disposal of wastes (including residential waste) which may endanger underground water which supplies, or can reasonably be expected to supply, any public water systems, and means of control of such waste disposal; not later than one year after enactment EPA shall transmit to the Congress the results of such survey and study, together with such recommendations as it deems appropriate;



- (8) study methods of underground injection which do not result in the degradation of underground drinking water sources;
- (9) study methods of preventing, detecting, and dealing with surface spills of contaminants which may degrade underground water sources for public water systems;
- (10) study virus contamination of drinking water sources and means of control of such contamination;
- (11) study the nature and extent of the impact on underground water, which supplies or can reasonably be expected to supply public water systems, of (i) abandoned injection or extraction wells; (ii) intensive application of pesticides and fertilizers in underground water recharge areas; and (iii) ponds, pools, lagoons, pits, or other surface disposal of contaminants in underground water recharge areas;
- (12) conduct a comprehensive study of public water supplies and drinking water sources to determine the nature, extent, sources of and means of control of contamination by chemical or other substances suspected of being carcinogenic; not later than six months after enactment, EPA is to transmit to the Congress the initial results of such study, together with recommendations for further review and corrective action; (EPA has already initiated this study);
- (13) collect and make available information pertaining to research, investigations, and demonstrations with respect to providing a dependably safe supply of drinking water together with appropriate recommendations; and
- (14) make available research facilities of the Agency to appropriate public authorities, institutions, and individuals engaged in studies and research relating to the purposes of the Act.

#### Technical Assistance and Training

EPA is "to the maximum extent feasible," to provide technical assistance to the States and municipalities in the establishment and administration of public water system supervision programs.

EPA may make grants to, and enter into contracts with, any public agency, educational institution, and any other organization to develop, expand, or carry out a program (which may combine training, education and employment) for training persons for occupations involving the public health aspects of providing safe drinking water; to train inspectors and supervisory personnel; to train or supervise persons in occupations involving the public health aspects of providing safe drinking water; or to develop and expand the capability of programs of States and municipalities to carry out the purpose of the Act.

#### Grants for State Programs

EPA may make grants to States to carry out public water system supervision programs. No State shall receive less than 1 per centum of the annual appropriation and no grant shall be made to cover more than 75 per centum of the grant recipient's costs in carrying out, during the one-year period beginning on the date the grant is made, a public water system supervision program. In each fiscal year, EPA shall allot the sums appropriated for such year among the States on the basis of population, geographical area, number of public water systems, and other relevant factors. To

the extent the applicable appropriation permits, the allotment of a State for any fiscal year shall not be less than \$50,000. There are authorized to be appropriated \$15,000,000 for the fiscal year ending June 30, 1976, and \$25,000,000 for the fiscal year ending June 30, 1977.

#### Other Grants and Loans

EPA may make grants for assisting in the development and demonstration (including construction of any project which will demonstrate a new or improved method, approach, or technology for providing a dependably safe supply of drinking water to the public; and assisting in the development and demonstration including construction) of any project which will investigate and demonstrate health implications involved in the reclamation, recycling, and reuse of waste waters for drinking and the processes and methods for the preparation of safe and acceptable drinking water.

These grants shall not exceed  $66 \frac{2}{3}$  per centum of the total cost of construction of any facility and 75 per centum of any other costs.

EPA during the fiscal years ending June 30, 1975, and June 30, 1976, shall carry out a program of guaranteeing loans made by private lenders to small public water systems for the purpose of enabling such systems to meet national primary drinking water regulations (including interim regulations) prescribed under section 1412. No such guarantee may be made to a system unless (1) such system cannot reasonably obtain financial assistance necessary to comply with such regulations from any other source, and (2) EPA determines that any facilities constructed with a loan guaranteed under this subsection are not likely to be made obsolete by subsequent changes in primary regulations. The aggregate amount of indebtedness guaranteed with respect to any system may not exceed \$50,000. The aggregate amount of indebtedness guaranteed under this subsection may not exceed \$50,000,000.

#### Citizen's Civil Action

With certain exceptions the Act authorizes "any person" to "commence a civil action on his own behalf" against any person, governmental instrumentality or agency for alleged violation of any requirement of the Act. The EPA administrator can be sued for failure to act. No action for violation of the Act may be brought against a public water system before March 1, 1977.

#### Rural Water Survey

EPA shall conduct a survey of the quantity, quality, and availability of rural drinking water supplies. The survey is to be completed within eighteen months of enactment and reported, with recommendations, to Congress within six months of completion.

#### Bottled Drinking Water

Following publication of interim and revised national primary drinking water standards, the Secretary of Health, Education, and Welfare shall either promulgate

amendments to bottled drinking water standards or publish his reasons for not making such amendments.

#### Other Provisions

Other provisions include establishment of a National Advisory Drinking Water Council, record keeping and inspection requirements, federal agency compliance, judicial review, and general administration provisions.

#### NEW INSTITUTE REPORTS

Report No. 101

#### Long Term Trends in Water Quality Lower Haw and New Hope Rivers - 1966-1973

by

Charles M. Weiss

Department of Environmental Sciences and Engineering  
University of North Carolina at Chapel Hill

A seven-year river sampling series of the lower Haw and New Hope Rivers, North Carolina, designed to establish their water quality profiles, has shown a level of quality generally associated with substantial pollution loads. However, in the main stem of the Haw at a point at the head of the arm of the proposed B. Everett Jordan Lake (New Hope Lake), oxygen and BOD<sub>5</sub> quantities indicate that stabilization of oxygen-demanding materials and nitrification of nitrogenous substances have occurred. The total phosphorus concentration in the Haw River is several times that of control streams of the area and the total load of transported phosphorus (lbs/day) is approximately five times that of the New Hope River.

Sharp changes in several water quality parameters were evident in a comparison of the period prior to 1970 and after 1970. These changes have been identified with an overall change in river runoff in the region, resulting from a shift in the pattern of dry to wet years. The change in water quality caused by variation in average runoff was substantial enough to mask any changes that may have occurred from variations in quantity of polluting substances introduced from upstream sources. This emphasizes the difficulty of establishing long-term trends based upon infrequent and short-term sampling series.

Report No. 102

#### Additional Studies of the Effects of Salt Marsh Impoundments on Mosquito Populations

by

James C. Dukes, Richard C. Axtell, and Kenneth L. Knight  
Department of Entomology  
North Carolina State University

A comparative study of three adjacent areas (a natural marsh, a partially completed impoundment, and a completed mosquito control impoundment) evaluated the effectiveness of an impoundment for salt marsh mosquito control. Potential mosquito producing sites in both the natural marsh and the partially completed impoundment were comparable in vegetative cover. Neither area produced mosquitoes - the natural marsh was inundated by tides too often; in the partially completed impoundment, the dikes eliminated normal tidal flooding.

Within the impounded marsh, Juncus roemerianus Scheele (black needlerush) remained in several large stands. However, in vast areas, only the stumps of the Juncus remained. Most of these and other marginal areas had been invaded by Typha spp. (cattail). Numerous patches of Spartina patens (aiton) and Distichlis spicata (L.)



were still thriving around the perimeter of the dike and on high ground within the interior. Bacopa monnieri (L.) Pennell, an emergent plant species, had also invaded the shallow areas near the perimeter.

Only two larvae of the salt marsh species Aedes sollicitans (Walker), were recovered within the impoundment. They were recovered, following a heavy rain, from a deep hole left by a fallen tree. Anopheles mosquito larvae were collected in small numbers from areas containing thick mats of vegetation (Spartina patens, D. spicata and B. monnieri) and flooded with less than six inches of water. During hot summer months, the water level dropped 6 inches due to evaporation. This loss of water caused most mosquito breeding sites to become unproductive. Areas in deeper water, or where the vegetation was submerged, were not mosquito producers. Salinity within the impoundment was 0 parts per thousand throughout the entire research period.

Light trap data indicated that adult mosquito populations were greatest during late spring and early summer in the nearby Davis community. Aedes sollicitans and Culex species were most abundant with Anopheles bradleyi (King) and Aedes taeniorhynchus (Wiedemann) following, respectively, in abundance.

#### LEWIS R. MARTIN NEW DIRECTOR OF NORTH CAROLINA POLLUTION CONTROL AGENCY

Mr. Lewis R. Martin, 39, became Director of the Division of Environmental Management, North Carolina Department of Natural and Economic Resources, on January 1, 1975. The Division of Environmental Management is the State's principal air and water pollution regulatory agency.

Mr. Martin, a native of South Carolina, is a graduate of the U. S. Military Academy and holds an M.S. degree in chemistry from Penn State University. He held various assignments as an army officer from 1959 to 1971 when he joined the Monsanto Company in Greenwood, S.C., as an environmental control coordinator. Since May 1974, he has been a research and development representative in Atlanta with the U.S. Environmental Protection Agency.

#### CHOWAN RIVER PROJECT

The Chowan River Project is the first step in the development of a plan to control the algal problem in the river. It is a series of specialized studies to find the facts needed as the basis of a control program for this outstanding water resource of Northeastern North Carolina. Several public agencies and institutions have joined efforts in these studies. The Project was begun in 1973 by the North Carolina Department of Natural and Economic Resources to enlarge upon its studies of the river which had been in progress a number of years.

The new intensive program resulted from the nuisance algal growth which choked much of the river in the summer of 1972 and severely restricted the traditional uses of the Chowan for fishing, both commercial and sport, for recreation, and for navigation.

Excessive growths of algae, which are microscopic floating plants, occur in watercourses when nutrients, or plant food materials, reach very high levels. Nitrogen

and phosphorus are the most common of these nutrients. Many sources put nutrients into the Chowan. These include wastewater discharges by towns and industries and overload runoff from rural and urban areas.

State investigators in 1972 found a new factor at work--large amounts of nitrogen in wastewater discharges to the Chowan from the fertilizer plant at Tunis. These discharges, stopped by State action appeared to have triggered the excessive algal growths.

In tackling the problem, the State faced many questions. For instance, what nutrients come from each of the sources? What amounts of material does each source release? How much material comes down tributaries to the Chowan? And so on. The North Carolina Board of Water and Air Resources (now Environmental Management Commission) authorized a thorough investigation to get the answers.

It turned first to the Water Resources Research Institute of The University of North Carolina, which funds research projects by engineers and scientists of colleges and universities in the State.

Since the Chowan is an interstate stream (two-thirds of its drainage basin lies in Virginia), the U.S. Environmental Protection Agency and the Virginia State Water Control Board were asked to participate in a steering committee for the Project.

A technical advisory committee was also formed to develop a study plan to meet two primary objectives:

1. To determine the effect of waste inputs, from both fixed discharge points and overland runoff, on water quality in the river; and
2. To develop mathematical models for a water quality management plan that will predict the impact of increased discharges and new discharges in the Chowan basin.

A secondary objective is the development of techniques and procedures that will improve management planning in other river basins that have similar features.

The study plan includes water quality studies by the North Carolina Division of Environmental Management, flow measurements by the U.S. Geological Survey, and specialized studies by researchers from three universities.

Four of these studies are funded by the Water Resources Institute-UNC, one by the U.S. Environmental Protection Agency, and one jointly by the Environmental Management Division and the U.S. Geological Survey.

The principal investigators and their research projects are:

Dr. Mark Brinson, Biology Department, East Carolina University: The effect larger water plants such as water lilies have in storing and releasing nutrients.

Dr. John Hobbie, Zoology Department, North Carolina State University: What happens to nitrogen in the river - its use and storage by algae and small animals and the release of nitrogen for use by new populations of algae and aquatic animals.

Dr. William Galler, Department of Civil Engineering, North Carolina State University: Predicting by mathematical computations the effect of waste discharges on different parts of the river from Holiday Island downstream.

Dr. D. N. Contractor, Department of Civil Engineering, Virginia Polytechnic Institute: The same as Dr. Galler but from the headwaters of the Blackwater and Nottaway rivers in Virginia to Holiday Island.

Dr. A. M. Witherspoon, Department of Botany, North Carolina State University: A study of the kinds and numbers of algae occurring in the river and laboratory experiments to determine the quality of water that will grow algae.

Dr. Charles Daniels, U.S. Geological Survey: An evaluation of the stream flow characteristics including the effects of wind and moon tides.

A preliminary report on the findings of the Project is expected in mid-1975.

Ed. Note: Reproduced from "The Chowan River Project," published by the Division of Environmental Management, North Carolina Department of Natural and Economic Resources.

#### SOUTHERN WATER RESOURCES SCIENTIFIC INFORMATION CENTER

The Southern Water Resources Scientific Information Center (SWRSIC), a joint project of the Water Resources Research Institute of The University of North Carolina and the D. H. Hill Library of North Carolina State University was established in 1972 as one of three regional centers in the United States which comprise The Water Resources Information Network. This network is sponsored by the Water Resources Scientific Information Center (WRSIC), an agency of the Office of Water Research and Technology, U. S. Department of the Interior.

The purpose of the Center is to provide an effective means of identifying and retrieving references to published results of research on water resources. A computer based on-line literature searching service utilizing advanced techniques in information storage and retrieval is employed to accomplish this objective. The Center serves users in the Southeastern states.

Users of the Center include research scientists, administrators, engineers, educators, and others in the field of water resources whose work requires information for problem solving, planning, and decision making. The Center serves federal, state, and local government agencies, educational institutions, industrial concerns, consulting engineering firms and other institutions as well as individuals.

#### The WRSIC Data Base

The WRSIC data base consists of a rapidly growing file of over 75,000 references and full text abstracts of published literature related to water resources. Included are monographs, periodical articles, technical reports, conference papers, and legal documents. References in the WRSIC data base have been published since 1967 in Selected Water Resources Abstracts, a semimonthly publication of the Water Resources

Scientific Information Center. Coverage is particularly strong for results of federally sponsored research and for publications of the more than 50 Water Resources Research Centers and Institutes. The WRSIC data base also includes related literature in such fields as law, sociology, and economics.

#### The Searching System

The Center uses an on-line terminal to enter search questions for computer searching of the WRSIC data base. The search is generally made by searching on descriptors or subject terms related logically in a search strategy calculated to provide optimum response to your request. Searching can also be done on other parameters such as author, issuing agency, and contract number. The WRSIC searching system provides quick response and flexibility to assure effective retrieval of information.

#### The Search Service

A literature search can be requested by mail, phone, or in person at the Center. Special request forms are available, but are not needed in order to make a request. Your request should include:

1. Your name, address, and phone number
2. Your company, agency, or phone number
3. A description of your search request in paragraph form. Include the nature of the problem and the results you desire. Be as specific as possible.
4. Terms which are important in the search should be underlined or listed separately.

If possible, use the WRSIC "Thesaurus of Water Resource Terms," 1971, to aid in selection of terms and cross references.

The Center staff will analyze your question and plan an effective search strategy. This may involve consultation with faculty members who are experts on the subject to be searched. Your search is then carried out via our on-line computer terminal. Preliminary results are obtained within a few minutes. These results may indicate the need for further consultation with you and modification of your question or search strategy.

The final results of the search are printed out at the computer site in Oak Ridge, Tennessee and mailed to SWRSIC in Raleigh; reviewed, edited, and forwarded to you within two weeks.

The final search results will be a bibliography which will include author, title, source, citation, descriptors, and an informative abstract for each reference. If you are in urgent need of results SWRSIC will, if requested, print out an abridged bibliography on our terminal and mail it to you immediately. This printout will not include abstracts, but will contain the Selected Water Resources Abstracts accession number so that you can locate the abstract if needed. Full results will be forwarded to you later.

Cost

The fee for a search is \$25.00. You will be invoiced upon completion of the search.

For those who anticipate using the service extensively, a subscription rate of \$150 is available that will entitle a user to ten searches in a twelve month period.

For further information or service write or phone:

Southern Water Resources Scientific Information Center  
D. H. Hill Library  
North Carolina State University  
P. O. Box 5007  
Raleigh, North Carolina 27607  
(919) 737-2683

WASHINGTON STATE MUNICIPAL BONDS FOR PRIVATE INDUSTRY FINANCING OF POLLUTION CONTROL  
HELD VIOLATION OF STATE CONSTITUTION

In the November election, North Carolina voters turned down a referendum allowing local governments to float bonds for construction of pollution control facilities by private industry. This is an issue certain to come up again in the new General Assembly. Thus a recent case, Longview vs Taxpayers of Longview, in the Supreme Court of Washington may be of interest.

The court held that Washington state legislation providing for issuance by municipalities of tax-exempt bonds for private industry financing of pollution control facilities constitutes loan of money by municipalities to private corporations and as such violates the state constitution.

Extracts of the opinion follow:

"The Weyerhaeuser Company has been required to install pollution control facilities at its Longview plant by July 1, 1975... Public Law 90-364 added in 1968 a new subsection (c) to the Internal Revenue Code, 26 U.S.C. Section 103. This provides, generally speaking, that for federal income tax purposes gross income does not include interest on the obligations of a state or political subdivision of a state issued to provide for air or water pollution control facilities. It applies where the facilities are used directly or indirectly in any trade or business carried on by an organization not a governmental unit.

"In 1972 our state legislature enacted the challenged legislation which sought to allow port districts to make available pollution control facilities to non-public entities. The act allowed this to be done by lease, lease purchase agreement, or other agreement binding such user to pay for the use of said facilities for the full term of the revenue bonds issued by the port for the acquisition of said facilities. The payments were to at least fully reimburse the port for all principal and interest paid by it on the bonds.

"The Weyerhaeuser Company requested from the Port of Longview assistance in financing the cost of the acquisition, construction, and installation of the pollution control facilities necessary to be installed at the Longview complex. The port entered into a pollution control facility financing agreement in which it agreed to purchase a leasehold interest in certain land and pollution control facilities to be owned by Weyerhaeuser and installed at the Weyerhaeuser Longview complex. They further agreed to make such facilities available to Weyerhaeuser by sublease.

"The form of the ... pollution control facility financing agreement entered into between the private corporation and the political subdivision of this state in this suit... provides in substance that the port district or county shall issue bonds in the name of the municipality sufficient to cover the cost of acquisition, construction and installation of the pollution control facility on property of the private corporation. Under the terms of the agreement, the municipalities have agreed to purchase a leasehold interest in the pollution control facility with the proceeds from its bond issue and to transfer to the corporation a lump-sum payment from the funds for the leasehold. This lump-sum payment equals in amount that sum necessary from time to time for acquisition, construction, and installation of that facility. The private corporation, in turn, receives payment from the municipality for this leasehold and uses those funds to acquire the completed pollution control facility.

"Simultaneous with the lease to the municipality, the municipality has subleased back to the private corporation its entire possessory interest in the facility for a term equal to the original leasehold term, less one day. The acquisition cost to the private corporation for the sublease is equal to the municipality's cost, principal plus interest in retiring the bonds, plus any incidental municipal administration costs. However, unlike the lump-sum payment made by the municipality for the original lease, the owner-lessor-sublessee of the pollution control facility, the private corporation, has agreed to pay for the sublease with periodic payments over the entire term of the sublease. At the conclusion of the simultaneous lease-sublease term, the reversionary interest of the private corporate owner of the pollution control facility becomes a present interest fully vested both in interest and possession with no additional payment to the municipal corporation.

"The bonds are issued in the name of the municipality. The face of the bond declares that it is an obligation of the issuing municipality. The proceeds from the issue of the bonds are received in the municipal treasury out of which they are paid to the private corporate owner of the facility. These bonds differ, however, from general obligation bonds and the usual municipal revenue bonds in that they provide to the issuing municipality a contractual affirmative defense to a suit by a bondholder for the municipality's breach of obligation on the bond. Specifically, the terms of the bonds provide that, in the event the owner-lessor-sublessee private corporation defaults on its sublease obligation to the municipal corporation in whose name the bonds are issued, the bondholder shall hold harmless the municipality and may proceed only against the private corporate owner and sublessee of the facilities and the specific assets acquired by the private corporation with the bond proceeds.

"Counsel for respondents has informed this court in oral argument that 'There are several hundred million dollars more (in privately owned pollution control facilities) that will be dependent upon the outcome of this case.'

"Appellants, taxpayers of the Port of Longview, argue that the lease-sublease transactions between these municipal corporations and private corporations are nothing other than a municipal loan of money to a private corporation in direct violation of Const. art. 8, section 7, which provides:

'No county, city, town or other municipal corporation shall hereafter... loan its money, or credit to or in aid of any individual, association, company or corporation, except for the necessary support of the poor and infirm...'

They contend that, stripped of all its lease-sublease terminology, the municipality is simply borrowing money in its own name in the form of a municipal bond issue and loaning that same money to a private corporation. The private corporation, in turn, has agreed to repay the principal and accrued interest on the money borrowed originally by the local government.

"We agree with appellants that the agreements entered into between the municipal corporations and private corporations here are indistinguishable in function and operative effect from a loan of money with repayment of principal plus interest over a term.



"The money which is raised by the municipal bond issues and which ultimately is used by the private corporations to acquire, construct, and install their pollution control facilities is the municipality's money. Counsel for respondents conceded this in oral argument. The bonds were issued by the municipal corporation, and the proceeds from their sale came into the municipal treasury. While these bonds are payable out of the private corporation's sublease payments to the local governmental unit, which is a specific source, they are nonetheless obligations of that local government. This is apparent from the opening paragraph on the face of the bond. In the Port of Longview case, the opening paragraph of the bond states:

'The Port of Longview, Washington, a municipal corporation organized and existing under the laws of the State of Washington (hereinafter called the "Port"), acknowledges itself indebted and for value received promises to pay to Carr & Co. or its successor, or its registered assigns the principal sum of TWENTY MILLION DOLLARS (\$20,000,000)'

The private corporate owners and sublessees of their own facilities rely upon the fact that these funds are municipal funds derived from the issuance of municipal bonds and that the bonds are, therefore, accorded tax exempt status under the federal income tax law. Their sublease agreements specifically provide that they, in their discretion, may terminate the sublease if their bond counsel conclude that the interest on the bonds is taxable.

"In the sublease agreement it is expressly provided that the private corporation may cancel the sublease if the Internal Revenue Service rules that the payment by the municipality for the underlying leasehold constitutes gross income to the private corporation. The private corporation sought to persuade the Internal Revenue Service to view the transaction as a loan of money while at the same time arguing in our state courts that these transactions should be considered to be leases. This inconsistent treatment was apparently deemed necessary to save them from attack as violating our state constitutional prohibition against the municipal loan of money to a private corporation. Const. art. 8, Sect. 7.

"These transactions cannot be both loans and lease-sublease agreements. Viewed as a whole, they make clear that (1) the municipalities involved had no intention of asserting a possessory interest in the leased facilities as, indeed, the simultaneous sublease would have effectively prevented in any case; (2) the municipalities received nothing of value by virtue of these transactions to which they were not already by law entitled; and (3) the pollution control facilities acquired by the private corporations and constructed on their property could only be used at their individual and respective plants and could be of no separate value to the municipality. The fact that the sublease terms were drafted to expire one day short of the expiration of the underlying leasehold, thereby giving the municipality, technically speaking, the legal right to one day of exclusive possession of the pollution control facilities, merely continues the form of the transaction.

"These transactions are patent, albeit convoluted, violations of Const. art. 8, Sect. 7. The Laws of 1972, 1st Ex. Sess., ch. 54, Sect. 1 and Laws of 1973, ch. 132, Sect. 4, pursuant to which these transactions were entered into, are unconstitutional."

#### NEW WATER RATE STRUCTURE ENCOURAGES WATER CONSERVATION

The Fairfax County (Virginia) Water Authority has approved substantial rate increases for both retail and wholesale water users in what an authority spokesman describes as the first use by a water agency of pricing as a means of encouraging water conservation. "We're trying to get people to conserve water, to think twice about

leaving water running on lawns and frequent refills of the swimming pool," said Fred Griffith, assistant engineer director for the authority.

Under the new rate structure, the retail rate will increase about 26%, while the wholesale rate will jump nearly 50%--from 23 cents per 1,000 gallons to 33 cents per 1,000. This means a likely rate increase for residents of Alexandria and Prince William County, since the Virginia American Water Company serving these areas buys its water from the Fairfax County Water Authority. The Fairfax County Water Authority, through its Occoquan Reservoir, serves some 84,000 customers, or about 80% of the Fairfax County population.

Retail customers who use the most water will have a proportionately higher bill under the new rates than under the old, and residents who use more than the normal amount of water in the summer will pay a heavy rate surcharge. The old retail rate was \$7.20 for any quantity up to the first 10,000 gallons; 58 cents per 1,000 gallons from 10,000 to 490,000 gallons; 55 cents per 1,000 gallons from 490,000 to 3 million gallons and 50 cents per 1,000 thereafter. Under the old rate structure, the price per 1,000 gallons decreased with higher volumes of usage, effectively giving discounts or subsidies to high-volume users and providing no incentive to conserve water use. The new rate is a flat \$3 service charge plus 68 cents per 1,000 gallons, which clearly precludes volume discounts.

The new rates went into effect November 1, 1974. Next June, the retail rate will drop from 68 to 64 cents per 1,000 gallons, but customers will have to pay an extra \$1 per 1,000 gallons if they use more than one and one-third times their normal winter consumption. In June of 1976, the rate will drop to 60 cents but the surcharge for extra summer usage will rise to \$2.

The increases, which give Fairfax County the highest water rates in Metropolitan Washington, are expected to hold for the next decade. The authority also cited the need of additional revenues to counter sharply increased operating costs, particularly for labor, chemicals, and electricity.

. . . NEWS, Virginia Water Resources  
Research Center

#### UNIVERSITY SCIENTIST EXCHANGE PROGRAM

The U. S. Office of Water Research and Technology (OWRT) proposes to meet certain of its scientific staffing needs under the provisions of the Intergovernmental Personnel Act of 1970. That Act provides for "temporary intergovernmental assignment" of employees between Federal agencies and states, local governments, and institutions of higher education. In addition to "temporary intergovernmental assignments," OWRT would also be interested in considering similar arrangements for allowing members of

OWRT's regular staff to assist universities in meeting their research and education objectives. The objective of both types of exchange is to increase the effectiveness of the OWRT research and development programs by the infusion of new ideas and generally keeping OWRT abreast of most recent scientific developments.

While certain limitations will obviously exist, the exchange scientist coming to OWRT will be assigned duties very similar to those of the regular scientific/technical staff. These may be best characterized by four major activities;

(1) Program planning and development; (2) Research results interpretation; (3) Proposal review and evaluation; and (4) Monitoring research project and program progress.

Normally each scientist will be assigned a reasonable combination of all these duties and such assignments will reflect the expertise of the individual concerned as far as possible.

The format for the work is a functional organization. The exchange scientist might be assigned lead responsibility for program development with respect to a particular water problem, assisted by others of the staff with complementary disciplinary backgrounds, and at the same time be assigned advisory responsibilities with respect to other programs as a related disciplinarian; similarly with the other activities.

It is also planned to establish a regular staff seminar series at which exchange scientists would present topics of their own research interest (whether their own work or that of others).

The duration of an assignment can vary, but not exceed two years unless there are special circumstances. However, to enable an assignee to OWRT to be most productive and make a significantly worthwhile contribution, the assignments normally should be for not less than six months.

For further information please contact the Director, Office of Water Research and Technology, U. S. Department of Interior, Washington, DC 20240.

#### DATES TO REMEMBER

April 2,3,4, 1975 - Southeastern Conference on Water Supply and Wastewater Planning and Development in Coastal Areas, Wrightsville Beach. Contact F. Eugene McJunkin at the Institute for details.

#### WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR DECEMBER

Monthly mean discharges of streams during December were generally near normal in the mountains and Coastal Plain and slightly above normal in the Piedmont region (see map below). Rainfall during the month was also slightly above normal across the State. No flooding was reported as the light scattered showers caused only minor rises on most streams. Streamflows at the end of the month were near normal.

Ground-water levels declined slightly in the mountains but generally rose in the Coastal Plain and Piedmont regions. Water levels, as compared to the long-term averages, were normal in the mountains and slightly above normal elsewhere.

. . . U. S. Geological Survey

## WATER RESOURCES LEGISLATION IN THE 93rd CONGRESS

### Bills Introduced

#### House

- H.R. 17571 To amend the Coastal Zone Management Act of 1972 to suspend until no later than June 30, 1976, Federal oil and gas leasing in areas seaward of State coastal zones.
- H.R. 17633 To amend the Coastal Zone Management Act of 1972, to provide for Federal-State cooperation in oil drilling activities which may affect the coastal zone of a state prior to final approval of a State's coastal zone management program.

## NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

(Residents of North Carolina may borrow these from the Institute for a two-week period. Where individual copies are desired, readers are encouraged to request copies from the organizations issuing the publication. The addresses are provided by the News for this purpose.)

Abbreviations used throughout as follows:

ARS	- Agric. Res. Service	SCS	- Soil Conservation Service
EPA	- Env. Protection Agency	TVA	- Tennessee Valley Authority
ERC	- Engr. Res. Center	USDA	- U.S. Dept. of Agric.
IWR	- Inst. for Water Resources	USDC	- U.S. Dept. of Commerce
NAS	- Nat'l. Academy of Sciences	USDI	- U.S. Dept. of the Interior
NCDNER	- N.C. Dept. of Natural & Econ. Res.	USGPO	- U.S. Gov. Printing Office
NERC	- Nat'l. Env. Res. Center	USGS	- U.S. Geological Survey
NPS	- Nat'l. Park Service	WPC	- Water Pollution Control
NTIS	- Nat'l. Tech. Information Serv.	WQS	- Water Quality Standards
NWC	- Nat'l. Water Commission	WRC	- Water Resources Council
*OWAR	- N.C. Off. of Water & Air Resources	WRRRI	- Water Resources Res. Institute
OWP	- Office of Water Programs	WRSIC	- Water Res. Sci. Information Center
**OWRR	- Office of Water Res. Research		

### Water Resources Planning

- "Country Line Creek Watershed Environmental Statement, Rockingham and Caswell Co., NC," (DRAFT), 12/74, USDI, SCS, P.O. Box 27307, Raleigh, NC 27611.
- "Country Line Creek Watershed Work Plan," Rockingham and Caswell Co., NC," (DRAFT), 12/74, USDI, SCS, P.O. Box 27307, Raleigh, NC 27611.
- "Land-Use Issues, Proceedings of a Conference," (Pub. 629), 11/74, Ed. J. P. Marshall, et al, WRRRC, VPI & St. U., Blacksburg, VA 24061.
- "Management of Water and Related Land Resources to Enhance the Urban Environment," 7/74, by M. Wendell, et al, Environments for Tomorrow, Inc., 1432 Laburnum St., McLean, VA 22101.
- "Riverine Recreational Development Mathematical Modeling," (Final Rpt. R74-6), 10/74, by R. M. Shane, Dept. of CE, Carnegie-Mellon U., Pittsburgh, PA 15219.
- "North Carolina Water Plan, Area Management Plans - The South Atlantic Gulf Region, Yadkin-Pee Dee River Basin, Water Resources Aspects of the Proposed Perkins Station Nuclear Power Plant," (T.R. #IV-21-C (#1)), 11/74, avail. from NCDNER, OWAR, Raleigh, NC 27611.

\*Agency name changed to N. C. Division of Environmental Management, NCDNER.

\*\*Agency name changed to Office of Water Research & Technology (OWRT) as of July 29, 1974.

- "Estimating the Value and Incidence of Recreation Benefits from a Beach Erosion Control Project," (IWR Paper 74-P4), 10/74, by M. R. Krouse, US Army Eng., IWR, Kingman Bldg., Ft. Belvoir, VA 22060.
- "Reservoir Impact Study," 11/74, by D. Baumann, et al, WRI, TX A&M U., College Station, TX 77843.
- "Productive Agriculture, A Quality Environment, Food Production, Living, Recreation - The Rural-Urban Interface," 1974, Printing & Publishing Off., NAS, 2101 Constitution Ave., NW, Wash., DC 20418.
- "A Framework for Uncertainty Management in Water Resources Planning," (IWR Rpt. 74-9), 10/74, by Decision Sci. Corp., avail. from NTIS, USDC, Springfield, VA 22151.
- "Theoretical and Applied Concepts of Water Resources for Social Welfare," (Res. Series 4), 11/73, Ed. D. R. Street, WRI, Auburn U., Auburn, AL 36830.
- "Water Use and Coal Development in Eastern Montana: Water Availability, Water Demands and Economic Impacts," (#57), 11/74, by P. E. Polzin, MT U. Joint WRRRC, Bozeman, MT 59715.

#### Water Quality Management

- "Research and Development of a Selective Algaecide to Control Nuisance Algal Growth," (EPA-660/3-74-019), 8/74, by B. L. Prows, et al, The Dow Chemical Co., for EPA, avail. from USGPO, Wash., DC 20402, Price \$2.95.
- "Electronic Devices for the Capture of Aquatic Invertebrates," (T.R. #40), 1974, by J. L. Ervin, et al, Inst. of Water Res., MI St. U., E. Lansing, MI 48823.
- "Brush Control Along Agricultural Drainage Ditches: Environmental Safety and Efficacy of Herbicide Formulations," (T.R. #49), by D. J. Morré, 9/74, by Purdue U., WRRRC, W. Lafayette, IN 47907.
- "Shrimp Canning Waste Treatment Study," (EPA-660/2-74-061), 6/74, by A. F. Mauldin, et al, Domingue, Szabo & Assoc., Inc., for EPA, avail. from USGPO, Wash., DC 20402, Price \$2.05.
- "Water Quality Management Plan Cape Fear River Basin, Sub Basins 18, 19, 21, 22, 24," (DRAFTS), 12/74, Env. Mgt. Com., NCDNER, Raleigh, NC 27611.
- "Methods for Chemical Analysis of Water and Wastes," (EPA-625/6-74-003), 1974, EPA, Office of Technology Transfer, Wash., DC 20460.
- "Measurement of Residual Chlorine Levels in Cooling Water--Amperometric Method," (EPA-660/2-73-039), 8/74, by R. M. Manabe, NERC, EPA, avail. from USGPO, Wash., DC 20402, Price \$1.10.
- "Evaluation of a Computer Program for GC-MS Specific Ion Monitoring," (EPA-660/2-74-002), 6/74, by A. L. Alford, SE Env. Res. Lab. for EPA, avail. from USGPO, Wash., DC 20402, Price 75c.
- "Analysis of Cost-Sharing Programs for Pollution Abatement of Municipal Wastewater," (NBSIR 74-479), 9/74, by H. E. Marshall, et al, for EPA, avail. from Bldg. Ec. Section, Inst. for Applied Tech., Nat'l. Bur. of Standards, Wash., DC 20234.
- "Rum Distillery Slops Treatment by Anaerobic Contact Process," (EPA-660/2-74-074), 7/74, by T. G. Shea, et al, Bacardi Corp., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.75.
- "Feedlot Pollution Control Guidelines," (MP-1155), TX Agric. Ext. Serv., TX A&M U., College Station, TX 77843.
- "Losses of Fertilizers and Pesticides from Claypan Soils," (EPA-660/2-74-068), 7/74, by G. E. Smith, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.45.
- "Heavy Metal Concentration in Fish Tissue of the Upper Clark Fork River," (#55), 8/74, by W. P. Van Meter, MT U. Joint WRRRC, Bozeman, MT 59715.
- "Rotifers as Monitors of Heavy Metal Pollution in Water," (Bul. #71), by A. L. Bulkema, Jr., et al, WRRRC, VPI & St. U., Blacksburg, VA 24061.
- "Implementation of a Computer-Based Information System for Mass Spectral Identification," (EPA-660/2-74-048), 6/74, by J. R. Hoyland, et al, Battelle Columbus Lab., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.10.
- "Environmental Applications of Advanced Instrumental Analyses: Assistance Projects, FY '73," (EPA-660/2-74-078), 8/74, by A. L. Alford, SE Env. Res. Lab., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.
- "An Investigation of Ion Removal from Water and Wastewater," (EPA-660/3-74-022), 8/73, by R. J. Starkey, Jr., et al, for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.95.
- "State of the Art Summary - Lake Restoration: Procedures and Their Effectiveness," (#1), (Research Results Analyses, R&D Program), 12/74, by T. E. Maloney, NERC, EPA, Region IV, 1421 Peachtree, St., NE, Atlanta, GA 30309.
- "Estimating Nutrient Loading of Lakes from Non-Point Sources," (EPA-660/3-74-020), 8/74, by P. D. Uttormark, et al, for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.90.
- "Pesticides in the Illinois Waters of Lake Michigan," (EPA-660/2-74-002), 1/74, by R. A. Schacht, for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.25.
- "Crop Insurance and Information Services to Control Use of Pesticides," (EPA-600/5-74-018), 9/74, by J. A. Miranowski, et al, ABT Assoc., Inc., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.55.
- "Research Needs Related to Recycling Urban Wastewater on Land," (Proceedings), 7/74, Inst. for Res. on Land & Water Resources, The PA St U., Univ. Park, PA 16802.
- "Catalyzed Bio-Oxidation and Tertiary Treatment of Integrated Textile Wastewaters," (EPA-660/2-74-039), 6/74, by A. J. Snyder, et al, FRAM Corp., for EPA, avail. from USGPO, Wash., DC 20402, Price \$1.55.

- "Proceedings, Workshop on Agricultural Non-Point Source Water Pollution Control," (Mayflower Hotel, Wash., DC), 9/74, by & avail. from EPA and Ext., Com. on Organization and Policy, Wash., DC 20460.
- "Ion-Selective Membrane Electrodes for Water Pollution Monitoring," (EPA-660/2-74-079), 8/74, by G. A. Rechnitz, St. U. of NY, for EPA, avail. from USGPO, Wash., DC 20402, Price 80¢.

Water Quantity Management

- "The World Water's Management, The Storm Runoff Pollution Control Systems," A. A. Toth, Storopollics, P. O. Box 4022, South Bend, IN 46601.

Miscellaneous

Annual Reports: State Water Resources Research Institutes

Delaware                      Maryland                      North Dakota

- "The Fifth Annual Report of the Council on Environmental Quality," 12/74, avail. from USGPO, Wash., DC 20402, Price \$5.20.
- "Alternative Futures: A Re-Evaluation," 11/74, Temporary State Commission on the Water Supply Needs of SE NY, SE Water Supply Com., Albany, NY 12207.
- "Animal Colonization of Salt Marshes Artificially Established on Dredge Spoil," (UNC-SG-74-15), 10/74, by L. M. Cammen, et al, Sea Grant Prog., 1235 Burlington Lab., NCSU, Raleigh, NC 27607
- "Ninth Annual Conference on Water Resources Research," 4/10-11/74, OWRT, USDI, Wash., DC 20240.
- "Assessment of the Potential of Clean Fuels and Energy Technology," (EPA-600/2-74-001), 2/74, by E. Hall, et al, Battelle Columbus Lab., for EPA, avail. from USGPO, Wash., DC 20402, Price \$2.60.
- "Saline Water Conversion Research, Progress Report, Jan. 1, 1973 - June 30, 1974," 7/74, WRC, U. of CA, Davis, CA 95616.
- "Research Reports supported by Office of Water Research & Technology under the Water Resources Research Act of 1964," (received during the period July-Sept. 1974), USDI, OWRT, WRSIC, Wash., DC 20240.
- "San Luis Unit - Technical Record of Design and Construction," (Vol. VII), 11/74, USDI, Bu. of Reclamation, Denver, CO 80202, Price \$9.75.
- "A Regional Model of the Future Demand for Transportation: The Case of Barge Transportation," (IWR Paper 74-P3), 10/74, by B. R. Sasaki, US Army Eng. IWR, Kingman Bldg., Fort Belvoir, VA 22060.

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