/ NEWS
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OF THE UNIVERSITY OF NORTH CAROLINA

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PRIVATIZATION FOR WATER AND SEWER FACILITIES

A new kid has moved into the neighborhood who is offering to build and operate water and sewer facilities for municipalities at substantially lower costs than they can do it themselves, and he is claiming that he can do it easier than going through the process of obtaining federal grants and complying with related regulations. His friends call him PRIVATIZATION. He is making the rounds with the courtesy of representatives of several major financial institutions; he seems to have influential friends; and he has already sold his wares to several cities.

We asked several questions about this kid. Is he really a new kid? Is he offering us a deal that we should take seriously? Is he offering what we really need? We haven't learned all there is to know about him, but some things are worth mentioning.

First of all, we found out he is not entirely new to us in the field of water and wastewater management in North Carolina. By the end of 1984 there were 378 private water companies in our state operating 926 systems, excluding mobile home parks and other systems where the water bill is collected as part of the rent. Although most of these systems are relatively small (averaging 93 customers), they do serve about 86,000 customers in 81 counties.

Even publicly owned systems have relied heavily on the private sector for many of their goods and services we use, and much of the capital to finance these investments has been borrowed from the private sector through the sale of bonds. Private engineering firms have provided us with much of our expertise for feasibility studies, design, and supervision of construction for our water supplies, treatment plants, and major pipelines and pumping stations. Most of our major capital facilities have been built by private contractors selected through competitive bidding or by private developers who want to extend services to their properties. Electrical and mechanical equipment included in those facilities has been bought from privately owned manufacturing firms, and the chemicals, energy, and other supplies to operate and maintain them are bought from the private sector.

So what is this new kid offering that we haven't seen before? It seems that the biggest things he has to offer now are tax advantages in the form of investment tax credits and depreciation, things that are not available to the public sector. When those advantages are packaged with accelerated depreciation schedules and tax-exempt Industrial Development Bonds (IDBs) in various combinations permitted under current tax laws, the savings to local governments can be substantial when compared to 100-percent local public financing. Much of that savings to local governments, of course, is in the form of tax revenues foregone by state and federal governments.

Special attention has been given to private financing and operation of wastewater treatment plants. The U. S. Environmental Protection Agency has commissioned several studies to evaluate this option. One of the better ones was prepared by Peat, Marwick and Mitchell & Co., one of the so-called "Big-Eight" accounting firms. That study concluded that "...private financing under a service contract arrangement with IDB financing may be roughly comparable in cost to an EPA 55-percent grant when about 60 percent of the total project cost is grant eligible..." It also concluded that municipal or tax-exempt lease options in which facilities are privately financed but publicly operated are no longer an economically attractive alternative because of changes in the federal tax laws in 1984. A similar view was echoed by David MacKenzie of Arthur Young, Inc., another of the Big-

Eight firms, at a recent seminar on financing in Denver. MacKenzie stated that privatization was most attractive with large capital investments and contract service operations. The real key to success in those circumstances is a well-written contract that clearly defines the responsibilities of the municipality and the privatizer, a contract that clearly delineates the risks and liabilities assigned to each of the parties.

Whether or not those tax advantages will continue to be available is a matter to be resolved in the discussion of President Reagan's proposed tax reforms. Recently, Sen. David Durenberger (R-Minn) declared his intention to fight for retaining them in the upcoming debate.

It is unfortunate that the primary incentive for private operation of water and wastewater systems is tied to the tax advantages associated with capital investment. There are many small communities in North Carolina who cannot afford to have and retain a high quality staff that is necessary to operate and maintain those services at currently accepted or mandatory standards. By contrast, a private company (or a regional public agency) could afford to do so if it served many communities at once. At least one company in North Carolina has found that to be a profitable enterprise. Many more communities could benefit from that kind of assistance. With the proper incentives and safeguards, privatization could solve the perpetual problem of finding the kinds of technical and managerial skills to properly operate and maintain these services in which we have invested such large amounts of capital.

FUNDING FOR FUTURE WATER AND SEWER PROJECTS IN DOUBT

Hundreds of N. C. Communities are in need of funding assistance to construct needed water and sewer facilities. The problem becomes even more severe as the federal government seeks to phase out its support as cost and need for the facilities grow. The 1985 General Assembly appropriated $120 million for water and sewer grants to cities and counties over a two-year period. Distribution of those funds is based upon population.

S. Thomas Rhodes, Secretary of the N. C. Department of Natural Resources and Community Development, has criticized this legislation because the funding formula does not address environmental needs. Some communities would receive more money than they need while others with major water and sewer problems would not have adequate resources.

Sewer projects have over the years been supported by federal EPA and state grant funds based on priorities established by EPA. Under the current funding formula, EPA supports approximately 50 percent of the cost of projects, and the state and local governments supply the remaining funds. In North Carolina's EPA priority list there are 54 sewer projects with a total cost of $91.4 million. If the state met its 25-percent share, the cost would be $22.2 million. Under the current procedure for distributing funds by population, the state would supply $8.2 million for those projects.

Secretary Rhodes is urging that the General Assembly change the water and sewer grant program and replace it with a revolving fund that would provide low-interest loans to local governments based on need.

More details on possible funding options are anticipated in the next few months.

NORTH CAROLINA COMMUNITIES SHOW INTEREST IN NEW WATER SUPPLY CLASSIFICATIONS

Thirty North Carolina communities have expressed a desire to pursue a more protected water supply classification under the new system adopted by the Environmental Management Commission in December. The new water supply classifications are designed to give greater protection to community surface water supply sources. The need to strengthen classifications stems from local governments' and citizens' concerns about the thousands of toxic substances being found in drinking water sources and the limited mechanisms available to the state to control them.

The new North Carolina classification system moves from an emphasis on water-borne infectious disease to giving greater attention to reducing chemical contaminants that may be the source of chronic diseases. The program is expected to increase the level of activity by local governments, which can work with the state to preserve and protect high-quality sources if they choose to do so.

Under the new classification system, land-use regulations in watersheds will be the responsibility of local governments with the Division of Environmental Management assuring that no point discharges would be permitted to conflict with the desired water supply classification. There are three categories: WS-I, WS-II, and WS-III.

WS-I is the most restrictive; it includes watersheds with controlled private development but no discharges. These watersheds may permit private development, but all point source discharges are prohibited, and nonpoint sources must be suitably controlled through the adoption of land-use restrictions by local government.

Under WS-II, suitably treated domestic wastewater discharges are permitted, but industrial wastewater is not, although some non-process discharges may be allowed. The Environmental Management Commission must approve all discharges, and local land-use restrictions are required to control nonpoint sources.

WS-III requires the control of toxics from industrial discharges.

Local governments can make formal requests to the EMC to reclassify their water supplies from WS-III to a more protected classification of WS-I or WS-II. Formal resolutions go to the Director of the Division of Environmental Management, R. Paul Wilms.

Questions concerning the new water supply classification may be directed to Bob Holman, Coordinator of the Water Supply Protection Program, at (919) 733-5083.

MAJOR PEAT MINING EFFORTS HINGE ON APPROVAL OF WATER PLANS

Water management regulations being developed by the N. C. Environmental Management Commission will be used to evaluate water management plans of proposed peat mining operations in North Carolina. Draft regulations are tentatively scheduled for public hearings in mid-March. In the meantime, proposed peat mining projects are being delayed.

Concern over the environmental effects of peat mining relates to such impacts as increased freshwater runoff from the mining sites to saline fish nursery areas and increased loadings of pollutants to receiving waters.

Two large-scale peat mining ventures have been proposed for North Carolina. One is by First Colony Farms, which wants to mine peat from a 15,000-acre tract of land south of Lake Phelps in Washington, Tyrell, and Hyde Counties. The peat would provide fuel for a 200-megawatt electric power plant that First Colony plans to build on the site. Another project, by White Tail Farm in Hyde County, would mine peat on over 7,000 acres. The peat would be transported off site for energy production.

Both First Colony and White Tail Farms have prepared water management plans to prevent adverse effects on receiving waters. The plans focus on controlling runoff from the

mining areas. First Colony's water management plan for mining and reclamation of the land involves a system of temporary and permanent lakes. The proposed mining area drains to the upper Pungo River. The lakes would be used to store runoff and control releases.

White Tail Farm's water-release management plan involves measures to treat runoff and redistribute flow releases both in time and direction. Currently, runoff from the proposed mining area is split between the Pungo River, Rose Bay (a primary nursery area) and the Alligator River. Under White Tail's water management plan, mining as well as agricultural runoff from the area would be diverted away from Rose Bay, and about half the mining runoff would be diverted away from the Pungo River and toward the nearly freshwater Alligator River.

ACTION DELAYED ON URBAN RUNOFF STANDARDS

The Coastal Resources Commission (CRC) has voted to delay adoption of the proposed urban runoff standards to allow the Environmental Management Commission (EMC) time to adopt its own runoff standards and passed a resolution supporting the EMC in its efforts to approve such standards.

Several factors combined to convince the commission that the proposed standards should be refined further while waiting for the EMC to adopt urban runoff rules. At public hearings held on the CRC's rules, many people commented on the need for further study of the problem and suggested holding more meetings with local communities to explain the rules. Also, the Environmental Management Commission and Marine Fisheries Commission adopted resolutions at their December meetings requesting the CRC to delay action until the EMC approves its own rules. The EMC expects to approve runoff rules by May 1986.

The Coastal Resources Commission listened to public comments on the proposed rules and revised its working draft of the rules, then voted to postpone action on the rules while encouraging the EMC's efforts on urban runoff. The CRC will meet with representatives of coastal interest groups to discuss the rules and continue to refine them.

. . . *Camagram*

COMMUNITY CUTS ELECTRIC COSTS FOR WATER SYSTEMS

A major expense to water and sewer operations in North Carolina communities is the cost of electricity. One community faced with high energy bills has successfully changed its time of using electricity to substantially reduce its costs.

In 1982 the Town of Montreat, a resort community, acquired the water system formerly owned by the Mountain Retreat Association (MRA) of the Presbyterian Church. The system consisted of a surface water supply and distribution lines throughout the service area. The town, with $1.25 million in grants and loans, made improvements to its water supply system including the installation of a closed-storage water supply system.

An article in the December issue of The Professional Engineer, by William H. Council, an industrial power engineer for Carolina Power and Light Company, describes the town council's concerns and actions to reduce operation costs for its new water system which was to increase costs 375 percent. A major part of the increase came from the use of electricity. The old system had an electrical operating cost of less than $4,000 per year, and the new system was estimated to cost $19,000. City officials working with representatives of CP&L considered its time of use (TOU) program to reduce cost. CP&L estimated that by running the system at off-peak times the town could save 40-45 percent of its electric bill. The town was able to install a series of automatic controls which placed the water systems' pumps on a schedule to operate only on off-peak periods. The community has experienced no adverse effects on the water supply with off-peak pumping.

CLEAN WATER AND DRINKING WATER BILLS DELAYED OVER BUDGET CUT DEBATES

The Senate and the House are centering their attention on the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Control Act legislation, which could impact water programs. Action on the Clean Water Act and Safe Drinking Water Act is being delayed with debate over mandatory budget cuts called for by the balanced budget law.

The Gramm-Rudman Act calls for automatic budget reductions needed to eliminate the budget deficit by 1991. Administration-recommended reductions could begin by March 1 unless Congress develops an alternative budget-cutting plan.

Once the budget-reduction actions are taken, action is expected on reauthorization of the superfund law, Clean Water Act, and Safe Drinking Water Act.

The Clean Water Act legislation has similar language in both House and Senate Committees. They both provide financial aid for wastewater treatment plant construction and funds for nonpoint pollution controls from rural and urban areas, strengthen control measures for toxics, and provide for greater EPA power to enforce water pollution control regulations.

The major difference is in the amount of money for direct grants and revolving loan funds. The House version, HR 8, would authorize $21 billion through fiscal 1994 while the Senate version, S 1128, provides $18 billion. The legislation could still be vetoed by President Reagan. His administration has called for a level of funding of $6 billion and a phase-out of federal aid for sewage treatment plants by the end of fiscal 1989.

Safe Drinking Water Act

The House and Senate must resolve differences in the Safe Drinking Water Act before it can receive final approval. Reauthorization is expected to be slowed by EPA actions to set drinking water standards for eight industrial solvents and initiate a rule-making process for standards on 43 other contaminants. Both reauthorization bills require EPA to set standards for water utilities and specify maximum allowable levels of contaminants in drinking water. EPA is also required in future years to set maximum contaminant standards for additional substances in water. Groundwater provisions in the House and Senate versions are different. The House measure, HR 1650, would provide for a federal program of grants to states to devise and implement comprehensive groundwater protection programs. The Senate version, S 124, would provide for a smaller program to protect aquifers that serve as a community's source of drinking water.

Additional groundwater protection legislation is under consideration. In the Senate and House, bills S 1836 and HR 3808 would require states to set ambient groundwater standards at least as stringent as federal drinking water standards. Another bill, HR 3906, calls for additional federal research on groundwater contamination.

WATERBORNE GIARDIASIS INCREASING

The incidence of all waterborne diseases is increasing steadily, but outbreaks of one in particular--giardiasis, an intestinal illness--are doubling every five years, according to an article in the January

Journal of the American Water Works Association. Giardiasis, which is caused by a protozoan named Giardia lamblia, is most often reported in areas that do not use filtration but rely only on chlorination for the water treatment process.

Giardia is the pathogen most frequently identified in outbreaks of waterborne disease in this country. Most outbreaks of giardiasis have occurred in New England and states in the Rocky Mountains and along the Pacific Coast. Many water systems in these areas draw their supplies from mountain streams and lakes. Because of the good quality of these sources and the absence of point source discharges in the watersheds, the systems often use minimal treatment, according to the article. Chlorine disinfection, which may be the only treatment used, is not always effective in killing the Giardia cysts.

Symptoms of giardiasis are nausea, chronic diarrhea, weight loss, fatigue, abdominal bloating, and flatulence. Giardia is described in the July 1985 Water Impacts as a tiny parasite, ingested as an inactive, hard-covered cyst in contaminated food or water. The cyst "hatches" into an active organism in the human small intestine. Ingestion of only 10 to 100 cysts can result in infection. The incubation period is 8 to 15 days. The acute stage of the disease may last only a few days, frequently resolving itself spontaneously, the article said; however, some patients have periodic recurrences of acute symptoms, and others show no outward symptoms but continue to pass cysts and may infect other people. Giardiasis is confirmed by the presence of Giardia cysts in stool specimens.

There has been increased awareness of giardiasis in recent years. Outbreaks in northeast Pennsylvania received attention when they resulted in boil-water orders for several communities and a class-action law suit against the water utility.

The AWWA article says that outbreaks of giardiasis underscore the need for effective filtration and disinfection of public water supplies. Chlorination deficiencies were a primary cause in a majority of outbreaks. Problems include overdependence on indicator organisms to assess the adequacy of disinfection, failure to apply currently available technology, and overestimation of the effectiveness of disinfection. University and EPA studies have shown that diatomaceous earth filtration is effective in removing Giardia cysts from drinking water supplies, the article said.

NEW JERSEY ACID RAIN RESEARCH LINKS LAKE SEDIMENTS TO ACIDIFICATION

Recent testing of rivers, lakes, and reservoirs in northern New Jersey suggests that little change in pH and alkalinity levels has occurred because of acid deposition. "There is strong evidence," the researchers concluded, "that clay minerals in lake bottom sediments participate in acid neutralization and control the water's pH values."

The research was conducted by Samuel Faust, of Rutgers University's Environmental Sciences Department, and Alan McIntosh, director of the university's Water Resources Division. They found that most of the rivers sampled appeared to have adequate buffering to withstand significant acid deposition. But they identified seven lakes and reservoirs on the Kittatinny Ridge in northwestern New Jersey and the state's north-central Highlands as vulnerable. Each of the lakes was sampled twice a month for 11 months. Three of the lakes were in watersheds with considerable amounts of limestone.

"Much of the ability of the study lakes to buffer acid deposition is due to the cation exchange capacity of the sediments," the study found. "The two lakes at the extremes of buffering capacity, Catfish Pond (pH from 4.58 to 5.64) and White Meadow Lake (pH from 6.5 to 10.1), were examined for differences in cation content in the top 2 to 3 centimeters of their sediment versus the remainder of the core. In both cases, there was a considerable difference in the concentrations of major cations, particularly calcium. This result indicates that a substantial part of the sediment's ability to provide buffering comes from the cation exchange capacity. This CEC involvement is the primary factor in buffer capacity for those lakes that do not exhibit any weathering of the sediments."

. . . Center for Coastal and Environmental Studies Newsletter

TVA LOOKS AT DISSOLVED OXYGEN AND TROUT GROWTH

An economically significant water quality problem in the Tennessee Valley is low levels of dissolved oxygen (DO) in water downstream of some dams. There is concern about the effects of these low DO levels on trout fisheries. The Tennessee Valley Authority has for some time sought ways to remedy this problem. Presently, the agency is looking at two systems for increasing the DO content of water released from its reservoirs during periods of hydroelectric power generation. Also, studies are being conducted to determine the relationship between trout well-being and DO, according to Impact, a TVA publication.

Some streams in the Tennessee Valley have been dramatically altered by construction of high dams that create large reservoirs for flood control and hydroelectric power generation. As a result, trout are subjected to DO concentrations at or below 2 parts per million (ppm) immediately downstream of some of the dams during the summer and fall. Such conditions are believed to stress the fish, affecting their overall physical condition, and limit the number and variety of food organisms that can survive in the stream, the article said.

The Impact article describes two systems that are being explored, both designed to inject air into the water that spins the hydroelectric generator turbines. One involves the use of metal baffles installed adjacent to vents in the turbine hubs. These vents normally draw in small amounts of air as a means of overcoming cavitation effects. The baffles increase suction through these vents, pulling more air into the water column so that more oxygen is absorbed during periods of power production. The other system makes use of blowers to force air through the hub vents into the water. Each of the systems promises an increase of 2-4 ppm in DO levels in streams below dams.

Releases from some dams become severely depleted in DO during the summer and fall because of thermal stratification. Water to generate electric power is generally drawn from the cold, lower reaches of the reservoir, where DO levels tend to be lower during periods of stratification. Thus, water released through the hydroelectric plant to the stream below may be within the preferred temperature range of trout but contain very little dissolved oxygen.

Studies at TVA's Aquatic Research Laboratory are attempting to get definitive answers to questions about the effects of DO improvements on trout fisheries. In outdoor channels that simulate natural aquatic environments, oxygen levels are regulated by use of liquid nitrogen. One study looked at the growth and survival of rainbow trout exposed to different DO levels. The only significant effect on growth of the trout occurred among those exposed to the lowest treatment, which had an average daily DO level of 4.7 ppm. These fish did not feed as actively as those in channels with higher DO levels. None of the treatment levels produced significant mortality during the study period, the article said.

TVA BEGINS NEW JOURNAL This year, the Tennessee Valley Authority will begin publication of the Forum for Applied Research and Public Policy, a quarterly journal designed to explore policy issues in energy, natural resources, and economic development. By serving as a bridge between the worlds of research and public action and by bringing together discussions of technology, energy, environment, and public policy, the forum will seek to establish the necessary connections through which questions of public policy can be meaningfully framed and addressed. Submissions and inquiries should be directed to: Alanson Van Fleet or Daniel Schaffer, Forum for Applied Research and Public Policy, Tennessee Valley Authority, 400 Summit Hill Drive, E3C85, Knoxville, TN 37920. The editors can be reached by phone at 615-632-8019.

SWITZERLAND TO BAN PHOSPHATES The Bulletin of the International Union for Conservation of Nature and Natural Resources reports that starting in July 1986, the Swiss Interior Ministry has banned the use of phosphates in laundry detergents and reduced the amount used in dishwashing liquids and sewage disposal wastes.

The action was taken in response to increasing alarm about the amounts of phosphates in the country's streams, rivers, and lakes.

Switzerland will be the first European nation to take such action.

. . . *Hydrata, January '86*

USGS EVALUATES WATER RESOURCES RESEARCH INSTITUTE The North Carolina Water Resources Research Institute was evaluated on January 27 and 28 by scientists, administrators, and representatives of federal and state government.

The United States Geological Survey is inspecting all 54 Water Resources Research Institutes across the country, in accordance with the Water Resources Research Act of 1984 (P.L. 98-242). Each institute will be inspected during a two-year period to ensure "that the quality and relevance of its water resources research and its effectiveness as an institution for planning, conducting and arranging for research warrants its continued support in the national interest."

Members of the inspection team included Department of the Interior personnel, a director of another institute, university faculty or administrators, state or local agency personnel and a private citizen from North Carolina.

In evaluating each institute, the team considered:

1. Research quality
2. Research relevance
3. Research coordination
4. Information transfer
5. Training
6. Accreditation
7. Physical resources
8. Interdisciplinary relationships
9. Administrative relationships
10. Institutional commitment

The Geological Survey considers the inspection as a way to encourage better performance and as a way to suggest improvements in each institute's program.

NEW INSTITUTE REPORT *Future Drinking Water: State and Local Policies for Protecting Future Drinking Water Reservoir Sites and Watersheds in North Carolina* by Dr. Raymond J. Burby and Dr. David J. Brower of the Center for Urban and Regional Studies and Dr. Dale Whittington of the Department of City and Regional Planning, all of UNC-Chapel Hill. This Institute report points out the need for North Carolina, as a rapidly urbanizing state, to protect future drinking water supplies. It examines the threats to potential reservoir sites as well as what is being done to protect these sites and what can and should be done. A comprehensive program is outlined, involving a partnership of state and local government, for protecting sites and watersheds needed to supply drinking water in future years.

The authors cite the need for protection of the reservoir sites. Available sources of high-quality water, they note, are limited. Topography limits the number of places where dams and reservoirs can be constructed at an affordable price. Groundwater is in limited supply in some areas. The costs of pumping and political impediments to interbasin transfers limit the transmission of water over long distances. And pollution spawned by sprawling urbanization and continued erosion from farmland limit the number of streams that are suitable for drinking water.

Surveys of potential water supply watersheds in 12 counties were conducted during the course of this research. They indicated that a number of the watersheds were threatened by pollution from various sources. Local action to preserve reservoir sites and maintain future water quality had been initiated in a few cases, but more often nothing was being done to protect potential drinking water sources for future use, the report said.

A state program for future drinking water supplies is suggested in the report. It encompasses four functions: water supply planning, reservoir site preservation, control of point sources of pollution, and control of nonpoint sources.

Planning

1. Formulate a state water supply master plan and continuous planning process to estimate demand for drinking water and identify, but not finally select, alternative ways of meeting that demand (e.g., new surface and groundwater sources, interconnections, conservation).

2. Enact legislation requiring localities to prepare water supply plans that, based on the state master plan, designate future sources of supply, formulate schedules for developing those sources, recommend watershed protection measures, and indicate other needed local water supply improvements, such as expansion of treatment plants, installation of new mains, and reconstruction of existing facilities.

3. Establish and fund grants-in-aid to local governments for the preparation of state-mandated water supply plans.

4. Classify (or reclassify) streams and lakes to indicate their intended future use as drinking water sources.

5. Issue a gubernatorial executive order that directs state agencies to avoid actions that could lead to the degradation of water quality in streams designated as future sources of drinking water, or enact new water supply legislation that includes similar directives.

Preservation of Reservoir Sites

6. Enact legislation that enables local governments to adopt ordinances officially designating future drinking water reservoir sites and that prohibits people from improving property located within those

designated sites unless water systems or local governments fail to purchase it within a specified period of time.

7. Establish a revolving loan fund for advance acquisition of drinking water reservoir sites by local governments.

Control of Point Sources of Pollution

8. Prohibit new point source discharges of pollutants in upland watersheds designated as potential future drinking water supplies.

9. Monitor point source discharges of pollutants to and water quality in streams designated as potential future drinking water sources in order to make adjustments in state and local water supply plans as potential sources become unsuitable for drinking water use.

Control of Non-point Sources of Pollution

10. Target administration of state sedimentation pollution control regulations to ensure that proper erosion control measures are used in connection with new construction in designated future water supply watersheds.

11. Enact legislation that requires local governments to formulate and administer stormwater management programs in designated future water supply watersheds.

12. Adopt stringent rules for the installation and operation of subsurface sewage disposal systems located in designated future water supply watersheds and for the disposal of animal wastes in those watersheds.

13. Enact legislation that requires local governments to formulate and administer comprehensive watershed protection programs in designated future water supply watersheds.

14. Promote the adoption of best management practices to minimize agricultural erosion in designated future water supply watersheds by funding and extending existing state cost-sharing programs to those watersheds and by targeting federal, state, and local technical assistance programs to them as well.

15. Increase technical assistance to local governments to help them prepare and administer watershed protection programs for designated future drinking water sources.

The report is No. 222. Institute reports are free of charge to North Carolina residents; for out-of-state requests, there is an $8 charge.

1986 TRIANGLE CONFERENCE ON ENVIRONMENTAL TECHNOLOGY — The Triangle Environmental Technology Conference is a regional forum for exchanging new ideas on environmental technology and for enhancing understanding of new research, design, operating, and regulatory techniques useful in solving practical environmental problems.

The conference will be held April 1-3 at the Carolina Inn on the campus of the University of North Carolina at Chapel Hill.

The program for the conference consists of presentations on the following topics:

- the rationale, development, and application of new and practical techniques for monitoring and protecting groundwaters.
- technology and regulatory requirements for evaluating and disposing of hazardous wastes.
- experiences of other states and communities in handling hazardous wastes, sludges, and industrial wastewaters.
- current situations and trends in laws and regulations for treatment and disposal of municipal and industrial wastewaters, solid wastes, and hazardous wastes.
- new approaches and technology for solving problems in the planning, design, treatment, and disposal of municipal and industrial wastewaters, including joint handling systems.
- case studies of treatment plant operating problems, including both successful and unsuccessful approaches.

This conference begins at 1:30 p.m. April 1 with a special workshop on Monitoring and Modeling of Groundwater Contamination offered by the Department of Environmental Sciences and Engineering at UNC-Chapel Hill School of Public Health. Instructors are Drs. Cass T. Miller and Francis A. DiGiano, who are on the faculty, and Mr. Daniel Gallagher, who is a doctoral candidate in the Water Resources Engineering Program and a research associate of the Water Resources Research Institute.

The sessions will provide information for those interested in groundwater pollution and hazardous waste disposal and will serve as background for several of the papers to be presented later during the conference. The cost of the workshop is included in the conference registration fee.

The conference registration fee is $35 if paid prior to the conference, $40 if paid on site. To register, send check to: Communications Assistant (CE101), Office of Continuing Education, UNC-CH School of Public Health 251H, Chapel Hill, NC 27514. Telephone (919) 966-4032. Make checks payable to Division of Community Health Service.

Sponsors of the conference are:

The University of North Carolina at Chapel Hill, Department of Environmental Sciences & Engineering
Duke University, Department of Civil and Environmental Engineering
North Carolina State University, Department of Civil Engineering

POSITIONS AVAILABLE — Hydrogeologist II, Division of Water Resources, Hydrology and Management Section. Contact Linda Bryan, Division of Water Resources, P. O. Box 27687, Raleigh, NC 27611. (919) 733-4064.

Iowa State University has two academic positions open at the rank of Assistant Professor of Civil Engineering in the areas of Water Resources Engineering and Quality and Quantity Aspects of Groundwater Hydrology. Submit resumes to: Dr. Richard R. Dague, Chairman, Department of Civil Engineering, 390 Town Engineering Building, Iowa State University, Ames, Iowa 50011.

The U. S. EPA is accepting applications for one or more visiting scientist positions in a research program to determine the effects of acidic deposition on aquatic and terrestrial resources. Appointments are flexible and may be for up to three years on a full or part-time basis. For further information concerning this program, contact: Robert T. Lackey, Environmental Research Laboratory--Corvallis, USEPA, 200 SW 35th St., Corvallis, OR 97333. (503 757-4806/4673/4634.

To apply, submit by March 21, 1986, a letter of interest, a curriculum vitae, and a brief description of specific research to Roger S. Cortesi, Director, Office of Exploratory Research (RD-675), U.S. EPA, 401 M Street, SW, Washington, DC 20460, with a copy to Dr. Lackey.

The U.S. EPA Environmental Research Laboratory - Corvallis, OR, is seeking a forest ecologist as a member of a research team determining the current and potential effects of acidic deposition on forests throughout the U. S. The incumbent will work as a scientist and key member of a research team located in Corvallis, OR. For more information write Robert T. Lackey, Environmental Research Laboratory - Corvallis, U.S. EPA, 200 SW 35th St., Corvallis, OR 97333.

Quality Assurance Specialists (5) to assist in the Quality Assurance (QA) Program for research on the effects of atmospheric deposition on forest ecosystems. Position requires an M.S. degree or equivalent experience in forestry, forest science, forest ecology, forest biology, or related natural or environmental sciences. Submit resume, cover letter, transcripts, and names of three references by February 28, 1986, to: Ms. Karen Borgen, Northrop Services, Inc., 200 S.W. 35th St., Corvallis, OR 97333.

Irrigation Specialist available on the University of California Davis campus. Please refer to position number #A-84-113-R in any correspondence. Applications and information may be obtained from: Mary-Louise Peters, Agriculture & Natural Resources Personnel, 2120 University Ave., 6th Floor, U. of CA, Berkeley, CA 94720. (415) 644-4320.

WATER RESOURCES CONDITIONS IN NORTH CAROLINA FOR JANUARY 1986

Streamflow was below normal (in the lowest 25 percent of record) across the state. According to the National Weather Service, many areas received less than one inch of precipitation during the month. In the Eastern Piedmont and Coastal Plain, monthly flows were at minimum levels which, on the average, occur only once every 5 to 10 years. Hydrologic conditions are rapidly approaching those of a winter-time drought.

Monthly mean flows for selected stations, as compared to the median monthly flows for the 30-year reference period (1951-80), were as follows:

French Broad River at Asheville (Blue Ridge), 51 percent;
South Yadkin River near Mocksville (Piedmont), 44 percent;
Contentnea Creek at Hookerton (Coastal Plain), 25 percent.

Groundwater levels in unconfined acquifers fell across the entire state. At the end of the month, levels in the Piedmont and Blue Ridge were generally 1 to 2 feet above the long-term average for January while levels in the Coastal Plain were slightly below average.

. . . *U. S. Geological Survey*

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 organization issuing the publication. The addresses are provided by the NEWS for this purpose.)

Water Resources Planning

"Hillslope Stability and Land Use," (M.11), 1985, by R. C. Sidle, et al., AGU, 2000 Fla Ave., NW, Washington, DC 20009. (02J)

"Digest of Proceedings: ICWP/USACE Workshops on Water Project Financing and Water Project Financing Roundtable," (85-PS-2), 8/85, by US Army Engr. Inst. for Water Resources, Water Resources Support Center, Casey Bldg., Ft. Belvoir, VA 22060-5586. (06C)

"First Colony Farms Reclamation Plan," 12/85, by D. A. Adams, et al., avail. from FCF, Rt. 1, Box 201, Creswell, NC 27928. (06H Energy)

"First Colony Farms Water Management Plan," 12/85, by J. M. McCarthy, et al., for First Colony Farms, Rt. 1, Box 201, Creswell, NC 27928. (06H Energy)

"Clean Water Finance 1985," ed. by L. Silverman, et al., The American Clean Water Association, POB 6297, Washington, DC 20015-0297. (06C)

"Water Policy in Tennessee: Issues and Alternatives," (#41), 4/83, by E. L. Thackston, et al., WRRC, U. of TN, White Ave. Bldg., Knoxville, TN 37916. (06E)

"Proposed Water Release Management Plan for White Tail Farm, Hyde County, North Carolina," 8/85, by SJE Investments, 1960 N. Lincoln Park W., Suite 2702, Chicago, IL 60614. (06H Energy)

"A Synthesis and Annotated Bibliography, Water Law and Water Rights in the South," 11/85, by R. R. Carriker, Southern Rural Development Center, Mississippi St., MS 39762. (06E)

Water Quality Management

"Rules for Safe Drinking Water," (Ch 391-3-5 Rev., Aug. 1983), by GA Dept. of Natural Resources, Env. Protection Div., 270 Washington St., SW, Atlanta, GA 30334. (06E)

"Falls of the Neuse Reservoir Water Quality Data Review 1983-1984, (85-09), 7/85, by Water Quality Section, DEM, NCNRCD, POB 27687, Raleigh, NC 27611. (05A)

"Evaluation of Nitrogen Application Technique and Tillage System on Nitrogen Runoff from an Erodible Soil," (#174), 12/85, by C. A. Lembi, et al., WRRC, Purdue U., W. Lafayette, IN 47907. (05B)

"Rules and Regulations for Water Quality Control," (Ch. 391-3-6 Rev., Oct. 1980), by GA Dept. of Natural Resources, Env. Protection Div., 270 Washington St., SW, Atlanta, GA 30334. (06E)

Water Quantity Management

"Conserving the Ogallala: What Next?," D. E. Kromm, et al., Dept. of Geography, Dickens Hall, Kansas St. U., Manhattan, KS 66506. (03F)

"Methods of Analyzing Instream Flows," (#148), 1985, by G. V. Loganathan, et al., WRRC, VPI SU, 617 N. Main St., Blacksburg, VA 24060. (02E Instream Flows)

Miscellaneous

"Water Resources Atlas of Florida," 1985, ed. by E. A. Fernald, et al., Fla. Resources and Env. Analysis Center, 361 Bellamy Bldg., FL St. U., Tallahassee, FL 32306, Price - $20.

"Environmental Analysis and Executive Summary of First Colony Farms, Inc. (FCF) Peat-Mining and Power-Plant Project in Northeastern North Carolina," (Technical Review Draft), 12/85, avail. from FCF, Rt. 1, Box 201, Creswell, NC 27928. (06H Energy)

"Environmental Research Summary, Tennessee Valley Authority," 7/85, avail. from Env. Research and Infor. Section. Off. of Natural Resources and Economic Dev., TVA, 210 Summer Place Bldg., Knoxville, TN 37902. (TVA)

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Rockyhock Creek, Chowan County. Photo by David H. Howells

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