REPORT OF

THE STATE WATER COMMISSION

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 90

COMMONWEALTH OF VIRGINIA
RICHMOND
1997

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REPORT OF THE STATE WATER COMMISSION

to

The Honorable George Allen, Governor,
and
the General Assembly of Virginia
Richmond, Virginia

The State Water Commission is a permanent agency of the Commonwealth directed by statute to (i) study all qualitative and quantitative water supply and allocation problems in the Commonwealth, (ii) coordinate the legislative recommendations of other state entities responsible for water supply and allocation issues, and (iii) report annually its findings and recommendations to the General Assembly and the Governor (§ 9-145.8 of the Code of Virginia)[1]. The Commission was given an additional responsibility by Chapter 912 of the 1996 Acts of Assembly (the budget), which directed the Commission to "review the ability of the Department of Environmental Quality to enforce ground water management statutes and regulations, and the sufficiency of resources within the agency." The Commission met in September and October of 1996 and in January of 1997. In addition to examining the state's ground water management program, the Commission reviewed several small water supply system issues, received an update on Virginia's Indoor Plumbing Program, and considered and endorsed appropriation requests from the Virginia Water Project, Inc., and the Virginia Water Resources Research Center.

I. GROUND WATER MANAGEMENT PROGRAM

The Commission began its review of the ground water management program by receiving a staff briefing on the legislative history of the Ground Water Management Act of 1992, which was proposed by the State Water Commission and enacted by the General Assembly to remedy the inadequacies of the Groundwater Act of 1973. The Commission then heard testimony from representatives of groups who expressed concerns about the program. Finally, the Commission received a detailed status report from the agency charged with implementing the program, the Department of Environmental Quality (DEQ), as well as information concerning agency's future plans for the program.

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[1] Subsequent citations are to the Code of Virginia unless otherwise indicated.

A. BACKGROUND

Ground water management areas

The Groundwater Act of 1973 and its successor, the Ground Water Management Act of 1992, share the same purpose: to allocate ground water resources in areas where they are scarce. The requirements of the 1973 law applied in limited geographical areas, called ground water management areas. The 1992 law continues this scheme, describing ground water management areas as areas where the State Water Control Board has determined that:

> 1. Ground water levels in the area are declining or are expected to decline excessively;
>
> 2. The wells of two or more ground water users within the area are interfering or may reasonably be expected to interfere substantially with one another;
>
> 3. The available ground water supply has been or may be overdrawn; or
>
> 4. The ground water in the area has been or may become polluted. Such pollution includes any alteration of the physical, chemical or biological properties of ground water which has a harmful or detrimental effect on the quality or quantity of such waters (§ 62.1-257).

Upon finding that any of these conditions exist, the Board may by regulation declare the creation of a ground water management area and define its boundaries. There are currently two ground water management areas: the Eastern Shore Ground Water Management Area was established in 1975[2] and the Eastern Virginia Ground Water Management Area was established in 1976.

The Groundwater Act of 1973

Under the Groundwater Act of 1973, users of groundwater were required to file, within six months of the establishment of the ground water management area, a registration statement with the State Water Control Board. The Board would then issue a certificate of ground water right entitling the user to withdraw daily an amount of water he had used on any day within a specified two-year period. After the six-month period, any user who intended to withdraw water or enlarge a

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[2] This ground water management area was called the Southeastern Virginia Ground Water Management Area when it was established 1975, and renamed the Eastern Virginia Ground Water Management Area when it was expanded in 1989.

withdrawal was required to apply for a permit. Permits were likely to be issued for the requested amount unless the withdrawal would interfere with the rights of a prior user. Neither of these requirements applied to withdrawals of less than 300,000 gallons per month or withdrawals for agricultural purposes. Both permits and certificates of ground water rights were of indefinite duration (§§ 62.1-44.99 and 62.1-44.100; repealed by 1992 Acts of Assembly, Chapter 812).

In 1989, the United States Geological Survey (USGS) completed a ground water modeling study for southeastern Virginia. That study demonstrated that an 88 million gallon a day (mgd) withdrawal of ground water would likely result in salt water intrusion into the aquifer, and that a 167 mgd withdrawal could cause a decline in ground water levels, increased potential for salt water intrusion, and dewatering of confined aquifers in the western coastal plain. In 1991, the Board's records showed certificated rights of 212 mgd and permitted rights of 31 mgd, for a total of 243 mgd. While actual withdrawals were estimated to be significantly smaller than this amount, about 95 mgd, the total authorized withdrawal was 45 percent greater than the largest withdrawal evaluated by USGS. When presented with this information, the State Water Commission concluded that

> [i]f all users were to exercise their authorized withdrawals, (i) the aquifer would be stressed and the possibility would exist for salt water intrusion; and (ii) further development would be hindered. The aquifer system in this management area may not be able to support existing permitted ground water withdrawal rights. The Board's current ability to issue new permits is curtailed because new permitted withdrawals would deprive existing permit holders of their permitted ground water (Report of the State Water Commission, 1992 House Document No. 59, p.8).

The Commission thus set about rewriting the ground water statute.

The Ground Water Management Act of 1992

A chief concern in revising the law was how to re-establish the rights of existing permit and certificate holders, while at the same time allowing the Board greater control over ground water use in the ground water management areas, in order to prevent the consequences of over-use that had been identified in the USGS study. The new law accomplished this by (i) requiring holders of existing certificates and permits to apply for new permits and (ii) providing a method by which the permitted amount would be calculated. Under this method, users could choose any 12-month period within a specified five-year period; the amount withdrawn during that 12-month period, together with any savings as could be

demonstrated to have been achieved through water conservation, would be the yearly amount authorized by the new permit.

The Commission decided to eliminate the exemption for agricultural users that had been provided by the 1973 Act, based in part on the concern that without a certificated right or permit, in the event of a shortage, agricultural users would be without a guarantee that the amount of water that they were accustomed to using would be available. Agricultural users withdrawing water on or before the effective date of the Act are allowed a 10-year window on which to base the permitted withdrawal amount (as opposed to the five years provided for permit and certificate holders). The permit exemption for withdrawals of less than 300,000 gallons per month provided in 1973 Act remains in the 1992 Act.

For new withdrawals of ground water, permits may not authorize an amount exceeding that which can be applied to the proposed beneficial use of the water. The Act requires that applications for new withdrawals must include water conservation and management plans. If a new ground water management area is established, existing users will have six months to apply for a permit. The amount authorized by the permit will be determined in a similar way as described for those who held permits or certificates or were withdrawing water for agricultural uses on the effective date of the Act. All permits have a fixed term, which may not exceed 10 years.

B. CONCERNS ABOUT PROGRAM IMPLEMENTATION

The Commission heard testimony from several individuals who expressed uncertainty about ground water management in Virginia's ground water management areas. Representatives of the Virginia Association of Counties, the Eastern Shore Ground Water Committee, and the Hampton Roads Planning District Commission had questions about the ground water program because of reports of well failures and difficulties experienced in drought planning. They raised concerns about the pace at which the Ground Water Management Act of 1992 is being implemented and the adequacy of the resources committed to the program by DEQ.

Larry Land, Director of Policy Development for the Virginia Association of Counties (VACo), explained what prompted him to inquire about the status of the ground water program. In August of 1995, representatives of Accomack County (a member of VACo) made a presentation to VACo's Steering Committee on Planning, Public Works and Natural Resources, expressing concerns about well failures that had occurred in the county. A study had been commissioned by the Eastern Shore of Virginia Ground Water Committee to determine the cause of the well failures. According to Land, this study indicated that large withdrawals of water for

irrigation was causing fluctuations in ground water levels. Land pointed out, however, that this finding has been the subject of some controversy.

After the presentation from the Accomack County representatives, the steering committee raised concerns about the implementation and enforcement of the Ground Water Management Act of 1992, which had been designed to prevent the kinds of problems that were being experienced in Accomack County. The steering committee asked Land to write a letter to DEQ and inquire about the status of the program. (This letter appears as Appendix A of this report; the response Land received is Appendix B.) Land suggested that the following questions should be part of the Commission's examination of the ground water management program: Has DEQ established any deadlines for completing the processing of newly submitted permit applications? Does DEQ have adequate staff and financial resources to effectively implement the Act? How have the regional offices of DEQ been organized to effectively enforce the Act? Has the practice of "spot checking" the quarterly reports of permittees been an effective enforcement mechanism?

C.D. Fleming is the chairman of the Eastern Shore Ground Water Committee, a group of elected officials, citizens and local government staff dedicated to the protection and management of ground water resources in Accomack and Northampton Counties. The Committee was one of the groups that recommended revising the Groundwater Act of 1973, and it has been monitoring the state's implementation of the Ground Water Management Act of 1992. Fleming characterized the Eastern Shore well failure study commissioned by the Committee as unable to determine the cause of the well failures. However, he said, the ground water modeling conducted during the study showed that pumping large volumes of ground water can cause large fluctuations in ground water levels and may cause domestic well failures. The Committee, which concluded that the study supports the General Assembly's decision to require withdrawal permits for all large ground water withdrawals, is concerned about implementation of the Ground Water Management Act of 1992.

Fleming expressed the Committee's fear that DEQ lacks sufficient funding and staff to fully implement the Act, including the development of agricultural withdrawal regulations, processing of permits, management of ground water data, modeling of potential impacts of withdrawals and conducting research drilling. Full implementation of the Ground Water Management Act of 1992 will benefit the Eastern Shore by informing present and future users about ground water availability: farmers will know how much water they can safely pump without impacting adjacent users, industry will know how much water is available for expansion and siting of new facilities, and domestic users will know how to construct wells that will operate successfully in the long term. Fleming emphasized that management of the area's ground water resources is essential to economic development in Accomack and Northampton Counties. He urged the Commission to see that the Ground Water Management Act of 1992 is fully implemented and

that DEQ has adequate funding to properly manage the Eastern Shore's limited ground water resources.

John Carlock, director of physical and environmental planning for the Hampton Roads Planning District Commission (HRPDC), spoke to the Commission on behalf of the HRPDC and its directors of utilities committee. He emphasized that ground water is a very important resource to all 15 localities in the Hampton Roads area, and that the resource is stressed. Because the ground water resource extends beyond the boundaries of the Hampton Roads region, he said, an effective state and local partnership is essential to its protection. He provided of a set of comments that were submitted by the committee to DEQ on the ground water withdrawal regulation (Appendix C), and Carlock highlighted some of the directors of utilities committee's current concerns.

Carlock told the Commission that the absence of a final agricultural withdrawal regulation concerns the committee because the impacts of large agricultural withdrawals will continue to be unknown until agricultural ground water users are issued permits for specific amounts. During droughts (such as occurred in 1981, 1993 and 1995), use of ground water for public and private drinking water supply and irrigation increases significantly. Water levels in aquifers are lowered, which reduces the yield of drinking water supply wells. Drought management planning options are difficult to evaluate when the impact of agricultural withdrawals is unknown.

The fact that the quantity of agricultural withdraws is unknown can also result in an economic burden for the permitted community, said Carlock. Certain permittees are required have a plan to compensate owners of wells damaged with respect to yield or water quality because of increased pumpage during a drought. In Hampton Roads, utilities mitigate damages to private wells through a regional program administered by the HRPDC. Under the program, compensation payments are calculated based on each permittee's contributions to the drawdown which caused the damage, estimated through the use of a model. According to Carlock, "without inclusion of the agricultural withdrawals in these simulations, permitted industries, businesses and public utilities are compensating impacted well owners for a greater proportion of the damage than occurred due to their withdrawal."

The committee is also concerned that DEQ may not have adequate resources to fully implement the program, especially with respect to data collection and management and modeling. Permittees are required to provide a large amount of data with permit applications so that impacts of the proposed withdrawal can be predicted. Carlock asserted that the agency should be able to ensure that information on the shared ground water resource is available to applicants so that they are not forced to duplicate efforts to obtain such information. He suggested ways of addressing this concern, including increasing funding for agency staff,

contracting these responsibilities to the private sector, and increasing cooperative efforts with USGS.

C. AGENCY PROGRESS IN IMPLEMENTING THE GROUND WATER MANAGEMENT ACT OF 1992

Terry Wagner, ground water program manager at the DEQ, described the agency's implementation of the Ground Water Management Act of 1992. His discussion focused on five issues: the promulgation of regulations implementing the Act's agricultural ground water withdrawal requirements, the number of withdrawal applications that have been received and permits issued, compliance activities, enforcement activities, and agency resources.

DEQ convened an advisory committee in the spring of 1993 to discuss the 1992 Act's addition of agricultural withdrawals to those required to obtain a permit. That group provided a position paper to DEQ in the fall of 1993, and in October of that year two public hearings were held to obtain additional public comment. Executive order 94-15, which required agencies to review existing regulations, was subsequently issued by the governor, and DEQ decided to incorporate the consideration of agricultural requirements into this regulatory review process. The public comment period for the regulatory review process ended December 1, 1995. DEQ staff planned to present a draft agricultural withdrawal regulation to the December State Water Control Board meeting, according to Wagner, and obtain permission to commence the public hearing stage of the promulgation process.

Wagner delineated the five categories of permit applications created by the Act and provided a status report on each:

1. New applications for new uses after July 1, 1992. This category of applications has been accorded the highest priority by the regional offices. As of the September Commission meeting, the agency had received 26 category 1 applications and had issued 11 permits.
2. Applications for uses existing July 1, 1992, where the applicant is willing to accept a permitted withdrawal amount equal to historic withdrawal. These applications, which require little technical evaluation on the part of agency staff, have been given second highest priority in the regional offices. Of the 70 applications received as of September, 53 permits had been issued.
3. Applications for uses existing July 1, 1992, where the applicant requests more water than historic withdrawal. The agency had received 130 of these applications, and had returned to each applicant a new application and instructions, 18 of which have been received by the agency. These applicants, under the statute, may continue to withdraw the amounts to which they were entitled under the Groundwater Act of 1973 until the agency issues new permits.

4. Applications for agricultural uses existing July 1, 1992. These permits cannot be issued until the agricultural withdrawal regulations are final, so none of the 107 applicants have been issued permits. They can continue to withdraw water until the agency acts on their permits.

5. Applications for special exceptions to withdraw ground water. Section 62.1-267 allows the Board to issue special exceptions "to allow the withdrawal of ground water in cases of unusual situations where requiring the user to obtain a ground water withdrawal permit would be contrary to the intended purposes of the Act." Nineteen applications in this category had been received as of September and seven special exceptions had been issued.

With respect to DEQ's efforts to ensure compliance, Wagner stated that permittees are required to meter and report their withdrawals to the agency. These reports are compared to permit limits, and when this process reveals noncompliance, regional office staff utilize telephone contacts, site visits and informal compliance letters to ensure compliance. Wagner stated that these informal activities have been effective in obtaining compliance without the need for formal enforcement actions. One formal enforcement action had been taken as of the September meeting, in which a seafood processor was required to apply for a new ground water withdrawal permit as part of a consent order related to waste water discharges.

Wagner listed the agency resources currently committed to the program and told the Commission about the program's future needs. Current funding allocated to directly to the implementation of the Act totals about $475,000, including $389,000 of direct program support for three permit writers in regional offices, 2.1 FTEs in the central office, and funding for a cooperative USGS/DEQ ground water modeling effort. The agency allocates about $86,000 to activities that indirectly support implementation. Noting that the most time-consuming aspect of reviewing permit applications is reviewing the applicant's evaluation of the impact of the proposed withdrawal, which usually involves the use of a ground water flow model, Wagner said that the agency had recently begun the recruitment of a ground water modeler. DEQ planned to hire someone with the capabilities of performing technical evaluations of ground water withdrawal applications and using the USGS Coastal Plain Flow Model to evaluate the impact of total withdrawal. Wagner said that this action would significantly decrease the processing time for agency review of applications and would result in significant financial savings to the regulated community. Other agency needs noted by Wagner include the need to develop data management capabilities for the large amount of data associated with withdrawal applications and permits, and the need to conduct ground water research drilling to monitor salt water intrusion, provide data points to support modeling efforts, and ensure that implementation of the Act is having the desired effects.

After receiving the initial report from DEQ, several Commission members expressed concern about the rate at which the ground water program is being

implemented. Senator Colgan, chairman of the Commission, wrote a letter to DEQ's director and asked that the agency provide more specific information regarding agency resources committed to the program, including a timeline for the tasks outlined in Terry Wagner's presentation, a detailed staffing profile for the program, an estimated program budget for each of the next five years, and a list of the staff and technical resources that should be authorized by the General Assembly in order to enable DEQ to implement the program more rapidly (Appendix D). DEQ's deputy director, T. March Bell, responded to these questions at the Commission's October meeting and provided details in written materials which appear as Appendix E .

Bell assured the Commission that DEQ is committed to fully implementing the Ground Water Management Act of 1992. The agency has identified four interrelated prerequisites for the program to be fully operational: (i) the completion of all permits, (ii) the inclusion of agricultural permits (which requires completion of the agricultural withdrawal regulation), (iii) the addition of a sophisticated modeling capability, and (iv) an increased research capability. Bell explained that centralized ground water modeling will expedite the permit process and is essential to proper management of the resource, and that completion of all permits, including agricultural permits, and additional research will provide the data necessary to manage each ground water management area.

Bell told the Commission that the agency did not currently have sufficient staff for the program but that it would within 90 days. The agency was planning to hire three additional staff: a ground water modeler, a ground water data management technician, and a permit writer. Although transferring a current employee to the modeling position had been considered, DEQ rejected the idea and decided to advertise the position, which would be filled in December. The agency was also investigating whether to transfer an employee to the new data management technician position and planned to decide this issue by November 1. The new permit writer would be hired after it was determined whether the person should be working solely on agricultural permits or should be added to the regional staff in the Tidewater/Piedmont region. The agricultural regulation, Bell continued, should be final in the fall of 1997. Bell assured the Commission that hiring for these three positions could be accomplished with existing funds, and that, with their addition, the staffing level for the program would be sufficient for "first-stage" implementation of the program. After a year it would be determined whether additional staff should be hired to do research or whether that function should be fufilled by the private sector under a contract with the agency.

At the Commission's January 1997 meeting, Robert Burnley from DEQ told the Commission that an offer had been made for the ground water modeling position and that the data management technician position was in recruitment.

II. WATER SUPPLY AND TREATMENT SYSTEMS

A. SMALL WATER SUPPLY SYSTEMS

Dr. Randolph L. Gordon, Commissioner of the Virginia Department of Health, provided an update on two issues related to small waterworks.

Issue 1: In 1994 the Commission sponsored legislation amending § 32.1-169 requiring that the Board of Health "recognize the relationship between an owner's financial, technical, managerial, and operational capabilities and his capacity to comply with state and federal drinking water standards" in exercising its supervision and control over water supplies and waterworks. The Commission also sponsored legislation amending § 32.1-172 to: (i) require applicants for water supply system permits to submit a comprehensive business plan to assure long-term system performance; (ii) have the Department of Health (VDH), in conjunction with the State Corporation Commission, establish criteria to be used in the development of business plans; and (iii) allow VDH to require business plans from existing waterworks that have demonstrated significant noncompliance.

Dr. Gordon briefed the Commission on the status of efforts to implement these requirements. First, Department of Health staff were instructed to consider the managerial, financial, technical and operational viability of a proposed waterworks during the preliminary engineering conference held with the owner and to request the owner's engineering consultant to address viability in the preliminary engineering report. Second, two notices were published in the Virginia Register requesting comments on the requirement of a comprehensive business plan for waterworks. Finally, VDH established an ad hoc committee to develop the business plan criteria. The committee, which included representatives of VDH, the State Corporation Commission, the Virginia Water Companies Association and Virginia Water Projects, Inc., drafted criteria, solicited comments on the draft, and submitted a final draft to VDH. Gordon provided a copy of the criteria to the Commission (Appendix F).

Issue 2: In 1994 VDH proposed a concept, endorsed by the Commission, to provide local governments with easier access to loans of up to $40,000, through the Virginia Resources Authority Fund, for upgrades of water supply facilities. Legislation was introduced during the 1995 session of the General Assembly (SB 1019) to achieve this. Although the bill failed, the Commission agreed to look at the issue. The Commissioner was asked to comment on the continued need for such legislation.

Gordon reported that his staff had conducted meetings with representatives of the Department of Treasury, the Department of Environmental Quality, the

Virginia Resources Authority, the Virginia Municipal League and the Virginia Association of Counties. As a result of these meetings, two potential strategies for providing localities with easier access to small sums of money were identified. If these strategies prove to be feasible, legislation such as SB 1019 may not be necessary.

The first approach would be helpful where there is an immediate need for funding. The Virginia Water Supply Revolving Loan Fund (VWSRF) statute authorizes the Board of Health to award both grants and loans. A third, "middle ground" possibility would be for the Board to transfer funds to a locality after the locality signs a letter of intent to repay. This approach would carry with it an increased risk to the Board because there would be no legal obligation for the locality to repay the money, but it would also eliminate the need for the conditions and procedures normally inherent in the loan process. The other strategy would entail the issuing of a local anticipation note and/or a long-term marketable bond and streamlining the existing loan process in a way that would allow a county or city attorney to act as bond counsel or the Virginia Resource Authority's counsel to act as both general counsel and bond counsel.

B. SAFE DRINKING WATER ACT FUNDS

Dr. Gordon also addressed the status of available funds for water supply and treatment programs. He pointed out that, as of the September meeting, no significant funds remained in the VWSRF, as all available moneys were committed to local projects. Congress, however, had in August reauthorized the Safe Drinking Water Act, and the reauthorization legislation created a revolving loan fund for each state to use in financing waterworks construction. Congress had not yet passed appropriations legislation to implement this provision, but was soon expected to do so. Gordon said that Virginia's share of the money was expected to be close to $30 million and be contingent on a 20 percent state match.

In anticipation of the availability of federal funding for technical assistance to small water supply and wastewater treatment utilities under the Safe Drinking Water Act, representatives of the Virginia Rural Water Association and the Virginia Water Project, Inc., appeared before the Commission at its September meeting and described their experience in offering technical assistance. Dr. Gordon told the Commission about several recent instances in which Department staff had provided technical assistance to ensure the safety of water treatment plants and drinking water sources in flood-stricken localities.

III. INDOOR PLUMBING PROGRAM

William Shelton, deputy director of the Virginia Department of Housing and Community Development, spoke to the Commission about the Commonwealth's indoor plumbing program, which was created in 1989. About 45,000 homes in Virginia currently lack indoor plumbing. Three hundred homes receive assistance through the indoor plumbing program each year, and 150-200 homes receive similar assistance through the Community Development Block Grant program. Funding for the indoor plumbing program runs at about $ 7.5 million a year, with $3 million coming from the state general fund and $4.4 million coming from the federal government. The average cost to upgrade a single house, which can include improvements to plumbing, heating and electric systems, is about $23,000. (Shelton pointed out that the Department and General Assembly had made a policy decision in recent years that rehabilitating entire homes should be favored over single-system repairs.) The per-household limit imposed by the program is $25,000.

The program is a forgivable loan program. That is, if the family remains in the home several years after the assistance is provided, up to 50 percent of the loan can be forgiven. Education programs that provide information on bathroom and kitchen maintenance and water and sewer system billing are also available.

IV. BUDGET REQUEST ENDORSEMENTS

A. VIRGINIA WATER RESOURCES RESEARCH CENTER

Dr. Leonard Shabman, director of the Virginia Water Resources Research Center at Virginia Tech, appeared before the Commission to review the history of the Center and share plans for the Center's future. The Water Center was created a state agency by the General Assembly in 1982 and directed to, among other things, "facilitate and stimulate research that: (i) deals with policy issues facing the General Assembly; (ii) supports the state water resource agencies; and (iii) provides water planning and management organizations with tools to increase efficiency and effectiveness of water planning and management" (§ 23-135.7:9).

In fiscal year 1990, the Water Center received a state appropriation of $450,000. This appropriation level began to decline in 1992 and since 1994 there has been no appropriation. While the Water Center does receive modest federal support, it remains a state agency with no state budget appropriation.

Past work of the Water Center has included the publishing of "Water News," a free newsletter; providing special reports and research bulletins; and sponsoring conferences. Dr. Shabman suggested that as Virginia urbanizes and becomes more heavily populated, water policy will grow in importance, and that the expertise that is available in the statewide university system should be directed to the most pressing of these problems. He provided the Commission The Virginia Water Resources Research Center's Plan to Serve the Commonwealth (Appendix G) and summarized the Water Center's goals. Under the plan, the Water Center will:

- publish analyses of future water demand and supply conditions;
- develop technical and financial information for small communities facing new cost challenges under the Safe Drinking Water Act;
- develop the data and models needed to choose the most cost-effective water quality policies;
- provide technical support to the committees of the General Assembly;
- encourage cooperative research between the universities and the private sector; and
- expand student opportunities to work on solutions to the Commonwealth's pressing water management issues.

At the Commission's final meeting, it endorsed Shabman's request for an appropriation to the Water Center for the second year of the biennium of $230,000.

B. VIRGINIA WATER PROJECT, INC.

Mary C. Terry, executive director of the Virginia Water Project, Inc. (VWP), described VWP's various projects and detailed the conditions suffered by Virginia residents who are without safe running water in their homes. Such families may have running water that comes from a contaminated source, or they may be without a water source of any kind. Families without water often resort to obtaining water from filling stations, workplaces or streams, and collecting rainwater in barrels, buckets or cisterns. Terry pointed out that a home's lack of running water is not often obvious when the house if viewed from the road.

VWP services range from providing indoor plumbing to needy families to financing water supply and wastewater treatment systems for entire communities and from providing technical assistance to operators of existing systems with compliance problems to training community leaders to address housing and environmental safety problems. Terry observed that many operators of rural water and wastewater systems are not certified and can benefit from training and technical assistance from VWP. VWP also offers educational programs for people who have installed plumbing in their own homes, to ensure that owner-installed plumbing provides uncontaminated water and directs sewage to a septic system or

public sewer. VWP also organizes and trains student volunteers in construction and other tasks in rural communities and provides educational programs in rural primary schools on water safety and water conservation. VWP staff has also assisted localities in preparing solid waste management plans.

At the Commission's final meeting, it endorsed Terry's request for an increase in the Virginia Water Project's appropriation for the second year of the biennium of $350,000.

Respectfully submitted,

Senator Charles J. Colgan, *Chairman*
Senator Mark Earley
Senator Madison M. Marye
Senator Stanley C. Walker
Senator Martin E. Williams
Delegate Watkins M. Abbitt, Jr.
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John C. Van Hoy

APPENDICES

VIRGINIA ASSOCIATION OF COUNTIES

1001 East Broad Street • Suite LL 20 • Richmond, Virginia 23219-1928 • (804) 788-6652 • fax (804) 788

October 13, 1995

Mr. Peter W. Schmidt
Director
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

Dear Peter:

During its most recent meeting, VACo's Steering Committee on Planning, Public Works and Natural Resources discussed the status of ongoing state programs to ensure the availability of ground water for communities which depend on it as an essential resource for human consumption and economic development. Most specifically, members of the Committee are interested in receiving information on DEQ's progress in implementing the Ground Water Management Act of 1992.

Protection of ground water supplies is critical on the Eastern Shore where large withdrawals have unexpectedly reduced groundwater availability for some of Accomack County's residents. In light of this information, many county officials have developed a greater appreciation and recognition of the need for state programs that will effectively protect ground water supplies.

The major purpose for the Ground Water Management Act of 1992, as we understand it, was to allow for sufficient ground water withdrawals while also assuring long-term availability to accommodate a variety of necessary uses. Members of the State Water Commission, which played the key role in developing the legislation, expressed concerns that unless Virginia were to strengthen its program for permitting ground water withdrawals, expedited salt water intrusions into aquifers would be more likely to occur. There is now evidence to suggest that demand for ground water is increasing in ground water management areas. We are concerned that if the Ground Water Management Act of 1992 is not aggressively implemented and enforced, an exhaustion of consumable supplies will occur sooner than expected. For affected communities, such an event would be devastating.

We understand that until new permits are approved pursuant to §62.1-260 of the Ground Water Management Act, facilities may continue to withdraw ground water at rates allowed under the older permits. Under this scenario, the schedule for the depletion of supplies could accelerate.

A major provision of the Ground Water Management Act of 1992 was the removal of the agricultural community's exemption from requirements to obtain ground water withdrawal permits. While we understand that many agricultural operations have applied for new permits, we are concerned that such permits (which should set reasonable withdrawal limits) cannot be approved until the State Water Control Board enacts new regulations applicable to agricultural

operations. Until these permits for agricultural withdrawals are approved, such operations may continue to withdraw ground water at rates that could easily exceed levels existing when agricultural operations were exempted.

In light of the concerns so far identified in this letter, VACo's Steering Committee on Planning, Public Works and Natural Resources is compelled to raise the following questions to the Department of Environmental Quality:

- What kinds of enforcement mechanisms have been employed to prevent, to the maximum extent possible, illegal withdrawals of groundwater in groundwater management areas?
- Is the Department of Environmental Quality sufficiently staffed to conduct a timely review of applications for new groundwater management permits as required under § 62.1-260 of the Act?
- Has the Department of Environmental Quality created any mechanism for monitoring compliance with the new permits issued under the Act?
- Has the Department of Environmental Quality taken action to compel all facilities requiring new permits to submit their applications within the required deadlines?
- When is the anticipated time when new regulations, applicable to agricultural groundwater withdrawals, will be finalized?

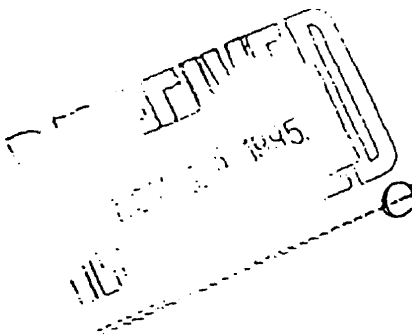
We look forward to receiving your response. We are willing to discuss this matter with you in further detail.

Thank you for your consideration of the concerns raised in this letter. Please do not hesitate to contact me at (804) 343-2504 if you have any questions.

Sincerely,

Larry Land
Intergovernmental
Relations Coordinator

cc: The Honorable [illegible]



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

November 9, 1995

P. O. Box 10009
Richmond, Virginia 23240-00
(804) 762-4000

Mr. Larry Land
Virginia Association
of Counties
1001 East Broad Street
Suite LL 20
Richmond, Virginia 23219-1928

Dear Mr. ~~Land~~ Larry:

I have received your letter of October 13, 1995, regarding the Ground Water Management Act of 1992. I appreciate your organization's concern regarding the proper management of the ground water resources of the Commonwealth. The following are responses to your six specific questions.

Ground Water Withdrawal Enforcement: All current permit holders are required to report their withdrawals to DEQ. Typical permit conditions require quarterly reporting of monthly ground water withdrawal amounts. These ground water withdrawal reports are currently spot checked by staff (please also see the response related to monitoring compliance). This type of self monitoring is typical of most permitting programs. The Agency's overall enforcement strategy is currently being revised to coincide with the regionalization of our enforcement function. Enforcement of ground water withdrawal permits will be an element in this revised strategy.

Staffing: Section 62.1-260 of the Ground Water Management Act of 1992 requires the re-issuance of all permits that were granted under the Ground Water Act of 1973. This section of the legislation was specifically written to allow such permit holders to continue their withdrawals so long as they submit applications by mandated deadlines. This flexibility is being used to issue new permits under the Ground Water Management Act of 1992 on a staggered basis to create a constant workload for staff. This is a much better solution, from a staffing standpoint, than to have a large number of ground water withdrawal permits that are all due for re-issuance every ten years. The Agency is continually evaluating our programs and priorities to assure that staff is efficiently utilized.

Compliance Auditing: My staff has developed an automated database to manage all information related to ground water withdrawal permits. I have plans to investigate the feasibility of developing (and develop, if possible) a compliance auditing module for this database. Conceptually, such a system will be used to store all ground water withdrawal reporting information, automatically print reports documenting non-compliance with withdrawal or other permit limitations, and print notices of such violations to be sent to the permittee. I anticipate that the feasibility evaluation will be completed during this fiscal year and that development of a system will begin contingent on available resources.

Application Deadlines: Each person that held a ground water withdrawal permit issued under the Ground Water Act of 1973 was mailed a notice that included a preliminary application about ninety days prior to each deadline. All persons who reported agricultural ground water withdrawals under the Virginia Water Use Reporting Regulation who were located in a ground water management area were also mailed such a notice. In addition, letters were sent to each county extension agent within ground water management areas informing them of the deadline for submission of applications for existing agricultural withdrawals. Based on these mailings, the agency has received about 250 applications from persons who held permits issued under the Ground Water Act of 1973 and about 100 applications from persons with existing agricultural ground water withdrawals. Approximately 40 new permits have been issued to the 250 persons who held permits under the Ground Water Act of 1973. These 40 permittees were willing to accept new permits based solely on their historic withdrawals. The majority of the remaining applicants in this category have expressed a desire to withdraw more water than they historically withdrew. Section 62.1-260 of the new Act specifically allows such an application and requires that DEQ treat such applications as new withdrawals. Each existing permittee that indicated a desire to increase their withdrawals above historic levels has been mailed a new application. Staff will begin the process of requiring these persons to submit new applications during this fiscal year. No action is anticipated on agricultural ground water withdrawal applications for existing withdrawals prior to the revision of the Ground Water Withdrawal Regulation to include specific requirements for this class of permits.

Agricultural Ground Water Withdrawal Regulations: As you are aware, all regulations are currently being reviewed subsequent to Executive Order #15. The existing Ground Water Withdrawal Regulation and the need for withdrawal regulations specific to agricultural withdrawals will be reviewed concurrently. The Agency is currently accepting comments regarding the Ground Water Withdrawal Regulation as we begin the review process. This comment period will end on December 1, 1995. A Notice of Intended Regulatory Action was filed in the fall of 1993 for the purpose of amending the Ground Water Withdrawal Regulation to include specific agricultural requirements. Two public meetings were held in the fall of 1993. Based on the outcome of the regulatory review, it is anticipated that the development of agricultural amendments will proceed during the late summer of 1996.

I hope that my responses are sufficient to answer the questions and concerns expressed in your letter. If I can be of additional assistance, please feel free to contact me. If you have specific questions regarding the Ground Water Withdrawal Regulations, please feel free to contact Mr. Terry Wagner at (804) 762-4043.

Yours truly,

Peter W. Schmidt

PWS/tdw

cc: Mr. Terry D. Wagner

Appendix C

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

DR. ALAN P. KRASNOFF, CHAIRMAN • BENJAMIN F. SEAWELL, JR., VICE CHAIRMAN • ROBERT M. MURPHY, TREASU
ARTHUR L. COLLINS, EXECUTIVE DIRECTOR/SECRETARY

January 12, 1996

Mr. Peter Schmidt, Director
Department of Environmental Quality
Post Office Box 10009
Richmond, Virginia 23240

Re: Ground Water Withdrawal Regulation (WAS:102)

Dear Mr. Schmidt:

Over the last several years, the Hampton Roads Planning District Commission staff (HRPDC) and the Directors of Utilities Committee has met with DEQ staff on several occasions to discuss our concerns about effective management of the Commonwealth's ground water resources. Most recently, we discussed those concerns in the context of the Commonwealth's review of the Ground Water Withdrawal Regulation (VR-680-13-07). Although the HRPDC participated in the public review of the regulation, we believe that the ground water management issues are so important that we want to share our comments directly with you.

Enclosed for your consideration is a copy of the consensus statement reached by the HRPDC Directors of Utilities Committee at its November 3, 1995, meeting. The statement, "Comments of the Staff of the Hampton Roads Planning District Commission on Behalf of the Directors of Utilities Committee on the Ground Water Withdrawal Regulation," identifies a number of issues that we have requested the Department of Environmental Quality (DEQ) and the State Water Control Board (SWCB) to review pursuant to the "Schedule for Comprehensive Review of Regulations," published in the Virginia Register of Regulations on September 18, 1995.

Through the HRPDC, the region's local governments have, since 1986, provided funding for a regional ground water management program. Current regional ground water management projects include a cooperative continuing study with the USGS, which involves maintaining a water level monitoring network and conducting a comprehensive ground water chloride study. Significantly, this program also supports the HRPDC ground water technical assistance program, which includes the Hampton Roads Regional Mitigation Program, support for various local ground water studies and ground water education.

MAILED

JAN 12 1996

HRPDC

JMC

HEADQUARTERS • THE REGIONAL BUILDING • 723 WOODLAKE DRIVE • CHESAPEAKE, VIRGINIA 23320 • (804) 420-8300
PENINSULA OFFICE • HARBOUR C... STREET • SUITE 502 • HAMPTON, VIRGINIA 23669 • (804) 728-2067

Our region's involvement in ground water projects stems from our understanding of the socioeconomic importance of managing the ground water resources of the Hampton Roads area. Since the Coastal Plain ground water system extends far beyond the Hampton Roads area, we believe effective management of this resource requires a strong state and local partnership. That partnership depends on the ability of the State to address ground water issues throughout the Coastal Plain and not just in the Ground Water Management Areas.

The staff of the HRPDC and its member local governments appreciate your interest in the ground water regulations and would be pleased to discuss our concerns with you and to work with the DEQ staff and the SWCB in further refining the Ground Water Withdrawal permitting program.

Sincerely,

Arthur L. Collins
Executive Director/Secretary

SRE:lw

Enclosure

cc: HRPDC Directors of Utilities
w/enclosure

COMMENTS OF THE
STAFF OF THE HAMPTON ROADS PLANNING DISTRICT COMMISSION
ON BEHALF OF THE DIRECTORS OF UTILITIES COMMITTEE
ON THE EXISTING GROUND WATER WITHDRAWAL REGULATION

In October 1995, the Department of Environmental Quality (DEQ) issued a Notice of Public Hearing and Public Comment Period on several existing regulations which included the Ground Water Withdrawal Regulation (VR 680-13-07). The Ground Water Withdrawal Regulation implements the Ground Water Management Act of 1992. The HRPDC and Directors of Utilities Committee (formerly the Regional Ground Water Committee) reviewed and commented on the Notice of Intended Regulatory Action in August 1992 and the Proposed Regulatory Action in February 1993.

The staff of the Hampton Roads Planning District Commission (HRPDC) recognizes the difficult task faced by the DEQ and the SWCB in reviewing the regulations to ensure that they meet the environmental and socioeconomic characteristics of the Commonwealth, while also considering the management needs of the aquifer system. In that respect, the HRPDC staff and the Directors of Utilities Committee appreciate the opportunity provided by the DEQ and the SWCB for interested parties to provide input to this regulatory review. The Commission's Directors of Utilities Committee is comprised of members representing the region's fifteen local governments.

During its monthly meeting on November 3, 1995, the Directors of Utilities Committee discussed the current status of the Ground Water Withdrawal Regulation with DEQ staff. Based on this discussion, the Committee reached consensus on a number of administrative and technical points which are documented in this Statement. The Committee requests that these comments be considered by the DEQ and the SWCB during its review of the Regulation.

The consensus reached by the Committee reflects the Hampton Roads region's twenty plus years of experience with ground water regulations under the Ground Water Act of 1973 and the Ground Water Management Act of 1992. It also reflects the "Position Statement of the Hampton Roads Planning District Commission on Proposed Amendments to the Virginia Ground Water Act" endorsed by the HRPDC at its Executive Committee Meeting on December 18, 1991, the "Comments of the Staff of the Hampton Roads Planning District Commission on Behalf of the Regional Ground Water Committee on the Proposed Ground Water Withdrawal Regulation," presented to the DEQ staff on August 19, 1992, and the "Comments of the Hampton Roads Planning District Commission on the Proposed Ground Water Withdrawal Regulations" endorsed by the HRPDC and presented to the SWCB at a public hearing on February 23, 1993. Those statements recognize that the ground water system of Eastern Virginia is stressed and that improvements in the existing management system are necessary to protect not only the resource but also the

socioeconomic vitality of the region. Technical comments on and recommendations concerning the existing regulation are as follows:

1. In August 1992, the HRPDC staff and the Commission's Regional Ground Water Committee recommended that the SWCB form an Advisory Committee of affected parties to assist it in developing the regulation prior to formal SWCB action on a proposal. An Advisory Committee was formed by the SWCB to assist in dealing with agricultural withdrawals in May of 1993. The HRPDC appreciated the opportunity for a member of its regional Ground Water Committee to serve on that committee. It should be noted that the regulations dealing with agricultural withdrawals have not yet been fully implemented. The Directors of Utilities Committee is concerned with the magnitude of large unpermitted agricultural withdrawals and their possible implications for predicting available community ground water resources. The Committee recommends that the State finalize and proceed to implement this important part of the Ground Water Management Regulation.

2. The December 1991 "Position Statement" of the HRPDC indicated the Commission's belief that additional financial and technical resources should be made available to the DEQ to improve its ability to analyze and evaluate ground water withdrawal proposals requiring permits under this regulation. The magnitude of the permitting task and the critical nature of the ground water resource dictates that adequate resources be available if the resource is to be managed in the most effective manner. It does not appear that adequate resources have been made available. Therefore, the Committee still believes that the resources be sufficient to implement the ground water permitting program to levels commensurate with the Air Quality and the Virginia Pollutant Discharge Elimination System (VPDES) permitting programs. In both of these programs, the state maintains the data bases and computer modeling capability, provides direction in the technical studies required for these permits, and has enforcement capabilities to require facilities without permits to come into compliance. This approach appears to be a cost effective approach to managing environmental quality. Using these programs as a model for the Ground Water Management Program will require the DEQ to further develop and/or maintain agency capability in data collection, data management, ground water modeling, and enforcement.

   The data collection and management recommendations stem from the continuing concern of all communities about the extensive data requirements associated with the application for a permit under the current regulation. Each applicant is required to retain private consultants or other outside assistance to develop the information and impact analysis necessary to enable the DEQ staff to make informed permit decisions. The effort and cost associated with collecting and analyzing the information by each applicant is often times duplicative. The DEQ STORET data base for ground water users has not been updated since 1991; therefore, each applicant incurs

additional duplicative costs for obtaining current information through a laborious research of hard copy records that are available only in the regional offices instead of accessing the existing data through a computer database that should be maintained by the DEQ. The cost of the manual data collection and of conducting these analyses may have a significant adverse financial impact on a community or industry as it attempts to obtain additional ground water information. Delays in permit review and decision-making attributable to the current data management deficiencies also can have adverse financial impacts on the regulated community.

The ground water system in the management areas is not isolated from the impacts of ground water users located outside of the management boundaries. As a result, the Committee believes that the DEQ should maintain the computer capabilities to simulate the impacts of ground water withdrawals for the entire Coastal Plain Physiographic Province. During the late 1980s, the USGS developed with partial funding from the DEQ, a regionally calibrated model designed to evaluate the impacts of pumpage on the Coastal Plain ground water system. Over the past several years, the resources to update this model or to incorporate this model into the ground water program have not been available. Although it was not necessarily the consensus of the Committee, at least one utility suggested that the DEQ resume the cooperative program with the USGS to refine and maintain regional ground water modeling capabilities.

Furthermore, the DEQ staff must evaluate not only the accuracy of the information collected for each permit but must also evaluate the method or methods used by the applicant to predict the potential impact of additional withdrawal on the aquifer system. The suggested ground water modeling capabilities would provide the DEQ with an important resource to independently evaluate the computer generated results of the impact analysis against a baseline regional computer simulation.

4. Section 3.1.C.2.j requires that a permit application include an evaluation to determine areas of the aquifer that would experience a least one (1) foot water level decline dues to the proposed withdrawal. Prior modeling of the Coastal Plain, suggests an indicator of impact should be a five (5) foot water level decline. Based on the accuracy of ground water models to date, a five (5) foot water level decline criteria would still be technically more appropriate.

5. The December 1991 "Position Statement" of the HRPDC indicated that the relationship between the State Health Department (VDH) permits and the SWCB ground water permit should be clarified. Although specific language regarding the role of the VDH and DEQ does exist in the current regulations for public supply ground water withdrawals, the committee recommends further clarification regarding the role of the two permits in operating a water

supply system and the permitted withdrawal amounts. The VDH Waterworks Permit is based on operating capacity of a public water system in gallons per day. In general, the VDH permit requires the purveyor to operate the public water system at levels which are eighty percent of the capacity or less. The remaining 20 percent is a reserve capacity. The DEQ Ground Water Withdrawal Permit, on the other hand, is based on the projected ground water usage in gallons per month over a twelve month period. The DEQ regulation does provide a condition allowing a public water purveyor to withdraw ground water at a level consistent with the conditions and requirements contained in the VDH permit. However, confusion still arises from this potential significant discrepancy in volume between the operating capacity of a public system as permitted by the VDH and the annual maximum withdrawal limit as permitted by the DEQ. Permit limits for public supply wells need to be made consistent to ensure that public water supplies can meet the health needs and growth assumptions inherent in the Health Department permits, while concurrently protecting the ground water resource as intended by the DEQ permit.

Through the HRPDC, the region's local governments have, since 1986, provided funding to several regional ground water programs. These projects not only facilitate local efforts to be good stewards of the ground water resources, but also enhance the overall understanding of the ground water system. The information collected from these programs also enhances the State's ability to manage the ground water resource. Current regional ground water projects include:

Cooperative Regional Ground Water Management Program- Continuing Studies On behalf of the member localities, the HRPDC administers a cooperative, cost sharing agreement with the USGS to continue to develop and refine the regional ground water model and related ground water data base for Eastern Virginia. Under this program, the USGS is responsible for the collection of field data, computerization of the data, refinement of the existing Coastal Plain Model and computer evaluation of the data. This project currently encompasses two discrete, but mutually supportive, elements:

- Water Level Network
- Comprehensive Ground Water Chloride Study

Regional Ground Water Management Program-Mitigation Administration Water Technical Assistance The fifteen member localities have provided funding for the HRPDC to support a planner/engineer with ground water hydrology and computer modeling expertise to provide ground water technical support to the member localities. This project includes the following activities:

- Hampton Roads Regional Mitigation Program.
- Local Ground Water Studies.
- Ground Water Education.
- Administrative Support and Coordination for Cooperative Ground Water Programs with the USGS.

The involvement of the staff from the HRPDC and its member localities in ground water projects stems from our understanding of the importance of managing the ground water resources of the Hampton Roads area.

The Coastal Plain ground water system extends far beyond the Hampton Roads area. Effective management of that resource requires a strong state and local partnership. That partnership depends on the ability of the state to address ground water issues throughout the Coastal Plain. The staff of the HRPDC and the Directors of Utilities Committee hope to continue working cooperatively with the DEQ staff to pursue such a partnership in this important endeavor.

Appendix D

COMMONWEALTH OF VIRGINIA

CHARLES J. COLGAN
29TH SENATORIAL DISTRICT
PRINCE WILLIAM, NORTHERN
MANASSAS, MANASSAS PARK
P.O. BOX 1650
MANASSAS, VIRGINIA 22110

SENATE

COMMITTEE ASSIGNMENTS
COMMERCE AND LABOR, CHAIRMAN
FINANCE
GENERAL LAWS
LOCAL GOVERNMENT
RULES

September 24, 1996

Mr. Thomas L. Hopkins, Director
Department of Environmental Quality
Post Office Box 10009
Richmond, Virginia 23240

Dear Mr. Hopkins:

As you know, the State Water Commission is, pursuant to Item 6#1h of the budget, reviewing the ability of your agency to enforce ground water management statutes and regulations. Recently, Terry Wagner testified before Commission on the status of DEQ's efforts to implement the ground water program, and his presentation was very informative. Several members of the Commission, however, expressed concern about the rate at which the Ground Water Management Act of 1992 is being implemented. According to the information provided by Mr. Wagner, for example, very few permits have been issued under the Act in comparison to the number of permit applications the agency has received.

It seems logical to assume that the DEQ's pace in implementing the program is directly related to the staff and technical resources the agency has committed to the program. And as the budget item directed the Commission to evaluate "the sufficiency of resources within the agency," the Commission requests that DEQ provide more details on this subject. Specifically, we ask that you or your deputy director come to the next meeting and provide the following information:

- During his presentation, Mr. Wagner mentioned many tasks that must be accomplished in order for DEQ to have a fully effective ground water management program. Please provide a list of dates by which DEQ expects to complete each of these tasks.

- Please provide a detailed staffing profile for the personnel that was assigned to the program prior to the September 11 Commission meeting, including job descriptions, educational background required for the position, whether each person is assigned to the central or a regional office, and the amount of time each person is assigned to other programs, if any.

- For persons hired to work on the program since the last Commission meeting and personnel the agency plans to hire to work on the program, please provide the same information as for currently assigned personnel. In addition, please estimate the amount of training time such

new personnel will require, and explain whether you plan to hire for these positions from within or outside the agency. If persons have recently been reassigned from another program to the ground water program, please provide their former job descriptions.

- Please provide an estimated budget that projects the cost of implementing the program over each of next five years.

- What staff and technical resources will it be necessary for the General Assembly to authorize in order to enable DEQ to accomplish its Ground Water Management Act goals more rapidly?

You will receive notice when a final date for the meeting, planned for the week of October 21st, has been set. Please feel free to call the Commission staff (Nikki Beyer, Shannon Varner or Marty Farber, 786-3591) if you have any questions.

Sincerely,

Charles J. Colgan
Member, Senate of Virginia
Chairman, State Water Commission

cc: The Honorable Robert S. Bloxom
Members of the State Water Commission

Appendix E

State Water Commission Presentation
October 24, 1996

1. Tasks and Completion Dates
   A. Adopt amendments to ground water withdrawal regulations to include agriculture Late Fall 1997
   B. Develop in house capabilities to perform technical evaluations of impacts of proposed withdrawals (Ground Water Modeling Position)
      Hire Ground Water Modelling Position December 1996
      Capabilities Developed April 1997
   C. Develop data management capabilities for ground water withdrawal information (Ground Water Data Management Position)
      Consider transfer of existing staff October 1996
      Procure short term data management contractual services October 1996
   D. Issue ground water withdrawal permits for all existing applications Date uncertain, dependent upon the successful completion of Tasks A through C
   E. Develop ground water research function Date uncertain, function will be developed over next two to five years with available funding

2. Existing Staffing Profile

Positions that directly support program

Ground Water Withdrawal Permit Writers

Job description: Review ground water withdrawal permit applications and prepare ground water withdrawal permits for issuance. Perform other duties related to the management of ground water withdrawal permits such as reviewing permit reports to assure compliance with permits and recommending appropriate actions for permit violations.

Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description. Typically requires some level of education, training, or experience in geology or ground water hydrology.

Three Positions: Two positions assigned to the Tidewater Regional Office and one Position assigned to the Piedmont regional Office.

Time assigned to other programs: Positions in Tidewater Regional Office assigned no tasks not directly related to ground water withdrawal management. Position in Piedmont Regional Office assigned to other ground water related tasks for approximately 30% of time.

Ground Water Withdrawal Program Manager (Office of Ground Water Management Director)

Job description: Manages and supervises agency central office ground water withdrawal management and ground water protection programs. Interprets Ground Water Management Act of 1992, promulgates regulations to

implement the Act, manages the Agency's ground water modelling, ground water data collection, and ground water data management efforts.

Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description. Typically requires some level of education, training, or experience in geology or ground water hydrology and environmental program management.

One position assigned to Central Office.

Time assigned to other programs: Approximately 15% of time assigned to management of the Agency's ground water protection program.

Ground Water Withdrawal Program Planner

Job description: Provide technical support to the regional offices in the evaluation of ground water withdrawal applications and the issuance of permits. Coordinates the annual USGS/DEQ cooperative ground water modelling project. Serves as the Agency's primary technical resource for ground water conditions statewide, but especially in the two existing ground water management areas.

Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description. Typically requires some level of education, training, or experience in geology or ground water hydrology and the collection and analysis of ground water information.

One position assigned to Central Office.

Time assigned to other programs: None

Ground Water Protection Program Planner

Job description: Serves as the interim manager of the automated Ground Water Permit Tracking System. Procure and coordinate short term contractual services to update the data tracking system.

Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description.

One position assigned to Central Office.

Time assigned to other programs: 80% of time assigned to the implementation of the Agency's ground water protection program.

(NOTE: This is a temporary assignment that will end when the Agency fills the full time ground water data management position.)

Position that indirectly support program

Environmental Specialist

Job description: Conducts ground water levels measurements, maintains ground water research stations, and compiles ground water levels data.

Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job

Description.
One position assigned to the Charlottesville Satellite Office.
Time assigned to other programs: 40% of time assigned to collection of surface water data.

3. No positions have been filled since September 11.
Ground Water Modelling Position
Job description: Provide assistance to the regional offices in the issuance of ground water withdrawal permits by performing technical evaluations of proposed ground water withdrawals. These evaluations will be performed using the USGS Coastal Plain Flow Model, where appropriate, and other flow models as required. conduct simulations of the effect of total permitted ground water withdrawals using the USGS Coastal Plain Flow Model.
Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description. Typically requires some level of education, training, or experience in geology, ground water hydrology and the application of regional and site specific ground water flow models to evaluate ground water supply issues.
One position will be assigned to the Central Office.
Time assigned to other programs: None
The Agency investigated the transfer of an existing employee to this position since the meeting on September 11. Although an existing employee has been determined to be minimally qualified, the decision has been made to advertise the position to the general public. An ideal candidate will have experience in the application of the USGS Coastal Plain Flow Model and will significantly reduce the time required to develop operational capabilities to apply this model. The position will be advertised as soon as possible.

Ground Water Data Management Position
Job description: Maintain and upgrade the automated ground water withdrawal permit data management system. develop data management capabilities that are compatible with the USGS Coastal Plain Flow Model and coordinate the transfer of all ground water data required to update the Coastal Plain Flow Model to the USGS.
Educational Background Required: Any combination of education, training and experience indicative of skills necessary to perform tasks associated with Job Description. Typically requires some level of education, training, or experience in geology or ground water hydrology, the application of relational data management systems, and the management of geographically related data.
One position will be assigned to the Central Office.
Time assigned to other programs: None
The Agency is currently investigating the transfer of an

existing employee into this position. A decision will be made to either transfer an existing employee or advertise this position to the general public by November 1.

4. Estimated budget for implementing the program.

FY96	
Ground Water Withdrawal Program Manager	50,750
Ground Water Withdrawal Program Planner	42,877
Ground Water Protection Program Planner	13,135
Contractual Services	10,000
Unit Budget	1,125
USGS/DEQ Modelling Project	100,000
Ground Water Withdrawal Permit Writers (3)	171,357
Ground Water Field Technician	48,375
USGS/DEQ Ground Water Monitoring Project	37,500
FY96 TOTAL	**475,119**

Total positions 6

FY97	
Ground Water Withdrawal Program Manager	50,750
Ground Water Withdrawal Program Planner	42,877
Ground Water Modeler	58,415
Ground Water Data Management Technician	49,314
Unit Budget	51,125
USGS/DEQ Modelling Project	100,000
Ground Water Withdrawal Permit Writers (3)	171,357
Ground Water Field Technician	48,375
USGS/DEQ Ground Water Monitoring Project	37,500
FY97 TOTAL	**609,713**

Total Positions 8

FY98	
Ground Water Withdrawal Program Manager	50,750
Ground Water Withdrawal Program Planner	42,877
Ground Water Modeler	58,415
Ground Water Data Management Technician	49,314
Agricultural Ground Water Withdrawal Permit Writer	58,415
Unit Budget	1,125
USGS/DEQ Modelling Project	100,000
Ground Water Withdrawal Permit Writers (3)	171,357
Ground Water Field Technician	48,375
USGS/DEQ Ground Water Monitoring Project	37,500
FY98 TOTAL	**618,128**

Total positions 9

FY99	
Ground Water Withdrawal Program Manager	50,750
Ground Water Withdrawal Program Planner	42,877
Ground Water Modeler	58,415
Ground Water Data Management Technician	49,314
Agricultural Ground Water Withdrawal Permit Writer	58,415
Ground Water Research Geologist	49,314
Ground Water Research Driller	49,314
Ground Water Research Driller Assistant	41,697

Unit Budget (Support truck @ 30k, Research Drilling operating expense @ $75K)	106,125
USGS/DEQ Modelling Project	100,000
Ground Water Withdrawal Permit Writers (3)	171,357
Ground Water Field Technician	48,375
USGS/DEQ Ground Water Monitoring Project	37,500
FY99 TOTAL	**863,453**

Total positions 12

FY00	
Ground Water Withdrawal Program Manager	50,750
Ground Water Withdrawal Program Planner	42,877
Ground Water Modeler	58,415
Ground Water Data Management Technician	49,314
Agricultural Ground Water Withdrawal Permit Writer	58,415
Ground Water Research Geologist	49,314
Ground Water Research Driller	49,314
Ground Water Research Driller Assistant	41,697
Unit Budget (Research drilling operating expense @ $75K)	76,125
USGS/DEQ Modelling Project	100,000
Ground Water Withdrawal Permit Writers (3)	171,357
Ground Water Field Technicians (2)	90,069
USGS/DEQ Ground Water Monitoring Project	37,500
FY00 TOTAL	**875,150**

Total positions 13
(FY99 and FY00 budgets assume reinstating research drilling functions with existing equipment. Purchasing new equipment or contracting this service to the private sector will result in increased costs.)

5. Staff and technical resources necessary to implement the program more quickly.
The GA could supply additional resources in the 99-00 biennium to support research drilling function. This would require:
FY99 3 additional FTEs and $245,325 in additional funding.
FY00 1 additional FTE and $11,697 in additional funding (above FY99 level)

Virginia Department of Health

September 3, 1996

WATERWORKS PERMIT APPLICATION - *PART C - Comprehensive Business Plan*

Return to appropriate geographical Virginia Department of Health Engineering Field Office

I request that this business plan (be __)(not be __) retained in confidence to the extent allowed by Code of Virginia section 32.1-172 B.

*Applicant printed name:*_____ *signed:*_____ *date:*_____

WATERWORKS APPLICATION PART C - Business Plan — PAGE #

1. Executive summary
   - General overview that highlights company history and personnel experience _____
2. Background - Company description and qualifications
3. Operations and management _____
   - Management
   - Operation procedures
   - Other
   - Emergency response procedures including 24 hour phone number
4. Technical - overlaps with Waterworks Permit Application PART D - Preliminary Engineering Report
   - a. General information _____
   - b. Alternatives
   - c. Waterworks _____
     - Description
     - Design criteria
     - Evaluation of waterworks
       - source description
         - water quality
         - source protection
         - safe yield (including withdrawal permits and permit limitations)
         - treatment
       - storage
       - distribution
       - hydraulics
       - operation and maintenance analysis
   - d. Capital Improvement Program _____
     - summary of waterworks deficiencies from 4c above
     - 20 year improvement schedule
     - 6 year improvement schedule
5. Financial program capability _____
6. APPENDICES _____

PART C.1. *Comprehensive Business Plan* EXECUTIVE SUMMARY

Provide a general overview that highlights company history and personnel experience.

PART C. 2. *Comprehensive Business Plan* BACKGROUND INFORMATION

In addition to an owner's background and experience, each new and existing (that is required to provide a comprehensive business plan) waterworks applicant shall provide the name, company affliation, address, phone number, qualifications and any membership in professional water industry organizations of :

(1) **Owner**

(2) **Office** - both the mailing and delivery location of the company's office(s):

(3) **Budget** -person/company who will be responsible for budget preparation and administration:

(4) **Tax returns and annual audit reports** - person responsible for filing.

(5) **Operatoring personnel** - person(s)/company(s) who will be responsible for routine operations including sample collection, maintenance, customer billing and collections, repairs, emergency service and daily management. Describe the technical background and experience of the operatoring personnel

(6) **Licensed Operator** - list the responsible person and their license number assigned by the Virginia Department of Professional and Occupational Regulation (DPOR).

(7) **Manager** - person/company who will manage the waterworks, if different from operatoring personnel.

(8) **Cross connection and backflow prevention program** - person who will be in charge of this program.

(9) **Professional Engineer** - list the person(s) and their Virginia DPOR license number(s) and firm(s) that will be responsble for PER development, plans and specification preparation, construction inspection, ongoing evaluations and reports. The term professional engineer as used in this document means a professional engineer licensed in Virginia.

PART C 3. *Comprehensive Business Plan* OPERATIONS AND MANAGEMENT

The Operations and Management Plan specifies the commitments needed to provide effective management and operation of the waterworks. The information represents three areas of concern:

- identification of the qualifications of owners, managers, and operators of the waterworks sufficient to document that they are responsible individuals or organizations;
- an operating plan to define the tasks to be performed in managing and operating the waterworks; and
- a plan of reporting to and review by the VDH to determine that the commitments made for proper operation and management of the waterworks does occur.

1. Items to be addressed - by new and existing waterworks

a. Management issues

(1) **Annual budget** - Describe the formulation process.

(2) **Controls** - Describe the controls that will be in place to keep operations within budget and the sanctions or consequences for budget overruns.

(3) **Cost sharing** - Describe any sharing of physical plant, staff, or other items with other nearby waterworks to reduce costs?

(4) **Capital Improvement Plan (CIP)** - Describe the planning process to be implemented. Assign responsibilities providing for future needs of the customers, including the increase of future supplies and extensions for new customers as may be necessary. Describe the financial structure (bonds, bank loan, personal funds, etc.) to support the waterworks.

This document is updated annually by the owner as part of his six-year budget update (refer to Part C 5).

(5) **Operator contract** - Provide a signed agreement or contract, between owner and operator, under which the proposed operator will serve.

(6) **Operator** - Describe (a) the limits of the operator's authority
(b) the ongoing training provided or required
(c) the number of hours on-duty per day (per week).

(7) **Mandatory connection** - Describe any policy on mandatory hookup for any connection in the waterwork's service area.

b. Operations issues

Procedures - Provide a copy of the written procedures for :

(1) *Maintenance*
Leak detection - Provide procedures, a schedule, and an accounting method to be used to determine water loss.
Waterworks maintenance - Provide documentation of a program for routine waterworks maintenance.
Spare parts - Provide a spare parts inventory listing.

(2) *Customer billing and collections*
Water service - Provide documentation of adequate procedures for providing water service, including turn-offs of customers for nonpayment of bills.

(3) *Customer complaints*
Complaints -Provide a description of procedures for handling customer complaints.

(4) *Daily operation of the waterworks*

Sampling and Reporting - Provide a plan (including the procedures, methods, schedule and location) for conducting required sampling, testing, and reporting regarding: water quality testing; pressure testing; production metering; and customer meter testing.

Safety - Provide procedures for operator safety:

Compliance - Describe monitoring and reporting requirements and a scheduling mechanism to assure compliance.

Compliance Records - Describe how records are maintained to document compliance.

Cross connection control and backflow prevention program plan - Provide a program consistent with the Waterworks Regulations.

c. Other

(1) **Records** - Provide a plan for maintaining the required records including at least: as-built service area maps; water quality, pressure, metering and other tests; customer and production metering; energy use; chemical use; water levels; and financial records.

(2) **Water source protection** - Provide procedures to protect the water source(s) from existing and future contamination:

(3) **Emergency plan** - Provide written emergency operating procedures for a flood, drought, major equipment failure and source water contamination:

(4) **Water conservation** - Describe water conservation procedures.

2. In addition to the above, address the following for Existing Waterworks

a. **Capital Improvement Plan** -

Provide the average ages of major treatment and distribution sub-waterworks, and what fraction of their useful life has already passed (¼, ½, etc.).

Provide a funding mechanism to replace these major waterworks components at the end of their useful service life.

Provide a waterworks improvement plan with schedule and source(s) of funding.

b. **Problems and Complaints** - Describe occasions of pressure problems, shut-downs, outages, or customer complaints.

c. **Technical Assistance** - Describe any regular or occasional technical assistance from outside sources, such as the state, your engineer, other utilities, or organizations specifically dedicated to providing technical assistance.

d. **Problems** - Describe problems identified by regulatory agencies and plans for correction.

e. **Actions** - Describe your past and future activities to comply with monitoring, reporting requirements.

PART C. 4. ***Comprehensive Business Plan*** **- TECHNICAL DATA**

Most data needed for the business plan is provided by the separately required Preliminary Engineering Report (PER) described in the Waterworks Regulations. Following are additional data necessary for an acceptable business plan;

reflecting increased emphasis on:

(1) long-term planning needed to improve projected financial needs.

(2) investigating alternatives to new waterworks creation.

In addition to the PER, the following items are needed:

1. **General information:**

   a. Provide an assessment of Safe Drinking Water Act (SDWA) and Clean Water Act (CWA) compliance requirements for existing and/or proposed facilities.
   b. Describe problems identified by regulatory agencies and Waterworks owner's plans for proposed correction.
   c. Provide a description of the nature and extent of the existing and future (20 year and 40 year) area to be served; and existing water service deficiencies in those areas. (The PER requires only a description of the area to be served.).
   d. Describe existing water and sewerage facilities' impacts on the source quantity of the proposed waterworks; (the PER requires review of quality and operation impacts) and provide an appraisal of any existing waterworks deficiencies. (The PER requires a description of existing waterworks and sewerage facilities.).
   e. Provide an implementation schedule for design, funding, permitting, construction, and expansion.

2. **Consumption & flow:**

   a. Provide existing waterworks leakage rate.
   b.. Provide actual consumption and flow demands of existing waterworks (PER requires design flow values).
   c. Describe existing, currently proposed and potential future interconnections with other waterworks.
   d. Describe plans for metering water production, wholesale, and retail accounts.

3. **Alternate plans:**

   a. For each source of water supply considered, provide a description of the site, advantages and deficiencies of each, and the analysis leading to source selection. Upstream and downstream discharges and withdrawals, and extension and expansion of existing facilities must be reviewed.

   b. Provide an assessment of alternatives for integration of the waterworks into adjacent waterworks. Institutional and facilities options must be reviewed.

PART. C. 5. *Comprehensive Business Plan* FINANCIAL

I. General

This section contains four criteria that are compared with budgeting information to determine the financial strength of the waterworks. *The purpose is to verify that the owner has a reasonable expectation of generating sufficient revenue to operate a reliable waterworks over the long term.*

A six year budget projection is prepared and submitted initially; in addition after the waterworks begins operation, the financial worksheets are filed:
(1) semi-annually for the first two years and
(2) annually for at least six years or until the VDH determines the worksheets can be waived based on satisfactory performance and compliance.

The ***Financial Analysis*** for new and expanding community waterworks consists of four related financial comparsions. This covers a forward looking six-year planning period. The first three individual analyses examine the adequacy of the waterworks's operating budget, operating cash reserve, and emergency reserve. The fourth analysis, the household median income, allows evaluation of the water rate impact on waterworks users. The four criteria are listed below. A more detailed description follows.

Analysis #1 Operating Budget Summary: Revenues - Expenses ≥ 0

Analysis#2 Operating Cash Reserve Summary:Operating Cash Reserve ≥ 1/8 x Annual O&M +G&A

Analysis #3 Emergency Reserve Summary: Emergency Reserve ≥ Cost of Most Vulnerable Facility

Analysis #4 Household Income Index Analysis Summary: Rates ≤ 1½ percent x MHI

Although an owner develops and submits a six-year budget for the Financial Analysis, the owner should review/update the budget at least every three months and a Capital Improvement Plan (CIP) every year. If a problem arises, VDH may request submission of an updated budget and CIP.

Attached are details and blank worksheets 1 - 5 for an owner to use to develop a budget, complete the analysis and submit the following:

Financial Analysis - Certified Public Accountant or Professional Engineer submittal
Worksheet 1. Six-Year Operating Budget Form
Worksheet 2. Projection of Water Revenues
Worksheet 3. Operating Cash Reserve Disclosure Form
Worksheet 4. Emergency Reserve Disclosure Form
Worksheet 5. Financial Analysis Summary Sheet

The **State Corporation Commission** (SCC) requires waterworks owners that they regulate to establish a standard accounting system. Contact the SCC for more information.

II. Completing The Financial Analysis

The owner's consultants (professional engineer, certified public accountant,) complete a six-year budget using the PER/Business Plan and the information and worksheets provided herein. Reference material entitled "Developing an Operating Budget" is available.

After all 56 lines of the budget (Worksheet 1) and the projection of water revenues (Worksheet 2) for the planning period have been completed, the remaining Financial Analysis requirements can be fulfilled. The next action is to establish and fund the operating, emergency and replacement reserves with the funds identified in the budget. The last step in taking the Financial Analysis is to fill out Worksheet 5 - Financial Analysis Summary Sheet.

When the waterworks owner believes he passes the analysis, the Financial Analysis forms are submitted by licensed professionals (Professional Engineer, Certified Public Accountant) to VDH for review and approval.

As stated earlier, the owner may be able to create much of the Financial information and work with his consultants to submit the documents for review and approval.

Financial Analysis - Pass/Fail Consequences

The waterworks owner has direct control over the outcome of the first three analyses (i.e., the waterworks either does or does not perform the required actions). The fourth analysis, however, is only to be used as a tool for determining if the rates are affordable. It may not be within the power of the owner to assure that water rates are less than ***1½ % of median household income (MHI).*** The MHI information is available in the federal census data.

Consequences of Financial Analysis

It is important to note the consequences of either passing or failing the financial analysis with respect to public health and waterworks development. The following consequences apply to either passing or failing the first three financial analyses.

The waterworks owner, by passing the first three financial analyses may be able to:

- manage, operate and maintain a successful waterworks,
- respond in an emergency situation by obtaining needed resources,
- plan for and implement needed improvements to supply growth without interruption,
- improve working relations with lending institutions , and
- facilitate the documentation process for existing and potential financial assistance programs.

Failing the first three financial analyses could lead to:

Determination by VDH that the waterworks is inadequate, which could result in:

- Denial of VDH construction and operation permits
- Denial of building permits by local governments,

- Denial of subdivisions by local governments,
- Denial of home mortgages by lending institutions,
- Receivership action ordered by the courts after action initiated by VDH, as has occurred in past enforcement cases.

Restructuring

For waterworks that fail any of the first three financial analyses, an alternative to growth curtailment or possible receivership action might be restructuring. In this case, alternatives include:

- Merging with an adjacent waterworks,
- Acquisition by another waterworks owner,
- Governmental formation of a water department, water authority or sanitary district, or
- Contracting for management, operation and maintenance service from a qualified operator.

The Financial Analysis can be used as a tool where restructuring is being considered to:

- Assist in determining the cost to restructure, or
- Compare the cost associated with a selected restructuring alternative to the cost to achieve and maintain compliance as an independent waterworks.

Fourth Financial Analysis Consequences

Passing the fourth analysis indicate that rates are within a range generally accepted as affordable. If a waterworks rates are above this range, the owner should recognize that rates may be unaffordable to waterworks users. If a waterworks fails the fourth analysis, VDH suggests the owner investigate restructuring options and provide the findings to the waterworks users.

Public Disclosure

It is important to emphasize that the Financial Analysis is used not only as a tool for determining waterworks adequacy, but also may be used as a public disclosure document for existing and potential waterworks customers. At the option of the owner, the results of the Financial Analysis should be distributed to the customers of the waterworks. Some options for distributing this information include: newsletters, annual reports, bill attachments, and a separate document.

III. Financial Analysis Description

All four individual analyses are discussed below in detail. These analyses demonstrate a certain capacity or ability needed for successful operation of a waterworks.

Analysis #1- Develop An Operating Budget

The first analysis requires the waterworks owner to develop an operating budget that *demonstrates* sufficient revenue to meet all incurred expenses. The initial operating budget is for a six-year period. Review/updates to the budget should be completed at least every three months, including impacts from projects and activities identified in their PER.

During the operating budget process, an owner reviews whether he is generating sufficient revenue to meet estimated expenses. Smaller non-municipal waterworks are generally limited in the amount and type of non-rate revenue available to them. If the waterworks does not have sufficient revenue to meet all of its expenses, it should either raise its water rates or reduce non-essential expenses. The items in an operating budget, and the procedures to develop an operating budget are further detailed in the available reference material entitled 'Developing AN Operating Budget.

Analysis #1 Operating Budget Summary

Revenues - Expenses ≥ 0

Analysis #2- Create And Fund An Operating Cash Reserve

The second analysis requires the owner to *demonstrate* the ability to withstand cashflow fluctuations. There can be a significant length of time between when a waterworks provides a service and when a customer may pay for that service. A study of the waterworks' historic cashflow can accurately quantify the time period between delivery and payment for service. A **45-day difference** is the generally accepted industry norm. Because of this potential delay in payment, most waterworks attempt to keep **at least 1/8** of their annual operating and maintenance (O&M) and general and administrative (G&A) expenses in an Operating Cash Reserve to prevent cashflow problems. The Operating Cash Reserve is essentially the check-book balance an owner maintains to meet cashflow needs and provide contingency funds for unforeseen operating emergencies.

This reserve can be funded initially with:
1) a one-time charge,
2) a transfer of funds from an existing reserve, or
3) funds accumulated in the first year of the budget in the Operating Cash Reserve line item (Worksheet 1, line 43)

If a waterworks does not presently have an existing Operating Cash Reserve equal to or greater than 1/8 its annual operating budget (O & M and G & A), it must *demonstrate* how this reserve will be funded or demonstrate its ability to withstand cashflow fluctuations.

Analysis #2 Operating Cash Reserve Summary

Operating Cash Reserve ≥ 1/8 x Annual O&M + G&A

Analysis #3- Create And Fund An Emergency Reserve

The third analysis requires the owner to *demonstrate* the ability to cover the costs of an emergency or failure of its most vulnerable waterworks component. This can be accomplished either by:
1) developing and funding an Emergency Reserve or
2) obtaining an alternative financing arrangement.

In the Business Plan/Preliminary Engineering Report, a waterworks owner conducts a vulnerability assessment to establish the facility equipment most prone for failure. Generally, replacement of a production well, a source of supply, the largest pumping equipment, or key transmission lines represents the most vulnerable facility and is used to estimate the minimum Emergency Reserve amount.

Determining the emergency reserve level for a waterworks is also a function of management objectives and overall waterworks reliability. If an owner creates an Emergency Reserve, this reserve can be funded initially with:
1) a one time charge,
2) a transfer of funds from existing reserves,
3) funds accumulated in the six-year budget in the Emergency Reserve line item (Worksheet 1, line 48), or
4) an alternative financing arrangement.

Analysis #3 Emergency Reserve Summary

Emergency Reserve ≥ Cost of Most Vulnerable Facility

Analysis #4- Conduct Median Household Income Index Analysis

The fourth and final analysis has the waterworks owner *measure* the rate impact of increased operating and facility expenses on the waterworks users. To complete this analysis the owner should:

1) Compute 1½ **percent** of the respective county's average annual median household income (MHI). The MHI is a value computed by the U.S. Census Bureau.

2) Determine the current and projected average annual residential water bill (for all six years) using either the flat rate or metered rate (for a metered rate, compute average bill from an estimate of average annual residential use identified in your Plan), and

3) Compare the existing and projected average annual residential bill to 1½ percent annual MHI for all six years.

This analysis provides an indication of a residential connection's ability to pay the existing and projected rates. When rates exceed 1½ percent of the MHI in any year of the budget, the waterworks' rates may not be affordable.

Analysis #4 Household Income Index Analysis Summary

Rates ≤ 1½ percent x MHI

Waterworks

Financial Analysis - Worksheet Submittals

Worksheet 1.	Six-Year Operating Budget Form
Worksheet 2.	Projection of Water Revenues
Worksheet 3.	Operating Cash Reserve Disclosure Form
Worksheet 4.	Emergency Reserve Disclosure Form
Worksheet 5.	Financial Analysis Summary Sheet

I have reviewed the documents listed above and hereby submit it for review and approval by the Virginia Department of Health.

Printed Name: _____

_____	_____	_____
Signature	Date	Seal

Six Year Operating Budget (Worksheet 1)

Line No		Projected Year 1	Actual Year 1 0-6 months	Actual Year 1 7-12 months	Projected Year 2	Actual Year 2 0-6 months	Actual Year 2 7-12 months	Year 3	Year 4	Year 5	Year6
1	REVENUES										
2	Water										
3	Fees and Service										
4	Other Revenue										
5	TOTAL REVENUES (Add 2-4)										
6	EXPENSES										
7	Operation & Maintenance Expenses										
8	Salaries &t Other Benefits (Operator)										
9	Power & Other Utilities										
10	Chemical & Treatment										
11	Monitoring										
12	Materials, Supplies & Parts										
13	Transportation Expenses										
14	Miscellaneous Expenses										
15	Total Operation & Maintenance Expenses(Add 8-14)										
16	General and Administrative Expenses										
17	Salaries & Benefits										
18	Office Supplies & Postage										
19	Insurance - Vehicles, Liability, Workers' Comp										
20	Legal & Accounting										
21	Engineering & Professional Services										
22	Fees										
23	Miscellaneous Expenses (e.g. Training)										
24	Total General Administrative Expenses (Add 17-23)										
25	Depreciation Expense (If Aplicable)										
26	TOTAL EXPENSES (Add 15+24+25)										
27	Taxes (Property, B & O, Income)										
28	Annual Debt Payments - Loans/Bonds(Principal & Interest)										
29	Total Outstanding Debt - Loans/Bonds(Principal & Interest)										
30	Capital Improvement Program Expenditures										
31	New CIP Facilities										
32	Renewal & Replacement Facilities										
33	Safe Drinking Water Act Facilities										
34	Non-Facility Costs (e.g. conservation program costs)										
35	Capital Sources										
36	Loan/Bonds Fund										
37	Grants										
38	Special Charges										
39	Withdrawal From Existing Reserves										
40	Net CIP (31+32+33+34)-(36+37+38+39)										
41	Operating Cash Reserve										
42	Minimum Balance (1/8 Line (15 +24)										
43	Annual Installment										
44	Running Balance										
45	Emergency Reserve										
46	Minimum Balance (Cost of Most VulnerableFacility)										
47	Annual Installment										
48	Running Balance (May be Alternative Financing)										
49	Replacement Reserve										
50	Target Balance (Waterworks Replacement Cost)										
51	Annual Installment										
52	Running Balance										
53	TOTAL REVENUE REQ.(Add 26+27+28+40+43+47+51)										
54	BUDGET SURPLUS (DEFICIT) (Subtract 5-53)										
55	0.015 Annual Median Household Income										
56	Projected Annual Residential Bill (from Worksheet)										

Projection Of Annual Water Revenues
(Worksheet 2)

FORECASTED

Line No.		Year 1	Year 2	Year 3	Year 4	Year 5
1	Forecasted Number of Service Connections					
2	Meter Charge @ $____/Meter					
3	Projected Water Sales (Gallons)					
4	Commodity Charge @ $___/1,000 Gallon					
5	Total Projected Revenue					
6	Rate Revenue Per Connection					

Operating Cash Reserve Disclosure Form (Worksheet 3)

Type of account:

____ bank checking/savings _____ escrow account _____ trustee account

_____ other (specify) _____

Name of bank or institution: _____

****

Emergency Reserve Disclosure Form (Worksheet 4)

Type of account:

____ bank checking/savings _____ escrow account _____ trustee account

_____ other (specify)

Name of bank or institution: _____

OR

Type of commitment:

_____ surety bond _____ letter of credit _____ guarantor _____ other

_____ (specify)

Name of bank or name and relationship of guarantor: _____

Virginia Department of Health

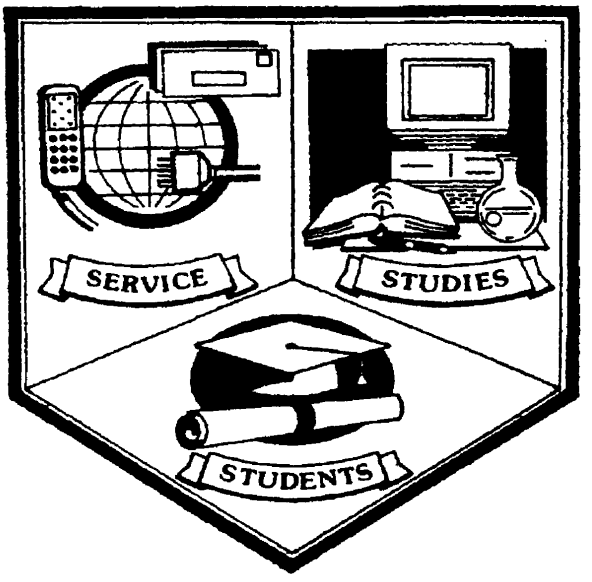
September 3, 1996

Financial Viability Analysis Summary (Worksheet 5)

Analysis 1 - Do you have a budget in place, and are rates sufficient to cover expenses?	BUDGET-YEAR 1	BUDGET YEAR 6	BASIS FOR CALCULATION
1 REVENUES			
2 Water Rates			From Worksheet 1, Line 2
3 Total Other Revenues			From Worksheet 1, Lines 3+4
4 TOTAL REVENUE (Add lines 2-3)			Should Equal Line 5 of Worksheet 1
5 EXPENSES			
6 Total O&M & A&G Depreciation Expenses			From Worksheet 1, Line 26
7 Taxes (Property, B&O)			From Worksheet 1, Line 27
8 Debt Service Payments			From Worksheet 1, Line 28
9 Net CIP From Rates			From Worksheet 1, Line 40
10 Operating Cash Reserve (Increase)			From Worksheet 1, Line 43
11 Emergency Reserve (increase)			From Worksheet 1, Line 47
12 Replacement Reserve (Voluntary Increase)			From Worksheet 1, Line 51
13 TOTAL REVENUE REQUIRED (Add Lines 6-12)			Should = Line 53 of Worksheet 1
14 Required Water Rates (Line 13 - Line 3)			Total Expenses Less Other Revenue
15 Is Line 4 = > Line 13			Yes/No, If No Go Back & Raise Rates or Reduce Expenses
Analysis 2 - Is the Operating Cash Reserve = to or greater than [(O&M + G&A budget subtotal X 45)/365]?			
16 Current Operating Reserve (beginning of year)			From Worksheet 1, Line 44
17 Plus: Budgeted increase (Line 10)			
18 Total Operating Cash Res. Funds (Line 16 + 17) (end of year)			
19 Required Operating Cash Reserve (Line 6 X 0.125)			From Worksheet 1, Line 42
20 Is Line 18 = > Than Line 19			(45 Days/365 Days) = 1/8=0.125 Yes or No, If No Continue to Budget Annual Increase in Budget
Analysis 3 - Is the Emergency Reserve = to or greater than the cost of the most vulnerable facility?			
21 Current Emergency Reserve (beginning of year)			From Worksheet 1, Line 48 or Separate Emer. Reserve (Alt. Fin.)
22 Plus: Budgeted increase (Line 11)			From Worksheet 1, Line 47
23 Total Emergency Res. Fund. (Line 21 + 22) (end of year)			From Worksheet 1, Line 48
24 Cost of most vulnerable facility			From Worksheet 1, Line 46
25 Is Line 23 = > Than Line 24			For Budget Year 6, Yes or No, If No Increase Annual Budget
Analysis 4 - Household Income Index; Is 1.5 percent of Median Household Income = to or greater than Cost/ERU?			
26 Median household Income			
27 Median Household Income X .015 (Line 26 X 0.015)			
28 Cost/ERC (Line 14/Line 31)			
29 Is Line 27 = > Than Line 28			Yes or No, If No, VDH suggests waterworks explore restructuring option or revise improvement Implementation Schedule
Customer Data			
30 Median Household Income			
31 Total Number of Equivalent Residential Connections			From Your Customer Records or PER

Virginia Water Resources Research Center's

Plan to Serve the Commonwealth



Briefing for the Virginia State Water Commission
Richmond, Virginia

Dr. Leonard Shabman, Director
Virginia Water Resources Research Center
Virginia Polytechnic Institute and State University
Blacksburg, VA

Virginia Tech

September 11, 1996

ARTICLE 2.02.

Virginia Water Resources Research Center.

§ 23-135.7:8. Established. — The Virginia Water Resources Research Center, which came into existence as the result of the Water Resources Research Act of 1964 (P.L. 88-379), is hereby established as the Virginia Water Resources Research Center, hereinafter referred to as the Water Center, to be located at Virginia Polytechnic Institute and State University, for the purposes of developing, implementing and coordinating water and related land research programs in the State and transferring the results of research and new technology to potential users. (1982, c. 379.)

§ 23-135.7:9. Functions, powers and duties of the Water Center. — A. The Water Center shall: (i) consult with the General Assembly; federal, state and local agencies; water user groups; private industry; and other potential users of research; (ii) establish and administer agreements with other universities of the Commonwealth for the conduct of research projects; (iii) [Repealed.] (iv) disseminate new information and facilitate transfer and application of new technology; (v) be a liaison between Virginia and the federal research funding agencies as an advocate for Virginia's water research needs; (vi) encourage the development of academic programs in water resources management in conjunction with the State Council on Higher Education.

B. In addition, the Water Center shall facilitate and stimulate research that: (i) deals with policy issues facing the General Assembly; (ii) supports the state water resource agencies; and (iii) provides water planning and management organizations with tools to increase efficiency and effectiveness of water planning and management. (1982, c. 379; 1984, c. 734.)

The 1984 amendment substituted "Commonwealth" for "State" in clause (ii) of subsection A and deleted clause (iii) of that subsection which read "report annually to the Governor and appropriate committees of the General Assembly on the progress and findings of research projects."

§ 23-135.7:10. Control and supervision. — The Water Center shall be a unit of Virginia Polytechnic Institute and State University under the supervision and control of the University's Board of Visitors. (1982, c. 379.)

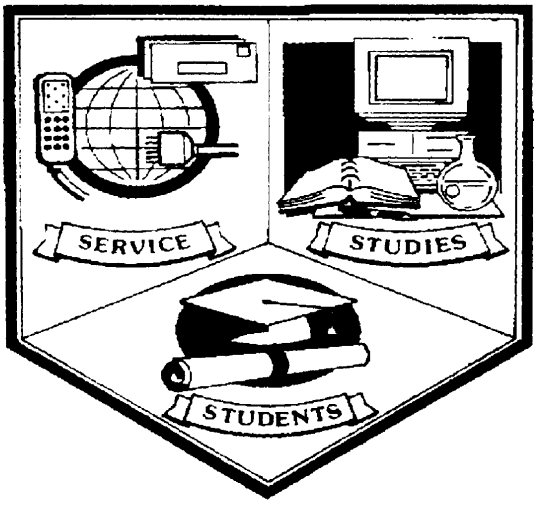
§ 23-135.7:11. Appointment of an executive director. — The principal administrative officer of the Water Center shall be an executive director, who shall be appointed by the President of Virginia Polytechnic Institute and State University with the approval of the Board of Visitors, and who shall be under the supervision of the President of Virginia Polytechnic Institute and State University. (1982, c. 379.)

§ 23-135.7:12. Powers and duties of the Executive Director. — The Executive Director shall exercise all powers imposed upon him by law, carry out the specific duties imposed upon him by the President of Virginia Polytechnic Institute and State University, and develop appropriate policies and procedures, with the advice of the Statewide Advisory Board, for (i) identifying priority research problems; (ii) collaborating with the General

DIRECT FUNDING TO THE VIRGINIA WATER RESOURCES RESEARCH CENTER UNDER VIRGINIA CODE SECTION 23-135.7:8-13

State Fiscal Year	Budget to the VWRRC
82-89	$350,000
90	$450,000
91	$450,000
92	$394,273
93	$373,183
94	$259,612
95	$75,000
96	0
97	0

VIRGINIA WATER RESOURCES RESEARCH CENTER



ANNUAL REPORT

Virginia Tech

Virginia Polytechnic Institute and State University

September 1995 - August 1996
Draft - 8/31/96

Mission

The Virginia Water Resources Research Center (VWRRC) will advance the Commonwealth's and its universities' missions by encouraging studies of solutions to water resources problems, by facilitating the water resources education of university students, and by enhancing the transfer of water sciences, policy, and management information to public and private decision makers.

As the Commonwealth's designated water center, the VWRRC programs will build upon the foundation of currently available faculty expertise in water sciences, policy, and management. To fulfill this mission, the VWRRC programs will assist universities' faculty :

- in securing research support from public and private sources for *studies* to address water sciences, policy, and management information needs in the public and private sectors
- in providing educational opportunities for undergraduate and graduate *students* in the areas of water sciences, policy, and management
- in transferring water sciences, policy, and management information as a *service* to the public and private sectors and to the Commonwealth's citizens.

History of the VWRRC

In 1964, a congressional act [illegible] a network of [illegible] water resources programs to be located at land-grant [illegible]. Virginia Tech was selected to house the state's water center. The VWRRC began operations in 1965, with federal [illegible] funding [illegible] through the Virginia Tech Research Division. Since 1965, the Center annually received a federal base grant for program administration and development from the US Geological Survey Office under the Department of Interior. Initially, the Center's purpose was to enhance study opportunities for faculty interested in water sciences, water policy, and water management.

Authorized by the Virginia General Assembly in 1982 as a state agency, the VWRRC secured significant state funding. These monies were used primarily for programs in water outreach and education, with some allocation to research support. Combined with funding secured from contracts and grants, the Center developed an internal staff that by the late 1980s was recognized as the outstanding program of water resources education programs among the 54 similar water centers (institutes) from across the nation.

Budget reductions at the state level eliminated funding for the VWRRC in the early 1990s. Virginia Tech's Division of Research and Graduate Studies stepped in and replaced a fraction of the lost revenues. Thanks to this support, the VWRRC has been able to remain a well recognized program in the University and across the Commonwealth. The Center remains an agency of state government administered by Virginia Tech. Activities of the past year have been directed toward the re-establishment and expansion of the VWRRC's commitment to provide faculty with assistance in securing external support for studies and education in water resources science, policy, and management.

STUDIES

Twenty-one projects were funded by the VWRRC in 1995-96. The VWRRC used a combination of federal and state funds to provide partial support to 21 graduate and 18 undergraduate students. As an outcome of these projects, the principal investigators have published or presented 27 papers, and submitted 10 research grant applications.

1995 Projects

A stochastic framework for modeling non-point pollution in heterogeneous soils. C. Heatwole, Virginia Tech.

Water quality impacts of integrated cover crop/manure management systems. M. Wolfe, D. H. Vaughan, M. Alley, E.R. Collins, Virginia Tech.

Development of a model to evaluate effectiveness of riparian buffer zones with regard to hydrologic flux and sediment transport. T. Dillaha, S. Mostaghimi, S. P. Inamdar, Virginia Tech.

An innovative approach to enhance dissolved organic carbon (DOC) removal and disinfection by-product reduction during drinking water treatment using enzymatic coupling of DOC. W. Knocke, D. F. Berry, Virginia Tech.

Doppler radar in flash flood forecasting. D.F. Kibler, G.V. Loganathan, Virginia Tech.

In situ bioremediation of xenobiotic compounds by iron-reducing organisms in groundwater: development and validation of a numeric model. M. Widdowson, Virginia Tech.

The impact of industrial wastewater composition on the bioflocculation of biological sludges. N. Love, J. T. Novak, Virginia Tech.

Use of antibiotic resistance profiles to determine sources of fecal pollution in natural waters. B. Wiggins, James Madison University.

Identification and partial characterization of a national groundwater research site in Virginia. J. Smith, University of Virginia.

Iron and manganese dynamics in groundwater in a surficial coastal plain aquifer and associated wetland. J. Herman, M. E. Tuccillo, University of Virginia.

Development of investigative techniques for determining the bio-availability of contaminants in a creosote-impacted Virginia sub-estuary. M. Unger, R.F. Mothershead, Virginia Institute of Marine Science.

Application of multidimensional gas chromatography to the separation of polychlorinated biphenyls and pesticides. R. Hale, J. Thomas, M. Kjellstrom, E. Harvey, Virginia Institute of Marine Science.

Modeling water and sediment movement in riparian wetlands. P. Tsiplas, T. Younos, Virginia Tech.

Pollutant removal performance of the Virginia Tech stormwater detention facility on West Campus Drive. D.F. Kibler, S. Mostaghimi, P. McClellan, Virginia Tech.

Oxygenation of lakes and reservoirs: Gas-transfer in buoyant, non-coalescing, bubble-driven flow. J. Little, Virginia Tech.

The role of anoxic zones in preventing methylethyl ketoxime (MEKO) inhibition of nitrification. N. Love, Virginia Tech.

Investigation of BMP impacts on non-point source pollution using system analysis procedures. S. Mostaghimi, J. Reed, K. Brannan, Virginia Tech.

DNA genetic fingerprinting of *Escherichia coli (E. coli)* to resolve non-point fecal coliform sources to tidal inlets in the Chesapeake Bay. G. Simmons, Jr., S. Herbein, Virginia Tech.

Lipid biomarker composition of particulate organic matter in the lower Chesapeake Bay. E. Canuel, Virginia Institute of Marine Science.

Determination of saltwater intrusion into freshwater aquifers in the eastern shore of Virginia using electrical resistivity methods: A pilot project. A. Nowroozi, J. H. Rule, G. R. Whittecar, Old Dominion University.

Stream-groundwater Interaction in a Saprolitic Aquifer, Old Rag Catchment, Shenandoah National Park. J.P. Raffensperger, University of Virginia.

STUDIES

The VWRRC was among 10 of the 14 institutes successful in securing research dollars from the USGS sponsored 1996 regional research competition. As a member of the Northeast region, the VWRRC received 22 preproposals to be considered for submission to the regional competition.

With the Center's assistance, five research teams were assembled from the principal investigators who submitted preproposals. These teams submitted full proposals that were subjected to three peer reviews. After peer reviews were received, the proposals were reviewed and ranked by a four-member advisory panel. Three proposals were selected for submission to the USGS regional competition. The proposal selected by the USGS review panel for funding was: "Sediment Flushing Capabilities of Unsteady River Flows and Effects on Spawning Gravel" by Dr. Panayiotis Diplas, Associate Professor of Civil Engineering and Dr. Donald Orth, Professor of Fisheries and Wildlife at Virginia Tech. The two-year project , funded in the amount of $67,840, will support several graduate students. The proposals that were unsuccessful in the regional competition will be submitted to other agencies for possible funding.

A research team of faculty from the Colleges of Agriculture and Life Sciences and Forestry and Wildlife Resources was formed by the VWRRC to compete for funding for two water quality projects. The team was successful and collected total funds of $82,000 from several governmental agencies . Focusing primarily on the Chesapeake Bay region and the Mississippi River Delta, the studies will assess the economic and environmental feasibility of farmland reforestation for timber values, water quality improvement, and carbon sequestration to address global warming concerns.

Proposals Submitted for the USGS Northeast Regional Competition

Privatization of Municipal Water Supply Systems: A Guide to Obstacles, Opportunities, and Pitfalls. Jeffrey Alwang, Associate Professor, Agricultural and Applied Economics and William Cox, Professor, Civil Engineering, Virginia Tech.
Federal Funds Requested: Year 1: $31,000 Year 2: $28,000 Total: $59,000

ANSWERS - 2000: A Planning Model for Integrating and Quantifying NPS Pollution. Theo A. Dillaha, Associate Professor and Mary Leigh Wolfe, Associate Professor, Biological Systems Engineering, Virginia Tech.
Federal Funds Requested: Year 1: $39,587 Year 2: $42,162 Total: $81,794

Sediment Flushing Capabilities of Unsteady River Flows and Effects on Spawning Gravel. Panayiotis Diplas, Associate Professor, Civil Engineering and Donald J. Orth, Professor, Fisheries and Wildlife, Virginia Tech.
Federal Funds Requested: Year 1: $34,902 Year 2: $32,938 Total: $67,840

A Modeling Approach for Enhanced Representation of Watershed Spatial Features for Non-Point Source Pollution Control. Saied Mostaghimi, Professor and Conrad Heatwole, Associate Professor, Biological Systems Engineering, Virginia Tech.
Federal Funds Requested: Year 1: $35,540 Year 2: $38,512 Total: $74,052

Enhanced In-Situ Desorption and Biodegradation of Petroleum Hydrocarbons and Chlorinated Solvents at Two Contaminated Sites in Virginia. James A. Smith, Assistant Professor, Civil Engineering; Aaron L. Mills, Professor, Environmental Sciences; Teresa B. Culver, Assistant Professor, Civil Engineering, University of Virginia; Mark A. Widdowson, Associate professor; Nancy G. Love, Assistant Professor; and John T. Novak, Nick A. Prillaman Professor, Civil Engineering, Virginia Tech.
Federal Funds Requested: Year 1: $35,000 Year 2: $35,000 Total: $70,000

STUDIES

In response to an RFP from NSF/U.S. EPA, the VWRRC facilitated the formation of a multidisciplinary team from the Colleges of Engineering, Arts and Sciences, and Agriculture and Life Sciences. The team drafted a proposal on watershed management under the leadership of Dr. Don Cherry, professor, Biology. The team plans to submit a final proposal for the 1997 competition.

The VWRRC contributed to the development of a multidisciplinary proposal to develop a decision support system for water quality managers. A $370,000 proposal was submitted to the National Research Initiatives program of the USDA. Proposal review is underway.

Five projects were funded by the VWRRC under its new competitive mini-grants program. A limited number of research mini-grants (up to $5,000) is provided to Virginia Tech faculty as seed money to support development of more significant proposals for an outside funding agency. A key criterion for a mini-grant award is the prospect for future funding. The duration of each award is one year. Funds may be used for student support, preliminary analysis to develop a project, and travel to visit a potential research site or to establish appropriate linkages with funding agencies.

Interested researchers are required to submit a three-page (single-spaced) proposal that includes a statement of justification for the proposed work, significant evidence demonstrating the research problem, supporting arguments for the necessity of background work to secure expanded funding, and a statement of prospects for additional funding. In the appendix, the researcher(s) must include a budget, a list of appropriate funding agencies where a larger proposal may be submitted, a list of cited references, and half-page biography of the principal investigator(s). Mini-grant recipients are expected to submit brief (two-page) quarterly reports and a final report in the form of a final research proposal (problem statement, objectives, and procedures) suitable for submission for outside funding. The VWRRC will also offer and support publication opportunities for the background research results, consistent with the VWRRC publication policy.

1996 Mini-Grant Proposals funded:

Hydrological Reconnaissance of the Piedmont and Blue Ridge Provinces for Characterization of Fracture Flow Thomas J. Burbey, Geological Sciences, Virginia Tech, $4,985.

Transport and Removal of Viruses in Wastewater as a Function of Soil Depth and Additional Treatment in Texture Groups 2 (Loam) and 3 (Silt Loam) Soils, C. Hagedorn and R. B. Reneau, Jr., Crop and Soil Environmental Sciences, Virginia Tech, $5,000.

Intensive Pasture-Based Dairy Production: Impact of Profitability and Water Quality, J. Pease, G. Groover, D. Bosch, Agriculture and Applied Economics, Virginia Tech, $5,000.

Determining the Fate of Nitrogen from Biosolids and Commercial Fertilizer Applied to Wheat, S. Mostaghimi, Biological Systems Engineering, R. Reneau, Crop and Soil Environmental Sciences, K. Brannan and T. W. McClellan, Biological Systems Engineering, Virginia Tech, $5,000.

Other:

Development of Environmentally "Friendly" Methods for the Determination of Organophosphate Pesticides in Environmental Samples. R. C. Hale, L. C. Mezin, Environmental Science, Virginia Institute of Marine Science, $4,500
Funding Source: USGS base grant

STUDIES

Some research studies are potentially valuable for a wide audience of professionals and agencies and also have immediate decision-making value to industry or to the public sector. A funding dilemma arises when the immediate beneficiary may not be able to fully support the necessary research, but the research appears too narrow to compete successfully for general research funding at NSF, EPA, or similar agencies. The new VWRRC challenge grants program fills the gap between a user's ability to pay and the funding needed for a successful study by providing a match for funds raised from the private, public, or non-profit agencies. In 1996, the VWRRC awarded its first challenge grant.

A proposal, "A Comprehensive Training and Technology Transfer Program for Non-Point Source Pollution Control - The Upper North Fork Holston River Watershed", has been submitted to the Virginia Environmental Endowment (VEE) by Drs. T. Younos, VWRRC, B.B. Ross, Biological Systems Engineering, and M. J. Elerbrock, Agricultural and Applied Economics, Virginia Tech. Local groups, such as the Evergreen Soil and Water Conservation District, New River Highlands RC & D, Natural Resources Conservation Service, Tennessee Valley Authority, and the Friends of the North Fork River, have agreed to support this project. The $50,000 funding request to the VEE will be matched with funds from Virginia Tech and other groups, for a combined project funding amount of $97,441.

VWRRC Awards Challenge Grant

This year, a challenge grant has been awarded to Drs. N. G. Love, M. Widdowson, and J. Novak, Civil Engineering for a study entitled "**An Investigation into the Use of Biologically-Based Treatment Technologies for Waste Oil Volume Reduction at Norfolk Southern Corporation.**" The VWRRC will commit funds up to $10,000 to support this project. The $62,000 of matching funds will be provided by the Norfolk Southern Corporation.

The VWRRC Role in Multidisciplinary Studies

The research community can provide a strong scientific base (hypothesis testing or model building) in support of private and public sectors decision making needs. Individual researchers can be most effective in securing funds when bidding as a team, can ensure oversight of multidisciplinary projects, and are able to communicate the solutions to water management problems. The VWRRC provides the assistance needed for effective team formation.

STUDENTS

To encourage graduate work in water resources, and to recognize the contributions of the only full-time director of the VWRRC and his support for graduate education, the VWRRC has initiated a campaign in cooperation with the program development office to create an endowment to fund the William R. Walker graduate fellowship in water sciences, policy, and management.

The goals of the VWRRC's new undergraduate research fellowship program are to provide a research opportunity to an outstanding undergraduate, support faculty research and encourage that student to consider Virginia Tech when making graduate school plans.

Students considered for the fellowship need a strong academic record, two letters of reference, a support letter from a Virginia Tech faculty sponsor, and a 300-word essay about their interests in water resources and their professional goals. Students awarded the fellowship receive $2000 for a 10-week period (June through August). The faculty sponsor receives $500 for discretionary use. Students are required to work full-time for ten weeks under the supervision of their faculty sponsor. Also, the student must submit a report detailing the research objectives and results of the work performed during the ten-week period. This report may be used in future VWRRC publications.

In 1996, the VWRRC administered a competitive proposal process that resulted in awards to three rising seniors for summer internships at Virginia Tech.

William R. Walker Endowed Graduate Research Fellow Award

The William R. Walker Graduate Research Fellow Award is intended for individuals preparing for a professional career in water resources. Individuals pursuing graduate work in a field different from the field of emphasis as an undergraduate, or individuals with work experience returning to graduate school are especially encouraged to apply. Recipients of the award shall be recommended by the William R. Walker Scholarship Committee and selected by the University's Scholarship and Financial Aid Committee. Recipients will be chosen on the basis of competitive application.

1996 Summer Research Fellowship Recipients

Nathaniel Rudy, an environmental science major working with Ray Reneau, professor of crop and soil environmental science, on alternative onsite wastewater treatment systems that could reduce risks of surface and groundwater contamination.

Mary Rust, a civil and environmental engineering major working with Nancy Love, assistant professor of civil engineering, on a research project that will lead to a better understanding of the metabolic pathways of organisms under anaerobic conditions.

Daniel Liebert, a liberal arts and science major, working with George Simmons, alumni distinguished professor of biology, on the ecology of river systems and specifically the use of the diurnal oxygen curve as an indicator of river water quality.

Graduate students on campus have few opportunities for a multidisciplinary professional experience. The American Water Resources Association is a 35-year old professional organization that encourages and supports multidisciplinary water sciences work. The VWRRC recruited a faculty advisor and provided financial support for the creation of a student chapter of the American Water Resources Association. Several introductory meetings have been held and plans are underway to complete the chapter organization in the fall.

STUDENTS

A minority student from the College of Agriculture and Life Sciences was provided in-house research support by the VWRRC under the Summer Research Intern Program. Dr. Tamim Younos directed the work of Ms. Tiffeny Wade during her internship and a report was submitted entitled: "Water supply needs for rural development in the coalfield counties of Southwest Virginia. Case Study: Dickenson County, VA." The purpose of this program is to encourage undergraduate students to consider Virginia Tech to continue their graduate study.

Increasing campus-wide communication among undergraduate and graduate students, faculty, and staff with interests in water resources is an effort the VWRRC undertook in 1996. The Center cosponsored and provided financial support for a monthly on-campus water sciences seminar in cooperation with a multi-disciplinary faculty group developing Systems for Watershed Assessment Management and Policy (SWAMP). Each month, speakers with expertise in various areas of water science and policy were invited to interact with graduate and undergraduate students, and faculty and staff.

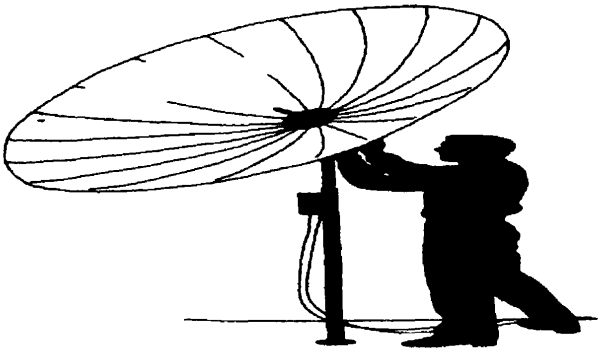
The average attendance for each seminar was about 25 students, faculty, and staff. This program will be continued in 1997.

Providing students with an opportunity for additional practical learning experiences in the areas of public environmental work is a direct extension of the Center's student mission. Revitalizing Virginia's Service Training for Environmental Progress (STEP) is a project the Center accepted, and in cooperation with the Waste Policy Institute and the Service-Learning Center, is developing plans for a fund raising drive.

Student interns working in a community for eight weeks during the summer gain hands-on experience not available to them in a classroom environment. Interns interact with grass-roots level community leaders and develop valuable leadership skills while providing communities with technical resources leading to the study and resolution of environmental problems. The STEP program meshes well with the Center's undergraduate summer fellowship program and our new initiative to create a technical assistance program for small communities' water systems.

SERVICE

The Safe Drinking Water Act of 1996 calls for a system of regional research and technical assistance centers for small scale drinking water systems. The VWRRC has taken leadership within a coalition of Commonwealth agencies and universities to develop a position paper and plan for such a center. Funds will be sought from multiple public and private sources to support this effort. Toward this goal the VWRRC has prepared, in co-operation with other universities and agencies of the Commonwealth, a position paper describing the mission and organization for the "Virginia's Center for Small Community Water Supplies." At present, three committees (policy, database and presentation, and invitation and arrangements) have been formed. Under the direction of the VWRRC, the policy committee is developing guidelines for the new Center's organizational structure. Topics, such as identification and number of possible board members, legal issues, state agency involvement, and the role of satellite centers are some of the areas the committee will define.



Private citizens, soil and water professionals, local government officials, faculty and students from nearby colleges, and staff were brought together by the VWRRC to engage in an active panel discussion with three watershed management authorities and to view the satellite videoconference **Watershed '96 Moving Ahead Together** broadcast from Baltimore, Maryland. Approximately 60 people attended the workshop at the Donaldson Brown Continuing Education Center.

A comprehensive mailing list was developed to begin publishing and distributing a subscription-based newsletter on water and environmental topics including important VWRRC activities, and timely information on water management topics in Virginia and the nation. This will replace a suspended newsletter that had developed a wide spread following in the Commonwealth and continues to be requested by public officials and private citizens.

The VWRRC's new home page can be found at http://www.vwrrc.vt.edu /vwrrc/vwrrc.htm. The home page will provide researchers with access to news, data and links to important water resources information. Also, included on the homepage are such creative features as a self maintaining database of experts in water resources and a way to help homeowners diagnose drinking water problems. This media source will also be used for low cost distribution of publications and announcements.

Grant funds were received by the VWRRC to revise and reproduce three popular publications. A total of $35,900 was received from the Virginia Department of Environmental Quality to revise and reproduce *A Guide to Domestic Wells* (replaces *The Homeowner's Guide to Domestic Wells*), the USDA Extension Service to revise and reproduce *A Guide to the National Drinking Water Standards and Private Water Systems* (replaces *What Do the Standards Mean?* and *A Citizen's Guide to Drinking Water*), and from the National Institutes for Water Resources to write and produce an issue of the *Water Science reporter.: Effluent Allowance Trading: A New Approach to Watershed Management.*.

SERVICE

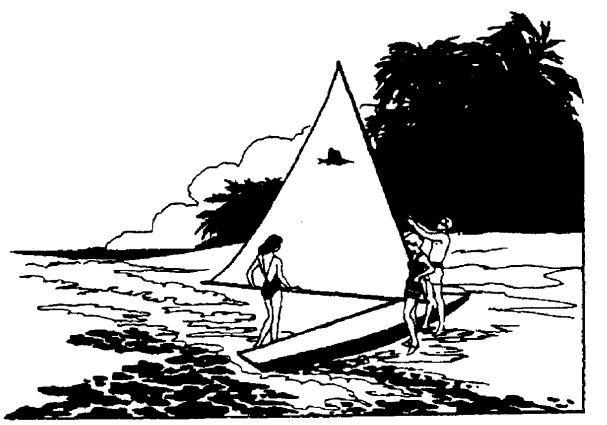
A proposal for $30,000 has been submitted to the Virginia Department of Environmental Quality to revise and reproduce three groundwater publications during 1996-1997. These publications will be produced in four colors and replace several publications that are out-of-print or need major revisions. Approval of the proposal is anticipated.

The VWRRC disseminates water sciences information to K-12 schools, local environmental groups, state and local government agencies, and private citizens. Approximately 500 educational packets were mailed to elementary and high school teachers prior to the start of the 1995-1996 school year. In addition, the Center staff responds annually to around 200 telephone requests for help with water related problems.

As an annual event, the VWRRC cosponsors with the Virginia Lakes and Watershed Association a water research conference. This year, the conference was held in Staunton, Virginia and was attended by approximately 200 researchers, local citizens, and water management professionals.

Working with the Virginia Tech *Choices and Challenges* , the VWRRC staff has contributed to the design of the main program and is responsible for the program at the Hotel Roanoke downlink site. The focus program at the Hotel Roanoke will feature a panel of water management specialists discussing ***The Lake Gaston Controversy: Lessons for Sharing Virginia'a Waters***. The purpose of the program is to highlight and understand the nature of water use conflicts in the Commonwealth and the roles that might be played in the state in conflict resolution.

The Kanawha-New River study unit of the USGS National Water Quality Assessment Program requested the VWRRC's help in planning the group's second meeting. The meeting was held at the Blacksburg Marriott and approximately 25 people attended. The objectives of the meeting were to review NAWQA progress in nearby study units, identify major water-quality issues and previous work in the basin, and develop a consensus understanding of the basin to guide future studies over the next several years.



Several colleges were brought together by the VWRRC to participate in a workshop on the Small Business Innovation Research (SBIR) program funded by the Virginia Department of Environmental Quality. The workshop was held at the Donaldson Brown Continuing Education Center and approximately 80 people attended including faculty from the colleges of Agriculture and Life Sciences and Forestry and Wildlife Resources at Virginia Tech, federal agency staff, state agency personnel, along with private industry representatives.

In cooperation with Lynchburg College, the James River Association, and the James River Basin Association, the

SERVICE

VWRRC is sponsoring a fall symposium on the future of the James River. Funds are provided by Lynchburg College.

The VWRRC, in cooperation with several state agencies, is sponsoring the Southwest Virginia Water Symposium to be held on October 26, 1996 in Abingdon. Financial support in the amount $2,000 for the symposium is provided by the Powell River Project and USDA-CREES.

A "Call for Papers" has been issued for a national symposium and workshop entitled the "Karst-Water Environment" to be held in October 1997 at the Hotel Roanoke Conference Center. The Virginia Department of Environmental Quality and Department of Conservation and Recreation have committed funds of over $10,000 to support the symposium. In addition, a partnership between the VWRRC and Draper Aden Environmental Modeling, Inc. has been established to support the symposium.

VWRRC STAFF

At the present time, the VWRRC has the following staff members :

Dr. Leonard Shabman, Director (1/2 time)
Dr. Tamim Younos, Associate Director
Ms. Judy Poff, Public Relations Assistant Specialist
Ms. Inga Solberg, Fiscal Technician
Ms. Sandra Howell, Office Services Specialist (1/2 time)

ADVISORY COMMITTEES

University Council On Water Resources — Campus Members

- Dr. William Cox, Professor, Civil Engineering
- Dr. George Simmons, Alumni Distinguished Professor, Biology

Administrators Advisory Committee

- Dr. Kenneth Reifsnider, Associate Provost for Interdisciplinary Programs
- Dr. Robert Cannell, Director, Agricultural Experiement Station
- Dr. Wolfgang Glasser, Associate Dean, College of Forestry and Wildlife Resources
- Dr. Joseph Cowles, Head, Department of Biology
- Dr. John Perumpral, Head, Biological Systems Engineering
- Dr. David Kibler, Professor, Department of Civil Engineering

1996 Technical Review Volunteers (1996)

- Dr. Yacov Haimes, Director, Center for Risk Management, University of Virginia
- Dr. David C. Martens, Eminent Scholar and Professor, Department of Crop and Soil Environmental Science, Virginia Tech
- Mr. Robert G. Burnley, Director of Program Support and Evaluation, Virginia Department of Environmental Quality
- Mr. Jack Frye, Director, Division of Soil and Water Conservation, Virginia Department of Conservation and Recreation

ADVISORY COMMITTEES

Statewise Advisory Board (Appointed by Governor George Allen)

The following individuals have been submitted to Governor Allen for his approval:

Mr. Eric Bartsch, Director
Office of Water Programs
Virginia Dept. of Health
1500 East Main St., Room 109
Richmond, VA 23219

Mr. Shockley Gardner
Virginia Resources Authority
P. O. Box 1300
Richmond, VA 23210

Dr. Pixie Hamilton, District Chief
USGS
3600 West Broad St.
Room 606
Richmond, VA 23230

Mr. Robert Burnley, Director
Virginia Dept. of Environmental Quality
Water Division
Richmond, VA 23192

Mr. Charles Crowder, Director
Fairfax County Water Authority
P. O. Box 1500
Merrifield, VA 22116

Ms. Faye Cooper
Executive Director
Valley Conservation Council
P. O. Box 2335
Staunton, VA 24401

Mr. Jack Frye, Director
Division of Soil and Water Conservation
Department of Conservation and Recreation
Richmond, VA 23219

Mr. Robert Green, President
James River Basin Association
2310 Langhorne Road
Lynchburg, VA 24505

Mr. Ron Tewalt
Town of Strasburg
P. O. Box 351
Strasburg, VA 22657

Delegate Victor Thomas
1301 Orange Avenue, NE
Roanoke, VA 24012

Ms. Shirley Blackwell
P. O. Box 224
Marion, VA 24354

VWRRC PLAN TO SERVE THE COMMONWEALTH

What Will Be Accomplished?

The VWRRC plan will meet the information and decision making needs of public and private leaders by:

⇒ anticipating the Commonwealth's future water quality and water supply management challenges.

⇒ developing and evaluating water policy and management alternatives that
- ◊ are cost effective.
- ◊ avoid unnecessary future costs.

How Will the Plan Succeed?

VWRRC will enlist the analytical and educational expertise from the faculty of Virginia's universities.

Why Rely on Universities' Resources?

Internationally and nationally recognized experts at the Commonwealth's universities will provide sound and objective information on water science, water policy and water management.

Reliance on these experts is a cost effective means for developing needed information and analysis.

Relying on the universities will provide "real-world" educational experience for the Commonwealth's university students.

Why Rely on the VWRRC?

By its mission and responsibility under the Code of Virginia the VWRRC is the only state wide *organization* that

⇒ can provide leadership to set priorities for water resources information needs

⇒ enlist the services of available university faculty for cooperation with state agencies

⇒ manage projects requiring cooperation among and between agencies and the universities.

Are There Budget Needs?

Available expertise must be supported by data bases, specialized computer software, travel and student assistants. These support needs determine the VWRRC budget requirements. The VWRRC plan, made up of the specific tasks described below, will require funding for FY 1997 of $230,000 to be administered through the VWRRC. This budget is less than ½ of the historical state funding of the VWRRC (in inflation adjusted dollars).

What About Accountability?

A Governor's appointed advisory board. will participate in program review and provide the General Assembly with an *Annual Report* on VWRRC accomplishments with the allocated state funds.

Virginia's Centers for Small Communities Water Supplies

Need

- 4.5% of the households in rural Virginia do not have complete plumbing systems. Thousands of other households are served by individual wells and small (less than 30 connections) community water systems with questionable safety or reliability.

- Improvements will require appropriately scaled technologies that can be financed and maintained at acceptable cost. Many small communities have limited capacity to develop and finance such improvements.

- The General Assembly (HB 104) has recognized the need to study this problem and develop a response for the Southwest Virginia. The Congressional debate over the Safe Drinking Water Act Reforms of 1996 highlighted the technical and financial barriers facing small communities in securing safe and reliable water supply.

Product

- Design appropriately scaled water collection, treatment and distribution systems.

- Guidebooks on how to choose appropriate technologies and on water system planning and financing distributed to owners and operators of small community water systems.

- Individualized technical, planning and financial advice for owners and operators of small community water systems.

How Accomplished

- The *Center for Small Communities Water Supplies* will be located at the VWRRC. Satellite offices to provide direct technical assistance will be housed at VMI. ODU, JMU and Mountain Empire Community College.

- A detailed plan and the organization for the Center already has been developed in cooperation with affiliated universities and the VDPH, DEQ, the Virginia Rural Water Association, the Virginia Water Project and CIT.

Budget

- $75,000 per year from appropriations. These state funds will be leveraged with grant funds authorized in the SDWA for the establishment of regional research and technical assistance centers.

Cost Efficient and Equitable Water Quality Management

The Need

- Progress has been made in improving water quality throughout the state. However, reports on the quality of the states waters suggest that some problems remain .

- Unfortunately the obvious and low cost solutions to making further water quality improvements in the face of economic growth are few.

- The Commonwealth must develop new inter governmental responsibilities and secure new means of financing water quality improvements. For example, in the last General Assembly HB 1411 directed the Secretary of Natural Resources to develop plans to meet water quality goals that are locally supported, cost efficient, fair, able to be funded and use market incentives.

- Engineering, biological and economic considerations must be integrated into creating implementation alternatives. However, the mix of expertise and the time needed to execute the necessary evaluation of alternatives exceeds available agency resources.

Product

- An advisory team of university experts will be available to advise the program implementation agencies and to the General Assembly.

- Advisory team support from a computer model that integrates technical and economic analysis to identify the most cost effective water quality programs.

How Accomplished

During 1996 university faculty and students worked with the DEQ and DCR on the provisions of HB1411 for the Potomac River. Based on this experience the VWRRC and the agencies agree that continuing cooperation would be both of great value. The VWRRC will coordinate the university faculty and student team to work with the DEQ and the DCR

Budget

$75,000 per year from appropriations. In addition support funds and in kind assistance are expected through the USEPA and the state agencies.

Virginia Waters: A Demand and Supply Assessment

Need

- There is no comprehensive and analytical information about the current and possible future demands for water in relation to available supply.
- This information gap was a concern of the General Assembly when it directed the State Water Control Board to provide basic planning information on the states waters for the decision making needs of the Commonwealth's leaders.
- Implementation of this provision of the Code of Virginia has proven cost prohibitive under current budget limitations in relation to higher agency priorities.
- However, the adequacy and safety of drinking water remains in the headlines from the poorest communities in SW Virginia to the Occoquon Reservoir in Northern Virginia. Virginia Beach continues with its water demand dilemma and Newport News seems to face a similar challenge.

Product

- An annual report to provide the fundamental baseline information now called for in Section 62.1-44.38 of the Virginia Code. These reports will be organized according to the major river basins and will include basic information and critical analysis of water issues.

How Accomplished

- The VWRRC will coordinate university faculty and student teams to work in cooperation with the DEQ, the DCR and water user groups to prepare reports on Virginia's waters.

Budget

- $50,000 per year from appropriations. These funds will be supplemented by support funds and in kind assistance from the private sector and federal and state agencies.

Information in Support of Decision Making

Need

- Each year the general Assembly initiates studies, but there is no mechanism to draw from universities' talents and expertise in water resources, other than to appoint faculty to study committees. The opportunity to benefit from that expertise needs to be enhanced.

Product

- The VWRRC will match faculty experts and their student interns with the information needs of selected study committees of the General Assembly.

How Accomplished

- After each Assembly session the VWRRC will meet with staff from the Division of Legislative Services and the State Water Commission to identify needs and priorities for assistance with special studies.

- The VWRRC will recruit and provide the necessary support for faculty to provide service as advisors to the selected studies.

Budget

- Funds would be transferred to VWRRC in amounts as allocated and written into study resolutions to be used for student intern and travel support.

Applied Problem Solving

Need

- There are many new, but as yet unanticipated, study needs for informed water resources management decision making. These needs only can be met with a continuing base of support for basic studies. However, limited funds make it imperative that funding partnerships be encouraged for water science and technology studies.

- Informed public decision making demands that citizens be aware of the emerging water issues and challenges facing the Commonwealth. There is no single Virginia source for water related news.

Product

- A Challenge Grant Program to offer incentive funds to university faculty who secure grant and contract funds from private sector sources.

- A statewide a newsletter on water resources. The newsletter will summarize and synthesize the water related news and policy issues emerging each month.

How Accomplished

- The VWRRC will expand its Challenge Grant Program using funds provided through additional state appropriations.

- The VWRRC will expand staff support to develop and distribute a statewide a newsletter on water resources.

Budget

- $30,000 per year from appropriations. Supplemented by other grants and contracts of approximately $100,000 per year.