United States
Environmental Protection
Agency

Office of Water
(WH-550)

EPA-570/9-89-004
April 1989

EPA

Ensuring The Viability of New, Small Drinking Water Systems

A Study of State Programs

Printed on Recycled Paper

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EXECUTIVE SUMMARY

1. Introduction

Small drinking water systems serve only eight percent of the U.S. population, yet they account for 93 percent of maximum contaminant level (MCL) violations and 94 percent of monitoring/reporting (M/R) violations.[1] Plagued by personnel and infrastructure problems, many small systems are unable to meet the challenges of aging equipment, unexpected sources of contamination, and more stringent drinking water regulations mandated by the 1986 Safe Drinking Water Act Amendments. Underlying their difficulties are a lack of financial capacity, technical and management capability, and information about the regulations. Some small system operators are simply unwilling to comply with the regulations that affect their operations.

In the past two years, State drinking water programs have shown a heightened interest in limiting the creation of new small systems that are non-viable. By "non-viable" we refer to systems with technical, financial, or managerial weaknesses that may render them incapable of complying with drinking water regulations. In response to this interest, the Office of Drinking Water asked The Cadmus Group, Inc. to prepare a study of State programs in this area and to disseminate the results of this study to the States.

Four States were selected to be case studies: Connecticut, Georgia, Maryland, and Washington. They were chosen to provide geographic, demographic, and programmatic diversity. A comparison of the selected States appears on page ii. Interviews with State and county administrators and detailed reviews of statutes, regulations, and case studies formed the basis of the research.

We did not examine programs in every State that has established mechanisms to control the creation of potentially non-viable small systems. Nor did we examine the full range of institutional responses to the problem of existing non-viable systems. We do, however, briefly discuss some State responses to existing system problems when to do so sheds light on a State's efforts to control potentially non-viable system creation.

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[1] FRDS 07 and FRDS 19A, FY1987

COMPARISON OF STUDY STATES' CHARACTERISTICS
(Figures are for FY 1987)

	CT	GA	MD	WA
Area (sq. mi.)	4,872	58,056	9,837	66,522
Population (millions)	3.211	6.222	4.535	4.498
Density (pop. per sq. mi.)	659.1	107.2	461.0	71.9
Percent Rural	8.2%	36.2%	7.2%	19.0%
Median Income per Capita	$14,090	$10,191	$12,967	$10,866
Community Water Systems	656	1,558	597	2,355
Small Water Systems (Serving <3300 persons)	597	1,387	539	2,207
Percent Small Systems	91.0%	89.0%	90.3%	93.7%
Percent Population[2] Served by Small Systems	5.6%	12.2%	6.6%	15.8%
Percent of all Bacti MCL[3] Violations by Small Systems	100.0%	99.1%	91.7%	97.4%
Percent of all M/R[4] Violations by Small Systems	97.7%	97.1%	96.0%	97.2%
Average MCL Violations per Small System	0.11	0.21	0.07	0.33
Average M/R Violations per Small System	0.07	0.38	0.14	1.08

[2]Percentage of the populations served by community water systems, not the percentage of the States' population. The population served is greater than the State population because individuals are served by more than one water system.

[3]Maximum Contaminant Level

[4]Monitoring and Reporting

2. Findings

The Permitting Process

Each of the four States uses permitting to ensure that new small systems comply with minimum design, operating, and construction standards. Connecticut, Maryland, and Washington combine the permit process with additional controls to identify proposed systems and to require financial, operational, and management evaluations before installation. Connecticut uses its review of proposed systems to grant a Certificate of Public Convenience and Necessity. Maryland requires financial and managerial plan reviews of all proposed privately owned systems. Also, at the time of permitting, Maryland requires privately owned systems to deposit funds in escrow. The financial and operational review in Washington is referred to as the Small Systems Management Program.

Encouraging Interconnections with Existing Systems

Although programs vary in scope, each State in this study requires or encourages new small systems to connect with nearby systems when feasible. Connecticut requires proposed new systems to interconnect with an existing system when the State determines it to be feasible. This is a requirement of the Certificate of Public Convenience and Necessity. Georgia encourages interconnections during permitting if a proposed system is within 500 feet of a publicly owned system.

Satellite Management or Ownership

Connecticut, Maryland, and Washington actively encourage satellite systems. A satellite system is an arrangement in which a large system agrees to assume ownership, management, or operation of a small system. In Connecticut, satellite management or ownership agreements are required by the State where feasible. In Maryland and Washington, satellite systems are described in the regional plans. Connecticut and Washington review satellite arrangements to determine whether the proposed owner or operator has the financial, operational, and managerial qualifications needed for the responsibilities it will assume. In Maryland, counties implement satellite arrangements through county plans. If Maryland State officials find that a system potentially threatens public health, the State may appoint Maryland Environmental Services (a quasi-public agency that provides contract O&M services) to manage it. At least one county in Georgia, Rockdale, has developed its own program for promoting satellite management in the county.

Financial and Operational Requirements

Each of the States requires new small systems to take measures to ensure their financial viability. In Connecticut, financial, operational, and managerial reviews by the State are carried out

during permit approval. In Maryland, after the county determines the need for a new system and includes the proposed system in its county plan, the State reviews the system's financial, operational, and managerial qualifications in conjunction with its permit review. Maryland also requires privately owned systems to deposit funds in escrow to cover future expenses.In Washington, new public water systems are required to develop a financial management program. The State may review plans and require changes to ensure that water systems are effectively operated and managed and "continue to exist as functional and viable entities."[5]

Financial Assistance and Incentives

Connecticut, Maryland, and Washington provide funding for area-wide planning. Because the costs of such planning are high, planning bodies need State funding to hire consultants. Area-wide planning prevents many potentially non-viable systems from being created by identifying alternative methods of providing water service. Georgia provides free technical assistance to help resolve design problems in new systems. Funding for area-wide planning in Washington, however, is nearly exhausted.

Water Supply Planning

In some localities, effective planning may reduce the demand for new small water systems. Connecticut, Maryland, and Washington have instituted area-wide planning programs that restrict the development of new water systems. Washington's program is implemented at the option of the county. Area-wide planning specifies each water system's present and future exclusive service areas, system improvements, and expansion plans. In Maryland and Washington, the State and the counties have major roles in area-wide planning. In these two States, counties determine operational and design requirements for all public water systems. Connecticut and Washington incorporate satellite management plans and guidelines in their area-wide planning. State authorities in Connecticut oversee area-wide planning efforts.

Interrelationship of Methods

The methods described above are complementary. Connecticut, Maryland, and Washington use the permit process to control small system creation by encouraging interconnections and satellite operations whenever possible. In these States, the permitting and planning processes are closely linked. Planning programs determine whether there is a need for new water systems and specify how to achieve future water system development and expansion most

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[5]Washington State Drinking Water Regulations, WAC 248-54-196, 1970.

efficiently. The permitting process requires new systems to meet the standards established in the region or county after the need for a new small water system has been determined.

If interconnections or satellite management are not pursued, the proposed system is reviewed for technical, financial, and managerial soundness. In Connecticut, Maryland, and Washington, the State uses its permitting authority to assure viability of new systems through financial, operational, and managerial reviews. In Maryland and Washington, State law requires that new systems be consistent with county plan guidelines in addition to State permit and operational standards.

Georgia uses its permitting process to identify systems that require technical assistance to meet State technical standards. As part of the permitting process, privately owned new systems must consider connecting to existing publicly owned systems. The State, however, lacks the authority to order interconnections. State attorneys hold that, under current law, the State cannot require an existing system to accept new customers. Therefore, Georgia's efforts to control small system creation may be hampered by a lack of statutory authority.

Effectiveness

In each of the States, we reviewed case histories of actions that succeeded in preventing the creation of new non-viable systems. We found that it is not possible to derive any simple causal relationship between State control programs and the growth (or decline) in the numbers of new systems. Such an analysis is confounded by several factors, but particularly by the large number of external variables that might influence the creation of new systems. For example, the rate of growth of new water systems is more likely to be influenced by economic growth in the State than by State efforts to control their creation. Nevertheless, we can report on the specific case studies reviewed in each of the study States.

Connecticut. Because Connecticut's program was new, we looked at all of the State's actions to date. In one year of operation, the Certificate requirements prevented the creation of approximately 30 new systems. In addition, twenty-two systems were eliminated through State-endorsed takeovers.

Maryland. In Maryland, we looked at a sample of cases. State officials estimate that only 12 new systems are planned each year. The three cases we reviewed demonstrate the effectiveness of a program that prevents the creation of new systems. Two of the systems were required to hook up to larger systems; the operation of a third was taken over by a larger system, but without an interconnection.

Washington. The program in Washington has been initiated in 18 of 39 counties. We reviewed six cases in two counties; in each, a new system was prevented from being formed. Among the six counties that implemented the program prior to 1986, the annual increase in new systems serving between 10 and 1,000 people is no greater than 3 per county. Local officials have estimated that growth rates would have been significantly higher in the absence of the program.

Georgia. The creation of small systems, per se, is not a main topic of concern for the Georgia PWS program. Thus, many of the program elements developed by the other States do not exist in Georgia. Georgia officials use their administrative tools to avert technical (e.g. design and construction) inadequacies in new systems, thus controlling one potential source of eventual problems. They also attempt to discourage the development of privately owned systems. The State's main effort is directed toward bringing non-permitted existing systems into compliance with State regulations. In two case studies, previously non-permitted privately owned small systems were required to connect to existing publicly owned systems. Another was required to comply with State technical standards and to receive a permit. In one case, however, a water system avoided regulation by reducing its service population below the regulatory limit of the Georgia Safe Drinking Water Act.

Potential Drawbacks

At the outset of this study we anticipated three problems that might result from State programs to control the creation of potentially non-viable systems.

- The first was opposition from property owners, who might argue that limits on the creation of new water systems would restrict land development, thereby depriving them of the maximum use of their property.

- The second problem was the possibility that efforts to control creation might become an obstacle to the provision of safe drinking water to isolated rural communities.

- Third, if State control programs generate substantial opposition, there might be a tendency to evade those programs by operating systems outside the State regulatory structure. Respondents in the four States examined in this study reported that these problems were less significant than we had anticipated.

3. Conclusions

Effectiveness of State Programs

It is not possible to generalize conclusively about the effectiveness of these programs for a variety of reasons, including the small sample of States and the short period of time since program implementation. Nevertheless, several conclusions are supportable.

Permitting and planning processes, such as those of Connecticut, Maryland, and Washington, can be used to evaluate whether proposed systems can be interconnected with existing systems or could be run better through satellite management. Georgia's permitting process, although restricted in scope, encourages small privately owned systems to consider connecting to nearby publicly owned ones. In the States studied, these efforts decrease the number of new small systems created, thereby reducing the likelihood of small system non-viability.

The permitting process may be used to ensure the financial, managerial, and technical qualifications of water system owners and operators by requiring comprehensive reviews of the systems. The effectiveness of such reviews is enhanced when follow-up audits are made by the regulating authority.

In three of the States studied, the role of water supply planning is recognized as a means of addressing current and future problems in an orderly manner. It allows the identification of all regulated water systems in the area and the determination of how best to coordinate future development. Planning facilitates interconnections and satellite operations by detailing the future expansion plans and capabilities of existing water systems.

Of the controls examined in this study, satellite management and ownership appears to be the most effective and efficient way to increase the likelihood of viable water service in isolated areas where interconnections are not feasible.

The Federal and State Roles

Programs to control the creation of potentially non-viable drinking water systems are best developed at the State and local levels of government. As shown in this report, these programs often are part of broader State-wide policies concerning land use planning, economic development, and natural resource management. If they are concerned about the creation of new potentially non-viable water systems, States should consider legislation and/or regulations that would enable them to establish control programs.

EPA's interest in this issue is best served through two types of activities. First, working with the States, EPA should encourage the dissemination of information about successful control programs. Many States are eager to develop such programs, and EPA can assist by facilitating the exchange of information. Second, EPA can adopt a strategy favoring development of programs to control creation of non-viable systems. Once such a strategy is established, EPA Regional Offices can work with States to encourage development of such programs.

CHAPTER 1: INTRODUCTION

1.1 Background

Small drinking water systems traditionally have had difficulty complying with the National Primary Drinking Water Regulations. Small systems account for a disproportionate share of maximum contaminant level (MCL) and monitoring/reporting (M/R) violations. The rate of noncompliance by small systems is likely to increase as the 1986 Safe Drinking Water Act Amendments are implemented.

The reasons for small system noncompliance are well known. In general, both the infrastructure and the human resources available to small system operators are inadequate to meet the challenge of aging equipment, unexpected sources of contamination, or more stringent drinking water regulations. The underlying causes include a lack of: financial capacity, technical capability, information about the regulations, and for some system willingness to comply with those regulations.

To address the problems facing small drinking water systems, the American Water Works Association Research Foundation (AWWARF) commissioned a study on "Institutional Alternatives for Small Water Systems."[1] Its purpose was to assist legislators, local officials, planners, and public interest groups who were concerned about public water supply issues. One institutional alternative identified by the author was to control the creation of small water systems.[2]

In the past two years, there has been a heightened interest on the part of State drinking water programs for information about programs to control small system creation. Some States have assumed that compliance rates would improve if they could restrict the creation of new systems, potentially "non-viable" systems. (By "non-viable" we mean systems with technical, financial, or managerial weaknesses that will likely render the system incapable of complying with drinking water regulations.) In response to this interest, the Office of Drinking Water asked The Cadmus Group, Inc. to prepare a study of State programs in this area and to disseminate the results of this study to all States.

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[1]Robert G. McCall, "Guidance Manual: Institutional Alternatives for Small Water Systems," prepared for the American Water Works Association Research Foundation, 1986.

[2]The AWWARF study was a precursor to this report. Our study is different, however, in that it focuses on non-viable small systems, not small systems in general.

1.2 Purpose and Scope of the Study

The purpose of this project is to disseminate information on State programs aimed at controlling the creation of non-viable small drinking water systems by:

- examining State efforts to control the creation of non-viable small systems through legislation or regulation;
- evaluating the effectiveness of such programs on reducing the emergence of small non-viable systems; and
- describing a series of legislative tools that other States could use to implement their own control programs.

This study examines programs to restrict the creation of potentially non-viable small systems in four States: Connecticut, Georgia, Maryland, and Washington. We have evaluated their programs, the cost of these programs, and how these programs have affected the creation of new potentially non-viable small systems. We have also examined State characteristics that contribute to program effectiveness.

We did not examine programs in every State that has established mechanisms to control the creation of potentially non-viable small systems. Nor was our task to examine the full institutional responses to the problem of existing non-viable systems. (We do, however, briefly discuss some State responses to existing system problems when to do so sheds light on a State's efforts to control potentially non-viable system creation.)

1.3 Study Design

A survey of drinking water administrators, used in the AWWARF study, identified several States with laws or regulations to control small system creation. Based on telephone interviews with EPA Regional offices and with State administrators, we reviewed the information on candidate States. The selection criteria included:

- population density,
- percent of population in rural areas,
- rates of compliance by small systems,
- variation in geography, e.g., climate and availability of water,
- variation in methods to control system creation, and
- reputation of the State's control program.

We selected the following States.

- Washington is a large rural State on the West Coast with the first nationally-recognized program for controlling the creation of potentially non-viable new systems. Washington also has large arid regions in the eastern half of the State, where water rights are an important issue.

- Connecticut was selected because it is a small urban State in the Northeast. The Connecticut program is based on the Washington program. Unlike Washington (where implementation in each county is optional), the Connecticut program is implemented state-wide.

- Maryland is a small, urban mid-Atlantic State. Maryland has had a strong control program for the past 20 years.

- Georgia was selected to represent a rural southern State. Its legislation provides some authority to control small system creation, but the State has no program, as such, to do so.

For each State selected, we contacted the appropriate EPA Regional Office and visited the State officials who implement the program. In addition, depending on the State, we contacted county or local officials, developers, utility owners or operators, and representatives of isolated rural populations.

We supplemented our explanation of each State program with case studies which illustrate how the program works. We analyzed these case studies to gain insight into implementation successes and failures.

1.4 Availability of State Documents

Since the purpose of this study is to disseminate information about innovative State legislation and regulations, we collected the most important documents from each of the States in our study. The Association of State Drinking Water Administrators has agreed to become the repository for these documents. If readers are interested in obtaining them, they may contact Mr. G. Wade Miller, Executive Director, at Suite 400, 1911 North Fort Myer Drive, Arlington, VA 22209, (703) 524-2428.

CHAPTER 2: CONNECTICUT CASE STUDY

2.1 Introduction

Connecticut has developed a comprehensive program for preventing the creation of new, potentially non-viable small systems. Using legislation passed in 1984 and 1985, Connecticut has instituted the following mechanisms for restricting the creation of new community water systems (CWSs), expanding the service of existing community water systems, and addressing the problem of existing non-viable small systems.

- Certificate of Public Convenience and Necessity (referred to below as the certificate) requires a new or expanding water system serving between 25 and 1,000 people to obtain a permit, requiring assurances of technical, financial, and managerial viability. The creation of a new water system is allowed only when the State determines that an interconnection or a satellite system is not feasible. If such a determination is made, the technical, financial, and managerial qualifications of the system's owners are then evaluated by the State.

- The Connecticut Plan (based on the Washington PWSCA) establishes "exclusive service areas" for existing utilities using a area-wide planning approach.[1] The utility accepts responsibility for all new and existing water systems in its service area, thereby reducing demand for new, potentially non-viable small systems.

- Takeover of Existing Water Companies. The State has the authority to order a solvent water company or municipality to take over a failing small water company. These laws may deter system developers from seeking to create new water systems without adequate resources.

The laws are described in greater detail in Section 2.2.

Although a major goal of the Connecticut program is to eliminate new, potentially non-viable small systems, it also restricts the creation of all new small systems whenever possible and encourages a decrease in the number of existing non-viable small systems. Connecticut addresses the problems of new and existing small systems in the same legislation because the State wants to ensure the viability of all of its public water systems. Hence, the distinction between programs for new and existing small systems is often blurred. However, this chapter will focus on the control of new small systems and will discuss other controls only as they relate to the central topic.

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[1]See Chapter 5 for a discussion of the Washington PWSCA.

The measures outlined above were adopted by Connecticut in response to a drought that drew attention to small system owners' and operators' lack of financial and human resources. On the assumption that many small systems are likely to become non-viable, the State has focused on restricting the creation of new small water systems by promoting interconnections and satellite management, and by decreasing the number of existing non-viable small systems through the use of receivership and acquisition statutes. All three of Connecticut's programs contribute to the goal of increasing the number of interconnections and satellite systems throughout the State.

State Profile

Connecticut has 169 towns and eight counties. Counties do not have governing authority in the State. The population of this small, densely populated State is 3.2 million.[2] Real estate values are high in comparison to the national average. Connecticut's median value of owner-occupied homes ranks fifth in the nation, according to the 1980 census. Fairfield, Hartford, and New Haven counties comprise 76 percent of the State's population[3] and 40 percent of the State's area. Another illustration of Connecticut's concentrated development is the fact that 79 percent of the population lives in urban areas while 60 percent of the land in the State is forested.

Roughly one-third of Connecticut's population relies on groundwater for safe drinking water. In Connecticut, CWSs provide an average of 65 million gallons of groundwater and 314 million gallons of surface water average daily.[4]

In general, Connecticut has an abundant supply of high-quality water. Although the commissioner of Department of Health Services has the authority to allow the use of Class B waters--water into which sewage is discharged--in certain emergencies,[5] he has never exercised this authority. However, several water supply issues continue to trouble State health officials. There are 798 wells--111 public, 630 private, and 57 commercial--that are known to have been contaminated as of September 1984. The contaminants include

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[2]Office of Policy Management Population Projection, 1984, Appendix, Individual Water Supply Plan Manual.

[3]Ibid.

[4]Water Resources Task Force Final Report, 1984, 33, 52.

[5]Op. cit., 52.

solvents, hydrocarbons, salt, and landfill leachate. In addition, 20 percent of all water lines in Connecticut are over 80 years old.[6]

The Small Systems Problem

There are 656 community water systems in Connecticut, according to 1987 Federal Reporting Data System data. Fifty are publicly owned by either a municipal or regional authority; these systems are generally found in the areas of greatest population density and serve 58 percent of the population served by community water systems. Small water systems, on the other hand, are typically found in the suburban and rural sections of the State.[7]

As shown in Exhibit 2.1, 91 percent of Connecticut's water systems are small; however, they supply water to only 5.6 percent of the population served by community water systems. Similarly, although 86 percent of the population served by community water systems is supplied by surface-water sources, 92 percent of the systems use groundwater sources.

The Water Resources Task Force was formed in 1982 to evaluate Connecticut's water supply issues and to recommend improvements in the management of water resources. The Task Force found that small system failures were often due to poor management and lack of finances. The Task Force found many instances of small water companies being unable or unwilling to cope with pollution of wells, deteriorated infrastructure, inadequate pressure, poor water quality, water system breakdowns, and dry wells. In part because of part-time and inexperienced management, small water systems do not regularly apply for the rate increases that would fund system maintenance and repair. Moreover, our review of Connecticut's files revealed that many small systems have negative net worth and that their owners are no longer interested in running them.

State administrators believe that proper design, service, and management would greatly improve the condition of Connecticut's public water systems. Many of the State's small water systems are old and, in many cases, cannot remain viable. Connecticut State officials express their support for the State program to restrict the creation of small systems.

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[6] Op. cit., 54.

[7] Op. cit., Introduction.

Exhibit 2.1
Connecticut Water Systems, Violations and Systems in Violation

FY 1987

	Population Served:							
	25-100	101-500	501-1,000	1,001-2,500	2,501-3,300	Total <3,300	Total >3,300	TOTAL
Systems	326 49.7%	213 32.5%	25 3.8%	23 3.5%	10 1.5%	597 91.0%	59 7.0%	656 100%
Population	16,000	49,000	18,000	38,000	29,000	150,000	2,549,000	2,701,000
MCL Violations	40 50.0%	17 21.3%	6 7.5%	2 2.5%	3 3.8%	68 85.0%	12 15.0%	80 100%
M/R Violations	7 12.7%	12 21.8%	1 1.8%	4 7.3%	16 29.0%	40 72.7%	15 27.3%	55 100%
Average MCL Violations per system/year	0.12	0.07	0.24	0.08	0.30	0.11	0.20	0.12
Average M/R Violations per system/year	0.02	0.06	0.04	0.17	1.60	0.07	0.25	0.08
Systems with MCL Violations	26 46.4%	15 25.7%	4 7.1%	2 3.6%	2 3.6%	49 87.5%	7 12.5%	56 100%
Systems with M/R Violations	7 25.9%	9 33.3%	1 3.7%	2 7.4%	3 11.1%	22 81.5%	5 18.5%	27 100%

Source: Federal Reporting Data System, Reports 7, 19A, 19B, 1987

Note: Percentages may not add due to rounding.

2.2 Organizational and Legislative Structure

History

A drought in 1980 resulted in water shortages in the south western portion of Connecticut, which affected many small systems. Their problems drew attention to the need for improved water supply management, and the State executive and legislative branches responded.

As a result of the growing concern over water resources, the Water Resources Task Force was formed. This special, temporary committee addressed two major issues that concern this study:

- restricting the creation of new systems, and
- establishing a mechanism for taking over failing small water systems.

The Task Force was charged with recommending legislation to deal with the State's water supply problems. It found that, because of the State's large number of small systems, State agencies had difficulty ensuring that water quantity and quality standards were maintained. The Task Force therefore recommended that actions be taken to restrict the creation of small systems.

State Organization

Two State agencies have major roles in regulating Connecticut's public drinking water supply. The organizations with the authority to restrict small system creation are the Department of Health Services (DOHS) and the Department of Public Utility Control (DPUC). Organization charts for these two agencies are shown in Exhibits 2.2 and 2.3, respectively.

A primary function of DOHS is to ensure adequate water quality and quantity for the State's residents. Therefore, the DOHS has final approval over the individual water supply plans and the coordinated (area-wide) plan. Because DOHS already has engineering and planning sections that approve and monitor all community water systems in the State, it has the technical background and administrative experience necessary for overseeing and approving the Connecticut Plan. DOHS reviews proposed projects, long-range water supply plans, water quality data, and permits. It also shares responsibility with DPUC for implementing the statutes concerning water system takeovers and receiverships.

The DPUC regulates the rates of all public service companies in the State, including water companies serving more than 50 customers. In addition, the Connecticut statutes stipulate that DPUC's definition of public service companies does not include municipal water systems (CGS Sec. 16-1). DPUC approves utility

Exhibit 2.2

Connecticut Department of Health Services

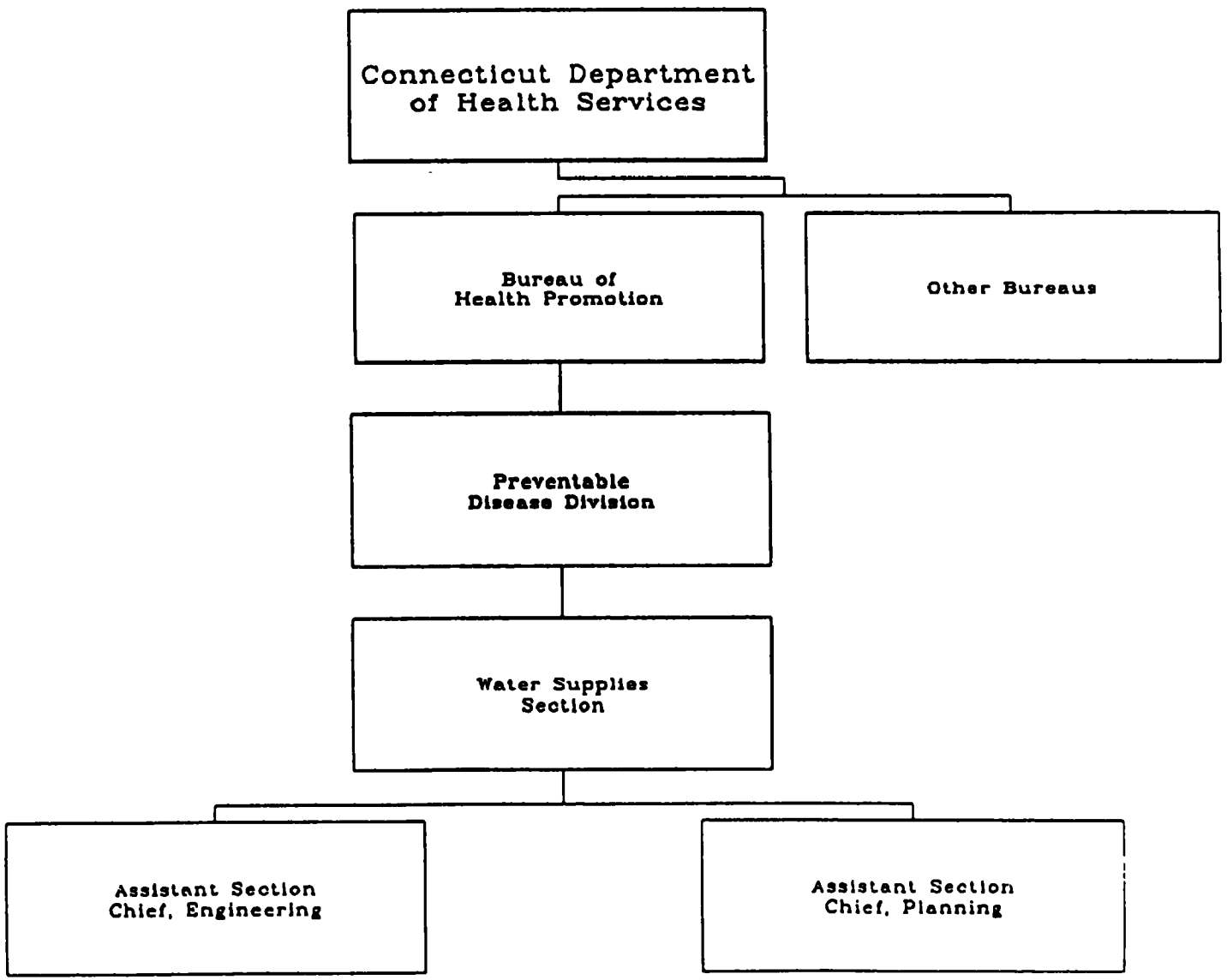
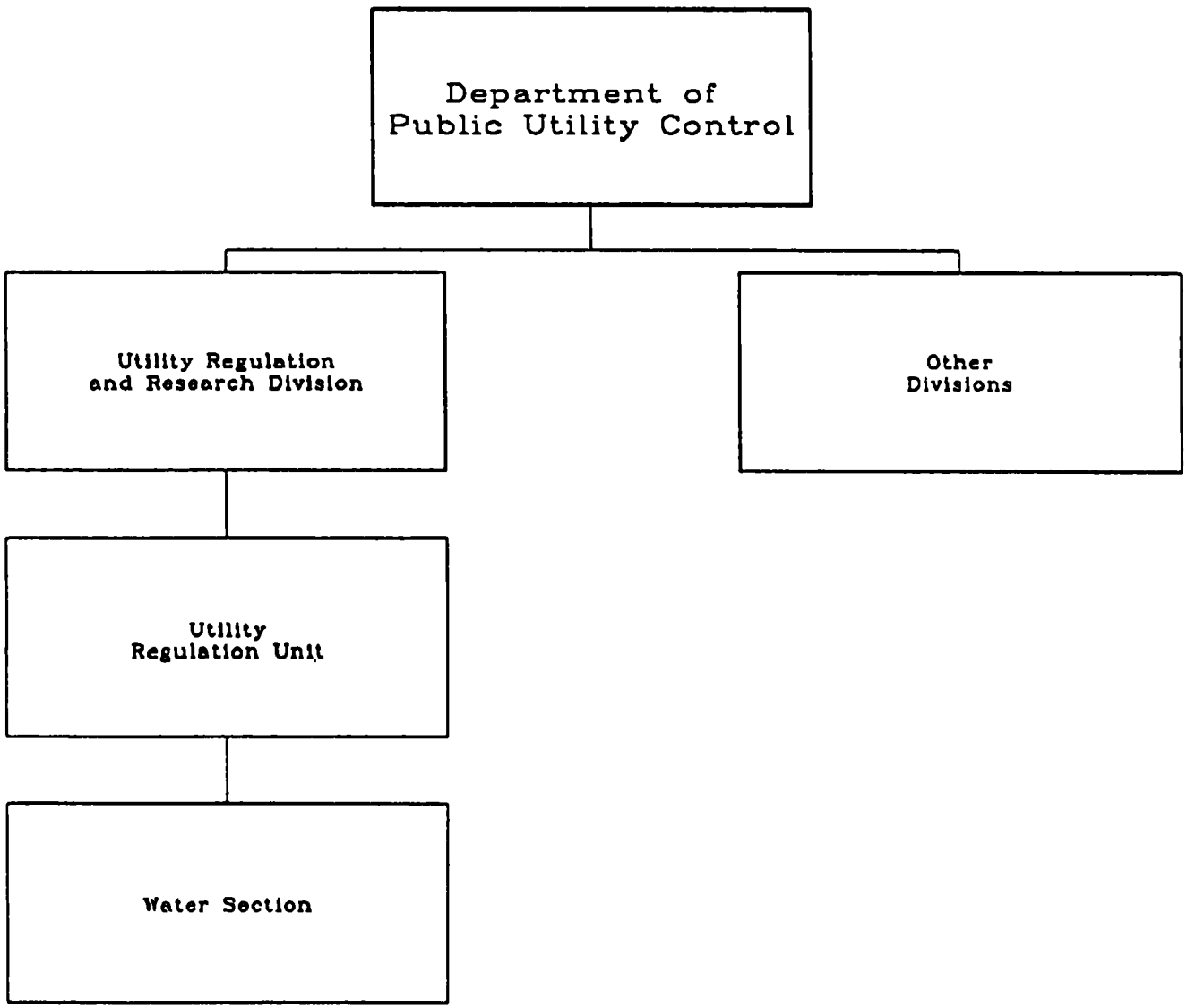


Exhibit 2.3

Connecticut Department of Public Utility Control



rates; regulates plant and equipment expansion, transfers of assets, franchises, and the issuance of notes, bonds or other securities; performs management audits; and requires annual audits. In addition, DPUC, in conjunction with DOHS, has authority to approve and permit the creation or expansion of any water system serving 25 to 1,000 persons.

Under the authority of CGS Sec. 16-262n, DPUC, in consultation with DOHS, may require takeover of a water company that is in violation of any DOHS or DPUC order. Although DOHS has the leading role in implementing the Connecticut Plan, DPUC must concur with DOHS on individual water supply plans before DOHS can approve them. Finally, DPUC reviews the coordinated water supply plan, but does not have final approval authority.

In addition to the DOHS and the DPUC, two other agencies are concerned with drinking water supplies. The Department of Environmental Protection (DEP) primarily regulates discharges into the waters of the State. DEP also issues diversion permits and controls resource allocation. The DEP's role in restricting creation is to review the coordinated plan and concur on the approval of individual water plans.

The Office of Policy and Management (OPM) also reviews the individual and coordinated water supply plans. In practice, DPUC, DEP, and OPM have considerable responsibility and input in the approval process.

The certificate regulations define "satellite system" as a non-connected water system owned by an existing system.

Legislative Structure

In response to the recommendations of the Water Resources Task Force, the General Assembly passed the following legislation 1984 and 1985:

- P.A. 84-330, "An Act Concerning Small Water Companies and the Receivership of Water Companies," which led to important amendments to the Connecticut General Statutes (CGS 16-262); and

- P.A. 85-535, "An Act Concerning a Connecticut Plan for Public Water Supply Coordination," then incorporated into the Statutes as CGS 25-32d and 25-33e-j.

The first of these Acts established more effective legal controls over the formation of new water systems and over the takeover of existing systems. The second, known as the Connecticut Plan, deals primarily with future water supply planning by establishing area-wide planning and exclusive service areas.

P.A. 84-330 amended CGS Sections 16-262l and 16-262m to clarify the conditions of a receivership and to improve State control over small system creation.[8] In addition, P.A. 84-330 added five new provisions that concern the takeover of existing water systems.

Certificate Laws

- CGS 16-262m establishes a joint DPUC and DOHS certification procedure for any new small system serving between 25 and 1,000 persons. The certificate, called a Certificate of Public Convenience and Necessity, restricts the creation of new small systems by encouraging feasible interconnections with an existing utility and by establishing a set of regulations for approval of the system's design and management, if an applicant cannot interconnect with an existing utility.

- CGS Sec. 8-25a requires that if a municipality approves a new water system without having received a Certificate of Public Convenience and Necessity from the State, the city or town is responsible for the operation of that system if that water system's ability to provide adequate service to its customers is impaired.

The statutes establish guidelines for ordering a municipality or water company to take over a failing small water company. A water system may be subject to acquisition if the system has repeatedly been found in violation of State drinking water regulations, a notice of violation, and an administration order have been issued, and the system has failed to comply with the administrative order. The acquiring community water system must either extend its mains or set-up a satellite system to serve the area, and must make any necessary improvements to the failing system. The DPUC subsequently adjusts the allowable water rates to compensate the acquiring company for the reasonable cost of acquiring and operating the new system.[9]

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[8]The initial version of CGS 16-262l was authorized in 1981 by P.A. 81-358. The first draft of 16-262m was authorized in 1981 by P.A. 81-427.

[9]One large utility has suggested that DPUC has not allowed rate increases that provide adequate financial incentives for acquisition. On the other hand, in a few cases water rates in Connecticut are higher than those deemed affordable by a National Regulatory Research Institute survey of 45 commissions that regulate water systems.

Takeover Laws

- CGS Sec. 16-262l. If DPUC determines that any water company is unable or unwilling to provide adequate service to its consumers, the DPUC may make an order "attaching the assets of the company and placing it under the sole control and responsibility of a receiver" (CGS Title 16 Sec. 16-262l(b)). A water company must pay for improvements made to the water system while in receivership if the company intends to continue to own the system.

- CGS Sec. 16-262n. DPUC and DOHS may call for an acquisition hearing. The departments must give notice to public and private water companies that a search for the most suitable acquiring entity will begin.

- CGS Sec. 16-262o. DPUC and DOHS may order the acquisition of a water company by the most suitable public or private entity. This section also provides for the recovery of all reasonable costs of the acquisition and improvements. To date, only privately owned systems have been taken over under this law.

- CGS Sec. 16-262p. Any company that has acquired another system through Sec. 16.262o must make the necessary improvements to that failed system. This section also requires the acquired company to transfer ownership to the buyer immediately.

- Sec. 16-262q. The acquired company is to be compensated by an amount agreed upon by the parties involved so long as the agreement is approved by DPUC and DOHS.

The Connecticut Plan

The 1985 Final Report of the Water Resources Task Force led to the passage of P.A. 85-535, "An Act Concerning a Connecticut Plan for Public Water Supply Coordination." DOHS Water Supply Section distributed a guidance manual for writing individual water system plans.

The first task specified by P.A. 85-535 was for DOHS to delineate boundaries for the Public Water Supply Management areas. These boundaries were established based on the similarity of water supply problems, geology, and population density within an area. In addition, DOHS considered the location of existing water supply sources and water systems.

The next step was to establish priority management areas to begin area-wide planning. The high-priority areas were chosen based on the severity of their water quality problems and planning needs.

The Act then called for the establishment of Water Utility Coordinating Committees (WUCCs) composed of members of all utilities serving over 25 persons, with assistance provided by representatives of area-wide planning authorities and State agencies. WUCCs were created as a forum for:

- determining future water needs in their area, and
- establishing exclusive service area boundaries.

The WUCC is charged with developing a Coordinated Water System Plan (CWSP) that allows utilities to maintain their present service areas to avoid "unserviced islands" and to ensure that service areas do not overlap or create a duplication of service. The CWSP has of two major components, the individual water system plans, and an area-wide supplement. An individual water system plan is written by each community water system within the regional management area that serves over 1,000 customers. The individual plan, which details the water sources the company plans to use and areas it plans to service over the next 50 years, is updated every five years.

The area-wide supplement has three major components: water supply assessment, delineation of exclusive service areas, and the integrated report. The water supply assessment evaluates the water systems in the management area, giving special consideration to areas with a history of water quality, service, and supply problems. Exclusive service area boundaries identify particular areas for which utilities are responsible. If the WUCC cannot agree on these boundaries, the WUCC must consult with the DPUC. The DOHS is authorized to make the final decision on service area issues unresolved by the WUCC and the DPUC. The integrated report provides an overview of the individual community water systems, addresses area-wide water supply issues, and promotes cooperation among community water systems.

2.3 Implementation of Controls

All three aspects of Connecticut's program to control the creation of small systems--the certificate, acquisition, and area-wide planning--have been carefully and specifically drafted to facilitate the implementation of these laws. The recommendations of the Water Resources Task Force were adopted in the Connecticut General Statutes. The presence on the Task Force of members from DPUC, DOHS, OPM, DEP, and the State legislature resulted in a document that attempted to lay out solutions to the problems of small water systems as precisely as possible.' Even with this extensive preparation, DPUC and DOHS officials expressed the need for amendments as problems arise in the implementation of the programs.

Below, we examine how Connecticut has chosen to implement its laws to restrict the creation of small systems.

Certificate of Public Convenience and Necessity Program

The Certificate of Public Convenience and Necessity Program, implemented jointly by the DPUC and the DOHS, has proven effective in preventing non-viable small systems from forming. The certificate, which requires the applicant to pay a $100 application fee, successfully restricts the creation of non-viable systems when any of the following occur:

- a proposed system voluntarily combines with an existing system. This option does not require the applicant to continue the certificate process;

- the DPUC and the DOHS jointly deny the certificate and thereby prohibit a potentially non-viable system from operating independently; or

- DPUC and DOHS approve the certificate. In this case, the new system is likely to operate as a viable water system.

The first response is probably the most common. It is difficult to determine how many water systems chose to combine with larger systems, since these systems were never independently formed and are therefore never recorded. An employee of the Connecticut Water Company, (a water utility serving approximately 52,000 persons) indicated that the company is currently reviewing 45 applications from water systems that wish to be taken over. Only two certificates have been denied since the program began, and 12 certificates are granted each year.

When interconnection through a main extension is not feasible, a proposed system must seek a satellite management arrangement with an existing community water system. Satellite management means that the water system would not be physically connected to the parent water system. However, the parent water system would have operational and managerial responsibility for the satellite water system. Although the motivation for a proposed water system to seek satellite management or main extension from an existing system may be to avoid the certificate review process, such voluntary mergers or arrangements are among the stated goals of the certificate program. The certificate regulations state that they are intended to restrict the creation of new, small water systems and to establish minimum design, construction and operation standards to be observed when creating new small systems or expanding existing systems.[10] Further, the certificate regulations require

[10]DPUC, Regulations for Application Procedures and Criteria for Issuing Certificates of Public Convenience and Necessity for Small Water Companies, Final Regulations, September 28, 1987.

a proposed new system to consider the feasibility of interconnection with an existing system before considering any other option. The next option proposed small systems must consider is satellite management.

One reason new small systems may seek larger systems to take over their management and operation is that systems serving over 1,000 people are not required to obtain a certificate. Therefore, by combining with a large system, they avoid delays associated with the certificate approval process (estimated by interviewees to be between six months and two years). In addition, the larger systems are usually better equipped to meet existing drinking water regulations, including the Safe Drinking Water Act (SDWA) Amendments of 1986.

Many banks require proposed water system owners to construct wells and to receive Certificate approval before they will approve a loan. Although banks have made this decision independently, it helps to prevent any circumvention of the requirement.

The certificate law, CGS Sec. 16-262m, calls for DPUC to adopt regulations to carry out the law. The regulations became effective September 28, 1987. The certificate regulations go beyond the Statute (1) to define the terms and the chronology of events in the application process and (2) describe technical issues not stated in the Statute.

The regulations define a series of phases that must be followed when an applicant intends to: (a) build a new community water system, or (b) expand an existing water system by five percent above the number allowed in an existing permit or five percent above the number served as of the date of these regulations. The following options must be considered by the State before a system may continue to the next phase:

- interconnection with an existing system,
- satellite management, or
- withdrawal of the application to seek zoning for individual wells in areas that allow individual wells,

To continue the application and be granted a certificate, the applicant must prove that the entity has the financial, managerial, and technical resources to operate the proposed water system. These options must be pursued in the order in which they are listed. The option of seeking local approval for individual wells is listed because there are rural areas of the State where dwellings are far apart. Some towns have therefore established the practice of private wells as the most viable alternative.

The regulations list all the information the applicant must provide to continue to apply for the certificate. The requirements

include certified engineering data, test results, design criteria, source protection, and specifications for the atmospheric storage tank, construction materials, fire protection, on-site standby power, distribution system, service pipes, and pump house.

The regulations also specify what qualifications an applicant must hold if applying to become the manager of a new small water system. The applicant must present such information as the income tax returns of the proposed owner, evidence that the owner is well capitalized and has adequate deposits available, a balance sheet, a proposed rate structure, a capitalization plan, proposed periodic budget review, a description of the operational plans and qualifications of any persons who will have any role in the management, operation or maintenance of the proposed system, and maintenance, conservation, and operator safety plans.

Central to the success of the certificate process is the fact that both the DPUC and DOHS simultaneously review each stage of it. With its staff routinely evaluating water systems' finances under its rate setting authority, DPUC is prepared to evaluate the feasibility of interconnections and satellite arrangements, and the financial information the proposed system provides at later stages of the application process. DOHS staff are trained to determine the technical feasibility of these arrangements, the technical and managerial qualifications of proposed system operators, and the adequacy of the water supply. DPUC and DOHS consult with each other throughout the certificate process; a certificate may not be issued without the consent of both agencies.

Both water main extensions and formation of satellite systems reduce the number of small systems to be regulated by the State. Assuming that there is a direct link between the number of small systems and the rate of non-compliance, reducing the number of small systems is desirable as a means of improving compliance.

Although certificate approval creates a new small water system, it increases the likelihood that the system will be well designed, maintained, and managed. Agency officials believe that the requirements are sufficiently stringent that the systems created will be as professionally run as the State's larger utilities.

The number of small systems in Connecticut has decreased since the regulations were promulgated in 1984. From FY 1985 to FY 1987, the total number of community water systems fell from 685 to 656, a four percent reduction. DOHS estimates that this reduction is due to voluntary and forcible acquisitions as well as inventory modification.

The Connecticut Plan

As described in Section 2.2, P.A. 85-535 established laws that called for the Connecticut Plan. DOHS drafted regulations

concerning Coordinated Water System Plan. These describe the composition and duties of the Water Utility Coordinating Committees, which generate CWSPs. Currently, three CWSPs are in various stages of development and approval. DOHS is phasing the implementation of the Connecticut plan because of revenue and staff limitations. Because of the State budget deficit and anticipated cut-backs, there is presently no schedule for implementing the Connecticut Plan in the remaining four management areas. However, legislation requires that the plan be implemented state-wide.

Before the WUCCs were established, the State set priorities as to which WUCCs should be established first. After several public hearings, Connecticut was divided into seven management areas. The Housatonic Region was chosen as the Connecticut Plan's first priority and was therefore directed to develop a WUCC first. As Exhibit 2.4 shows, the Upper Connecticut River Area and South Central Connecticut were given second and third priorities respectively. Each is developing a CWSP. These areas were chosen to begin implementation because of their severe water quality and quantity problems and their need for area-wide planning.

One major component of the WUCC's CWSP are the individual water system plans, submitted by each community water system. Although many individual water supply plans have been submitted, only one has been approved. One problem with this process is that water systems frequently require much time to complete their plans and to make any revisions required by DOHS. This delay makes the delineation of exclusive service areas more difficult.

All water companies serving more than 1,000 customers (and any water systems specifically requested by DOHS) are required to write individual water supply plans. DOHS has issued a guidance manual that must be followed when drafting the individual plan. Each plan must contain a description of the company structure and assets, a description of existing sources, their safe yields, and performance. Each plan must also contain a listing of the current population served and a projection 5, 20, and 50 years ahead. The plans projecting 50 years into the future are far less specific than those projecting 5 or 20 years. Water consumption trends and projections are included in order to estimate future water demand areas. The section on existing and anticipated land use also serves to pinpoint areas that will require water service in the future. Water companies are required to define future service areas. This section includes a detailed map delineating the boundaries of the current service area, and the boundaries of the service area 5, 20, and 50 years in the future.

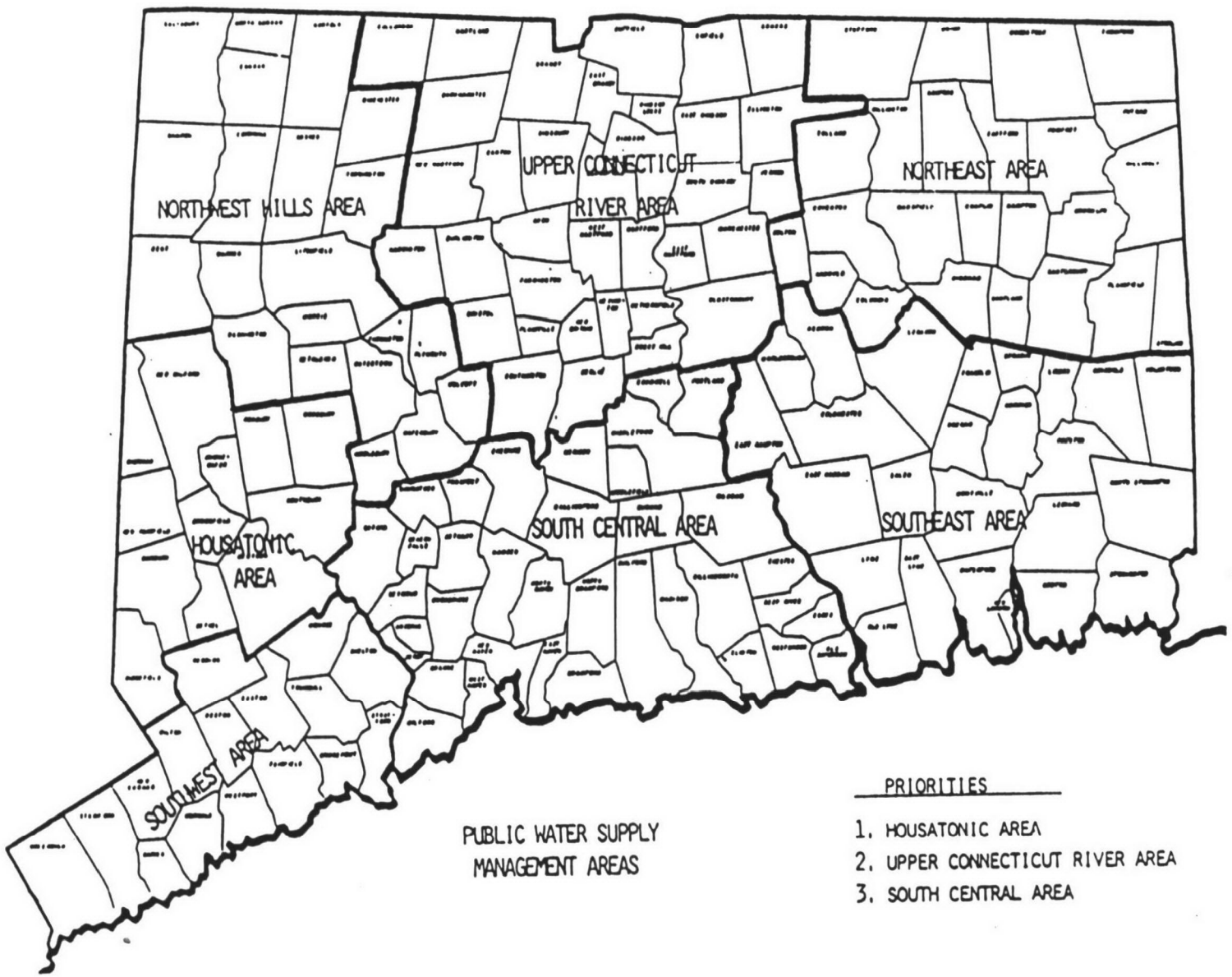
NORTHWEST HILLS AREA
UPPER CONNECTICUT RIVER AREA
NORTHEAST AREA
HOUSATONIC AREA
SOUTH CENTRAL AREA
SOUTHEAST AREA
SOUTHWEST AREA
PUBLIC WATER SUPPLY MANAGEMENT AREAS
PRIORITIES
1. HOUSATONIC AREA
2. UPPER CONNECTICUT RIVER AREA
3. SOUTH CENTRAL AREA

Exhibit 2.4

The purpose of the area-wide plan is to coordinate the individual plans submitted. The area-wide plan has two main concerns:

- to assess existing water systems for water quality and quantity and operational problems; and

- to set exclusive service area boundaries.

At this time, only one CWSP, the Housatonic Regional Plan, has been submitted. It has reached final review but has not yet been approved because the individual water supply plans have not been approved. The Housatonic Management Area consists of 12 communities in the western portion of the State.

Exclusive service areas were delineated based on requests from utilities in the Housatonic WUCC that desired to expand beyond their present service areas. As the statutes stipulate, no existing service areas were taken from a utility. According to the map included in the Housatonic plan, large portions of the Housatonic Management Area are not designated as exclusive service areas. These unserviced areas include significant portions of the towns of Sherman, Roxbury, New Fairfield, and Bethel. In addition, the Housatonic plan states that many portions of an exclusive service area will not be developed, and therefore will not require future public water supplies.

The Executive Summary of the Housatonic plan states that the principal water supply concern within the region is the existence of small water systems with inadequate technical, financial, and managerial qualifications. The plan calls for a State program of loan guarantees, grants or revolving funds for system improvements. Housatonic members are concerned that required improvements would unduly burden small system customers.

The State has ultimate approval authority for all area-wide plans. It can also establish exclusive service areas for water utilities if the WUCC cannot agree after consultation with DPUC. Therefore, it is in the interest of the WUCC members to reach agreement. Certainly, most utilities would want to have as much control as possible in determining their future expansion.

The Connecticut Plan avoids creating new regulatory authority and limits the State's role to plan approval. Once the coordinated area-wide plan is developed, the WUCC is not required by law to reconvene until the DOHS determines that the coordinated plan needs revision, or at least every ten years. However, some WUCC members may wish to meet without DOHS advisors to discuss mutual problems.

It is difficult to evaluate the effectiveness of this program, since no area-wide plans have been approved. However, we can examine the progress of the process, and assess the role that the plan is likely to have in preventing small systems creation.

One problem with the process has been delays in approving individual plans. According to DOHS staff, one reason the approval process moves slowly is that the plans are reviewed by four State agencies (DOHS, DPUC, DEP, and OPM) as well as communities within the region. Although ultimate approval authority lies with the DOHS, the review process requires consideration of many viewpoints. In addition, the DOHS must review the individual plans to ensure that water sources are sufficient to handle projected future plans. This is a difficult and complex task.

Another potential problem with the process, which was identified by a member of one of the existing WUCCs, is the relative timing of the individual and area-wide plans. In the first WUCC to be established, both the individual and the area-wide plans were due at roughly the same time. Ideally, individual plans would be developed well in advance of the area-wide plan.

Assuming that the seven area-wide plans are eventually approved as the law requires, the Connecticut Plan may become an effective mechanism for preventing the creation of non-viable small systems. In particular, the establishment of exclusive service areas in the State will streamline the regulatory process by establishing areas of responsibility among water supply systems. Rather than going through a complex hearing process, the State would know immediately to which water utility an existing failing system should be assigned. In addition, developers would know where to seek water service needed for new development. This should further reduce the demand for new small systems. Finally, the Connecticut plan may ultimately reduce the need for new laws or regulations to restrict the creation of non-viable small systems. Many problems may be solved between WUCC members or at the local level as a result of the dialogue and planning accomplished in the WUCCs.

Controlling Existing Failing Small Water Supply Systems

CGS Sections 16-262l, n, o, p, and q authorize DPUC to order a takeover of an existing water system and to establish ground rules for this process. Two components of the regulatory system are essential to its effectiveness:

- the laws explicitly state that DPUC must allow the parent company to recover reasonable costs associated with taking over a failing system, and

- if a company does not agree to take over a failing small system, the DPUC has the power to order it.

Regarding the first of these, the cost of improving the failing system is specified in the joint agency hearing. Therefore, the company taking over the small system knows that it will be able to recover the costs associated with system improvements. However, problems arise if costs are not fully anticipated by the

parent water company in the joint hearing. In this case, the company has to assume in advance that when it applies for a rate increase, the DPUC will agree that the additional costs were reasonable and necessary.

The second component, DPUC's authority to order a take over, may induce interested or nearby water companies to reach "voluntary" agreements to acquire small systems before being forced to do so.

The decision that a water company is no longer viable is made after the following events have occurred:

- a notice of violation is issued,
- an administrative order is issued, and
- the system fails to comply with the administrative order.

In the cases we studied, several administrative orders were issued without response before a takeover was initiated. The systems taken over were generally those that repeatedly failed to comply with administrative orders.

Once a system is designated for acquisition, a joint agency hearing occurs. Based on the examination of the case, the State issues a decision about what must be done to ensure that water of adequate quality and quantity is supplied to the population served by the "problem" system. To solve problems that arise after the hearing, several amended decisions often follow, either to extend the schedule or revise the required actions based on new information.

Although recently implemented, the program has already had some success. DPUC estimates that 22 water systems were taken over under the 16-262 process since 1985, and six of these acquisitions were voluntary sales. The new owner of the acquired system is required to follow a DOHS schedule of improvements so that the system will conform to State drinking water regulations. In contrast, during 1981-1985, only three water system consolidations occurred; all of them voluntary.

2.4 Case Studies

The following case studies illustrate the use of controls for both new and existing small water systems. The first case is an example of a denied application for Certificates of Public Convenience and Necessity. The second is an example of the State's use of its authority to order an acquisition of a failing water system.

Broadleaf Circle

In December 1985, DPUC denied a Certificate of Public Convenience and Necessity for Broadleaf Circle, a proposed subdivision with 24 single-family houses in West Suffield. Furthermore, DPUC informed the Town of Suffield, which had already approved the subdivision of land, that if it allowed the development to proceed without a certificate, Suffield would be held accountable for future system operation under CGS Sec. 8-25a. DPUC recommended an interconnection with West Service Corporation Water Company (WSCWC), a water utility under DPUC jurisdiction. Although WSCWC was unwilling to provide this service, CGS Sec. 16-20 allows DPUC to order that service be provided.

DPUC ordered that a main extension from WSCWC be made in 1986. Several meetings were held by the parties, but they were unable to agree on terms of the main extension contract. CGS Section 16-20 states that if DPUC finds that any public service company unreasonably fails or refuses to furnish adequate service at reasonable rates to any person within the company's service area, DPUC may, after a petition and hearing, prescribe service to be furnished by the company and prescribe the maximum rates at which the service shall be furnished.

As a result of the hearings on the 16-20 petition, the DPUC wrote the main extension agreement between the developer and the WSCWC, a function it rarely performs. The parties failed to execute this agreement and the DPUC created another docket, pursuant to Section 16-41 of the General Statutes of Connecticut, to show cause why WSCWC should not be fined, or why the developer's request for service should not be dismissed. A hearing on the second docket was scheduled, but was not held because the parties executed the main extension agreement on August 5, 1988. Construction of the main extension commenced on November 7, 1988. The future residents of Broadleaf Circle will pay WSCWC rates of $199 per 72,000 gallons of water.

Lebanon Water Company

This case shows the extensive time and effort required by the State in taking over an existing system, if difficult legal and technical issues are involved. In addition, this case illustrates the State's power to order takeovers, even without cooperation from the owner.

The Lebanon Water Company served 53 customers, most of which were single-family units in a residential development called Frankel Acres in Lebanon. Although treatment equipment existed on the premises, it had not been used for a long time. The original treatment had consisted of manganese greensand filters, pH adjustment and oxidation. There appears to have been no operator other than the owner.

In 1977, DPUC ordered Lebanon Water Company to provide an adequate and continuous supply of water to its customers. The owner was required to maintain daily records regarding the quality and quantity of water produced. On March 21, 1985, DPUC determined that the owner had abandoned his company and was in non-compliance with DPUC's orders. A temporary receiver was appointed by the Superior Court on July 8, 1985; Connecticut American Water Company (CAWC) agreed to provide maintenance for Lebanon under a service contract. The DPUC subpoenaed the owner, who did not appear at the hearings or in court. Between July 1985 and January 1986, CAWC unsuccessfully attempted to come to agreement with the owner of Lebanon Water Company for a voluntary transfer of ownership.

The joint investigation by the DPUC and DOHS into the adequacy of service rendered by the Lebanon Water Company revealed that the owner of Lebanon Water had violated administrative orders issued by DPUC and had abandoned his company as of August 1984.

In a series of Interim Decisions, CAWC was ordered to install a temporary treatment system and to remove and test a piece of asbestos cement pipe. CAWC was assured by the DPUC that CAWC would recover all costs incurred in providing service to Lebanon customers. The final decision ordering the transfer of ownership was rendered on March 19, 1987.

The DPUC transferred ownership to CAWC pursuant to CGS Sections 16-262n and 16-262o. Connecticut American was ordered to pay all of Lebanon's debts. Further, they were ordered to make the necessary capital improvements to Lebanon and to submit their proposals by the specific timetable outlined in the decision. CAWC was required to adjust and monitor the chlorination and pH levels entering the distribution system and to set up a backwash pump approved by DOHS.

The owner of Lebanon refused to sign a quit-claim deed turning over his company to CAWC. The DPUC then informed the owner that he faced a $50,000 fine for failure to comply with the transfer order. The DPUC found that the business and other assets of the owner were not kept in the owner's name however, and collection of the penalty would have been difficult. The DPUC ruled that the water company could be transferred without the authorization or signature of the owner, pursuant to CGS Sections 16-262n and 16-262o.

Before acquisition, the temporary receiver had not charged Lebanon's customers because the water had a high iron and manganese content and was aesthetically unacceptable. Until all former customers of Lebanon were metered, CAWC billed these customers at their flat rate of $144 per year, which was set on September 1973. After being metered, the customers were billed at the rate set for the Mystic Valley District of CAWC in a decision dated April 30, 1985. The typical Mystic Valley customer pays $470 annually.

To reduce costs, improve efficiencies, provide rate stability, and broaden the rate base to support capital improvements, the DPUC began integrating the divisions of large water companies and equalizing rates among the divisions. The rates of the Mystic Valley Division of CAWC were among the highest in the State. The DPUC ordered CAWC to equalize its rates. The Mystic Valley Division serves approximately 3,500 customers. The Division has recently had to distribute, over a small rate base, the costs of a new treatment and storage tank, the upgrading of a filter, and a legal dispute over sludge disposal. Another division of CAWC, the Greenwich Division, serves approximately 20,000 customers and has rates that are average for the State, $242 for 72,000 gallons of water annually. The customers of the Greenwich Division protested the equalization process; this issue is now on appeal. However, since a stay of the DPUC's order regarding the equalization was not issued, the equalization of CAWC's rates are now in effect. The DPUC estimates that with equalized rates, all of CAWC's customers will pay approximately $269 per year.

Former Lebanon customers have not complained about their water rates. DPUC considers the rates to be reasonable. DPUC estimates that the rates charged to former Lebanon customers would have been $1,000 per year if the Lebanon customers had not shared the acquisition and upgrading expenses with the Mystic Valley District customers.

2.5 Application to Other States

In this section, we evaluate whether elements of the Connecticut program could be useful to other States. In addition, we examine implementation problems that other States may need to consider when drafting their own regulations. We have received input on these subjects from water systems, developers, and State officials.

Connecticut's system for restricting creation has three components:

- Certificate of Public Convenience and Necessity,
- The Connecticut Plan, and
- Takeovers of existing water companies that are failing.

The program of requiring new small systems to obtain a Certificate of Public Convenience and Necessity has prevented non-viable small systems from forming. The laws that empower the DPUC to order a takeover of a failing water company have also enabled the DPUC to reduce the number of existing non-viable small systems. Together, these laws provide the DPUC and the DOHS with the required authority both to prevent future small systems problems and to react to existing ones.

It is difficult to assess the success of the Connecticut Plan because the process is just starting. As the program matures, we may be able to judge its effectiveness in addressing small systems creation.

State Characteristics that Enhance Program Effectiveness

Several characteristics of the State of Connecticut contribute to the effectiveness of its program to restrict the creation of non-viable small systems. Although we cannot quantify the extent to which program success is dependent on these characteristics, it is helpful to examine them and the effect they have on the process.

The following characteristics may affect program effectiveness:

- Real estate values. Connecticut has the fifth highest real estate values in the country. This may make the increased costs associated with water system development more acceptable, since this cost is small in relation to the total investment.

- Water supply. Connecticut has an abundant water supply. If potable water were less plentiful, existing systems would be less willing and able to take on troubled systems. Further, the State would not order a takeover if the water supply were not adequate to meet the additional demand.

- State size. Connecticut is compact--one can drive across the State in about two hours. Connecticut's size makes the program more manageable; there are potentially fewer remote areas that no water company would wish to service.

- Organizational cooperation. The DPUC has responsibility in the Certificate of Convenience and Necessity process for both private and public water systems, which is broader than the responsibility usually given to a State PUC. The Connecticut program is run cooperatively by the DPUC and the DOHS, as dictated by law. Cooperation between these two agencies is essential to the success of the program. The DPUC provides expertise in rate setting and determining the viability of small water systems. The DOHS provides engineering expertise regarding water quality and quantity.

- Legislative support. From the beginning, Connecticut's program has had substantial legislative support. There were no objections to the Connecticut Plan when it was being heard by the legislature, although towns expressed dissatisfaction about being excluded from the WUCCs.

- Strong State Agencies. The Connecticut DPUC and DOHS take a central role in administering the State's control program. The certificate program and the regulations concerning system takeovers might not be as effective in a State that delegates this function to local authorities. In this case, the State would either have to preempt local authority or accept inconsistencies in local implementation.

Program Benefits

The Certificate of Public Convenience and Necessity sets minimum design standards for emerging systems and encourages small systems to combine with larger ones. The certificate process has served to establish a formal review of system viability as part of the permitting process. DOHS has found that the certificate process' primary benefit is the review that allows DOHS to investigate questions they have prior to approval. One element of the process that makes the process work smoothly is that both the DPUC and the DOHS work together to assess:

- feasibility of interconnection or formation of a satellite system,
- financial viability of the potential water supplier, and
- adequacy of the water supply.

Another important element of the process is that, if towns approve a water system that does not obtain a certificate from the State, the town is responsible for that water system. This statutory provision encourages towns either to cooperate with the State or solve their own local water problems.

As the Connecticut Plan is implemented, most water supply problems may be solved at the regional level. Once exclusive service areas are established, individual water companies should accept responsibility for new and existing water systems in their exclusive service areas. The water company is then obligated to provide service whenever it is required in its exclusive service area.

Area-wide planning gives water suppliers the opportunity to meet and discuss common problems. In addition, establishing the area-wide water supply plan encourages water companies to plan, rather than simply react to problems as they arise. It also encourages interconnections with existing systems where feasible.

The laws and regulations allowing the DPUC to order takeovers of existing water companies complement the certificate program by giving the State the power to deal with existing non-viable small systems. One element of the process is that the DPUC is supposed to allow the acquiring water company to recover all reasonable

costs associated with a takeover. Water companies would be far more resistant to forced takeovers if they were not going to recover the costs of acquisition. The case studies show that the program need not result in unreasonable increases in water rates.

Potential Problems

In this section we identify problems that may make it difficult to apply Connecticut's program in other States.

First, the certificate results in delays. It takes a new system between six months and two years to obtain a certificate. Given the cost of capital, delays caused by the process may increase project costs. A similar problem arises in the case of takeovers. Companies that are taken over are generally chronic violators of DPUC and DOHS orders. Once selected for takeover, the joint hearing process is lengthy, as demonstrated by the Lebanon case study.

Second, the certificate process may encourage developers to install individual wells that are not regulated by the State. We have no data to confirm or refute whether the process does this. It is not possible to relate historical data on the number of private wells with regulatory changes, since many variables, including the health of the housing market and site geology, would affect the decision to sink an individual well. The certificate regulations, however, stipulate that individual wells are preferable to potentially non-viable small systems.

Third, one developer argued that the certificate program will decrease the availability of affordable housing. First, the program directly increases the costs of each housing unit. Second, in order to avoid the certificate requirements, developers may choose to install individual residential wells. Since a fairly large lot is needed for an individual well, this program may ultimately decrease the availability of affordable housing. The State's position is that this process helps to ensure that homeowners have an adequate and safe drinking water supply.

One potential problem with the Connecticut Plan that may not be acceptable in other States is the cost of developing individual and area-wide plans. The State provides $100,000 grants for regions to hire consultants to assist them in developing their coordinated plans. Even this level of funding may not be adequate in all regions.

Another problem with the Connecticut Plan is that having each individual and area-wide plan reviewed by four State agencies and the communities within the regions delays plan approval. Other States may wish to consider including cities and towns as members of the WUCCs rather than giving them review authority.

Cost and Effectiveness of the Connecticut Program

This section discusses the financial commitment made by the State of Connecticut to its various programs for restricting the creation of potentially non-viable water systems. The sections also considers the results of those programs.

Certificate of Public Convenience and Necessity

In the fiscal impact statement for the certification statute 84-330, the DOHS indicated that they would require five new positions, or $131,000 annually. The DPUC indicated that it would not need additional personnel to implement the legislation.

The Connecticut Plan

DOHS allocates $100,000 per year for the seven regional WUCCs to obtain assistance from contractors. Exhibit 2.5 shows the Water Resources Task Force's estimated agency costs associated with the Connecticut Plan. This estimate includes non-community water systems. Non-community systems were not included in the actual implementation, which decreased the burden.

Exhibit 2.5

	DOHS	
1	Principal Analyst/Engineer	$30,000
2	Senior Analysts/Engineers	52,000
2	Analysts/Engineers	48,000
1	Administrative Assistant	15,000
1	Clerk/Typist	13,000
	Data Processing (one time only)	100,000
	Other Expenses (cars, training, supplies)	30,000
	Total	$288,000
	DPUC	
2	Senior Utilities Engineers	$56,000
1	Utilities Engineer	24,000
1	Clerk/typist	13,000
	other expenses (cars, training computer time, supplies)	10,000
	Total	$103,000

Source: Water Resources Task Force Final Report.

Summary

It appears that Connecticut has established a comprehensive and effective program for restricting the creation of potentially non-viable small systems. Since the program was initiated, the DOHS and DPUC have denied two certificates and ordered the takeover of 22 non-viable small water systems. It is likely that the certificate program has encouraged many other small systems to combine with larger systems.

The Connecticut Plan may be an effective method of restricting the creation of non-viable small systems. However, because the enabling legislation is fairly recent, it is too early to judge its success.

CHAPTER 3: GEORGIA CASE STUDY

3.1 Introduction

Restricting the creation of potentially non-viable small drinking water systems encompasses two problems. The first is the development and operation of new--often privately owned--drinking water systems where previously there were none. The second is non-viability, the inability of a system to provide safe drinking water due to any combination of technical, managerial, and financial shortcomings on the part of the system owners or operators.

To an outside observer, the southeastern state of Georgia appears to have the administrative tools necessary to implement a program to restrict the creation of potentially non-viable drinking water systems. Robert McCall ascribes the following control procedures to the State:

- Specific laws, regulations, or policies to control creation of small water systems;

- Discouragement of construction when it is possible to hook up with another system; and

- Requirement that small systems view and evaluate regionalization, consolidation, contract service or another alternative prior to applying for a permit.[1]

Aspects of Georgia's Rules for Safe Drinking Water and their implementation by the State's drinking water program do fit the three proliferation control methodologies McCall identified. The most notable are Trust Indentures and the permitting process.

- Trust Indentures arrange for the continued operation of a bankrupt or otherwise non-viable drinking water system. Only private owners of public water systems that will serve homeowners are required to provide Trust Indentures.

- The permit approval process gives Georgia Drinking Water Program officials an opportunity to encourage prospective private owners of public water systems to consider hooking up to nearby publicly owned systems.

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[1]McCall, Robert G., "Guidance Manual: Institutional Alternatives for Small Water Systems," prepared for the American Water Works Association Research Foundation, 1986.

Closer examination of the drinking water program, however, indicates that Georgia officials have chosen to target the non-viability rather than the creation of drinking water system. Part of the reason for this stems from the character of the administrative tools themselves.

Trust Indentures have proven to be ineffective; they provide no guarantee that a trustee would be more financially or technically capable of running a system than would the original owner. Although the State can encourage interconnection of proposed drinking water systems with existing publicly owned ones, it cannot compel these linkages.

The Georgia Drinking Water Program instead addresses issues underlying drinking water system non-viability. For example, rather than deny permit applications for proposed systems whose design is substandard, the State works with applicants to correct technical problems to make the systems viable.

Such efforts, however, address only infrastructure problems; they do not consider the managerial, technical or financial competence of small system operators. (Georgia does require training and certification of public water system operators, but operators of groundwater systems serving 25 to 999 persons, are trained on-the-job and must pass no certification tests.)

Without an effective program to restrict the creation of new potentially non-viable systems, Georgia must grapple with the problem of systems that have become non-viable. Many of these systems are constructed without the State's knowledge or approval; they lack permits, and have never undergone the plan and specification review the State uses to mitigate or remedy design flaws that could lead to non-viability.

The State

Georgia is the largest State east of the Mississippi River and has an area of 56,056 square miles. More than 6.1 million people live in its 159 counties, making Georgia the nation's eleventh most populous state.

Some 36 percent of Georgians live in rural areas. The State estimates that 4 percent of its residents get their drinking water from systems serving fewer than 1,000 people. Eighteen percent of the State's residents are served by non-public water systems. Approximately 89 percent of the State's 1,500 PWSs serve fewer than 3,300 persons. The following is the number of small PWSs which have State permits to operate, grouped by type and population served:

Public Water Supply	Population Served 25-500	501-3300
Community:	1102	294
Non-Transient, Non-Community:	344	56

Georgia's safe drinking water rules define a PWS as "a system for the provision of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year." [This is essentially the same as the federal Safe Drinking Water Act (SDWA) definition.] A PWS is either a "community water system" or a "non-community water system."

Community water systems have at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents. Non-community systems generally serve the transient public and can include hotels, motels, restaurants, campgrounds, and service stations. Some schools, factories, and churches may also be considered non-community water systems.

Currently, approximately 170 surface water and 2,500 ground-water PWSs have permits to operate in the State, as shown below.

Public Water Systems	Surface Water	Ground Water
Community:	160	1413
Non-transient, Non-community:	13	401
Transient Non-community:	0	700

The Small Systems Problem

As is true in other States, small drinking water systems in Georgia are the most frequent violators of drinking water standards. In FY 1987, 99.05 percent of the Georgia Public Water Supply Systems that violated microbiological maximum contaminant levels (MCLs) were small systems, as were 97.5 percent of the PWSs that violated microbiological sampling requirements. (Small

systems, however, account for 89 percent of Georgia PWSs.[2]) During that year, 15 percent of the State's small systems violated Bacti MCLs and 25.67 percent posted microbiological sampling violations.

By contrast, only 1.17 percent of the State's large PWSs violated microbiological MCLs and 5.26 percent violated microbiological sampling requirements, according to the Federal Reporting Data System (FRDS). (Exhibit 3.1 presents a summary of Georgia water systems, violations, and systems in violation for FY 1987.) State Drinking Water Program officials say the numbers of non-compliers and persistent violators of monitoring/reporting and MCL requirements have been dropping since the PWS program began.

Most small system problems are blamed on operators' lack of (1) knowledge about their legal responsibilities, (2) managerial and technical expertise, and (3) finances to support their systems' operations. For example, Georgia officials say that most small system MCL violations occur because a monitoring sample was taken improperly and thus contaminated, or because improper disinfection following pump repairs or other work introduced coliform bacteria into the water.[3]

Small PWSs in Georgia are almost all groundwater systems. Groundwater PWSs serving between 25 and 999 persons are required by Georgia's drinking water rules to have trained operators. However, these operators get their training on the job; they attend no classes and take no tests. Consequently, the Environmental Protection Division must watch these operators closely to ensure that they put their training into practice. The high turnover of small system operators, many of them part-timers to begin with, also necessitates frequent site visits.

Georgia often addresses small system problems through enforcement. During the permit application process, developers work with the State's Environmental Protection Division (EPD) engineers to design and build systems that meet State regulations. This assures the Drinking Water Program that the PWS's initial infrastructure is sufficient to provide safe drinking water. Problems may arise, however, due to poor operator performance or improper maintenance. When that happens, the State must take enforcement action.

Small PWSs with no State permit to operate are also enforcement problems. In many cases, they started out too small to be regulated by the State, but over the years they have grown to

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[2]Federal Reporting Data System, Report 07, 1987.

[3]Interview with Georgia Drinking Water Program officials.

Exhibit 3.1
Georgia Water Systems, Violations and Systems in Violation

FY 1987

	Population Served:							
	25-100	101-500	501-1,000	1,001-2,500	2,501-3,300	Total <3,300	Total >3,300	TOTAL
Systems	622	483	132	115	35	1387	171	1558
	39.9%	31.0%	8.5%	7.4%	2.2%	89%	11%	100%
Population	36,000	121,000	95,000	186,000	103,000	541,000	3,892,000	4,433,000
MCL Violations	202	58	17	13	2	292	6	298
	67.8%	19.4%	5.7%	4.3%	0.7%	98.0%	2.0%	100%
M/R Violations	290	200	26	18	5	539	12	551
	52.6%	36.3%	4.7%	3.2%	0.9%	97.8%	2.2%	100%
Average MCL Violations per system/year	0.32	0.12	0.12	0.11	0.05	0.21	0.03	0.19
Average M/R Violations per system/year	0.46	0.41	0.19	0.15	0.14	0.38	0.07	0.35
Systems with MCL Violations	139	46	14	11	2	212	5	217
	64.0%	21.1%	6.5%	5.1%	0.9%	97.7%	2.3%	100%
Systems with M/R Violations	179	131	24	17	5	356	10	366
	48.9%	35.7%	6.5%	4.6%	1.3%	97.3%	2.7%	100%

Source: Federal Reporting Data System, Reports 7, 19A, 19B, 1987
Note: Percentages may not add due to rounding.

meet the State's (and SDWA's) definition of a PWS. In some cases, these privately owned systems were PWSs all along, but their builders simply ignored the State's permit requirements. Often poorly designed and built, these non-permitted PWSs frequently come to the Drinking Water Program's attention through complaints about their operation. The program then moves to bring them into compliance with the State's Safe Drinking Water Rules.

3.2 Organization and Legislative Structure

Administration

The Water Resources Management Branch of the Georgia Department of Natural Resource's EPD administers the State's Public Water System Supervision (PWSS) Program. Known as the Drinking Water Program, the PWSS has an Engineering Unit and a Permitting and Compliance Unit. In addition, the EPD's Program Coordination Branch oversees the operation of community and non-community groundwater systems through its four regional offices. Surveillance of all surface water systems is the responsibility of the Drinking Water Program in Atlanta. (Exhibit 3.2 shows the organization of Georgia's drinking water program within the State Department of Natural Resources.) Georgia has had primary enforcement responsibilities for all PWSs in the State since August 1977.

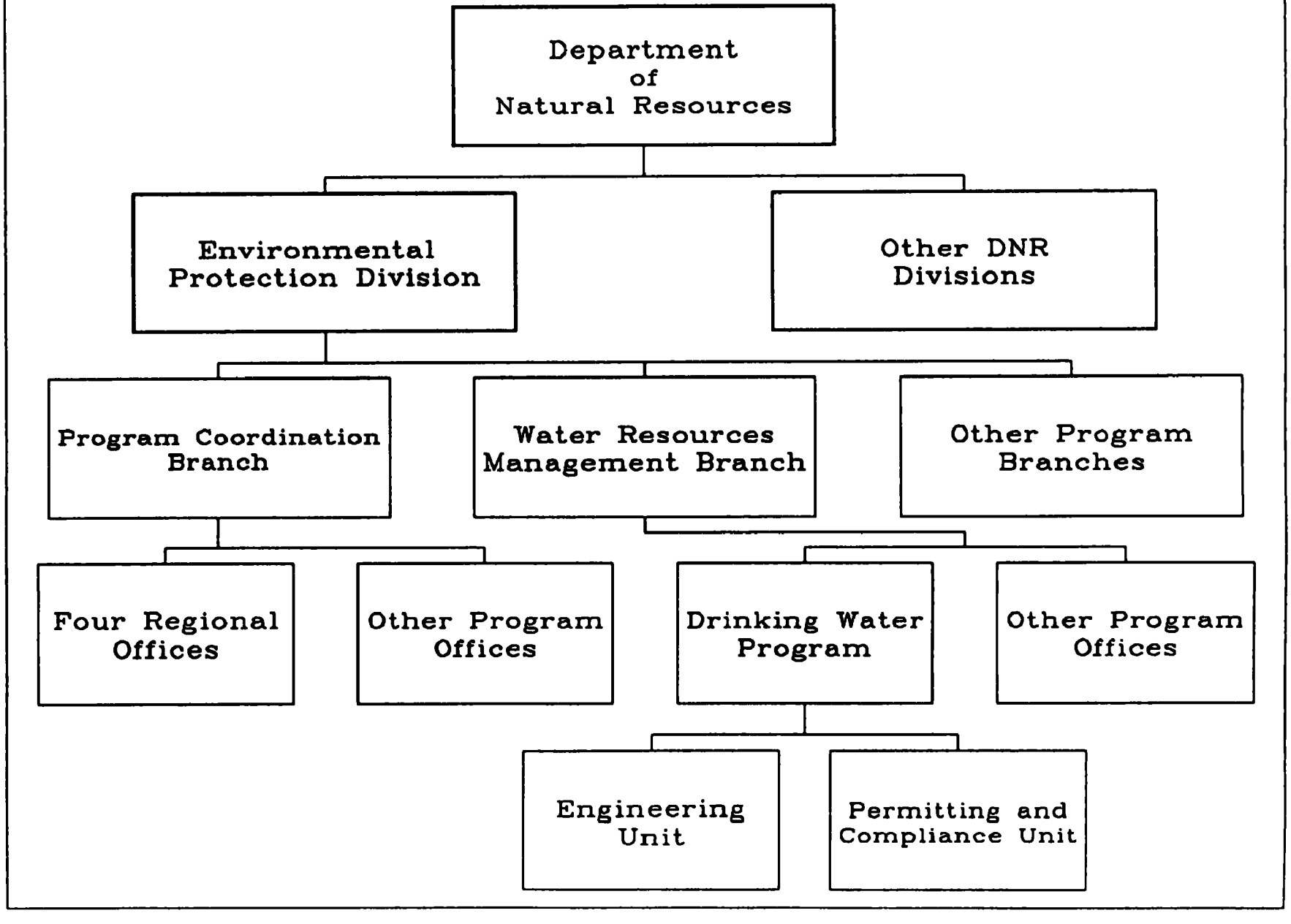
The Drinking Water Program's duties include reviewing plans, specifications, and engineering reports pertaining to water system construction, renovation, and modification. Program staff also review permit applications and recommend whether the Department of Natural Resources (DNR) director should issue or deny permits to operate publicly or privately owned PWSs. The Drinking Water Program also performs sanitary surveys of surface water systems, conducts technical assistance visits to both surface water and groundwater systems, and collects data for reports to EPA.

The Program Coordination Branch's four regional offices work with the Drinking Water Program to:

- maintain inventories of community and non-community groundwater systems,
- perform scheduled sanitary surveys,
- ensure that trained or certified operators are employed by all public water systems, as the drinking water rules require,

Exhibit 3.2

Georgia Drinking Water Program



- perform periodic and follow-up inspections of water systems, and

- provide operational and technical assistance to help PWSs meet the State's Rules for Safe Drinking Water (Chapter 391-3-5).

The regional offices are also involved with other environmental programs such as wastewater and solid waste.

Legislation

Statutory authority for the Georgia Drinking Water Program lies in the Georgia Safe Drinking Water Act of 1977, which tracks the federal SDWA. In addition, Georgia's Certification of Water and Wastewater Treatment Plant Operators and Laboratory Analyst Act, as amended, mandates the EPD to require in permits that a PWS operator be certified or trained in accordance with the class of water distribution system. The Act also requires the EPD to enforce the operator certification requirements.

Rules

Revised in August 1983, the Rules for Safe Drinking Water (Chapter 391-3-5) establish the policies, procedures, requirements, and standards necessary to implement the Georgia SDWA, and to carry out the purposes and requirements of the federal SDWA. Some of the rules--such as those mandating State review of water system plans and specifications or barring cross-connections between PWSs and non-permitted systems--predate the Georgia SDWA drinking water program.

A unique rule in Georgia requires that privately owned PWSs serving homeowners obtain a Trust Indenture to ensure continued drinking water service. The State intends this requirement, Rule 391-3-5-.04 (3), to protect homeowners from service interruptions due to bankruptcy of the PWS operator or other causes. Trust Indentures are not required by the Georgia SDWA. They are an example of the additional requirements the EPD Director can impose to carry out the Georgia SDWA and are discussed in detail below in Section 3.3.

Permits to operate PWSs are required by Rule 391-3-5-.17. The EPD issues permits for up to 10 years, and the DNR Director can revoke, suspend, or modify a permit for cause. Permits may include terms, conditions, and compliance schedules deemed necessary by the Director to meet the requirements of the Georgia and federal SDWAs.

Under Rule 391-3-5-.04, the EPD must approve the source of supply for a PWS and its purification, storage, and distribution methods before a system is constructed or substantially enlarged,

renovated or repaired. EPD approval of routine maintenance is not required, of course. This rule, 391-3-5-.04 (4), also requires any person planning to own or operate a PWS to consider connecting to a publicly owned PWS if:

- one is within 500 feet of the proposed privately owned system,
- the publicly owned system can furnish drinking water to the proposed private system at adequate pressure and flow, and
- the private system developer meets the construction requirements of the publicly owned system and the requirements of the State's Rules for Safe Drinking Water.

Whenever it can, EPD encourages private applicants to tie into existing municipally owned water systems, rather than construct their own systems.

The rules cited above are the EPD Drinking Water Program's basic administrative tools for confronting the creation of non-viable small drinking water systems. In addition, Drinking Water Program officials say they have two others which give them some leverage over PWSs. They are (1) the requirements for operator certification and (2) a 1984 amendment to the Georgia SDWA requiring privately-owned PWSs that frequently violate contaminant or water supply standards to post performance bonds or letters of credit up to $50,000 to help ensure compliance with these requirements. Neither tool, however, addresses the problem of new non-viable small systems.

Mechanics

Permits for all publicly and privately owned community water systems are issued by the EPD Water Resources Management Branch's Drinking Water Program from its Atlanta office. The Drinking Water Program handles surveillance of all PWSs with surface water supplies. The four regional offices of the EPD Program Coordination Branch handle the permitting for all non-community systems. The regional offices are also responsible for surveillance of all groundwater systems.

Obtaining a permit to operate a PWS is a five-step process.[4]

1. After obtaining planning and zoning approvals from local government, a developer requests EPD permission to drill a well. If the PWS is to be privately owned, the

[4]Interview with Georgia Drinking Water Program officials.

applicant must also present letters from area publicly owned systems stating that they will not serve the proposed private PWS. If the private system will serve homeowners, a Trust Indenture must also be provided.

2. EPD engineers review the report to ensure that the project conforms with the specifications of the Safe Drinking Water Rules. If the engineers give a favorable recommendation, the EPD approves the applicant's request to drill a test well.

3. After drilling the test well, the applicant performs a 24-hour capacity test and draws samples for chemical, radiological, and microbiological analysis, as required by Rule 391-3-5-.06 (d). EPD reviews these test results, plus well logs, to determine whether to approve the well as a drinking water source. The applicant also submits detailed system plans for review by EPD engineers.

4. Once the engineers approve the plans, and the proposed water source is accepted, EPD notifies the public of its intent to issue a permit to operate the PWS (Rule 391-3-5-.17 (7)). At least 30 days are allowed for public comment.

5. The permit to operate a PWS is drawn up and issued at the end of the public comment period. The State does not charge a permit application or issuance fee.

At least 45 days are required to complete this process, once the plans and specifications of a proposed system are received in Atlanta and found to be satisfactory. The average time is closer to 90 days due to increased demands on EPD staff.

EPD officials estimated in their program grant five-year plan that 325 engineering reports, plans, and specifications for community water systems and 20 plans and specifications or non-community systems would be approved during FY 1988.[5] (Program officials estimate 3.8 work-years are spent on plan reviews annually.) From October 1, 1986 to June 30, 1987, the Division approved 380 plans, specifications, and engineering reports for community systems and 41 plans and specifications for non-community water system construction.[6] Because EPD engineers work

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[5]Georgia Public Water System Supervision Program Grant Five Year Plan, 1987, 18.

[6]Ibid, 32.

out system details with developers in the planning stage, permit applications are rarely denied.[7]

Although non-community PWS permits are the responsibility of the Program Coordination Branch's four regional offices, Drinking Water Engineers are available directly through a "technical channel" to discuss plans, specifications, cross-connections or other problems. Policy questions, however, are handled strictly through channels.

PWS permitting is a State function; however, PWS developers must also address some local requirements. Some Georgia counties regulate aspects of PWS design. For example, Oconee County, some 50 miles east of Atlanta, regulates the size of water mains to ensure that private water systems can accommodate fire hydrants if and when they are connected to publicly owned systems. Still, county regulation of public water systems is spotty; Madison County, northeast of Oconee, has no such regulations, and Rockdale County, about 20 miles from Atlanta, is adopting the water system regulations of its county seat, Conyers.

3.3 Implementation of Controls

Assessing the State's Tools

The Georgia Drinking Water Program's basic administrative tools to restrict the creation of non-viable new small water systems are the Trust Indenture and the permit process. Drinking Water Branch officials say these mechanisms fall short of curtailing the development of small PWSs that turn out to be non-viable.

In reality, the Trust Indenture is no guarantee of the continued operation and maintenance of privately owned PWSs because there is no way to force a trustee to run a PWS properly. The permit process addresses only technical issues of system design and construction; it does not guarantee that a small system will be run properly or that the permit holder will have the technical or managerial skills or the financial capacity necessary to deliver safe drinking water.

Although Drinking Water Program staff are undoubtedly concerned about non-viable small system proliferation, they lack creation-control tools like those found in the other States reviewed in this study. Specifically, no comprehensive mechanism exists in Georgia to (1) manage the State's water supply, (2) ensure full-cost financing of new systems or (3) make independent judgments about the need for, and viability of, proposed systems.

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[7]Interview with Georgia Drinking Water Program officials.

Consequently, rather than try to restrict creation proactively, the State reacts to small system non-viability problems through enforcement and technical assistance. (The permit process may, however, delay the time when a small system becomes non-viable.)

Permits to Operate PWSs

The permit approval process allows the Drinking Water Program to influence the development of privately owned small PWSs so they meet State technical standards. The Rules for Safe Drinking Water include standards for drinking water wells, springs, water treatment facilities, distribution systems, storage tanks, disinfection, and operation.

EPD engineers' plan review includes evaluating:

- the location and siting of the water system,
- the quantity and quality of the water supply source(s), and
- the hydraulic design of the water system's components including water main size, material, and appurtenances.

The engineers can work with developers to solve design problems so that proposed systems comply with State regulations. Once a proposed system meets State standards, EPD will issue a permit.

The Georgia rules require every prospective PWS owner or operator to consider tying into an existing government owned PWS, if one is within 500 feet of the proposed private system, rather than develop and operate a separate system. EPD officials wanted to require these connections, but that notion was ruled out during a legal review of the regulations in 1983. State lawyers held that the EPD cannot require a PWS to accept a customer.

The Drinking Water Program has successfully encouraged some privately owned PWSs to tie into public ones. However, they were existing PWSs that had no permit when they came to the Drinking Water Program's attention. No statistics are available on how often private systems are tied into public ones.[8]

Trust Indentures

The Trust Indenture developed by the Georgia Attorney General's staff and used by EPD is intended to provide "an acceptable legal basis for assuring uninterrupted service and to provide relief for property owners in the event of suspension of service or improper operation by the owner." Service disruptions

[8]Ibid.

have been caused by owners shutting down the water system or failing to repair leaks, pump failures, and other problems.

Under the Trust Indenture, a trustee promises to operate a grantor's PWS if the grantor fails to run the system properly or is unable to operate it at all. In return, the trustee can deduct a fee from the gross charges collected from each customer.

EPD prefers that a trustee be a governmental authority. However, an established community utility, approved mortgagee, or title company is also acceptable. Property owners served by the water system may also form an association to act as trustee under Rule 391-3-5-.04. If a trustee is neither a unit of local government nor an approved mortgagee, the grantor must show EPD that no conflict of interest exists between the grantor and the trustee.

Georgia requires Trust Indentures only from privately owned systems delivering drinking water to property owners. A Trust Indenture is not necessary if the homeowners also own the water system or if the PWS serves rented property such as mobile home park lots. The State intends the Trust Indenture to protect homeowners from drinking water cutoffs; it presumes renters can move if they lose, or are unhappy with, their drinking water.[9]

Drinking Water Program officials, however, feel that Trust Indentures are ineffective. State officials must go to court to invoke a Trust Indenture, but few PWS problems are adjudicated, so the Trust Indenture is rarely used. (Officials could recall only one or two cases in which the Trust Indenture was enforced. They were unable to locate the file for the most recent case.)

PWS owners or operators whose customers appear most in need of the protection Trust Indentures offer have the most difficult time in obtaining trustees; there is no incentive for anyone to become a trustee. The only possible benefit to a trustee would come from service fees, but generally the revenues from a financially troubled small water system do not cover operating expenses, so no funds for trustee fees would be available. (Nor can EPD set a price for water in the Trust Indenture that would guarantee sufficient revenues.)[10]

Drinking Water Program officials plan to recommend that the Board of Natural Resources drop the Trust Indenture requirement. They believe Trust Indentures do nothing to ensure the continuity of operation and maintenance of privately owned PWSs.

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[9]Ibid.

[10]Ibid.

Regionalization

Some Georgia counties are pursuing regionalization. For example, the City of Conyers has worked with several developers in Rockdale County to ensure that proposed PWSs meet the city's technical standards, and the city has taken over their systems. In early November, Conyers and Rockdale County are expected to adopt a single set of water system regulations. This will give developers one set of requirements to meet when installing water systems in the county.

In the late 1960s, county officials authorized Conyers to operate all the publicly owned water systems in Rockdale County. The city owns and operates all the publicly owned drinking water and sewer systems in Rockdale County. Conyers purchases water from two adjacent counties, and maintains the State permits on five wells that could be used in an emergency.

Conyers has taken over three private systems serving subdivisions in Rockdale County. In each case, city officials worked with developers to ensure that the PWSs met the city's standards. Once they did and the EPD had indicated that the systems qualified for permits to operate, the developers deeded their systems to Conyers, which obtained the State permits.

The first system that Conyers took over serves a 42-lot subdivision called Chimney Ridge. Three homes are occupied and four more are being built. The PWS's well pumps more than 100 gallons per minute.

Conyers expects the Chimney Ridge subdivision to tie into the city's system within two years. The city's 12-inch water mains will be extended three miles at city expense.

The second water system deeded to Conyers is in a subdivision called Sierra View. The developer of that subdivision improved the existing water system so that it surpasses State regulations regarding pump size and water pressure. Only one house is currently under construction in this subdivision. Woodland Hills is the third subdivision whose water system has been taken over by Conyers. No houses have yet been built there, but the water system boasts five wells and a 5,000 gallon storage booster.

Six certified operators oversee Conyers' groundwater PWSs. Fire hydrants have been installed in those subdivisions, but they are valved off until the subdivision is tied into the city's system. Occasionally, homeowners on the well systems complain about paying the same rates as homeowners on city mains, even though the groundwater systems provide no fire protection. The water department works with developers to ensure that subdivision

residents realize they will have relatively low water pressure and no fire hydrants before they buy their homes.

Conyers wants to eliminate drinking water wells throughout Rockdale County because they are vulnerable to power outages and other problems. Conyers is, however, encouraging homeowners to drill wells for irrigation, lawn sprinkling, and similar uses. Well water would be cheaper than metered water for such activities, and would be a way of avoiding bans on municipal water use during droughts.[11]

3.4 Case Studies

Non-Permitted Systems

Permits are fundamental to the Georgia Drinking Water Program. Without a permit application to alert them that a PWS is being planned, Drinking Water Program officials have no way to track PWS development. Consequently, many Georgia PWSs are operating without permits.

EPD often learns of such systems through complaints about service. Sometimes, regional staff of the Program Coordination Branch discover non-permitted systems on their own. The Drinking Water Program has assembled an information package for Program Coordination Branch staff to use in those cases. The packet includes a form letter notifying the owner that the system requires a permit, a permit application, and a memo that explains what the owner must do to obtain approval of the well as a public water system source.

The Drinking Water Program requires non-permitted systems to comply with State drinking water rules; sometimes it encourages their connection to a publicly owned system. Some cases are resolved by the system owner, who turns a public water system into a private one by reducing the number of connections per well. Once a PWS is considered private, the EPD is powerless to regulate its operation or to enforce its safe drinking water rules. (The county health departments handle problems due to poor water quality of non-public water systems, which are not regulated by the State.)

There are approximately 200 active cases of non-permitted systems in the Drinking Water Program's files, and one person works with these systems part time.[12] This section presents four

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[11]Interview with Conyers water superintendent.

[12]Interview with Georgia Drinking Water Program officials.

examples of unpermitted systems whose status the Drinking Water Program resolved.

Old Hickory Heights

This case is an example of a non-permitted, privately owned public water system that was connected to a nearby publicly owned and operated PWS.

In December 1986, the manager of Georgia's Groundwater Program was informed of an unpermitted Community Water System serving 16 units at Old Hickory Heights in Carroll County, Georgia. Shortly thereafter, the owner of the system was sent a letter by the State saying that his system met the definition of a PWS. As a result, the owner must obtain a permit to operate.

The owner never answered this letter, so the State sent another, on June 15, 1987, warning him that he was still in violation of Georgia's Safe Drinking Water Act. The letter set a deadline of July 15, 1987 for the owner to provide various information to the DNR.

On July 16, 1987, the State received an application from the owner for a permit to operate a PWS. Ten days later, the Drinking Water Program informed him that the EPD still needed a Raw Water Chemical Analysis and the Trust Deed. Six months later, EPD received the Chemical Analysis and was informed that the Trust Deed was being prepared.

In February 1988, an environmental engineer in the Groundwater Program told the owner that Old Hickory Heights' storage and distribution system was inadequate to serve its 16 units. Extensive services would be needed to accommodate additional units. As a result, the engineer recommended that the owner connect his water system to the Carroll County Water System and abandon his wells. The engineer asked for a response to this recommendation by March 15, 1988.

The next day, the PWS owner told the Drinking Water Program that Carroll County would not allow him to connect to their system due to line size differences. Program staff then outlined the owner's alternatives:

- upgrading lines to Carroll County standards;
- drilling an additional well and upgrading storage;
- adding more storage, possibly without a new well.

The owner said he would investigate his options and respond.

He did not respond. Three months later, in May 1988, another letter was sent to the owner, this time from the chief of the Water Resources Management Branch, asking him for a compliance schedule for connecting to the Carroll County Water System. The branch chief warned that if the owner failed to respond by June 1, 1988, he would be "subject to civil penalties of up to $5,000."

Again, the owner did not respond, so the State sent him a Consent Order with a fine of $5,000. Finally, at the end of July, the owner of Old Hickory Heights Subdivision stepped in to help the PWS owner bring the water system into compliance. The subdivision owner assured the EPD that they will comply with the regulations. He met with members of the Permitting and Compliance Unit of the Georgia DNR on August 12, 1988 to discuss his plans to connect with the Carroll County System. Soon thereafter, the Department received a compliance schedule.

It took a year and a half to bring this system into compliance by tying in with the existing publicly owned PWS. In the end, connecting to an existing system was easier than obtaining a permit to operate a separate PWS.

Crumpton Mobile Home Park

This case study concerns a mobile home park that grew until it was large enough to be considered a public water system and therefore needed to obtain a permit to operate. Like the preceding case, this one was resolved by hooking up the private system to a public PWS.

In September 1977, the mobile home park (MHP) owners submitted an Application for a permit to operate a public water system. At that time, its groundwater system served six mobile homes and 13 people, so it did not warrant a permit. The EPD notified the MHP owners of that fact and noted that a permit would be necessary if the system became large enough to meet the State's definition of a PWS.

Ten years later, the EPD learned that the MHP water system had grown and was now a PWS. EPD sent a letter informing the MHP owners about what they must do to comply with State regulations and obtain a permit to operate a PWS.

In June 1988, the EPD received a permit application. Unfortunately, not all of the requirements had been fulfilled, and Drinking Water Program staff told the MHP how to complete the application process.

In July, the MHP notified the State that it had decided to connect with the nearby City of Carrollton Water System. The EPD concurred with the decision and said that the MHP must disconnect

its well. The well, if abandoned or not used for another acceptable purpose, would have to be sealed and plugged in a manner approved by the EPD.

The MHP owners decided to keep the well for their own use. Crumpton Mobile Home Park was connected to the City of Carrollton System on September 16, 1988.

W.N. Dollar System

This case study illustrates how water system owners can avoid the responsibility of operating a public water system by reducing the number of connections per well. The "loophole" here originates in the definition of a PWS as having at least 15 service connections or regularly serving 25 people daily at least 60 days of the year.

An environmental specialist working for EPD's Southwest Regional Office had been trying for eight months to get the Port City Day Care Center permitted as a non-community water system. A nearby privately owned well supplied the water for the day care center until it could drill its own. During April, May, and June 1987, the operator of the Port City Day Care Center sampled the water from that private well, and seven water samples exceeded the coliform bacteria MCL.

During a July 14, 1987 meeting with the private well owner and the day care operator, the State environmental specialist discovered that the well was technically a public water system because it served 16 residential connections. The case was then handed over to the EPD's Drinking Water Program in Atlanta so it could write a permit for the PWS.

The Drinking Water Program began the permit process by informing the well owner that he must apply for a permit to operate his water system. The letter explicitly outlined what needed to be done to comply.

The owner did not respond. Another letter was sent by the Program saying that he was still violating Georgia's SDWA. It set a new deadline of October 26, 1987.

There was still no response, so the State sent a Consent Order, including a $2,500 fine, on November 4. The well owner was required to do the following by December 4, 1987, or face further legal action:

- complete and return an application for a permit to operate,

- submit a copy of a Trust Indenture,

- submit the plans and specifications of the water system,

- provide information necessary for the State to approve the well as a public water supply source, including raw water quality data and a complete well construction data sheet, and

- pay a $2,500 fine.

The EPD was concerned about the MCL violations that its Southwest Regional Office had recorded for this water system.

By March 24, 1988, an Administrative Order (AO) was prepared and sent by EPD to the system owner, who had failed to respond to the Consent Order sent on November 4. The AO required him to take the actions cited above, plus provide public notification regarding the MCL and failure-to-monitor violations that occurred at his system since April 1987. He was also ordered to maintain and operate his system in compliance with Georgia's rules. The AO and a letter were sent to the Senior Assistant Attorney General to inform him of the non-complying water system and its MCL violations. The well owner made no response until June 1988, when a meeting was planned to discuss the Administrative Order.

On June 30, 1988, the owner met with the Drinking Water Program manager, an environmental specialist, and the Special Assistant Attorney representing the EPD on this case. The agreement made as a result of this meeting was that the owner would close the system by having property owners drill their own wells. The owner had to provide a letter from the Decatur County Health Department approving the individual wells and septic tanks, and a schedule of compliance was due at the Division by August 1, 1988. By forcing some property owners to drill their own wells, the owner could reduce the total number of units served by his well system until his system was no longer considered a public water system (i.e., until it had fewer than 15 connections).

During this period, the owner was also involved in bankruptcy proceedings. For this reason, and since he was fulfilling the agreement made on June 30, the Division decided to drop the Consent Order fine and not to proceed with the Administrative Order. As of August 19, 1988, the system had only 11 service connections serving 19 people, removing it from the State Drinking Water Program's jurisdiction.

This case took over a year to complete. In the end, a small system was prevented from forming, but the quality of the water supplied to the customers of the unregulated water system may not necessarily be improved. (The county health department is now responsible for dealing with any health problems due to poor

water quality.) The State could not solve the problem of the MCL violations observed in 1987 as long as the owner avoided regulation.

The Port City Day Care Center is drilling its own well, and an environmental specialist in the Southwest Regional Office is again working to obtain a non-community water system permit for the center.

Kings Bay Mobile Home Park

This case study shows how a non-permitted PWS was brought into compliance. Unlike the water systems in the first three cases, this PWS obtained a permit.

The Kings Bay Mobile Home Park Water System was discovered in early August 1987 during a routine PWS Sanitary Survey for Community Groundwater Systems. The park's system had 58 service connections serving 50 people, enough to qualify as a public water system.

State officials notified the PWS owner that she would have to obtain a permit. She failed to comply with the EPD's requirements on time, so the assistant director of the Department of Natural Resources sent her a Proposed Consent Order including a $2,500 fine. The maximum fine is $5,000.

In a long letter to the DNR, the owner explained why she and her husband had not complied. She sent the Consent Order back to the DNR with a counter-offer of $1,000. In this letter, the owner claimed that she and her husband were "victims of circumstances" beyond their control.

Apparently, the MHP had existed since 1976 and was now one of the largest in Camden County. The current mayor of St. Marys was the original owner and developer of the park. He never obtained a permit for the water system. The former St. Marys city manager, who was also president of a community planning company, bought the park from the mayor in October 1983. The new owner also did not apply for a PWS permit. The county sanitarian, who had been on the property several times in the past two years during the installation of new septic tanks, never asked about the water system or whether they had a permit, according to the present owner.

The present owners bought the park in October 1985 and were never informed that a permit was required for the water system. In her letter the owner wrote, "It seems to me that among these people (the mayor, a former city manager and land planner, our attorneys, or the county sanitarian) at least one of them should have known about and informed us of the need for a permit."

Furthermore, the owner claimed that she and her husband had upgraded the water system in 1986 to increase the water pressure throughout the system. She states in her letter, "...even without knowing that this law was in effect, we greatly improved the conditions within the park."

These were some of the reasons the owner used to justify the reduced fine of $1,000 which she proposed. The Division accepted the smaller fine.

Five months later, the owner had completed all the permit requirements, and a permit to operate a PWS was issued.

CHAPTER 4: MARYLAND CASE STUDY

4.1 Introduction

The Annotated Code of Maryland provides the Maryland Department of the Environment (MDE) and municipalities with authority to regulate water systems. Although these laws fulfill many functions, this chapter will focus on their use in controlling the creation of new, potentially non-viable small water systems. The Health-Environmental laws form the basis of Maryland's comprehensive authority to oversee water systems and may contribute to the State's strong compliance record and low rate of small system creation. The highlights of Maryland's control program are as follows:

- Reviews of New Systems. MDE requires submission of plans by all proposed water systems and approves water system design and construction. Title 9-206 allows MDE discretionary authority to determine the scope of plans required. MDE has implemented this law by requiring a financial management plan and an operation and maintenance plan from all proposed privately owned water systems. New privately owned systems may also be required to hire a certified water treatment superintendent and operator.

- Escrow Accounts. Title 9-2 and the Code of Maryland Annotated and Revised (COMAR) 26.04.03 (DHMH 10.17.03) authorizes MDE to require any financial assurances from new privately owned systems it deems necessary to assure continued viability.

- Area-Wide Planning. Title 9-5 requires each county to submit a plan for water service. The counties update and MDE reviews these plans every two years. Plans include service area agreements and proposed financing for each new water system. Planning for efficient present and future water service is critical in reducing the demand for new small water systems.

- Deterrent Effect of State Authority. Under Title 9-2, MDE may order the appointment of a water system manager, alterations to a water system, main extensions to provide service, or construction of a new public water system when operation is inefficient or endangers public health. The costs associated with these MDE orders are incurred by the person served with the order. Also, municipalities may take over privately owned water systems by condemnation or agreement. These State and county authorities may encourage owners of proposed small systems to consider thoroughly whether they can adequately operate a water system and may discourage the creation of new systems that lack adequate resources for continued viability.

State Profile

Maryland is a relatively small State with an area of 9,837 square miles. This predominantly urban State has a population of about 4.2 million people, of which only 7.2 percent reside in rural areas. Although most of Maryland's residents receive water from large systems, more than 90 percent of the water systems in Maryland serve populations of fewer than 3,300 people. During 1987, 92 percent of Maryland's bacti Maximum Contaminant Level (MCL) violations and 94 percent of its monitoring and reporting violations occurred in this group. (See Exhibit 4.1).

Maryland is characterized by several large metropolitan areas where the majority of its population is located. Population density facilitates controls on the creation of new systems. It is more difficult to resolve the problems of isolated water systems that do not have a nearby system to which they can interconnect or share facilities.

The Maryland Code of Regulations (COMAR) defines a public water system (PWS) as a system having at least 15 connections or regularly serving an average of 25 people daily at least 60 days per year. Requirements for these systems are essentially identical to the Federal Safe Drinking Water Act (SDWA). State construction planning and permitting requirements apply to systems as small as those serving two lots. A community water system in Maryland is any PWS which serves at least two lots throughout the year. Non-community water systems serve motels/hotels, medical facilities, restaurants, schools, industrial p[illegible]rts, and other facilities not connected to a community water

History

Maryland is unique among the [illegible]ates in this study because it has been implementing controls on new systems long enough to reduce dramatically the rate of increase of non-viable systems. In the late 1950s, an unanticipated increase in the development of mobile home parks and apartments led to the sudden numerical growth of small drinking water systems.

The State reacted to the growing number of potentially non-viable water systems by enacting Article 43 Section 387C of the Annotated Code of Maryland in 1969. This legislation was the original authority for the current stringent controls that Maryland has placed on privately owned drinking water systems.

The State's experience with small drinking water systems has shown that there are four categories into which most small system problems fall:

Exhibit 4.1
Maryland Water Systems, Violations and Systems in Violation

FY 1987

	Population Served:							
	25-100	101-500	501-1,000	1,001-2,500	2,501-3,300	Total <3,300	Total >3,300	TOTAL
Systems	219	204	46	59	11	539	58	597
	36.7%	34.2%	7.7%	9.9%	1.8%	90.3%	9.7%	100%
Population	12,000	50,000	36,000	99,000	31,000	228,000	3,211,000	3,439,000
MCL Violations	10	17	3	12	1	43	2	45
	22.2%	37.7%	6.6%	26.6%	2.2%	95.5%	4.5%	100%
M/R Violations	52	18	4	3	-	77	3	80
	65.0%	22.5%	5.0%	3.7%	-	96.25%	3.75%	100%
Average MCL Violations per system/year	0.04	0.08	0.06	0.20	0.09	0.07	0.03	0.07
Average M/R Violations per system/year	0.23	0.08	0.08	0.05	-	0.14	0.05	0.13
Systems with MCL Violations	9	14	2	1	-	26	3	29
	31.0%	48.3%	6.8%	3.4%	-	89.65%	10.35%	100%
Systems with M/R Violations	28	10	4	3	-	45	3	48
	58.3%	20.8%	8.3%	6.25%	-	93.75%	6.25%	100%

Source: Federal Reporting Data System, Reports 7,19A, 19B, 1987

Note: Percentages may not add due to rounding.

- poor management,
- inadequate staff or funds for operation and maintenance of facilities,
- lack of proper training, and
- inadequate rate base due to a small number of customers.

These problems eventually lead to noncompliance.

4.2 Organization and Legislative Authority

Administration

The Maryland Department of the Environment (MDE) has jurisdiction over drinking water issues. Departmental reorganization in July 1987 consolidated these responsibilities from the Department of Natural Resources (DNR) and the Department of Health and Mental Hygiene (DHMH). Within MDE, the Water Management Administration has two offices, the Water Supply Program Office and the Water Quality Programs Office. (See Exhibit 4.2.) The Water Supply Program Office concentrates on protecting public health and providing citizens with sufficient quantities of water. This includes monitoring and development of construction standards. The Water Quality Programs Office is responsible for system planning and permitting. MDE's authority is described more fully in the sections on statutory and regulatory authority.

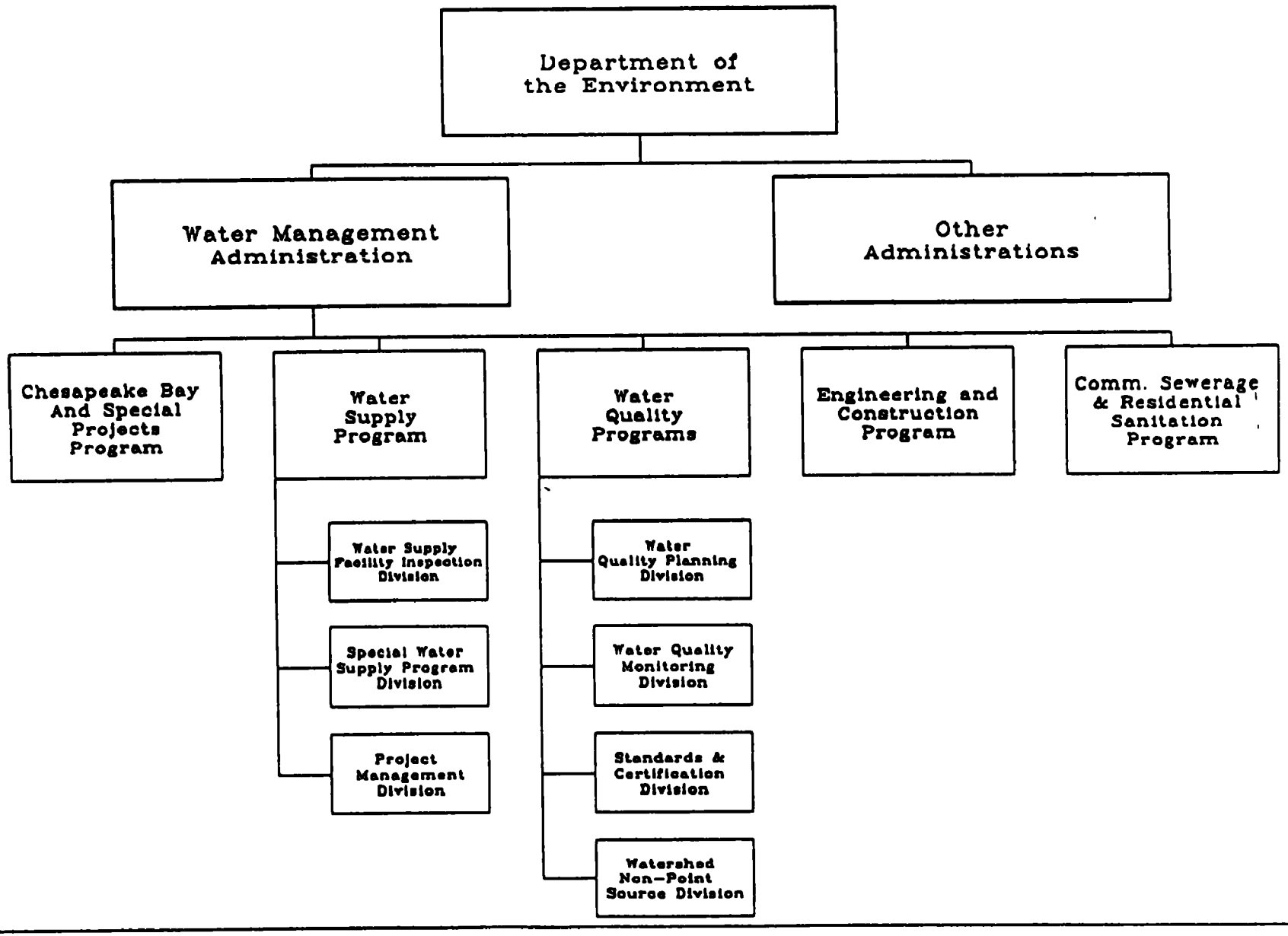
Statutory Authority

Title 9 of the Health-Environmental Code governs public water systems and contains the following subsections that relate to our study.

Title 9-2, "Regulation by the State," grants MDE broad authority for regulating both the initial and continued operation of public water systems. Title 9-2 allows MDE the authority to compel proper water system operation from existing systems and to require evidence from new system that they will remain viable entities. These laws also authorize grants to counties for planning and authorize municipalities to raise funds to carry out MDE orders to correct problems. Included in this title are laws establishing the following:

Exhibit 4.2

Maryland Drinking Water Program



- The Sanitary Facilities Fund finances the development of water system plans by the counties and the Washington Suburban Sanitary Commission.[1]

- MDE has the duty to review the design and construction of all public water systems and examine all existing public water systems. In addition MDE is granted the authority to "compel their (water system) operation in a manner that will protect the public health and comfort, or order their alteration, extension, or replacement by other structures if the Secretary (of MDE) considers it to be necessary."[2]

- The submission to MDE of plans by all public water systems, including financial, managerial and other information MDE deems relevant, is required.[3]

- MDE has the authority to require the appointment of an approved manager if MDE finds that a water system is inefficiently operated, a potential hazard or a nuisance.[4]

- MDE has the authority to order alterations or extensions of public water systems, and the authority to install a new system or plant as MDE finds necessary to ensure health.[5]

- If MDE finds that the absence or inadequacy of a public water system jeopardizes the health of a county or locale, MDE may order installation or completion of a public water system on a schedule. Upon this finding, MDE may also require the installation of any devices, methods or regulations it deems proper.[6]

- Publicly owned water systems are granted the authority to issue bonds, stocks or notes without prior legislative approval or popular vote to fulfill a MDE order. No public funds raised under this law may be expended without prior

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[1]The Annotated Code of Maryland, Health-Environmental Title 9-203, 1985 Cumulative Supplement, 80. (Note that in 1987, sub-titles were renumbered and 9-203 become 9-218.)

[2]Annotated Code, Health-Environmental Title 9-204, 1982, 350.

[3]Op. cit., Title 9-206, 352.

[4]Op. cit., Title 9-207, 353.

[5]Op. cit., Title 9-208, 354.

[6]Op. cit., Title 9-209, 355.

approval of MDE. These bonds, stocks and notes are free from State and local taxation.[7]

Title 9-5, "County Plans," requires the submission to MDE of county plans for all public water systems. This area-wide planning defines areas that will and will not require water service in the next ten years and must describe how any proposed water systems and their continued operation will be financed. MDE may approve, disapprove or require changes in county plans. Furthermore, Title 9-5 allows MDE to require installation of, or connection to public water systems, or system design compatible with existing public water systems to allow future interconnection. County plans may be funded under Title 9-2, the Sanitary Facilities Fund.[8]

Title 9-7, "Regulation by Municipalities," grants municipalities the authority to take over a failing, privately owned public water system, with or without owner consent.[9]

Regulatory Requirements

Maryland regulations that receive authority from The Health-Environment Article (9) are summarized below. These regulations are in various stages of recodification following the 1987 Departmental reorganization, so both reference numbers have been listed.

- COMAR 26.03.01 (DHMH 10.17.01), "Planning Water Supply and Sewerage Systems," effective July, 1975. These regulations further describe the requirements of Title 9-5 for County Water and Sewerage Plans. The regulations state that the county plan must include an inventory of water system problems, existing and planned water system boundaries, and planned improvements to community systems. These regulations also state that MDE may use the Sanitary Facilities Fund to help counties finance the planning of water and sewerage facilities including the preparation and revision of county plans.

- 26.04.03 (DHMH 10.17.03) "Water Supply and Sewerage Systems in the Subdivision of Land in Maryland," effective March, 1972. This regulation is intended to ensure that subdivisions will be served by an adequate community water system or, in the absence of a community system, by an adequate and safe system until a community system is made

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[7]Op. cit. Title 9-214, 361.

[8]Title 9-505, 9-506, 9-509, 9-510, Annotated Code of Maryland, 1987.

[9]Op. cit., Title 9-705, 507.

available. The chapter includes regulations for submitting water system plans prior to permitting, including assurances of financial and operational viability. MDE's authority to require financial assurances as it deems necessary is the basis of the escrow account requirement discussed below.

4.3 Implementation of Controls

Reviews of New Systems

Based on Title 9-2 of the Annotated Code, MDE has established the following set of "Requirements for Proposed Privately Owned Water Systems" that are sent to developers intending to apply for permits to construct and operate a private community water system.

- The county must amend the comprehensive plan to include the proposed system. If the county does not feel the new system is necessary, it will not amend its plan and the proposal will not proceed to the State level.

- The developer must obtain a water appropriation permit from the DNR, Water Resources Administration.

- If groundwater is to be used, developers must obtain a well construction permit from MDE, Water Management Administration.

- Before the system is installed, a State water construction permit must be obtained from MDE, Water Quality Programs.

- The owner must submit a financial management plan (that has been developed with the concurrence of county officials) to the MDE, Water Supply Program, outlining estimated operating costs and revenues.

- The owner must submit an operation and maintenance plan (with the concurrence of county officials) to the Division of Design Review.

These requirements help to ensure that potentially non-viable small systems will not proliferate. They achieve a high degree of control by instituting many levels of review and by combining area-wide planning with permitting.

Escrow Accounts

In addition to the requirements outlined above, one of the greatest constraints on the creation of new, potentially non-viable small systems is the financial base that a privately owned system must maintain to be allowed to operate. An agreement is

made between county officials and the owner of the proposed water system, which may require any or all of the following:

- Depositing sufficient funds in an escrow account to cover repair or replace the highest-cost water treatment plant unit.

- Establishing a separate escrow account with sufficient funds to ensure successful initial operation and maintenance. This requirement would normally expire only after the system was self-supported by income.

- Establishing a sinking fund sufficient to replace the system 20 years after construction. Funds for continued support of this sinking fund are provided within the rate structure.

The State has waived some of the requirements when private systems are intended to become public since public systems are exempted from the escrow requirement by MDE regulation (COMAR 26.04.03). Developers may not be required to maintain escrow accounts or the sinking fund when county takeover is intended. The various components and conditions (operation and maintenance, financial planning, escrow account and sinking funding) are drawn into a binding "public works agreement" between the county officials and the developer, owner, or builder of the new private water system. Publicly owned facilities frequently draw up public works agreements to establish the terms of water service to a given location. However, publicly owned facilities are not subject to the financial review and escrow accounts since State law grants them the ability to raise revenue through fees and bonds.

County Planning

Title 9-5 and the Maryland Regulations, described in detail above, establish the requirements for, and contents of, county water and sewerage plans. Only the requirements for water systems are discussed here. Each county plan must:

- be approved by MDE;

- provide for the development, extension and expansion of water systems during a period of at least 10 years, and

- identify present and future water supply systems, construction and operating costs, and time schedules and methods for financing the construction and operation of each planned water system.

By requiring the county to delineate areas that will require service from community water systems and areas where community water systems must be constructed, the State facilitates orderly and efficient water system development. Moreover, by requiring

financial and operational planning for each proposed system, the State is able to review systems for future viability. The county plans must be consistent with the county or local comprehensive plans that coordinate all development at the local level. The combination of these two planning processes requires counties to consider water system planning along with housing and commercial development.

If a county does not submit or correct inadequacies of its plan after being given notice, the State may refuse to issue any permits for water system construction or alteration. The county plan must be revised and approved by MDE at least once every two years.

Authority Over Existing Systems

MDE has the authority to investigate existing water systems to determine if they are operated efficiently and are meeting State and Federal water quality standards. If MDE finds that a water system is inefficiently operated and potentially threatens public health, MDE may appoint a new manager, or order water system alterations and extensions. MDE may appoint Maryland Environmental Services (MES) to manage a poorly operated water system. Currently, MES provides contract management and operation services to approximately ten water systems, not owned by the State.[10] Also, MDE may order the construction of all or parts of a new water system. Although State law does not specify that these rules apply only to small systems, they provide MDE with the means to correct many problems associated small system non-viability. In addition, they may dissuade potential small system owners who lack adequate resources from attempting to operate without satellite management services.

Level of Effort and Effectiveness

Maryland has legislative, regulatory, and policy tools to curb the creation of potentially non-viable small systems that are conceived without adequate resources. The State effectively controls small system problems by requiring that small system development follow county planning guidelines while the State reviews all construction and operating permits, water system management, operation and maintenance plans, finances and rates. There is also an opportunity for municipal, county, and State officials to use their experience and knowledge of drinking water systems to counsel developers against construction of new small systems where alternatives are available.

Maryland State drinking water officials estimate that approximately 12 new, small privately owned water systems are planned

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[10]MES primarily operates and manages State-owned water system serving public facilities such as parks and prisons.

each year. Only six to eight systems are approved. However, three or four of the approved systems are initially privately owned but are intended to be owned or managed by the county. The other three or four remain independent, privately owned systems.

The level of effort applied to the management, planning and control of non-viable small systems may best be estimated by evaluating State and county staff time devoted to these issues.

State planning officials estimate that approximately 5 percent of a staff of four engineers' time is devoted to the planning of small systems. This is approximately equivalent to ten person weeks per year being devoted to small systems. An example of cost at the local level can be drawn from Queen Anne's County, which is currently experiencing development pressures in previously rural, agricultural areas. Three people--a planner, an engineer, and a utility manager--spend approximately half their time to maintain, review, or develop the drinking water system portion of the county comprehensive planning efforts, review new water system developments and resolve potential or actual disputes. In addition, the county has hired a consulting engineering company to update the county water and sewage plan at a cost of $127,000. County officials estimate that at least half of this cost will be used for the water aspects of the plan.

Obstacles and Potential Problems

Maryland administrators recognize that there are several problems with their methods of controlling small drinking water system creation. One that has caused difficulty in the past is interpretation of written documents. Public Works Agreements between developers and county officials outline development practices including any creation of new water systems. In the case of Queen's Landing in Queen Anne's County, the county and the developer agreed to release the water system to the county "at a mutually agreeable time." The wording of this agreement was contested by the developer, who was not prepared to turn over the system when asked, citing that the time was not agreed upon by him as the Public Works Agreement stated.

Maryland has also witnessed problems with developers changing the proposed structure of a planned or existing water system to avoid compliance with laws or regulations. A developer in Worcester County attempted to divide a larger water system into several small water systems to avoid obtaining a multi-use permit. The developer was thwarted in this attempt by the county's refusal, with State concurrence, to approve occupancy permits if the system were divided.

"Taking of Land" or infringement of individual property rights is not an issue raised by small drinking water systems in Maryland, at least not at the State level. The key element is the statutory requirement for a county sewerage, drinking water,

and solid waste management plan that is consistent with the county or local development plan. Any issue that concerns a property owner, developer or builder may be properly heard at local zoning or planning hearings. The right of any owner to develop his property must be considered at the local level. Then, if incorporated into the county plan, a development must provide a water supply which meets certain management, operational, maintenance, financial, and other standards. The standards are generally not specified at the State level, but are developed at the county level to meet local requirements. Review and approval of each new private water system at the State level allows the county to incorporate controls in public works agreements which may have the benefit of State experience with small systems problems.

4.4 Case Studies

Careful planning and financial control are two of Maryland's strongest tools in ensuring small system viability. Many potentially non-viable small systems are conceived but never created because officials immediately recognized their questionable viability, the financial assurances MDE required cannot be met, and alternative means of providing viable water service are discovered in the planning process.

Martin's Crossroads/Cearfoss

The first case study, Martin's Crossroads/Cearfoss, shows how the planning process can be effective in preventing a non-viable system from being created. A small drinking water system was thwarted by the county at conception because of the strong possibility that it would be non-viable. Although there are only three or four new small systems created every year in Maryland, many more, like Martin's Crossroads/Cearfoss, are envisioned but never get beyond planning.

Martin's Crossroads and Cearfoss are located in a rural area of Washington County. The county lies in the northwestern part of the State, bordering both West Virginia and Pennsylvania. In March and April 1981 an outbreak of Hepatitis A in the area resulted in private well contamination. This outbreak triggered investigations by the Washington County Health Department which showed the wells were contaminated with petroleum products, streptococci, enterovirus, and fecal coliform bacteria as well as Hepatitis A virus. The non-hepatitis contamination was generally attributed to failure of individual on-site sub-surface sewage disposal systems. Coliform contamination from local farms was ruled out since the fecal bacteria were shown to be of human rather than animal origin. Because there was no public water system available to the area at the time, residents relied solely on private wells, and the threat to public health posed by contaminated private wells was significant. The severity of the

problem is shown by the citation of Martin's Crossroads/Cearfoss as the first priority of the proposed 1983 revision to the Washington County Water and Sewerage Plan.

Martin's Crossroads/Cearfoss has a history of well contamination. This chronic contamination episode led to calls for a permanent solution to residents' inability to obtain clean drinking water. The State's Department of Health and Mental Hygiene directed Washington County to make a public water system available to Martin's Crossroads/Cearfoss. County officials examined the possibility of drilling wells into a deeper aquifer to form a small community drinking water system for the area. Because there was a chance that the system could eventually become non-viable, State and county officials concurred that hook-up to a nearby system would be preferable.

Although hook-up was provided by the City of Hagerstown, revenue for the project was provided by fees, Washington County and the State Sanitary Facility Fund. Interconnection to an existing system was chosen over installation of a new system for two reasons. First, because of the history of severe contamination in the area, county officials had reason to believe that a new small system would be non-viable. Second, hook-up to nearby Hagerstown was economically feasible; cost estimates indicated that users' fees could be set at levels consistent with existing rates at other places in the county.

Queen's Landing

This study shows how a problem in implementing the Satellite Support program was resolved but caused interim delays during the transition from private to public ownership. Because of a legal dispute over a satellite system agreement, county officials were stalled in their efforts to ensure the viability of a new small system.

Queen Anne's County lies on the Eastern Shore of Maryland. It is directly east of Anne Arundel County and the State's capital, Annapolis, across Chesapeake Bay. Approximately 30,000 people live in this predominantly rural county. Miles of beach-front property and hunting and fishing opportunities--combined with the county's proximity to Washington D.C., Annapolis, and Baltimore--have made Queen Anne's County a target for developers in recent years. Every water system in the county currently falls into EPA's category of small drinking water systems. Two aquifers supply all the drinking water. The Aquia aquifer is the most heavily used because its counterpart, the Magothy aquifer, has a high iron concentration which makes its water costly to treat. The Aquia has a salt water intrusion problem which is worsened by shallow wells that have traditionally been used by developers. There are approximately 30-40 community system wells comprising 10-12 community systems in the county.

Queen Anne's County is currently experiencing a period of rapid growth. Development of scattered areas is resulting in the creation of small water systems. The county would like to control growth and limit it to areas near existing population centers. It wants to facilitate expansion of existing water systems, rather than promote development of new ones. Because of the condition of the aquifers, county officials are concerned that small drinking water systems that tap the Aquia or the Magothy are potentially non-viable.

Queen's Landing in Queen Anne's County was served by a privately owned water system when originally developed in 1983. From its inception, the water system was intended to be turned over to Queen Anne's County. The determination was made by county and State officials that the system was not capable of sustained independent operation. Several financial requirements for long-term operation, such as the escrow account, were waived. Developers were required to provide financial guarantees to replace any improper work or materials that might become apparent within the first nine months of operation. Since long-term operation was foreseen to be in the hands of the county, all other financial assurances were waived. A written agreement was drafted between the county and the developers that "fee simple title" of the water system at Queen's Landing would be "conveyed to the County at a mutually agreeable time."

As the drinking water system at Queen's Landing aged, county officials began to doubt future viability. Because the financial assurances, usually a county's most effective method of ensuring viability, were not put into place, county officials believed it was important to have the system turned over to the county when they deemed it necessary.

When the Bay View area planned to tie into the Queen's Landing water tower, Queen's Landing developers expressed concern that the water tower would be overburdened with both Queen's Landing and Bay View using it and that Queen's Landing residents would be unable to obtain properly treated drinking water. On these grounds, Queen's Landing developers refused to turn the water system over to the county when requested to do so, citing that they had not mutually agreed upon this time. Lawyers for the developers also claimed that the developers and the county tacitly agreed that the Queen's Landing water system would not be turned over to the county until construction was completed and most residences were occupied. This was not the case at the time of the request. Developers cited fears that turning the system over at that time would result in an inadequate water supply for Queen's Landing as the 320 residences became occupied and hooked up to the water system.

Queen Anne's County Commissioners directed developers to turn over the Queen's Landing Treatment Plant and informed them that failure to do so would be considered a breach of the public

works agreement and could result in the county's refusal to continue to provide sewer service to the area. The developers, upon the advice of their lawyers, relinquished title of the water system to the county.

The relaxation of financial guarantees is not unique to the Queen's Landing case. When a public works agreement has been negotiated that stipulates the relinquishment of a water system to the county at a specified time, MDE does not require deposit of funds in escrow. Viability of a small system is still usually ensured since the county assumes responsibility for the further maintenance of the system. The Queen's Landing case, however, caused alarm for several reasons. First, county officials doubted the developers could continue operation of the water system. Second, there was a new and unexpected drain on the water tower that made future provisions of sufficient water questionable. Third, without the financial assurances, no long-term viability could be guaranteed. Finally, the developer's refusal to turn over the water system was unanticipated.

Chesapeake Harbour

The final case study, Chesapeake Harbour, demonstrates the effectiveness of Maryland's stringent requirements in preventing the creation of systems with questionable viability. Faced with an immediate fiscal requirement of at least $67,000 to be placed in escrow, the Chesapeake Harbour developer was forced to reconsider the financial viability of the water system.

The Village of Chesapeake Harbour is located in Anne Arundel County adjacent to the City of Annapolis. Developed in 1983 and 1984, the subdivision was in an area of the county with no nearby county water system. The developer approached the Annapolis City Council about hooking up to the city water system, which was located across the street from the development. The developer and City Council members could not agree on the terms of hook-up and the developer subsequently decided against it. The developer then examined the feasibility of an independent privately owned system. The State sent the developer a letter outlining the requirements with which Chesapeake Harbour, Inc. must comply if it chose to construct a system for the development. Following are the financial and operational requirements listed in an unsigned public works agreement between Anne Arundel County and Chesapeake Harbour, Inc. Had the agreement been signed, developer would have been required to:

- Construct the water system according to State specifications.

- Maintain and operate the system according to all applicable State regulations.

- Deposit $30,000 in escrow as the Water System Emergency Reserve Fund. Additional deposits would have to be made to keep up with inflation as measured by the Consumer Price Index. The account would be used to pay for repairs and improvements and would not be available for ordinary operation and maintenance. If any money was withdrawn from the account for repairs or improvements, the developer would be required to restore it to the minimum balance ($30,000 adjusted for inflation).

- Create a $37,000 operation and maintenance fund prior to placing the water system in operation. This amount is intended to ensure initial start-up, operation and maintenance until the system becomes self supporting.

- Require each owner to pay a quarterly assessment to be deposited into the operation and maintenance fund.

- Establish a "sinking fund" to which each homeowner contributes. This water supply system reserve fund would provide an amount sufficient to replace the system after 20 years.

- Present to DHMH, within 30 days of the execution of the agreement, a corporate surety bond or an irrevocable letter of credit in the amount of $600,000 guaranteeing the construction of the water supply system.

The developer determined that it was not possible to meet these requirements and abandoned the idea of an individual system. The firm approached the Annapolis City Council again to negotiate hook-up to the city water system. The two parties made agreements concerning costs, construction, and maintenance of water lines, and Chesapeake Harbour was connected to the Annapolis water system by a main extension.

This case illustrates the effectiveness of Maryland's stringent requirements in controlling the number of small systems that are created, especially when there are nearby systems available for interconnection. Because of the large financial commitment a water system requires, new small systems are required to provide at least minimum assurances of viability.

4.5 Application to Other States

Maryland began restricting the creation of small systems nearly 20 years ago. In 1969, legislation put stringent controls on small drinking water system development. Additional legislation throughout this 20-year period has continued to provide the State with one of its most effective control methods. The success of Maryland's methods is evidenced, at least in part, by the scarcity

of new small privately owned systems. With only three or four such systems forming annually, Maryland has fewer new small systems per year than many counties in other States.

State Characteristics that Enhance Program Effectiveness

Maryland has several features that help to make its approach effective. Since most of the methods have been discussed previously, they will only be summarized here.

- Urbanization. Maryland is predominantly urban with few remote rural areas. Much of the population is centered in cities such as Baltimore, Annapolis, Hagerstown, Frederick, and near Washington, D.C. Connecting to city systems reduces the need for small water systems.

- Regionalization of Sewer Systems. A by-product of urbanization in many parts of Maryland has been the regionalization of sewer systems. As sewer systems regionalize, drinking water systems tend to do so as well, since there is an overlap in the management and resources required for each.

- County and Local Government Involvement. Crucial to Maryland's program is its strong county and local government involvement with publicly owned water facilities. While State legislation may be the authority for many of the State's small drinking water system controls, the legislation requires actual implementation by county and local officials. State officials doubt that Maryland's program could be used effectively without strong county and local government.

Applicability of Specific Program Elements

State officials believe that their methods could be useful to other States trying to control the creation of new potentially non-viable small water systems. While the details of their program have been shaped by Maryland's characteristics, the following program elements may be useful to other States:

- Permit Process. To construct or operate a water system, an owner must submit plans to, and obtain permits from, the county. The two key permit requirements in controlling creation are the MDE financial management, and operations/maintenance plans. Through this permit approval process, a county can carefully monitor the evolution of a water system and force the system's owner to correct any design and construction inadequacies by refusing permits. Moreover, by reviewing financial, operational and maintenance plans of proposed water systems, MDE evaluates whether the system's revenue can meet anticipated

costs and whether the system will be professionally managed and operated.

- State-County Cooperation. The State has final authority to ensure that small drinking water systems comply with SDWA standards; however, it has delegated some of this authority to counties. An example of this is a county water and sewerage plan. A county must make the plan and address all the items stipulated by the State, but the State has final authority to approve the plan. This joint effort ensures that county plans will be comprehensive enough to reduce significantly the number of problems that might occur.

- County Planning. A county water and sewerage plan that must be reviewed and approved by the State is required by law. This review process allows experienced drinking water officials to identify problems that may affect a county's water system in the future.

- Financial Assurances. The State requires financial assurances from all new community water systems. An agreement is negotiated between developers and county officials. If the water system is to be privately owned, requirements include escrow funds for initial and continued operation and maintenance, replacement of components, and a customer-financed sinking fund for system replacement. Each type of escrow requirement, other than the sinking fund, must be deposited by the owner before construction, thus providing a form of insurance to cover future costs of system operation. If the proposed system is publicly owned, MDE requires counties to maintain adequate revenue through assessments and bonds to ensure continued viability.

- Persuasive Power. Officials at the State, county, and municipal levels use their knowledge and experience in negotiations with developers to discourage construction of new small privately owned systems. Officials believe their long experience with small system non-viability allows them to provide expert counseling and strong technical advice; this often results in developers being convinced not to create new small systems.

According to the State Drinking Water Administrator, Maryland's approach to controlling non-viable small drinking water system problems may not be as effective in States with different population distributions. Many of the program elements require a system of strong county or municipal government which may not be present in more rural, less metropolitan States. Maryland has seen a trend toward urbanization in counties such as Cecil, Howard, and Frederick. Because of Maryland's urban nature, opportunities for creation of new small drinking water systems are primarily confined to seasonal recreational and rural areas.

Suburban developments that might otherwise have developed independent private systems are often near existing systems and are strongly encouraged to connect to them by county planning, financial incentives, and administrative requirements.

The regionalization of sewer systems also assists in keeping the number of new small, particularly privately owned, drinking water systems to a minimum. Most sewer systems in the State are regionalized, especially around metropolitan areas. Because the management and resources needed to operate sewerage and water supply systems are similar, it is often practical and economical to consolidate them under a single regional utility authority.

CHAPTER 5: WASHINGTON CASE STUDY

5.1 Introduction

The Washington State Drinking Water Program has three components that address restricting creation of new potentially non-viable small water systems:

- the Regulations of Public Water Supplies, Washington Administrative Code (WAC) Chapter 248-54 (referred to as the 248-54 Regulations), set standards for design, construction, monitoring, finance, operation, and management of water systems. Recent updates to these regulations expand the State's examination of proposed systems to include tests of financial and operational viability;

- the Satellite Support System, enables small systems to transfer ownership or to seek assistance from large or central water utilities in meeting the requirements of the Safe Drinking Water Act (SDWA). This system provides efficient alternatives in the management and operation of small systems; and

- the Public Water System Coordination Act (PWSCA) and its Procedural Regulations (Chapter 248-56 WAC) establish a planning process, reduces the demand for new potentially non-viable small water systems.

This chapter will focus on how these elements restrict the creation of new, potentially non-viable small water systems, although each of these program elements contain aspects that affect all water systems. Measures that affect existing systems will be discussed only where necessary to explain the Washington program.

By requiring comparable financial and managerial qualifications from small and large systems, the State intends to improve the viability of small water systems. At the same time, State officials promote the shared use of water facilities and satellite support systems as alternatives to independent small system operation. By requiring county planning for future water system development, the PWSCA reduces the likelihood that a potentially non-viable system will be constructed. This planning reduces the demand for new small systems and sets standards for new systems that improve viability. In addition, the PWSCA and the Chapter 248-54 regulations help ensure that water systems are viable at the time of construction by requiring water system plans or a small systems management program. The PWSCA and the 248-54 Regulations also help ensure the continued viability of new and existing systems by requiring regular reviews and updates of water system plans. The Satellite Support System may be used by either new or

existing small water systems that are unable to meet State and Federal drinking water standards. The concept may also be implemented by the counties, both inside and outside a PWSCA area, when the counties determine that a small water system is unable to provide adequate water service on its own.

Washington Proliferation Controls

The Regulations of Public Water Supplies

Washington revised its Regulations of Public Water Supplies in 1970, 1973, 1983, and 1988 to create more comprehensive design, financial, operational, and managerial controls of public water systems. Many of these regulations apply to all public water systems, but we will focus on how these regulations are applied to new, potentially non-viable small water systems. Moreover, those particular regulations aimed at small water systems will be described in detail.

Because small water system participation and requirements are limited under the PWSCA, in 1988 the Washington Department of Social and Health Service (DSHS) adopted regulations for improving the initial and continued viability of small water systems. Recognizing that not all small water system problems can be overcome through the PWSCA and that not all counties are likely to institute the PWSCA, the DSHS has instituted financial, operational, and managerial requirements for all small water systems. In particular, the State has identified the inadequate financial base of many small water systems as a key area for State officials to address.

Satellite Support Systems

The Satellite Support System (also known as the Satellite System Management Concept) is an agreement whereby the large or central utility performs direct, contract or support services for small utilities. Using Direct Service, the utility assumes ownership, operation, and maintenance responsibilities. Alternatively, a large water utility may agree to furnish technical, operational or managerial services, known as Contract Service. Finally, Support Service entails the provision of operator training, equipment, supplies, and advice on a fee for service basis.

The Satellite Support System is promoted both formally and informally by DSHS. Counties that have adopted the PWSCA are required to assess the need for Satellite Support Systems. In addition, counties that have not fully adopted the PWSCA have implemented the Satellite Support System. Third, the Department has sought to inform all water systems that Satellite Support Systems may resolve the financial, operational, and managerial responsibilities entailed in meeting State and Federal drinking water standards.

The PWSCA

In the 1970s, areas of Washington experienced rapid population and new small system growth. In the absence of State or county plans for water system development, these new systems created overlapping service areas and duplicated facilities as they competed for customers.

In 1977, Washington adopted a program to remedy this problem. The PWSCA creates a planning process which regulates water system development. Specifically, the PWSCA authorizes counties to create plans that can:

- demarcate present and future water system service areas, in which water utilities are responsible for providing service as needed;
- establish minimum design and fire flow standards;
- plan future water system development;
- develop procedures for authorizing new water systems;
- develop shared or joint use of facilities; and
- develop a Satellite Support System to provide management, operations or maintenance assistance to small systems.

These controls are described in greater detail in Section 5.3.

State Profile

The broad scope of Washington's programs offers a variety of solutions to resolve problems of geography, population density, differing political attitudes toward regulation, water quality, and water availability. To understand how Washington has developed its program to restrict the creation of potentially non-viable water systems, it is necessary first to understand the demographic and physical characteristics of the State.

Washington has an area of 66,522 square miles and a population of 4.5 million. Although only 19 percent of the population live in rural areas, this is the second highest percentage of the four States studied in this project. Washington's population density, 72 persons per square mile, is the lowest of the four States.

The western part of the State contains the major centers of commercial activity, with large urban and suburban populations in the areas surrounding Seattle, Tacoma, Everett, and Bellingham. There are also significant rural populations, large expanses of relatively unpopulated parklands in the Olympic and Cascade Mountains, and other heavily forested areas. Most residents of

western Washington are served by surface drinking water sources, but both ground and surface sources of high quality are plentiful.

Few urban centers exist in the eastern portion of the State, which is mainly rural with large desert areas. The City of Spokane is the largest urban center in eastern Washington. Spokane County is one of the few areas in the United States where the primary drinking water source is designated as a "Sole Source Aquifer" by EPA. This designation is a strong incentive for the local government to develop a water resource management program protecting the water supply for future generations.

Characteristics of Water Systems

According to the 1987 Federal Reporting Data System (FRDS), Washington has 2,355 community water systems. As shown in Exhibit 5.1, the vast majority (94 percent) are classified as small (i.e., serving 25 to 3,300 persons). The most distinctive feature of the Washington State inventory of community water systems, however, is the percentage of systems that are defined by FRDS as very small, i.e., serving fewer than 500 persons. These systems represent 82 percent of Washington State's community water systems, the highest percentage of the four States in this study.

Washington's definition of public water systems (PWSs) differs from EPA's. As shown below, Washington has four classes of PWSs, defined primarily by the number of connections.

Washington Classifications of Public Water Systems

Class	Number of Connections
1	> 100
2	10 - 99
3	25 - 299 (transitory)
4	2 - 9

Source: DSHS

All classes except Class 3 have permanent connections. Class 3 systems serve transitory populations of 25 or more on any one day. In Washington, small public water systems are generally defined as those systems having between 2 and 1,000 connections. This is roughly equivalent to the EPA definition. One thousand connections is approximately the same as a service population of 3,300, but the inclusion of systems with as few as two connections adds many systems excluded by the EPA definition. More than 60 percent of Washington's PWSs are in Class 4.

Exhibit 5.1
Washington Water Systems, Violations and Systems in Violation

FY 1987

	Population Served:							
	25-100	101-500	501-1,000	1,001-2,500	2,501-3,300	Total <3,300	Total >3,300	TOTAL
Systems	1,169 49.6%	756 32.1%	131 5.6%	131 5.6%	20 0.8%	2,207 93.7%	148 6.3%	2,355 100%
Population	64,000	161,000	94,000	221,000	58,000	598,000	3,195,000	3,793,000
MCL Violations	383 50.7%	249 32.9%	52 6.8%	37 4.9%	9 1.2%	730 96.7%	25 3.3%	755 100%
M/R Violations	1553 63.3%	626 25.4%	112 4.5%	87 3.5%	14 0.6%	2,392 97.2%	68 2.8%	2,460 100%
Average MCL Violations per system/year	0.32	0.32	0.39	0.28	0.45	0.33	0.16	0.32
Average M/R Violations per system/year	1.32	0.82	0.85	0.66	0.7	1.08	0.45	1.04
Systems with MCL Violations	236 50.0%	161 34.1%	32 6.7%	21 4.4%	7 1.4%	457 96.9%	15 3.1%	472 100%
Systems with M/R Violations	563 57.3%	278 28.3%	44 4.4%	43 4.3%	8 0.8%	936 95.4%	45 4.6%	981 100%

Source: Federal Reporting Data System, Reports 7, 19A, 19B, 1987

Note: Percentages may not add due to rounding.

The predominant source of water varies with size of system in Washington, as it does in many other States. Large systems primarily depend on surface water sources while small systems depend on groundwater sources. Sixty-nine percent of all groundwater systems serve fewer than 100 connections, while only 13 percent of Class 1 systems (those with 100 or more permanent connections) are groundwater systems. Since Washington has a generally abundant supply of high quality groundwater, most of these groundwater sources require little or no treatment.

Type of ownership also varies with system size. Over half of the Class 1 systems are publicly owned, while more than ninety percent of smaller systems are privately owned.

The Problem of Rapid Growth

During the rapid growth of suburban areas in the 1970s, there was a dramatic increase in the number of new small systems. The chart below documents the explosion in the number of small systems. The number of Class 1 (100 or more connections) systems grew from 419 to 556 between 1970 and 1981. During the same eleven-year period, the number of smaller systems between 2 and 99 connections increased from 2114 to 7685, an annual increase of nearly 24 percent.

This proliferation was alarming for several reasons. First, the owners of the systems, often homeowners' associations or sole proprietorships, did not have the experience or financial capability to maintain their systems successfully. Second, the systems were not adequately prepared for the management and capital investment challenges associated with rapid expansion. Yet many of these systems were trying to expand and were aggressively competing for new customers. Third, uncoordinated and unplanned system expansion resulted in crossing service lines and unnecessary facility duplication. "It was the wild west!," one State official said.

Washington State planning officials were concerned not only about uncoordinated water system development, but also that many of the new small systems lacked the financial and management capability to provide safe drinking water reliably. Washington identified several limitations on the viability of small systems. State officials concluded that small systems were more likely than large systems to violate water quality standards.

A DSHS study in 1987 indicated that the small system viability concerns were well-founded.[1] The study noted that Class 2 and 4 systems with the bacti monitoring requirement have a much lower

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[1] Small Water System Problems: An Assessment, DSHS, February 1988.

rate of compliance. The study attributed this lower compliance rate to the following problems which are more prevalent in small systems:

- lack of defined ownership and management responsibilities,
- lack of financing options for privately owned systems,
- probable lack of financial viability for utilities with fewer than 500 ratepayers,
- inability or unwillingness to design and construct small water systems according to professional engineering standards, and
- lack of qualified operators.

System Growth Prior to the PWSCA

Year	Class 1	Class 2	Class 4	Total
1970	419	<100	2,114	2,533
1973	493	716	2,331	3,585
1975	454	1,196	2,661	4,311
1977	520	1,732	2,476	5,712

Note:
Class 3 systems not included because they do not serve permanent connections.

Source:
DSHS, Environmental Health Program, Technical Services Section

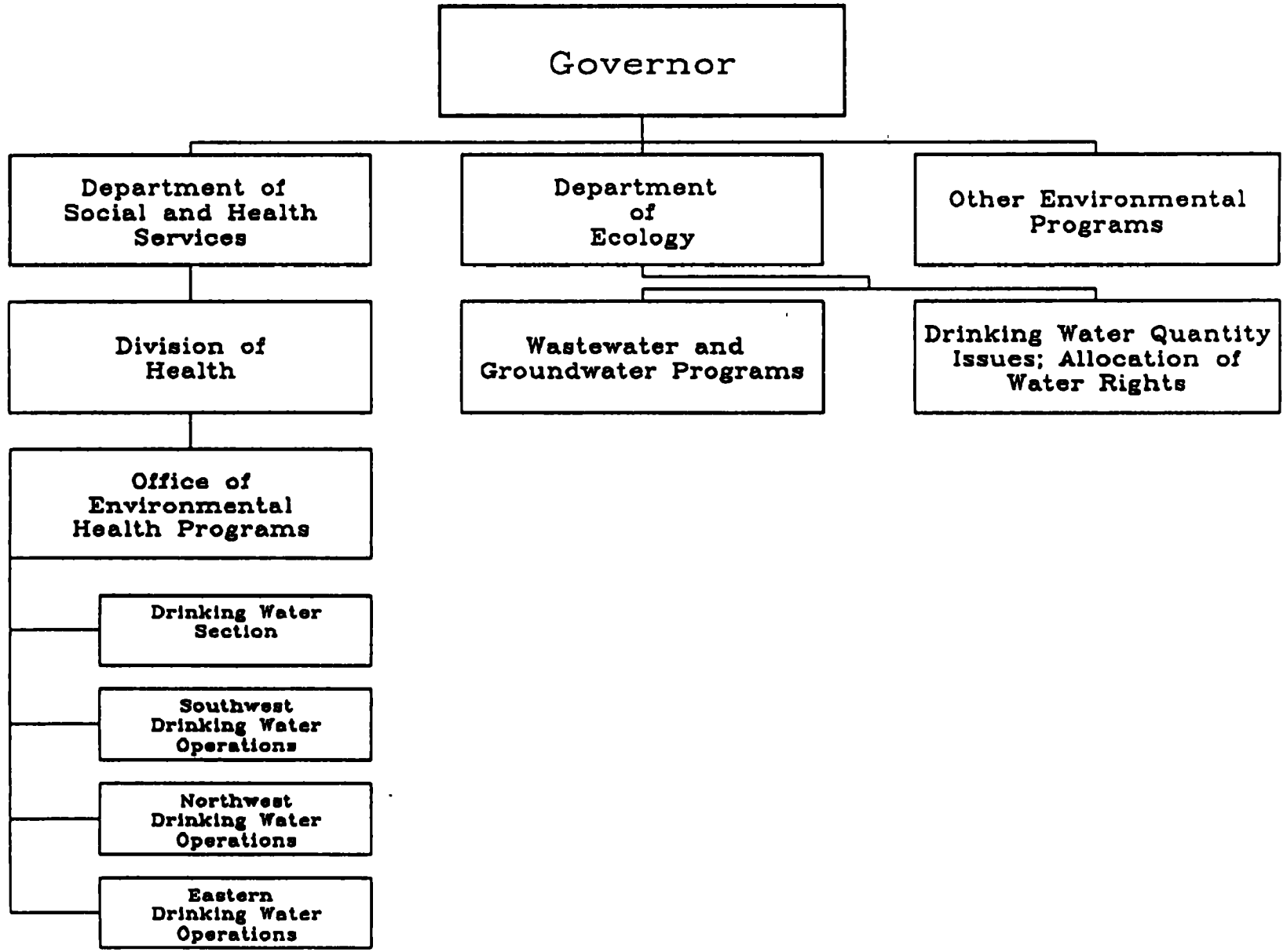
5.2 Organizational Structure of State Agencies Regulating Drinking Water

Exhibit 5.2 shows the organizational structure of agencies regulating drinking water.

The SDWA is implemented by the Office of Environmental Health Programs, part of the State's Department of Social and Health Services (DSHS). The drinking water section is responsible for SDWA primacy, certification of operators, and the planning and administration of the drinking water program.

Exhibit 5.2

Washington Responsibility for Public Water Systems



DSHS district field offices in Olympia, Seattle, and Spokane are responsible for maintaining water quality, approving plans, and developing criteria for new and existing systems. The Olympia office covers 12 counties in the southwestern part of the State. The Seattle office is responsible for eight counties in northwest Washington. Nineteen counties in eastern Washington are regulated by the Spokane office.

The Department of Ecology (DOE) has responsibility for other environmental programs, including waste water and groundwater programs. DOE also is responsible for drinking water quantity issues, particularly the allocation of water rights.

The Utilities and Transportation Commission is responsible for setting rates of privately owned water systems. They do not have any special provisions for regulating small water systems.

5.3 Implementation of Controls

The Regulation of Public Water Supplies

The Revised Code of Washington (RCW 43.20 and RCW 34.04) authorizes the following regulations. Public Water Supplies (WAC 248-54) sets standards for design, construction, monitoring, management and operations, and finance. The regulations also define the role of the local public health officials in relation to DSHS and define the method of enforcing of these rules. The purpose of these regulations is to protect consumers using public water supplies by requiring public water systems to be viable and reliable entities.

The 248-54 Regulations include provisions that are particularly important for restricting the creation of new, potentially non-viable small water systems.

First, the regulations establish the framework for local and State administration of the regulations pertaining to public water systems. State and local health officers designate the systems for which DSHS and the local health officers are responsible. Local health officials are governed by these regulations and the decisions of the DSHS.

Second, the regulations may be enforced by the issuance of letters, compliance schedules, DSHS orders, DSHS stop work orders, and the imposition of civil penalties up to $5,000 per day. The power to impose penalties was passed in 1988 as RCW 70.119A. Civil penalties may only be imposed in public health emergencies and in cases of chronic violations.

The 248-54 Regulations are summarized below according to type:

Water System Plans

Plans are required of all water systems in PWSCA areas, all water systems serving more than 1,000 service connections, and any public water systems experiencing problems or any new public water system as determined by DSHS. These plans are typically required of large systems even in non-PWSCA areas. The regulations allow the planning requirements to be scaled down according to the size of the system. This regulation is useful in restricting the creation of potentially non-viable small water systems because it requires large water systems to provide service within their designated water service area. The current and future water service areas delineated in the water system plans are considered by DSHS to be obligations to provide service. By providing service in an area, existing water systems decrease the potential for new non-viable water systems to be created.

Project Reports and Construction Documents

Project reports must be submitted to DSHS for written approval before the installation of any new water system, expansion of an existing water system or construction of system improvements. By requiring planning of all systems, regardless of whether they were required to submit a water system plan, the project report helps to ensure that a viable water system is constructed. The planning must include an operations program, engineering calculations, long-term management plans, a description of how the system will be operated and maintained over time, and an environmental impact statement.

Source Approval

This requirement involves a hydrogeologic assessment and water quality testing described below under Water Quality. These tests are designed to determine whether the source can meet the long-term needs of the system.

Design of Public Water Systems

These regulations include design standards, source protection, lead pipe restrictions, distribution system and disinfection requirements, and treatment design. These uniform standards help to ensure that new water systems are viable from an engineering perspective when built.

Water Quality

Here, the monitoring requirements for all public water systems are specified and the method of enforcing Maximum Contaminant Level (MCL) standards are set forth.

Water System Operations

Three regulations governing water system operation directly prevent the creation of new potentially non-viable small systems: operator certification, the small system management program, and reliability.

Operator certification regulations require certification of all operators of systems serving 100 service connections regardless of the source or serving at least 25 persons from a surface water source.

A Small Water System Management Program is required of each system not required to file a water system plan. The purpose of this regulation is to "assure the water system is properly and reliably managed and operated, and continues to exist as a functional and viable entity."[2] Although final guidelines for developing these programs have not been issued, DSHS engineers review and comment on the small system management program when approving new small systems, small system expansion, or when an existing system has problems related to inadequate management and operations. Required information about the management, finance, and operations of the small system is described in the DSHS Planning Handbook, A Guide for Preparing Water System Plans, which will be modified to address the specific problems of the potential non-viability of small systems. These guidelines will be completed in December 1989. The following topics will be covered:

Financial Program: The financial program is intended to facilitate financing of anticipated facility improvements required to operate the system. Expanding systems must to show how they will finance the improvements necessary to service a larger area. The water system is required to list revenue and expenses of operation and maintenance, facility replacement funds, and appropriations for major improvements. Private small water systems are more dependent on rates for their revenue. Therefore, the annual rates and the availability of other revenue sources such as fees or loans will determine whether the system can adequately finance necessary maintenance, management, and operations of the facility. DSHS officials are considering requiring small systems to post a bond to cover future expenses.

Operations Program: Water systems are required to identify all persons responsible for normal operations, preventive maintenance, troubleshooting, monitoring, emergency response, response to complaints, and budget formulation. Furthermore, water systems are required to have plans for system operation

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[2]WAC 248-54-196, DSHS, Office of Environmental Health Programs, May, 1988.

and control, water quality monitoring, emergency response, and cross-connection contamination control.

The regulation entitled "Reliability" applies to any new proposed water system or expansion. It requires that "systems be constructed, operated, and maintained to protect against failures of the power supply, treatment process, equipment, or structure with appropriate back-up facilities."[3] Furthermore, the regulation requires all water systems to have 24-hour phone availability to customers and to respond quickly to customer complaints.

The Satellite Support System

The Satellite Support System is predicated on the following statutes that allow various organizations to fund, construct, operate and contract with other entities to provide water service. Each of the following may provide satellite support to a small system:

- RCW 36.94, County Services Act authorizes county water systems.
- RCW 35 authorizes Municipalities and Metropolitan Municipal Corporations to run water systems.
- RCW 57 allows for the establishment of Water Districts with the powers of third class cities and towns.
- RCW 54 authorizes Public Utility Districts (PUD) to own and operate water systems with the same powers as municipalities.
- RCW 24.01 authorizes non-profit corporations to construct, purchase or receive property to establish a water system.
- RCW 23.86 authorizes cooperative associations of five or more persons to own and operate water systems.
- RCW 80.28 authorizes private companies to own, control, operate or manage water systems for hire. The companies authorized by this law must serve more than 60 customers and have an annual gross revenue of at least $60 per customer.

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[3]WAC 248-54-201, DSHS, Office of Environmental Health Programs, May, 1988.

DSHS recommends municipal corporations to provide satellite support because of their financing capabilities.[4] Currently, several counties are involved in the Satellite Support System. These counties are Jefferson, Skagit, Pierce, Kitsap, Thurston, Clark, Skamania, Chelan, Cowlitz, Snohomish, Klickitat, Stevens, Pend Oreille, and Spokane. Using publicly owned systems as Satellite Managers offers three principal advantages. Publicly owned systems are eligible for State Municipal Grants. They can tax property, and they may issue bonds.[5] Counties, metropolitan municipal corporations, municipalities, water districts, and public utility districts are all publicly owned operations.

The Washington Public Water System Coordination Act

History

Before the adoption of the Public Water System Coordination Act (PWSCA) was adopted, water system creation and expansion were approved with a minimum of State and local planning, control or coordination. Despite the widespread recognition of the State's water service planning problems, the PWSCA faced strong opposition from legislators and water utilities. Washington had no history of State-wide land use planning or growth management, and many people opposed a law that would require counties to undertake planning. Existing water utilities opposed the proposed law on the grounds that it would restrict free enterprise. Opponents defeated the bill three times. In response to the reservations about the legislation, a compromise bill was drafted that was supported by utilities, legislators, and county officials.[6]

The compromise gave the counties greater authority to implement the Act. Although DSHS has the authority to require implementation or to direct the outcome of the process, they have never done so. The Act states that DSHS, appropriate local planning agencies, and water systems shall study geographical areas where water supply problems such as uncoordinated planning, inadequate water quality, or unreliable service appear to exist. The Act states that only the DSHS or county government may initiate a study to determine the existence of problems with water quality and quantity, or water service planning. Authority over the

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[4]DSHS, Office of Environmental Health Programs, "Satellite Support System: A Means to Assure the Proper Management and Operation of Small Public Water Supplies Under the SDWA," May 1977.

[5]DSHS, "Satellite Support Systems," March 1982 and the "Kitsap County Public Utility District Satellite System Study," 1982.

[6]Nan Humphrey, "State of Washington Water Supply Initiatives," 16, based on Humphrey's communication with Consultant Robert Wubbena.

planning process and the content of the plan, however, rests exclusively with the counties, subject to limited review by the DSHS.

Components of the PWSCA

The result of the PWSCA process is the promulgation of Coordinated Water System Plans (CWSPs) for defined areas, called Critical Water Supply Service Areas (CWSSAs). The plans consist of the following elements to be implemented in CWSSAs:

- coordination of land use and utility planning,
- designation of future service areas,
- creation of service area agreements for individual water systems,
- definition of minimum area-wide water system design and fire flow standards,
- development of procedures for authorizing new water systems, and
- assessment of the possibilities for regional use of water facilities by separate water companies and satellite management operations.

Regulatory Authority

There are three sets of pertinent regulations and guidance documents that pertain to the PWSCA:

- Water System Coordination Act Procedural Regulations (WAC 248-56): These establish county authority for defining geographical areas (CWSSAs) and are used to develop a Coordinated Water System Plan (CWSP).
- Details of PWSCA elements are explained in a guide issued by DSHS: The PWSCA Handbook, A Guide for Preparing Water System Plans.
- Regulations for Resolving Water Service Area Conflicts (WAC 248-59) provide a process for resolving service area conflicts between systems located in a CWSSA.

Description of the PWSCA

The Coordinated Water System Plan (CWSP) is designed to assist water systems, counties, and DSHS in resolving area-wide water problems and to provide a long-term program to respond to area growth. Either a county or DSHS may initiate CWSP development. The first step is the preparation of a preliminary

assessment which identifies problems associated with water quality, unreliable service, or lack of coordinated planning. Either the county or the State may declare a Critical Water Supply Service Area (CWSSA) to identify the general region in which the program will be implemented. A Water Utility Coordinating Committee (WUCC) is appointed to recommend specific CWSSA external boundaries and to prepare the CWSP, both of which are approved by the county.

The WUCC must include representatives from the county legislative agency, county planning agency, county health agency, water system utilities and DSHS. All water systems with more than 50 service connections must be invited. DSHS or the county may appoint other agencies, systems, or interested parties as nonvoting members. After the WUCC is appointed, the county may receive State grant funding to complete the plan. Once external boundaries have been approved by the county, all proposed water systems or water system expansions within the boundaries must meet the standards and adhere to the policies developed by the WUCC. If the plan is approved, all new water systems must be developed in accordance with the plan.

The Coordinated Water System Plan consists of two parts: (1) Individual Water System Plans, and (2) an Area-wide Supplement.

The Individual Plan, prepared by each water system in the CWSSA, addresses the system's present and future service areas. Service area designation provides a mechanism for water utilities to identify their respective areas, based upon coordination and cooperation, and adequately plan for future needs.

The details of the plan depend on the number of service connections. Systems serving more than 1,000 connections must complete a detailed plan. An abbreviated plan covering all basic requirements must be submitted by systems having between 100 and 1,000 connections. Systems serving fewer than 100 connections must complete a brief questionnaire and fill out the Water Facility Inventory form. Privately owned systems are not required to complete a plan if they have no intention of expanding and were in existence before September 21, 1977. However, they are required to designate their future service areas in the Area-wide Supplement.[7]

Exclusive service areas are initially established by negotiation between systems. When a previously undeveloped site requires water service, the water system with its exclusive service area encompassing the site is required to provide service. The penalty for not providing service is the loss of portions of one's exclusive service area. Since purveyors usually decide to provide the required service, rather than lose a section of their service

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[7]DSHS, Water Supply Section, PWSCA Handbook, July 1984, 12.

area, establishment of service areas helps to restrict the creation of new systems.

The Area-wide Supplement addresses water system issues that affect the entire region. In the context of this broad policy document, the WUCC can propose additional programs that may help to restrict the creation of non-viable small systems and address the problems of existing ones. Topics to be considered in the supplement include: service area agreements, minimum design standards, potential use of satellite support systems, jointly used facilities, and fire flow standards.

- Service Area Agreements are written pacts among the existing water systems, approved by the county and DSHS to provide water service to a defined area within the CWSSA. Service area agreements allow water utilities to identify their respective areas and plan for the future. This eliminates competition, duplication, and inefficient extensions of facilities.

- Minimum Design Standards for new systems and extensions to existing systems are intended to make future system extensions easier by ensuring compatibility. They also require developers to build the same specifications. This may result in lower operating, maintenance, and replacement costs. Minimum fire flow requirements usually result in expensive six- to eight-inch distribution lines. This additional cost removes the incentive to build a small system. In addition, State and county governments must be assured that professional engineering standards are incorporated. This requirement tends to improve viability.

- Satellite Support Systems offer small systems that lack revenue and technical expertise a method for ensuring reliability, quantity, and quality of the water supply. Under the satellite system, responsibility is transferred, through ownership or contract, from the owner of a small system to another organization capable of providing adequate service.[8] The larger entity assumes responsibility for operation and maintenance of one or more small water systems. The small system, however, need not be owned by the management entity. In theory, there should be reductions in operation and management costs since the management entity can achieve economies of scale.[9]

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[8]Supplement to Status Report, November 1975 on the State's Drinking Water Program, DSHS, May 1977.

[9]Studies in three counties undertaken to analyze the concept of Satellite Management indicated a general rate increase after being brought up to the required standards. The analysts argued, however, that rate increases could have been even larger without

Satellite systems may be used in conjunction with service areas to provide water to areas which may not be scheduled for immediate connection to an existing system. The use of satellite systems in this instance allows the satellite manager to provide efficient management and operational services on an interim basis to systems that lack the necessary technical and financial resources. One private purveyor said that he considered satellite management the most cost-effective portion of the Act.[10]

- Joint Use of Facilities is an arrangement whereby individual water systems having quantity or quality problems agree to share other systems' facilities. Often, participation in the WUCC process reveals previously unrecognized opportunities. The most common arrangement is the physical interconnection or "intertie" of two systems. Utilities may also share water sources, reservoirs, or storage tanks. This process of sharing facilities has minimized costs for many systems and improved water service.

- Fire Flow Performance Standards often determine whether an existing system's expansion proposal or a new system development will be approved. All systems having over 1,000 connections and all systems within a CWSSA must meet minimum fire flow and capacity requirements. Fire flow standards can be used to control non-viable systems because all proposed systems that do not meet the standards are not approved. In some instances, these inadequate systems are upgraded to meet minimum standards or are taken over by an existing system that already meets the standards.

Additional issues that should be addressed in the Area-wide Supplement are:

- CWSP compatibility with land use plans/policy,
- development of future source plans, and
- the continuing role of the WUCC.

The detailed steps of the CWSP development process are shown in Exhibit 5.3.

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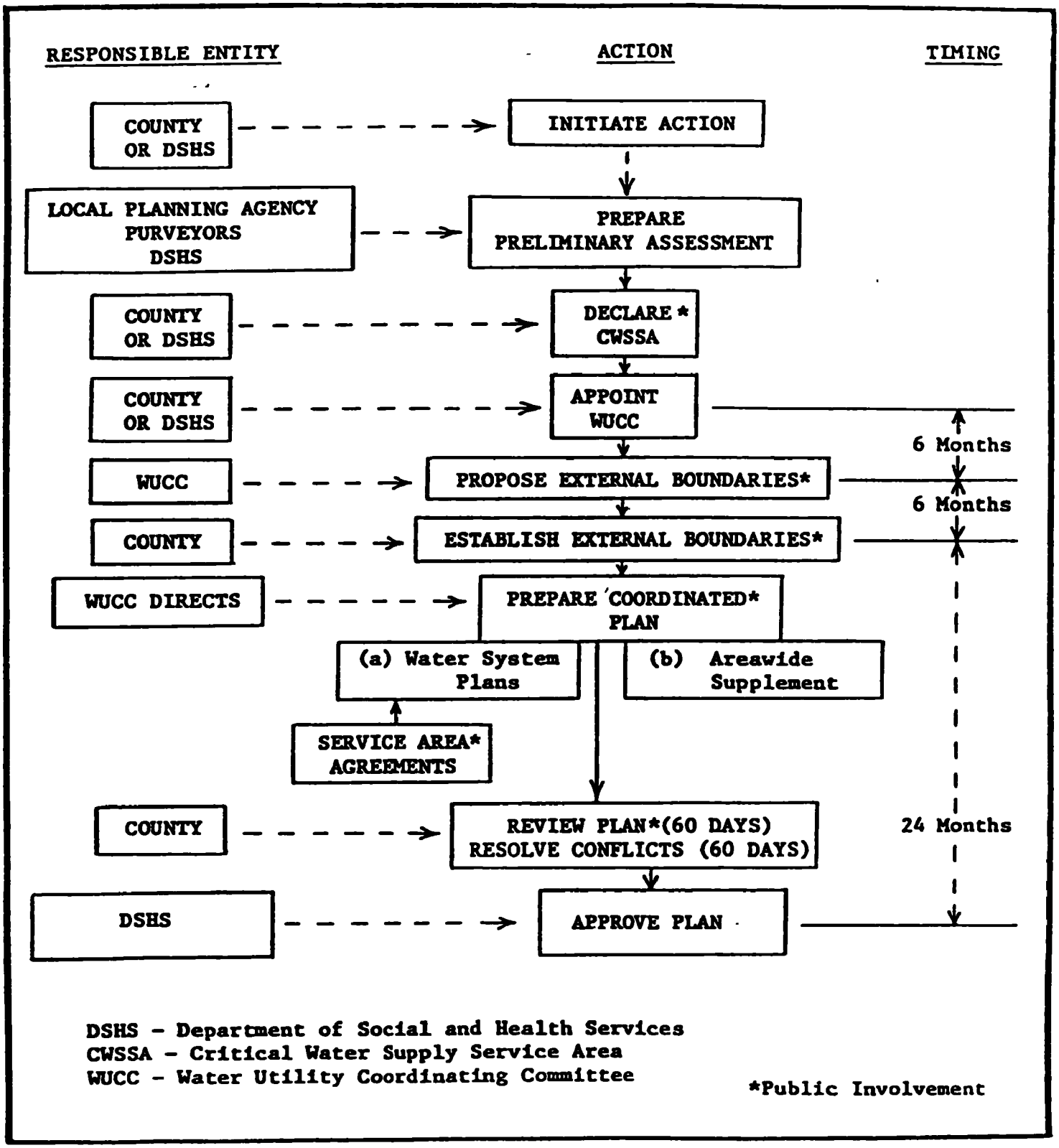
satellite management. See DSHS,"Satellite Support Systems", March 1982, 11.

[10]Interview with John Robischon, President of South Sound Utilities.

Exhibit 5.3

THE COORDINATION PROCESS



State Grant Availability

In 1972, Washington passed Referendum 27, incorporated into the Revised Washington Code as RCW 43.838, which established a Municipal Water Supply Funding Program of $50 million. In 1980, Referendum 38 granted this Funding Program $75 million. As the title suggests, this grant money is available only to publicly owned water systems. Washington law prohibits privately owned water systems from receiving public funds.

The Municipal Water Supply Funding Program provided assistance in implementing the PWSCA and the Satellite Support System. However, as of 1988, available funds have been nearly depleted and there are no pending referendums or legislation to provide additional funding.

The PWSCA: In Practice

Two aspects of the PWSCA are important controls on the creation of potentially non-viable new small systems. In addition to requiring counties and existing systems to plan for future water needs, the PWSCA sets standards for new system creation. All new water systems must be developed in accordance with the plan.

An important aspect of the Act is that it creates a framework in which the 39 county governments, working with interested utilities, can conduct area-wide water system planning. The Act does not require any uniform planning methods or design standards for the State as a whole. This authority is left to the counties and local committees. State, and sometimes county, officials serve on these committees as technical advisors. The drawbacks of Washington's approach, however, are evident in the fact that although more than 18 counties have started the process, only 14 have continued the formal planning effort beyond the initial assessment.[11] Thus, large sections of the State have chosen not to exercise the authority that would help reduce the demand for new small water systems. Exhibit 5.4 illustrates the portions of the State that have implemented the PWSCA.

State officials do not believe that full implementation of the PWSCA is necessary in the remaining parts of the State. Instead, they believe that the remaining counties would benefit

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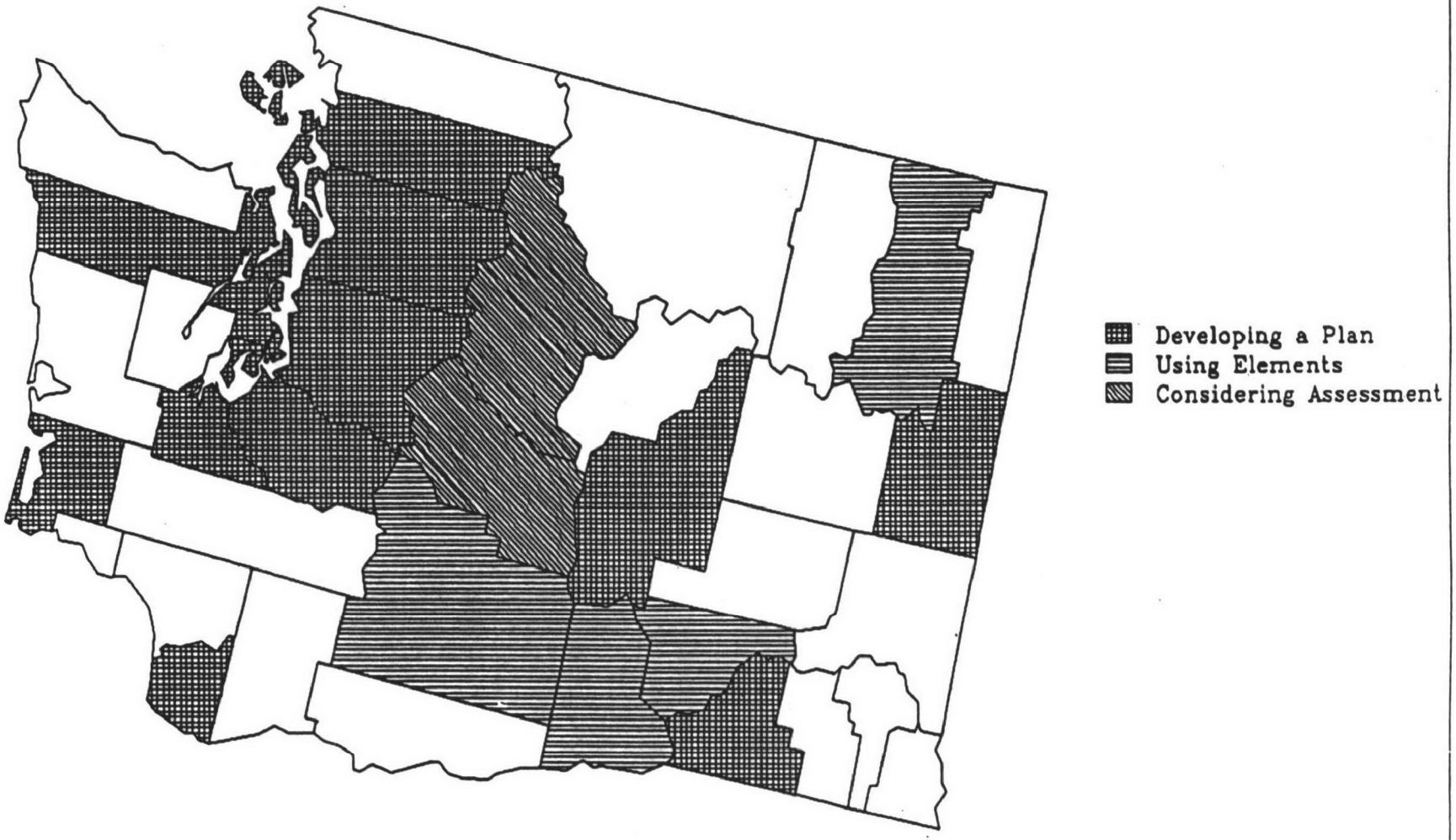
[11]The following counties are in various stages of developing a plan: Skagit, San Juan, Island, Jefferson, Snohomish, King, Pierce, Thurston, Pacific, Clark, Grant, Walla Walla, Spokane, and Kitsap. Yakima, Benton, Franklin, and Stevens are using elements of the PWSCA. Chelan and Kittitas are considering assessment. Whatcom County considered PWSCA implementation, but decided against it.

Exhibit 5.4

Washington Counties Using The Public Water System Coordination Act



from implementing the satellite and small systems management programs. Counties may also establish exclusive service areas without full implementation of the PWSCA.

The PWSCA allows local and State officials to initiate the declaration of a CWSSA that begins the implementation of the program. In practice, the process has always been initiated at the local level, though the State may have had significant influence. Since passage of the Act in 1977, 14 of the 39 counties have invoked CWSSAs. Three of these counties have multiple CWSSAs: Spokane (4), King (4), and Walla Walla (2). At least four additional counties have considered initial assessments. Three of these conducted an initial assessment and decided not to invoke a CWSSA or to continue the process. Two of these counties are using satellite management; the third has established exclusive service areas.

The PWSCA has very few hard and fast requirements. Instead, it is a structure or set of guidelines within which the planning process can take place. Since the plans are developed at the local level, they vary considerably in their content and administration. Counties may assume different roles in the process. For example, in Thurston County public and privately owned water systems carry out the program with county and State oversight. Thurston County has outlined a review process to be conducted by all affected parties when considering WUCC recommendations. Three cities in the county have adopted minimum design standards within their water districts. In contrast, Kitsap County Public Utilities District was designated as lead planning agency as well as owner and operator, or satellite manager, of its various water systems.

Nine counties have gone beyond the preliminary stages of the PWSCA process and have completed CWSPs. The remaining five that have declared CWSSAs expect to complete plans by January 1991. The first county to implement the Act fully was Spokane County, where four CWSSAs were invoked in 1980 and a plan was approved in March 1982. The Spokane County five-year review is currently in process. Five more counties completed plans in the next three years. Three of them are in eastern Washington, one is north of Seattle, and one is in the southeastern region. Four of these counties--Clark, Grant, Skagit, and Walla Walla--have county-wide plans. In these counties, there has been virtually no increase in the number of systems serving between 10 and 1,000 connections. In three of these counties, control has limited growth of Class 4 systems to fewer than 10 new systems per year.

Problems in Implementation

One concern of officials in western States where water is scarce is that attempts to control creation might involve sensitive water rights issues. By controlling the creation of new water systems, the State would be controlling development; and by con-

trolling development, the State may be interfering with water rights that may be associated with property ownership. We raised this concern with officials in eastern Washington. Their reaction was that scarcity of water seemed to be a good argument in favor of controlling system development. Furthermore, during the preparation of the Coordinated Water System Plan under PWSCA, county planners in Washington have begun to discuss the concept of area-wide water rights. This concept is particularly useful in implementation of intertie agreements that are essential to the PWSCA planning process.

A second concern is the lack of state-wide implementation. The PWSCA emphasizes local initiative. This fosters cooperation between the county and State governments in areas that initiate the program. The drawback of this approach, however, is that some counties may decide not to participate. In the 10 years since implementation, only 14 of 39 counties have chosen to continue the process past the initial assessment phase. Three other counties applied elements of the PWSCA, but chose to do it without the State support that comes from full implementation. Assuming that planning prevents some creation of potentially non-viable small systems, then the residents of 25 counties have been denied the benefits of this program.

Benefits of the PWSCA

The primary benefit of the Act should be reduction in the rate of non-viable water system creation.[12] The Urban Institute reviewed data on creation in 1985 and concluded that because of its limited implementation, "the program has fallen short of its ambitious goals of stemming the proliferation of new systems. Small systems have continued to grow at rates exceeding population increases statewide, although their growth rate might have been greater in the absence of the legislation."[13]

Since the planning process has been implemented in only 14 counties, statewide data on new water systems are inappropriate for this study. The data available from counties that have implemented plans, however, are quite instructive.

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[12]The reader will note that the PWSCA does not directly address the issue of water systems viability. Rather, it is directed at the control of proliferation of systems and the efficient provision of water service. Proliferation of small systems is seen to be inconsistent with the efficient, planned development of water systems in coordination with regional land use plans. Also, a recent DSHS study has concluded that controlling proliferation of small systems is an important part of the State's approach to dealing with the "small systems problem." See DSHS, Small Water Systems Problems: An Assessment, February 1988, p. 20.

[13]Humphrey, op. cit., p. 38.

- Fewer than ten new Class 2, 3, and 4 systems have been permitted in the Thurston County CWSSA in the last three years. Local officials believe that 100 to 200 systems would have formed if the CWSP were not implemented.

- Spokane County officials have said that "no new systems with inadequate design" can be started in the county. State data indicate no increase in systems having between 10 and 1,000 connections.

- Virtually no new water systems having between 10 to 1,000 connections have been built in Clark, Grant, Skagit, and Walla Walla counties since plans were implemented.

Also, DSHS recently concluded that the PWSCA "has proven effective in slowing down the creation of small water systems by encouraging existing utilities within a specified area to coordinate their existing and future service area requirements."[14]

The next section of this report presents case histories of the implementation of the Act. These illustrate the key concepts of the planning process. They also demonstrate the effectiveness of specific actions taken by counties to restrict creation of non-viable systems.

5.4 Case Studies

Thurston County

Thurston County has 150,000 people and approximately 700 water systems. There are three cities in Thurston County: Lacey, Tumwater, and the State capital, Olympia. The majority of the population lives in the northern part of the county. Each county water system, except the three city systems, has fewer than 1,000 service connections. In general, high quality groundwater is readily available within the Thurston urban area.

The Thurston County CWSP, approved in early 1986, resulted from the emergence of Thurston County as one of the fastest growing urban areas in Washington. From 1970 to 1980 the population of the Olympia/Lacey/Tumwater urban area grew from 62,600 to 97,000, an increase of 54 percent.

In the North Thurston County planning area, there were 267 water systems; 27 of these had more than 50 service connections and 240 served between 2 and 50 connections. The three cities of Olympia, Lacey, and Tumwater served more than 65 percent of the

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[14]DSHS, op. cit., p. 20.

population. The rest of the population was served by independent water systems or individual wells.[15]

Issues

Prior to adopting its plan, the county exercised no control over the growth and development of water systems within the urban area. As a result, many systems had undersized mains and no fire hydrants, and were poorly constructed. Substantial public investment would have been required to bring these systems up to city standards for fire protection and general water service. Lack of minimum design and fire flow standards was one of the major reasons the county invoked the PWSCA.[16]

The cities of Lacey, Tumwater, and Olympia, the largest purveyors in Thurston County, pressed for the development of a county water plan due to their concerns about several developments:

- the announced intention of 13 large water systems to expand, which raised the prospect of overlapping service areas, and

- the failure of many systems within the CWSSA to meet the county's urban water system standards or to offer fire protection. The existence of substandard systems would impede the expansion of the large municipal systems and hinder the consolidation of small systems with large ones.

The cities' desire to be able to integrate small systems into their own was sufficient to cause them to deny service to residents outside city limits in the absence of a county-wide plan.[17] They successfully demanded that the plan require developers within the cities' future service areas to waive their right to protest annexation by the city.

Lack of water system design and development standards was also a major issue. The three cities had developed voluntary standards and a coordination process. General service area boundaries had previously been established, and the cities had agreed to compatible (but not identical) standards for pipe sizing, fire hydrant placement, and other water system design elements. These standards were applied to all developments connected to their systems.

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[15]"Thurston County Coordinated Water System Plan: Area-wide Supplement," January 1986.

[16]Ibid.

[17]Private communication with John Robischon, President, South Sound Utility

Plan Development

The plan adopted by Thurston County covers only 60 percent of the county's area. The boundary of the planning area encompasses the existing and planned urban area and some other areas that required immediate system coordination. The land within the boundary was divided into 85 service areas. Competition among purveyors over service area boundaries was intense. When the plan was approved, 12 systems, including the three cities, had service area conflicts. After two years of negotiations, seven service areas remain to be adjudicated, and some utilities have said that they do not plan to sign the final agreements. The county maintains that the agreements will be legal nonetheless, because the public participation provisions of the WUCC process were observed.[18]

Two major goals of the county plan were to discourage the creation of small systems and to coordinate the orderly growth of existing systems. To accomplish these goals, a utility system review process was adopted. The plan incorporated the county's health and fire standards. Three different sets of minimum design standards were adopted, corresponding to the areas coordinated by each of the three cities. By requiring all systems in the CWSSA to comply with minimum standards, the plan can be used to curb small-system creation. Potential small system development and extension plans unable to meet the fire flow or design standards do not receive county approval. The use of these controls is illustrated in the Tomsinski Duplexes and Eagle Crest cases below.

The county plan adopted the State's procedure for authorizing new water systems. A purveyor must comply with requests for water from sections within its service area, or those sections will be removed from the purveyor's service area. "There have only been two or three cases where a purveyor did not support new systems or expansion in his service area," one county official said. The effects of this provision are illustrated in the Glen Johnson and Tomsinski Duplexes cases.

Level of Effort and Result

Thurston County received State grant funding to support the development of the county plan. The purveyors, not the county, bear most of the daily responsibility and expense of the plan. The county only spends a small portion of its time administering the program. A county official estimated that administering the plan currently requires less than 1/10 of a full-time person.

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[18]Private communication with Philip Brinker, Thurston County Senior Environmental Health Specialist.

The county recognizes that the initial cost of establishing water systems under the county standards is slightly higher than it would be under the DSHS minimum requirements. However, county staff believe that the long-term public cost will be substantially less because future rehabilitation and replacement will be avoided.[19]

Since the approval of the North Thurston external boundary in 1985, county officials believe that the plan has prevented the development of between 100 and 200 new systems. In particular, fewer than ten Class 2, 3, and 4 systems have been approved within the CWSSA since the plan was adopted.

The State's data (see Exhibit 5.5) indicate that the county's rate of increase for systems having 1,000 or fewer connections decreased from 29 per year (in 1975 to 1985) to 22 per year (after 1985). The county administrator has indicated that the apparent tripling of the rate of increase of Class 2 systems may be specious, resulting from earlier under-reporting. Although the overall rate of increase has diminished since 1985, it is not possible to ascribe this effect solely to the institution of the CWSSA, because 40 percent of the county lies outside the CWSSA boundaries.

Glen Johnson Water System, Thurston County

This case illustrates the use of the PWSCA planning process to modify a water system development that was inconsistent with the county's CWSP, thereby preventing the creation of a potentially non-viable small system. The county approved the extension on an interim basis, but required the system owner to upgrade the system and later hook up to an existing system. The case also illustrates the importance of defining exclusive service areas. In this case, the existence of such a boundary forced the existing purveyor to provide the requested service, rather than lose that section of its service area.

Glen Johnson is a privately owned system, built in 1940, with three service connections. In September 1986, the owner of Glen Johnson sought approval from Thurston County to extend his water system to serve two commercial buildings. He had not previously filed an individual plan in the Thurston County CWSP; the area served by Glen Johnson was part of the City of Tumwater's service area.

The owner of Glen Johnson was willing to upgrade his system and interconnect with the city's system, at city expense. He therefore presented such a proposal to the City of Tumwater.

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[19] Op. cit., Supplement.

Exhibit 5.5
Rate of Increase of Small Systems in Thurston County*

Water Systems	# of PWSs 11/70	# of PWSs 4/75	Rate of Increase, 1975-1985 (#/yr)	# of PWSs 11/85	Rate of Increase, 1985-1988 (#/yr)	# of PWSs 6/88
Class 1 >1000	3	3	-	3	-	3
Class 1	7	11	1.5	27	2.4	33
Class 2	97	150	4.0	192	6.0	207
Class 4	***	170	24.6	428	12.4	459
EPA Small Systems**	101	158	5.5	216	8.4	237

Notes:

* Data are ror the total county, including the area outside the CWSSA.

** EPA Small Systems includes all system having 10 - 1000 connections. It is calculated by adding the systems in Classes 1, and 2, and then subtracting those Class 1 systems that have more than 1000 connections.

*** County records combined Class 4 systems and Class 2 systems in 1970.

Although the Glen Johnson property was within Tumwater's future service area, Tumwater had no immediate plans or funding to expand service to this area. Tumwater agreed to provide water, but only if Glen Johnson would pay for the interconnection. An alternative suggested by the county was to obtain satellite services from Trails End Utility, a neighboring system that had indicated its willingness to manage Glen Johnson. The applicant rejected both options, claiming that the effect of the county's water plan was to take his property and water rights.

In June 1987, the county agreed to allow Glen Johnson to extend its system to the two commercial buildings. However, the county provided that: (1) Glen Johnson would be brought up to county design standards; and (2) after five years, the City of Tumwater would assume operation and maintenance of the Glen Johnson system, at which time the City would install the interconnection at its own expense.

Eagle Crest, Thurston County

The following case illustrates how minimum design and fire flow standards can be used to eliminate unsatisfactory system extension plans. The Beachcrest Water Company requested approval from the county to extend their system from 101 to 154 connections to serve the new Eagle Crest development. The county did not approve expansion because minimum fire flow standards were not met. However, after Beachcrest was bought by the City of Lacey, the county approved the extension of the city's system to include the Eagle Crest development, with the stipulation that fire flow performance would be ensured through an intertie with the city system.

The Beachcrest Company, including the Eagle Crest development, was bought by the City of Lacey in December 1986. Like the City of Tumwater, the City of Lacey had defined a large future service area. However, unlike Tumwater, Lacey had developed an aggressive expansion program. During 1986, The City of Lacey purchased ten systems; this greatly increased its service area. The city proposed a plan to improve the Eagle Crest expansion fire flow service through an intertie with the city system by October 1987. Until an intertie with the city's system was completed, the City of Lacey, after extending the existing Beachcrest system to include the Eagle Crest development, would continue to operate the Beachcrest system without upgrading the fire flow.

The City of Lacey requested a variance to the county's fire flow requirements. The variance would allow it to operate the Beachcrest system, without upgrading it, until October 1987 when the system would be connected to the city system. The county granted the variance provided that a bond was posted to ensure that fire flow would be achieved if Lacey was not able to intertie by October.

Tomsinski Duplexes, Thurston County

This case illustrates the use of minimum design and fire flow standards and interconnection to restrict the creation of new, potentially non-viable small systems.

Prior to 1986, the applicant met with the City of Lacey regarding water service to property that the applicant was planning to purchase. At that time, the city indicated that this property was outside its current or future service area.

As a result of acquiring the Beachcrest Water Company in December 1986, the City of Lacey assumed responsibility for providing service to the Tomsinski property. The city sent the applicant a letter stating they could serve the property if the applicant installed an eight-inch line extending 1,000 feet to the city's mains.

After purchasing the land, the applicant learned that additional improvements would have to be made to support minimum fire flow performance. After negotiating with the county and the owner, the city decided to provide the requested service. The city agreed to install the 1,000 feet of line extending to the city's water mains, if the applicant completed the fire flow improvements.

Kitsap County

Kitsap County, a largely rural county and a population of approximately 170,000, has experienced rapid growth over the last ten years. This growth is partially due to an expansion of the submarine base at Bangor. In June 1988, there were a total of 823 water systems, only nine of which served more than 1,000 connections.

Similar in area, population and recent growth rate to Thurston County, Kitsap County used a different planning approach which included the expansion of a PUD. One factor that influenced Kitsap's decision was that the largest purveyors (cities such as Bremerton and Port Orchard, and private purveyors such as the Annapolis Water District in Port Orchard) were not in competition for customers. They were separated geographically or they already served populations within well-defined boundaries established by agreement or court decision. Water quality and quantity were therefore mainly rural issues at the county level. Kitsap County therefore designed its plan around a county-wide PUD that would establish satellite relationships with those local water systems that it did not own.

The Kitsap County Public Utility District #1 (PUD), formed in 1962, started with one water system serving 260 people. It currently owns ten systems and serves 2,600 people. In April 1979 after a rapid growth in population on Bainbridge Island, county and PUD officials developed guidelines for establishing satellite systems throughout the county. At the urging of the PUD and the DSHS, a county-wide assessment was conducted. A CWSSA was adopted in 1987. The boundaries of the CWSSA coincide with those of the county, excluding the submarine base. The county designated the PUD as lead agent in the planning process.

Since the county's planning process was instituted in 1987, it is too early to determine whether the rate of increase in small systems has slowed. Nevertheless, two important applications of the State PWSCA are illustrated by cases in Kitsap County: (1) the development of a satellite management program under the aegis of the county PUD (the Bainbridge Island case) and (2) the use of grant funding and local tax revenues to develop sources and to acquire and improve problem systems (the Waggoner Wells case).

Bainbridge Island, Kitsap County

The Bainbridge Island case illustrates how a satellite program was implemented to restrict and regulate small system growth. The PUD will provide interim satellite services until the developments and improvements needed to ensure reliable water service have been completed.

In April 1979, a PWSCA preliminary assessment was initiated by Kitsap County officials. The assessment concluded that there was an exceptionally large number of Class 4 systems in the county. Many of these small systems were developed within the previous five years, as a result of larger systems' inability to serve many areas beyond their existing service lines.[20] Most of these systems were poorly designed, inadequately run, and lacked monitoring or sampling procedures. While there appeared to be no significant water quality problems, dry wells and insufficient water service were of increasing concern both to Bainbridge Island residents and to county drinking water officials.

In response to the problem of small-system growth, the county developed a two-phased action plan. In phase one, a set of guidelines was developed for satellite system development in the county. Phase two, which has three subphases (immediate, short-range, and long-range), applies only to Bainbridge Island. It provides a mechanism for controlling and regulating small, non-viable systems and establishes a schedule for the construction and development of water systems necessary to ensure reliable and adequate future service.

In the immediate phase, a satellite assistance program was established. New project review procedures and an emergency rationing program for systems having a history of water shortages were also established. The PUD operated as a satellite manager, providing operation and management services, technical assistance, and operator training. During the short-range phase from 1985-1988, shared reservoirs and transmission lines utilizing existing sources were constructed. During the long-range phase, beginning in five years, the county plans for water lines connecting new sources to shared reservoir sites and major interties to provide intra-subarea links. "The Bainbridge Island satellite management activities could be applied in any part of the country," the PUD director said.

Waggoner Wells, Kitsap County

This case illustrates the PUD's use of grant funding to provide satellite services. In exchange for assuming ownership,

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[20]Kitsap County Public Utility District Number 1, Satellite Study, Phase Two: Bainbridge Island, April 23, 1983.

the PUD will operate a satellite system until service lines can be extended to include the area.

The Kitsap County PUD negotiated a "license to enter and acquire a well site" with the owner of a subdivision. The PUD offered to operate and maintain the new system in return for ownership and water rights. The PUD used grant funding to acquire and complete construction of the new system. The PUD construction included drilling a new well to replace the owner's original well, which was designed to service five connections. The new well was capable of serving as many as 10 times the original number of connections. By increasing capability, the new system may extend its service area. The PUD will operate the system as a satellite until the PUD's service lines reach it.

Stevens County

This case study demonstrates that satellite programs can be effectively implemented without invoking the PWSCA. The important requirements are an institutional structure within the county that will support a satellite program, technical experts, and sufficient revenue to support necessary improvements.

Stevens County, with a population of about 30,000, is primarily rural with a few small urban centers. Although a preliminary assessment was conducted as the first step of the planning process, county officials decided that there was no need to invoke a CWSSA or to proceed with the development of a county water plan.

The Stevens County PUD, formed in 1936, took over the electrical systems previously owned by the Rural Electrification Association. In the late 1950s, the Washington Water Power (WWP) bought the PUD's facilities. The PUD was disbanded, but the PUD fund from the WWP remained undistributed. In the mid-1970s the PUD was given a new charter that included the responsibility to provide safe drinking water to the people in Stevens County. The PUD owned three water systems serving 300 people by 1982, and acquired seven more systems in 1987. The PUD also developed a satellite program with one system in northern Spokane County. The PUD provided operation and maintenance, but not management, services to this system. Since the owner would not make the necessary improvements, the PUD no longer supports this system. The PUD also became a satellite owner/manager of three other small, inadequate systems in northern Spokane County. The State regional office played a key role in both of these inter-county arrangements. The Stevens County PUD now owns an estimated 17 systems serving 1,800 people.

Having established satellite programs with small, privately owned systems, the PUD is now trying to determine the most effective way to use the satellite program to provide operational and management support to small, incorporated towns in Stevens County.

Spokane County

The case of Spokane County illustrates an application of the water system planning process where the county was able to divide planning areas to reduce small suburban area concerns with future annexation. The County accomplished a relatively complex planning process in a short time by supporting and adopting an interim plan. The State aided the county by partially funding the planning effort, facilitated decision making, and required delinquent utilities to support the planning effort.

Spokane County is a rapidly growing county with most suburban development surrounding a single central city. County population is about 360,000. It is a desert county; water is generally not plentiful. In January 1978, an Interim Management Report for county utility service was published. It fulfilled the requirements of a preliminary assessment in accordance with the newly enacted State PWSCA. The report concluded that although water quality was generally satisfactory, smaller systems had problems providing reliable service. Also, there was an overall lack of administrative policy and procedures to coordinate water utility service required for future growth.[21] There were more than 150 Class 1, 2 & 4 public water systems in the county, an increase from only 84 systems in 1975.

Also in 1978, the EPA designated the Spokane Aquifer a Sole Source Aquifer. Since this was the source of drinking water for the City of Spokane and nearly 90 percent of the county population, there was a strong impetus to protect the aquifer and to develop coordinated water and sewage system plans. Since then, the Spokane River has been developed as an alternate source. In October 1978, the county commissioners established four separate CWSSAs, encompassing about 50 percent of the county land area. These also included about 90 percent of the population and more than 95 percent of the county's water systems.

Four CWSSAs were selected to acknowledge and protect separate area needs and interests. One of the issues was annexation by the City of Spokane. The county therefore designated the city as one CWSSA, adding small future service areas to the north and to the south. The remaining CWSSAs were assigned to the rapidly developing suburban areas to the north, east, and west. Acknowledging the city's strong central role, the county appointed city representation to the three other WUCCs. A WUCC steering committee was appointed to insure coordinated planning between the four areas. Within the separate CWSSAs, nine small cities around Spokane established their own exclusive service areas, assuaging fears of future annexation by Spokane.

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[21]Spokane County CWSP, March 1982.

Although four separate groups conducted the planning in their respective areas, a single set of minimum design standards was established and a single Interim CWSP was adopted by the county in February 1980. With service area boundaries, minimum standards and interim system review procedures established, new water system development and expansion could proceed. An additional phase of planning continued to:

- finalize service area conflict disputes,
- complete and evaluate individual water system plans,
- evaluate current and identify potential shared or joint use facilities,
- structure a program of satellite water system assistance to be operated by the county, and
- integrate the CWSP with the Comprehensive Wastewater Management Plan that had been concurrently developed by joint city and county efforts.

A final CWSP was published in March 1982. The State played a relatively strong role in the Spokane water system planning process. Grant funding of $172,136 was matched by the county to support the planning process. In addition to funding support and its normal role as facilitator and technical advisor, DSHS:

- issued letters to utilities delinquent in the development of their individual plans,
- adopted a policy of not approving water system construction permits unless the proposing utility had an approved water system plan, and
- adjudicated one or more service area conflicts.

The CWSP is currently undergoing the periodic review and update process. Changes that are being considered include:

- establishing an expanded External Boundary,
- addition of Stevens County PUD as a purveyor to support inadequate systems in Northern Spokane County,
- increasing fire flow standards in many rural areas, and
- renegotiating service areas, plans for interconnection and basin use plans for one CWSSA.

Results

County health and planning officials are pleased with the results of these planning efforts. There are currently about 360 water systems in the county. The rate of increase by class of system is shown in Exhibit 5.6.

Exhibit 5.6

Rate of Increase of Small Systems in Spokane County*

Systems	11/70	4/75	11/85	6/88	Rate of Increase 1975-1985 (#/yr.)	Rate of Increase 1985-1988 (#/yr.)
Class 1 >1000	-	10	13	13	<1	0
Class 1	32	38	58	55	2	-1
Class 2	40	32	78	81	5	1
Class 4	-	14	190	221	18	12
EPA Small Systems**	-	60	123	123	6	0

Notes:

*Data are for the total county, including the area outside the CWSSAs.

**EPA Small Systems include all systems having 10-1000 connections. This number is calculated by adding the systems in Classes 1 and 2, and then subtracting those Class 1 systems that have more than 1000 connections.

The number of small systems with 10 to 1000 connections, roughly the size that the EPA defines as small, has not changed n the last three years. County administrators indicate that almost all of the new systems permitted by the county are outside of the CWSSAs. The few that formed within the CWSSAs are outside existing or future service areas. No new systems are allowed to develop that are of inadequate design or incapable of continued viability, according to county officials.

Few problems concerning water system development and service have been encountered since the plan was adopted. County administrators mentioned only two. Occasionally, the county receives complaints from a developer indicating that purveyors require expensive connection fees (e.g. $800 per hookup). However, these are always successfully negotiated and do not hinder development according to county plans. Some developers circumvent the system by developing individual wells. However, zoning and sewage planning requirements allow this only on five-acre or larger lots. These wells typically have poorer quality water than the larger community systems. These circumvention strategies are thus not normally successful on a continuing basis.

Connecticut-Washington Comparison

Connecticut modeled its plan after Washington's. However, Connecticut broadened the scope of its program. There are three major areas in which the Connecticut and Washington planning processes differ:

1. The programs do not deal with existing systems in the same way. Connecticut gave the State the authority to order the takeover of a failing water system. Washington did not.

2. In Connecticut there is more State involvement and no county involvement. DOHS was granted the authority for dividing the State into seven management areas, each with their own WUCC. Therefore, no areas of the State are left without water management plans. In contrast, Washington used existing county boundaries as their units in the water system planning. In Washington, the State has not required that each county institute a WUCC, and the entire county does not have to be included in the planning area.

3. The composition of the WUCCs are very different in the two States. The Connecticut WUCCs consist of all existing water systems that serve more than 25 people. In Washington the WUCC is appointed and is usually composed of county legislators, members of the county planning agency, county health agency, and owners or operators of water systems with more than 50 service connections.

5.5 Application to Other States

Washington's program for restricting the creation of new potentially non-viable small water systems has three components that may be useful to other States. The 248-54 Regulations, particularly the Small Systems Management Program, may be applied at the time of permitting to ensure that systems can meet both

normal and emergency operating expenses and responsibilities. The Satellite Support System concept is a useful and flexible tool for ensuring reliable water service in even the most remote areas. The PWSCA is an effective way of preventing potentially non-viable small systems by implementing efficient water service development and expansion.

State Characteristics that Affect Program Structure or Effectiveness

Several characteristics of Washington State influenced the development and implementation of the PWSCA. These are:

- An emphasis on local decision-making. The program was delegated to counties and local committees.

- Diversity in political structure. The WUCCs are different in each county and can be influenced by strong county government, city government, or utilities. Delegation of decision-making allows each county to adapt the planning process to its unique structure.

- Diversity in water system characteristics. Systems vary widely in terms of water quality, water quantity, source, size, and type of ownership.

- Population. Washington is the most sparsely populated State of the four study States. In addition, the counties vary significantly in terms of population density.

Applicability of Specific Program Elements

The extreme flexibility of the Washington water system planning process allows other States to model implementation strategies on Washington's program. After modifying tools to fit a State's characteristics, some of Washington's tools and options that might be effective in restricting creation or the future viability of new systems are:

- Public Water System Regulations. The 248-54 Regulations require new and existing systems to comply with State standards for technical, financial, operational, and managerial viability. Periodic reviews of systems are required to ensure continued viability.

- Satellite Support System. The methods of application of the satellite programs vary widely within the State. The satellite manager may assume ownership or provide services under contract. Satellite systems may be instituted with or without PWSCA implementation. Services may include management, operations, or maintenance.

- Water Utility Coordinating Committee. While the State administers the PWSCA, the county government and water utilities are given significant decision making authority. A committee of local elected officials and water system managers is formed to prepare the coordinated water system plan. The committee's continued role in developing the plan helps to ensure that all decision makers and water purveyors will follow the standards established by the plan. By involving the larger purveyors in the planning process, creation of new systems is discouraged. The State cases illustrate:

  -- designation of the PUD as lead agent in the planning process,

  -- appointment of a WUCC steering committee, subcommittees, and inter-community liaison to ensure coordinated planning,

  -- city representation on WUCCs of adjacent CWSSAs because of the city's strong central role.

- State, local government and community cooperation. Although the State partially funds and facilitates the planning process and then reviews and approves the contents of the plan, the County and local representatives have the authority to implement and direct the outcome of the PWSCA. Cooperation of the participants is essential to ensure adherence to the plan.,

- Exclusive current and future service areas. Service area designation allows water purveyors to identify their respective areas and plan for the future. Water systems must provide service to all current and future development within their service area or lose that section of their service area. Service area agreements eliminate competition, duplication, and inefficient extensions of facilities. After service area agreements are established, new systems will form only if the existing water system cannot or will not provide the requested service. If service cannot be negotiated with the water system designated to serve the area, an adjacent water system may expand to provide service or a satellite management program can be established.

- Intra-regional compatibility of plans. The PWSCA requires compatibility among plans in two ways. First, within a region, water utility plans must be compatible with county land use plans. Coordination of water and land use plans ensures that adequate water supplies will be available to support the planned land development. Second, individual system plans must be compatible with the plans of adjacent

purveyors. Coordination among neighboring systems discourages conflict and maximizes the potential for joint use or shared facilities.

CHAPTER 6: CONCLUSIONS

In this chapter, we compare and evaluate the four States described in the previous chapters. Programs aimed at controlling the creation of non-viable small systems are evaluated as composites, and then their elements are evaluated separately. This distinction is important because specific program elements may be useful even though there are problems with the program's overall effectiveness.

6.1 Summary of the Four States

Connecticut

Connecticut's program consists of three main components, each of which is based on State statutes. First, in its Certificate of Public Convenience and Necessity process, the State requires all new or expanding water systems serving between 25 and 1,000 people to obtain a permit. Before approving a new system, the State first determines whether an interconnection or satellite system is feasible. If so, the system is not allowed to operate independently. If the State determines that there is a need for a new water system or for a system expansion, the State requires the proposed system to prove its financial, managerial, and technical viability. Failure to provide such proof can result in denial of a certificate to operate independently or to proceed with expansion.

The second aspect of Connecticut's program is the "Connecticut Plan." This is an area-wide planning mechanism that requires existing water systems to detail their current and future service areas and capabilities. It also requires a regional body, the Water Utility Coordinating Committee (WUCC), to coordinate these individual plans and delineate exclusive service areas within each region.

Finally, the State statutes grant the Department of Public Utility Control (DPUC) and the Department of Health Services (DOHS) the authority to order a system to act as a receiver or to acquire an existing water system that has repeatedly violated State drinking water regulations and that has not responded to an administrative order.

Georgia

Georgia has three requirements that might be used to discourage the creation of non-viable small systems. First, new small systems are required to consider connecting to nearby publicly owned water systems. Second, water systems must seek permits before construction, at which point the State will provide technical assistance to ensure that new systems are constructed

according to certified standards. (The permitting process is not used to restrict the creation of all new, potentially non-viable systems as in Connecticut, Maryland, and Washington.) Third, the State requires a Trust Indenture from privately owned systems serving homeowners as a form of insurance in case of future system problems.

Georgia encourages interconnections with existing systems by requiring the prospective owner or operator to consider tying into an existing publicly owned water system if one is available within 500 feet. This rule does not require an actual interconnection. Instead, it requires consideration of the feasibility of such a connection. The State has no rule requiring consideration of an interconnection with a nearby privately owned water system.

The Trust Indenture establishes a trustee for each privately owned system that serves property owners. The trustee promises to operate the system if the system fails. However, the Trust Indenture is rarely invoked because that requires court action. State officials believe that the Trust is not useful.

Maryland

Maryland's small system creation control program consists of:

- financial, operational, and technical reviews of new privately owned systems,
- county comprehensive plans,
- a requirement that privately owned systems hold funds in escrow for operating and maintenance expenses and system replacement, and
- authority to order new management, system alterations, extensions, or construction of new facilities, as Maryland Department of Environment (MDE) finds necessary.

The permitting process allows the State and the counties to restrict the creation of new small systems. The process consists of a technical review and a financial and management review with both county and State involvement.

Each Maryland county must prepare a comprehensive plan. The county plan consists of an inventory of the current systems in the county, their current service areas, and a plan for future service areas two, five, and ten years in the future. The planning process encourages interconnections with existing systems rather than the creation of new small water systems.

Maryland also requires new small water systems to ensure that they will have an adequate financial base during their operational life. County and State officials may require the deposit of funds in escrow for future use. Agreements to do so are incorporated into the county plans.

Washington

Washington has developed the following mechanisms to control the creation of new, potentially non-viable small systems:

- Area-wide planning to define water systems' present and future service areas, and establishment of county design standards that incorporate State engineering standards;
- Comprehensive State requirements for new small systems, including finance and operation reviews; and
- Regional use of facilities and satellite management or ownership arrangements.

Area-wide planning reduces the demand for new small systems, and county standards serve as an additional test of viability that proposed systems must meet. The planning and permitting of proposed systems ensure that operational and financial viability will be evaluated prior to construction. In addition, satellite operations and shared facilities are important means of making resources available to potentially non-viable small systems.

6.2 Comparison of the State Programs

The SDWA establishes, as its primary objective, the elimination of violations of MCLs and of monitoring and reporting regulations. In contrast, many States have statutory frameworks that emphasize a comprehensive public health approach to drinking water. It is in the latter context that the States we examined have chosen to curtail the creation of small systems that may pose problems in the future.

All four States review new small water systems through their permitting processes. Of the four, Georgia uses its requirements in the least restrictive manner. Connecticut, Maryland, and Washington use their requirements to place heavy burdens of proof of viability on proposed systems. Connecticut and Washington have requirements specifically for new small systems (the Certificate and Small Systems Management Program respectively). Maryland has separate requirements for privately owned systems, which are often small.

Connecticut, Maryland, and Washington have instituted area-wide planning to ensure greater efficiency in water system development and to encourage interconnections and satellite management.

All areas of Connecticut and Maryland are required to institute water system planning. Connecticut's area-wide planning committees are overseen by the State, whereas Maryland's are overseen by both the counties and the State. Washington does not require all counties to institute planning.

The four States studied in this report have devised a wide array of policies for controlling the creation of potentially non-viable small water systems. A description of the strengths, weakness, and potential pitfalls of these State programs may be useful to other States interested in developing their own controls.

Connecticut

All three of Connecticut's programs described in Chapter 2 are based on the authority given to DPUC and DOHS through legislation. Without these laws and the consensus that was necessary to pass these laws, the State would not have had the opportunity to develop its comprehensive program.

Connecticut has defined a viable small water system in terms of the criteria a proposed water system must meet to receive a construction permit. Connecticut requires owners to employ staff with financial, managerial and technical skills. The applicant must:

- indicate a party responsible for the system's operation,
- demonstrate a full-time commitment to running the water company,
- require proof of technical, financial, and managerial competence, and
- present plans for dealing with routine problems and emergencies.

Periodic evaluations of systems' financial and managerial viability are accomplished through management audits performed by DPUC.

Georgia

As described in Chapter 3, Georgia's effort to restrict the creation of non-viable small water systems has limited effectiveness because of its lack of authority. First, the Trust Indenture program does not ensure that the water system will be adequately financed or maintained. Second, Trust Indentures are required only of certain privately owned water systems. Third, there is no incentive for a viable water company to become the trustee for a potentially non-viable small system because doing so could be very costly for the trustee.

The second major part of Georgia's program is the use of the permitting process to control potentially non-viable small systems. However, this program is limited by the fact that it only recommends that new private systems hook up to nearby public ones. The State cannot compel interconnection. State efforts to address potential non-viability through the permit process only ensure that the system is adequately designed and constructed. They do not ensure that the owners possess the financial, technical, and managerial skills necessary to operate a water system. Moreover, the permitting process may be circumvented. The State has not developed a process to monitor or to have the counties monitor the creation of water systems. This could be accomplished by linking building or expansion permits to water system permits.

Maryland

Maryland has developed the use of the permitting process and the county comprehensive plan in its efforts to control small system creation. The county plan is equivalent to the area-wide planning process in Connecticut. All areas of the State must institute planning.

Maryland's reviews of proposed systems during the permitting process are similar to those of Connecticut and Washington. All three evaluate the financial, managerial, and operational qualifications of proposed system owners to ensure viability. Maryland differs from these two States in that Maryland law aims its financial requirements at privately owned systems. And Maryland requires privately owned systems to place funds in escrow for future operations, alterations, and replacement.

Washington

The permitting requirements of proposed systems allow the State to evaluate systems before installation. The small system management program, required at the time of permitting, is an especially effective tool in restricting the creation of potentially non-viable small systems.[1] It is similar to Connecticut's Certificate of Public Convenience and Necessity in that it reviews the financial and managerial qualifications of all proposed small system owners and it requires periodic updates.

Washington's PWSCA gives counties a way to control the development of potentially non-viable water systems. The program is designed to improve water quality and water service by planning for the development of new water systems, developing compatible design standards so that future interconnections are possible, establishing future service area agreements, and promoting the sharing of facilities by adjacent water systems.

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[1]The State expects to have implementation guidelines for this regulation in December 1989.

State officials in Washington, in contrast to their counterparts in Connecticut, do not have the authority to decide service area boundaries if there is a dispute. Because the State lets the counties choose whether to implement the program, those county governments opposed to the idea of planning are free not to do so. Nevertheless, in those counties that have developed coordinated water system plans, the creation of new water systems is prohibited unless the State determines that existing systems cannot provide service. Washington's program reflects the unresolved question of whether favoring large water systems is fair or efficient.[2]

The Satellite Support System program offers another solution to the problems of non-viable small systems. Washington counties that have not adopted the PWSCA may encourage satellite arrangements for either ownership or contractual management and operation. However, this program may be difficult to implement, if it is not initiated in conjunction with planning. Companies seeking satellite services may not know whom to contact for such service. Therefore, well-known water systems may become flooded with requests, while other systems capable of providing service would not be approached.

6.3 Effectiveness of the State Programs

Connecticut has seen a decline in the annual number of applications for new small systems since the Connecticut programs were adopted. In 1986 and 1987, the State received 50 requests for new water systems. In 1988, the State received 42 such requests. Approximately 12 certificates are granted each year.[3] In the other cases, systems proceed with an interconnection, adopt a satellite management agreement, or withdraw their applications. State administrators also report they have seen a net decline in the number of small water systems because of voluntary and involuntary acquisitions, and inventory modification.

Washington has experienced constant growth in the number of small systems serving fewer than 25 customers. This most likely reflects the fact that only 18 out of 39 counties have adopted the PWSCA planning process. When those counties participating in the process are examined individually, it appears that the rate of increase in small systems has slowed. In particular, among the seven counties that have had plans since 1986 or earlier, the rate of change varies from a decrease of one system per year to a maximum increase of three systems per year. The Spokane County

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[2]Kasprak, The Washington Public Water System Coordination Act," Connecticut Office of Legislative Research, January 1984, 16.

[3]Only two certificates have been denied since the 1984 passage of the legislation.

Utilities Department commonly received 20-30 applications per year prior to the adoption of the water system management plan in 1982. Since 1985, however, the number of systems serving between ten and 1000 customers has not increased.[4]

In Maryland, only six to eight new small systems are created each year, and the State receives only 12 new-system applications annually. This low rate of small system creation may contribute to the high compliance rate in Maryland.[5]

In the States studied, the effectiveness of creation control programs depends on the State taking an active role in deciding whether a new water system should be created. Connecticut, Maryland, and Washington take such roles. These States not only regulate the quality of drinking water but also determine whether there is a need for the service; whether a new system will provide the service efficiently; and whether an existing system could provide service more efficiently. In effect, these States have adopted the principle that water systems are similar to other public services (like electric or natural gas companies, or hospitals) that must demonstrate a need before creating new infrastructure. State controls may include intervention in all aspects of a system's operations, up to and including system acquisition. This principle is demonstrated in Connecticut, where the DPUC is authorized by statute to evaluate public service companies, including water systems, to determine that there is a "clear public need for the service proposed or provided [and] that the public service company shall be fully competent to provide efficient and adequate service to the public in that such company is technically, financially, and managerially expert and efficient." (CGS Section 16-19e).

6.4 Problems

At the outset of this study we anticipated three problems that might result from State programs to control the creation of potentially non-viable systems. The first was opposition from property owners, who might argue that limits on the creation of new water systems would restrict land development, thereby depriving them of the maximum use of their property. The second problem was the possibility that efforts to control creation might become

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[4]Kasprak, 12. Kasprak interview with the Director of the Spokane County Utilities Department.

[5]Maryland's average number of violations is considerably lower than that of the nation as a whole, according to FRDS 19A, FY 1987. The average number of violations per system in Maryland is 0.07 for MCL violations and 0.13 for M/R violations. In contrast, the national average number of violations per system is 0.16 for MCL violations and 0.68 for M/R violations.

an obstacle to the provision of safe drinking water to isolated rural communities. Third, if State control programs generate substantial opposition, there might be a tendency to evade those programs by operating systems outside the State regulatory structure.

In fact, with the possible exception of Georgia, respondents in the States examined in this study reported that these problems were less significant than we had anticipated. However, a new problem emerged that we had not foreseen: small system complaints about State policies that appeared to favor aggressive growth of larger municipal or investor-owned utilities. Each of these issues is discussed in greater detail below.

Rights of Property Owners and Developers

Concern about the impact of State control programs on property owners and developers has been heightened by a recent U.S. Supreme Court ruling that a particular application of California flood control district regulations constitutes a "taking" of private property without just compensation.[6] This and other recent court decisions have raised the question of whether such fundamental State actions as licensing or permitting, which might be applied to water systems, constitute "takings" if they deny owners the maximum use of their property.

This issue was not a major concern of property owners or developers in the study States. (In the one case we observed that when a developer objected to county controls on the grounds of interference with his property rights, the issue was settled by negotiation.) In large part, this was caused by the fact that the State control programs did not impose categorical bans on new systems. The programs in Washington, Connecticut, and Maryland, for example, simply tried to influence the direction of new development and ensure that new water systems met minimum standards. This allayed the fears of most property owners. Developers were concerned, however, about potential delays in beginning construction while waiting for the outcomes of the planning process.

Safe Water for Rural Populations

Both the National Rural Water Association (NRWA) and the Rural Community Assistance Program (RCAP) have been concerned about the tendency of control programs to target all small systems, without distinguishing between the viable and the non-viable. The NRWA, for example, agrees that there may be merit in a planning process for the exploration of alternatives (e.g., hookup to existing systems) prior to the construction of new small systems. NRWA representatives remind us, however, that many small systems are

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[6]See First English Evangelical Lutheran Church of Glendale v. County of Los Angeles

well operated, and that people in rural areas deserve safe drinking water. This last issue is of particular concern to the RCAP representatives serving the Southeast. They feel that programs to restrict creation of non-viable systems might be used by States to prevent the development of systems to serve the rural poor. In their opinion, a new small system that does not meet all standards may be superior to no system at all.

Evasion

If the control programs are too onerous for property owners or for rural populations, either group could evade the program by: (1) dividing a public water supply into smaller units that would be exempt from the State's regulatory authority, or (2) developing a public water supply without a permit. Unpermitted systems were a problem in Georgia, but it is not clear whether this was in response to State programs. There was no firm evidence of evasion in any of the other study States, although officials in one Washington county expressed suspicions that it was occurring.

Favoring Large Publicly Owned Systems

Washington's program was criticized for favoring large publicly owned water systems over smaller ones in the development of future water service areas. First, small systems having fewer than 50 service connections are not represented on the planning committees. Since the counties play a large role in directing the planning process, it has been argued that they may be given first choice of areas in which they want to expand. The publicly owned water systems could therefore be granted the most profitable service areas.[7]

Connecticut, when studying Washington's program, identified this potential problem and sought to overcome it by allowing all regulated water systems to become members of the area-wide planning committees. Second, Connecticut's program is designed to encourage expansion and increased use of satellite agreements by all systems having the capacity to expand their service. Third, although the water systems on the planning committee are responsible for determining future water service areas, the State reserves the right to intervene if they cannot agree on an equitable allocation.

6.5 The Federal and State Roles

Programs to control the creation of potentially non-viable drinking water systems are best developed at the State and local levels of government. As shown in this report, these programs often are part of broader State-wide policies concerning land use

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[7]Kasprak, 14f.

planning, economic development, and natural resources management. If they are concerned about the creation of new potentially non-viable water systems, States should consider legislation and/or regulations that would enable them to establish control programs.

EPA's interest in this issue is best served through two types of activities. First, working with the States, EPA should encourage the dissemination of information about successful control programs. Many States are eager to develop such programs, and EPA can assist that development by facilitating exchange of information among the States. Second, EPA can develop a strategy favoring development of programs to control creation of non-viable systems. Once such a strategy is established, EPA Regional Offices can work with States to encourage development of such programs.