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A Study of State Operator Certification Programs

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A Study of State Operator Certification Programs

I. Overview

Background

The U. S. Environmental Protection Agency (EPA) recognizes the importance of having well-trained, qualified operators for all public water systems. Traditionally, State drinking water regulators have attempted to obtain qualified operators through operator certification. Although certification has existed for many years, there has been no study of these State programs. This report examines operator certification programs in all 50 States. The results indicate a significant variation in the stringency of certification requirements from State to State, and there seems to be no widespread agreement on what constitutes an efffective operator certification program. In addition, despite the popularity of operator certification programs, it has not been demonstrated conclusively that these programs improve compliance with drinking water regulations.

Several important questions that emerged during the preparation of this report remain unanswered. The most important is, "Can operator certification ensure that public water systems will have qualified operators?" It would seem that the effectiveness of operator certification depends on the stringency of the requirements and enforcement of those requirements. If so:

- How stringent must certification requirements be to assure that water systems will have qualified operators?

- Will stringent requirements be enforced? Where does enforcement of certification requirements rank among State priorities?

The data for this report were gathered from numerous sources, including a 1989 Association of Boards of Certification (ABC) survey, State laws, and State regulations. Telephone interviews with State drinking water program staff provided verification and updates of written data.

The report includes a separate section on operator certification requirements for small water systems. Small systems account for nearly 88 percent of all public water systems (PWSs) and are responsible for approximately 92 percent of all drinking water violations. One reason for small system non-compliance is that operators lack knowledge of drinking water requirements and proper system operations. Given the large numbers of small systems and their geographic dispersion, operator certification may be a cost-effective mechanism to improve system operations and compliance with Federal and State regulations.

There are three appendices to the report. Appendix A is a table summarizing the elements of State certification programs. Appendix B consists of matrices for six sample system types. Each matrix lists the States' certification requirements for the particular sample system. Finally, Appendix C provides the details of each State program, including a contact for more information.

Major Findings

Almost all States have mandatory operator certification: Forty-five States have mandatory certification programs. The exceptions are Delaware, Hawaii, Idaho, Nevada, and Rhode Island.

There is a serious lack of State professional consensus on operator certification. Many States agree on the value of operator certification, but disagree on what constitutes an effective program. The consequence is a wide variety of certification programs nationally. Major differences among States include:

- the way certification programs are administered;
- the systems covered by certification requirements;
- the criteria for distinguishing different classes of systems;
- experience prerequisites and testing;
- certificate renewal and continuing education requirements; and
- enforcement and program funding.

Most State certification programs are administered by the primacy agency; however, 14 State programs are administered by certification boards or committees, the primacy agency, and other agencies. Of the 14, Georgia, Massachusetts, and Virginia are the only States that split program responsibilities among three or more agencies. The remaining 11 States have certification boards or committees that assume some program responsibilities.

System coverage varies, but only 11 States require all PWSs to have certified operators. Frequently, State requirements apply only to some subset of PWSs, based on size, treatments used, or source of supply: 5 States require all PWSs that use treatment to have certified operators; 9 require all CWSs to have certified operators; and 2 require all CWSs that use treatment to have certified operators. The rest of the States exempt some small systems.

Of the States that have operator certification requirements for water systems, all but New York, Nebraska, New Hampshire, and South Carolina require all operators to pass an examination. Nebraska, New Hampshire, and South Carolina exempt their lowest system class--usually small system--operators from taking an examination.[1] New York has no examinations, but operators must pass a training course. All other States have examinations, but the exam content may differ depending on system class.

States vary in how often they require operators to renew their certificates, but many States wait at least three years for renewal. Sixteen States have a three year or longer renewal period, and 27 States renew certificates every one or two years. The renewal period for the remaining two States depends on system class.

Many States do not require operators to receive continuing education credits as a condition of certificate renewal. Sixteen States do not have any continuing education requirements, and three States have no requirements for operators of the lowest class systems. For these States, operators simply send in a renewal request and pay a fee.

Many States lack the resources to enforce their requirements properly. All but five States charge certification fees, but generally the fees are not earmarked for operator certification. Even when fees are set aside for certification programs, they may not cover program costs completely. Lack of staff and funding may prevent States from taking adequate enforcement actions against systems without certified operators.

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[1]South Carolina does not require its lowest class systems to have certified operators.

II. State Operator Certification Programs

Operator certification programs are designed to ensure that public water systems are operated by knowledgeable, properly trained personnel. State certification programs are composed of: program administration, system coverage, experience prerequisites and testing, certificate renewal and continuing education, and enforcement and funding. This section describes these elements and summarizes States' current requirements.

Administration of Operator Certification Programs

In many States, the operator certification program is administered by the primacy agency; however, 14 State programs divide administrative responsibilities among certification boards or committees, the primacy agency, and other agencies. (See Exhibit 1.) When different agencies are responsible for different functions, lack of coordination and communication may hinder implementation. Dividing program responsibilities also may impede implementation by making it difficult for agencies to maintain comprehensive and current records.

EXHIBIT 1

States' Administration of
Operator Certification Responsibilities

Primacy Agency		Primacy Agency and Certification Board	Certification Board	Split Between 3 or More Agencies
AL	MT*	AR	MD	GA
AK	NE	CO	SC	MA
AZ	NH	ME	SD	VA
CA	NJ	NC	TN	
CT	NM	OH		
FL*	NY	PA		
IL	ND	WA		
IN	OK			
IA	OR			
KS	TX*			
KY	UT			
LA	VT			
MI	WV			
MN	WI			
MS	WY			
MO				

* The primacy agency uses an advisory board or committee for one or more of its responsibilities.

System Coverage: Classifications of Systems Required to Have Certified Operators

States have had the freedom to define which systems need certified operators, and the result is a patchwork of State certification requirements. Exhibit 2 illustrates the different types of systems covered by States' operator certification requirements.

Eleven States require all PWSs, and five States require all PWSs that use treatment, to employ certified operators.[2] These are the only States that require non-community system operators to be certified. This is important because new Federal regulations will require non-community systems that serve the same group of people for more than six months (i.e., non-transient non-community systems) to meet the same standards as community water systems (CWSs). Nine States require all CWSs, and two States requires all CWSs that use treatment, to have a certified operator. Iowa, Maine, and Wisconsin base certification on water system type (e.g., municipal systems and water districts). **The remaining 15 States with operator certification programs explicitly exclude some systems serving fewer than 500 people from their requirements.** (See Exhibit 3.)

Every State with an operator certification program separates systems into various grades or classes. The two most common methods of classification are based on:

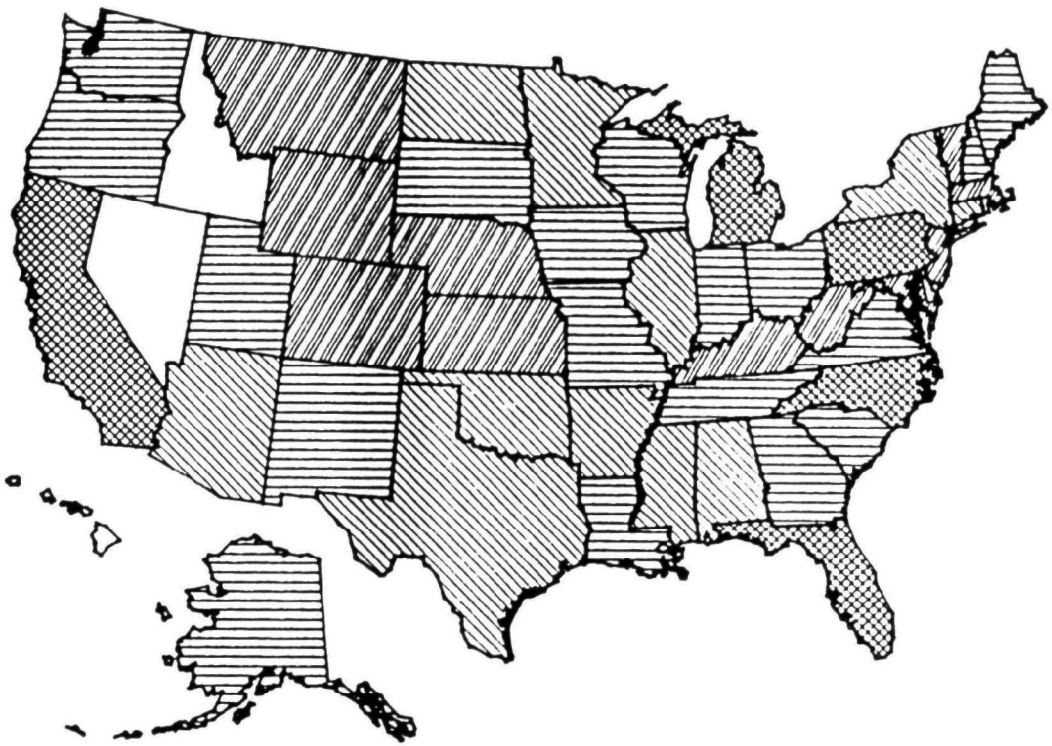
- treatment type and population served, and
- point systems.

Other methods range from Wisconsin's classification of systems based on source of supply and treatment, to California's classification based on the extent of operator responsibility and the rated capacity of a plant in millions of gallons per day (mgd) Texas classifies systems on a case-by-case basis. Exhibit 4 presents the classification systems and number of classes used by States.

Point systems are the most complicated classification method. States that use point systems base classification on factors such as source of supply, system size, treatment processes used, and amount of operator responsibility. Then they examine a system's characteristics, assign a point total, and use this total to classify the system. Minnesota, for example, considers: population served; water supply source; quality of water supply; unit treatment processes; distribution and storage capacity; and number of wells for groundwater systems. A Minnesota surface water system serving more than 100,000 people and using coagulation or filtration would be assigned the most

[2]Montana exempts non-transient, non-community systems.

Exhibit 2
Systems Covered By State Operator Certification Requirements



System Coverage

- All PWSs
- All PWSs Using Treatment
- All CWSs Using Treatment
- Some Small Are Exempt
- No Mandatory Program

States basing class on system type are in Some Small Are Exempt.

EXHIBIT 3

Systems Covered By State Operator Certification Requirements

All PWSs	All PWSs That Use Treatment	All CWSs	All CWSs That Use Treatment	Some Systems Serving 500 People or Fewer Exempt	Systems Serving 501 - 1,000 People Exempt	Systems Serving <2,500 People Exempt	Based on System Type
CO	CA	AL	CT***	AK	GA	NM	IA
KS	FL	AZ	NY***	IN	UT		ME
KY	MI	AR		LA			WI
MD	NC	IL		MO			
MA	PA	MN		NH****			
MT*		MS		OH			
NE		ND**		OR			
NJ		OK		SC			
VT		TX		SD			
WV				TN			
WY				VA			
				WA			

*Montana exempts NTNCs
**NTNCs serving > 500 people also must have certified operators
***Distribution systems serving > 1,000 people also must have certified operators
****New Hampshire requires all PWSs to have certified operators, but there are no requirements for the lowest class system operators.

EXHIBIT 4

System Classification Methods Used by States with Mandatory Operator Certification

Population & Treatment*	# Classes	Point System	# Classes	Treatment Only	# Classes	Treatment and Source of Supply	# Classes	Other	# Classes
AZ	4	AK	8	AL	4	IL	4	CA	5
AR	3	CT**	7	MD	5	MT	10	GA	3
CO	4	MN	4	MS	4	WI	7	NM	4
FL	4	MO	5					PA	3
IN	7	NH	5					SC	5
IA	4	NJ**	4					TX	6
KS	4	NC	3						
KY	13	OH	4						
LA	4	OK	4						
ME	8	OR**	8						
MA	8	SD**	8						
MI	4	TN***	8						
NE	5	UT	8						
NY	6	WA**	8						
ND	8	WV	5						
VT	4	WY	4						
VA	4								

*The Population and Treatment category includes States using capacity and treatment.

**Point system used for treatment plants; distribution system classes based on population.

***Point system used for surface water systems; other system classes based on treatment.

points; a groundwater system serving fewer than 1,000 people and using no treatment would be assigned the fewest points.

System classification directly affects operator certification requirements. The assumption behind system classification is that some systems are more difficult to operate and require operators who have more training and experience. Generally, system classification attempts to reflect the complexity of a system's operation and the risk to system customers: a system in the lowest class uses little treatment and serves a small population, while a system in the highest class uses complex treatment and serves a large population. The stringency of certification requirements usually corresponds to the system classification. For example, in Kentucky a class I operator is expected to have one year of experience while a class IV operator is expected to have three years.

Due to the myriad of system classifications used for operator certification, reciprocity among States is complicated. Because States use many factors to determine system classification, they cannot coordinate their certification requirements easily with other States. The data on States' use of reciprocity are confusing. Most States grant reciprocity to operators from other States on an ad hoc basis; however, there are conflicting data on written reciprocity agreements. Some States indicated they had written agreements with other States, while the other States said they granted reciprocity only on a case-by-case basis. California, Florida, Georgia, Michigan, West Virginia, and Wyoming do not allow reciprocity.

Experience Prerequisites and Testing

To ensure that operators have the theoretical and practical knowledge necessary to operate a PWS, most States require system operators to have some operating experience and meet minimum testing requirements. The stringency of these requirements generally corresponds to the level of operator responsibility and system complexity.

Many States have established experience prerequisites for operator certification. These prerequisites usually vary by system classification. For the lowest system classes, experience requirements range from fewer than six months to three years; for the highest system classes, the range is from one to twelve years. Most States' requirements mandate that operators have general experience operating a water system. However, some States' experience requirements are sequential. For example, operators in South Carolina cannot obtain the highest level certificates without first obtaining the lower level certificates. Most States let operators substitute education or training for experience. Exhibit 5 illustrates States' experience requirements for the lowest system classes.

EXHIBIT 5

States' Experience Prerequisites for Systems in the Lowest Classifications*

None	< 6 months	6 months to 1 year		> 1 year
AZ	FL	AK	NM	PA
CA	WV	AL	NY	
CO		AR	NC	
MO		CT	ND	
MT		GA	OH	
NE		IL	OR	
NH		IN	SC	
NJ		IA	SD	
OK		KS	TN	
TX		KY	UT	
WI		LA	VT	
		ME	VA	
		MD	WA	
		MN	WY	
		MS		

*Experience requirements for Massachusetts depend on system class and amount of education; Michigan uses a point system to determine experience requirements

Examinations are another way States ensure that certified operators have the knowledge to operate a system properly. Every State with mandatory operator certification--except New York, Nebraska, New Hampshire, and South Carolina--requires all operators to pass a certification exam.[3] Many States write their own exams, but 12 reported that they use the Association of Boards of Certification (ABC) exam.[4] Generally, the exam content corresponds to the classification level. For example, operators

[3]New York does not have certification exams, however, operators must pass a training course before they can become certified. Nebraska, New Hampshire and South Carolina exclude operators from the lowest grade systems from taking the exam.

[4]Arizona, Connecticut, Georgia, Iowa, Louisiana, Maryland, Massachusetts, Missouri, New Hampshire, New Jersey, Pennsylvania, and South Carolina reported use of ABC exam questions. ABC has 33 State clients, so some States did not specify use of ABC exams.

of groundwater systems that do not use treatment may be tested differently from operators of surface water systems that use complicated treatment processes. The rationale is that operators should be tested only on material they will encounter on the job. All exams are written or, in special circumstances, oral. There is no "hands-on" testing.

It is difficult to assess and compare States' exam content, because only Kansas would release a copy of their exam. Most State exams include general questions on regulations, specific treatment technologies, and math principles. Some States, however, do not test operators on system finances or management. Testing on these subjects is particularly important to ensure the financial viability of smaller systems whose operators perform a variety of tasks. These operators should be able to demonstrate an ability to manage system finances, as well as perform operations and maintenance.

Certificate Renewal and Continuing Education

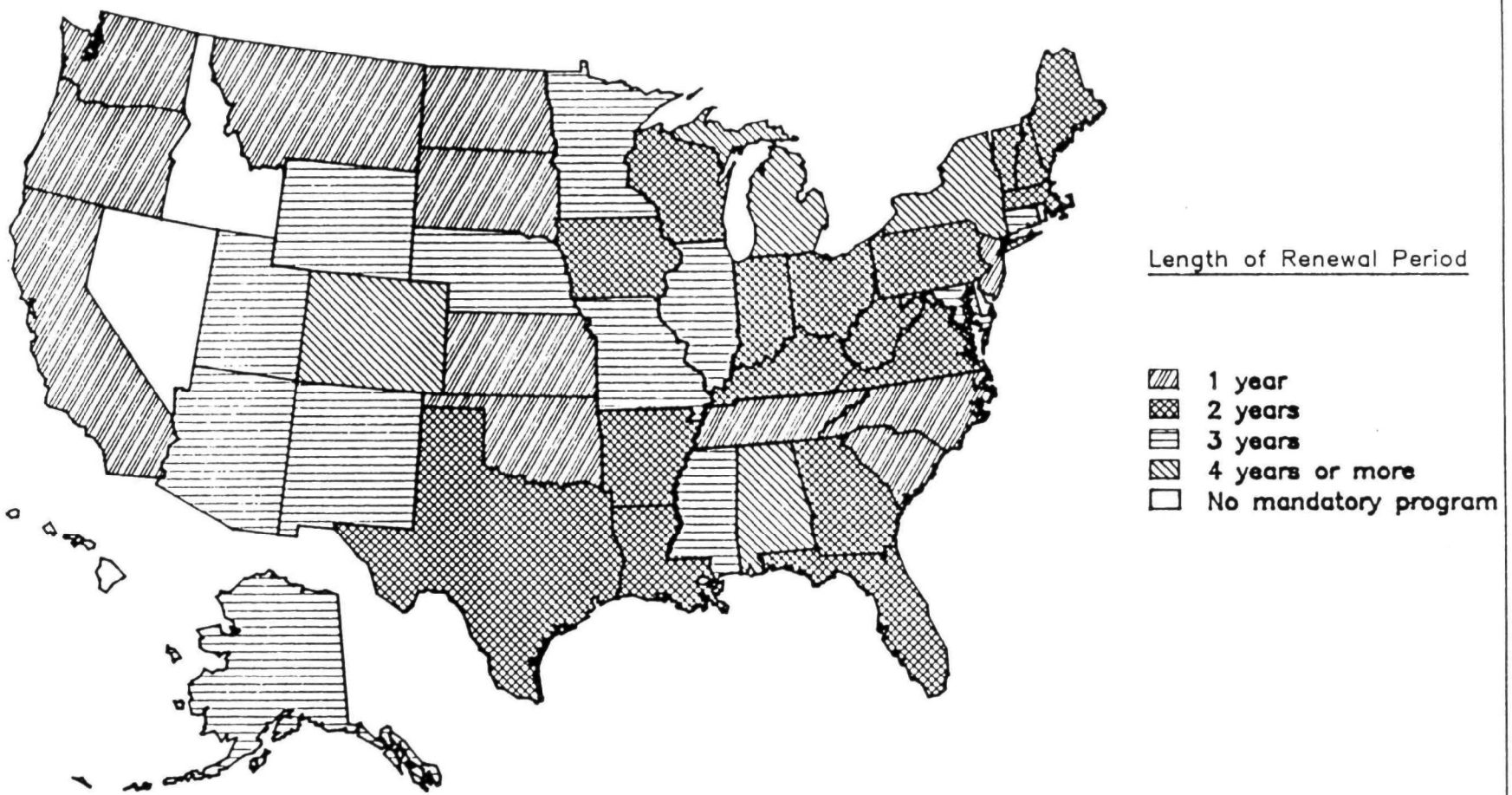
States differ significantly in how often they require operators to renew their certificates. Many States require operators to renew certificates every one or two years, while others require renewal at least every 3 years. (The map in Exhibit 6 illustrates States' renewal periods.)

Frequent renewal periods are a tool for maintaining effective oversight, but may be burdensome. Generally, renewal frequency is determined by a State's willingness to accept administrative burden. States that do not have the time or money to renew certificates every year have multi-year renewal cycles. These States commonly use sanitary surveys to verify operator certification. However, there has been a decline in the use and the frequency of sanitary surveys. States may conduct sanitary surveys of systems as infrequently as once every five years. A renewal period longer than two years may allow systems to evade the State and ignore operator certification requirements. There is, then, a tradeoff between administrative burden and effective oversight of operator certification requirements.

To ensure that operators are updated on important water supply issues, some States require operators to receive continuing education as a condition of renewal. Operators required to fulfill continuing education requirements are able to learn more about new regulations, treatment technologies, and safety measures. This will become increasingly significant as drinking water regulations grow in number and complexity. In many cases, water systems will be faced with the need to provide additional treatment. Operators must be aware of new regulatory requirements and have the necessary knowledge and skill to implement them.

Exhibit 7 presents States' requirements for continuing education. Several States do not require certified operators to obtain continuing education. Most States that do

Exhibit 6
States' Operator Certificate Renewal Periods



*When renewal varies, we use the shortest period.

EXHIBIT 7

Continuing Education Requirements
for Systems in the Lowest Classifications*

No CEUs	Less than 1 CEU/year	1-5 CEUs/year	> 5 CEUs/year
AL	CO	AK	SC
AZ	GA	AR	
CA	IN	KY	
CT	IA	MS	
FL	KS	MO	
IL	LA	NM	
ME	MD	ND	
MA	MN	OK	
MI	MT	OR	
NH	NE	TX	
NJ	SD	WY	
NY	TN		
NC	UT		
OH	WA		
PA	WI		
VT			
VA			
WV			

* Continuing education is measured in continuing education units (CEUs). For States that use other measurements, equivalents have been used.

require it, mandate between one and three continuing education units (CEUs) every year. Continuing education usually consists of training workshops offered by the drinking water program; university extension programs; and State affiliates of the National Rural Water Association (NRWA), American Water Works Association (AWWA), and Rural Community Assistance Programs (RCAPs). States usually require operators to obtain a certain number of CEUs each renewal period. Some States, however, use other measurements of continuing education. For example, Washington requires a "demonstration of professional growth" every three years, and Nebraska requires 15 "contact hours" every three years.[5]

[5]It is generally understood that 10 contact hours are equivalent to one CEU.

Enforcement and Funding

Mandatory certification is meaningless unless a State can and does enforce the requirements. Ineffective data management and organizational structure are two major barriers to State enforcement of operator certification requirements. States commonly oversee operator certification by maintaining a registry of certified operators. Most States have computerized their registries; however, information on operators often cannot be cross-referenced easily with other system information. In some States, the computerized operator list is not maintained by the same organizational unit that monitors system compliance. In addition, States may not require systems to report a change in operator. In such cases, States will find it difficult to enforce compliance with operator certification requirements.

Enforcement is also dependent on funding. Many States indicate that they lack the resources to monitor systems and aggressively pursue enforcement. When funding or personnel is limited, States target enforcement against larger systems that are out of compliance. Often, States prioritize their objectives to ensure that resources are used most efficiently. As resources diminish, enforcement of operator certification requirements becomes less of a priority and may depend on a system's compliance with other drinking water regulations. For example, some States enforce operator certification only if a system is out of compliance with another regulation. If a system maintains compliance, but does not have a certified operator, these States may not pursue enforcement.

To help defray program costs, many States have established fee systems. All but five States charge fees for operator certification.[6] Fees may be charged for the exam application, exam processing, the initial certificate, a replacement certificate, renewal, reciprocity, a late penalty, and training. Fees range from $5.00 in South Dakota to $200.00 in Nebraska.[7] In 26 of the States that charge fees, however, these fees are not channeled to the certification programs; and in the others, fees may not cover all program costs. States with funding problems may want to consider charging fees sufficient to defray all program costs. States also may be able to use funds from administrative penalties for operator certification.

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[6]Michigan, New York, Vermont, West Virginia, and Wyoming do not have fee systems for their operator certification programs.

[7]Nebraska charges a $200.00 fee for its week-long training session.

III. Operator Certification Requirements for Small Systems

Background

Small systems pose the largest compliance problem for all State drinking water agencies. They represent approximately 88 percent of all public water systems in the nation and account for nearly all drinking water violations. The small systems problem will be exacerbated as the 1986 SDWA Amendments are implemented. By the early 1990s, the number of regulated contaminants is expected to increase from 26 to 83. The consequences for small systems will be severe. Operator certification is one way States can help small systems cope with new State and Federal regulations.

Data Limitations on Small System Operator Certification Coverage

It is difficult to estimate States' coverage of small systems in their operator certification requirements. Because system classifications are so complex, many States cannot count the number of small systems required to have certified operators. As stated in the previous section, some States classify systems for operator certification by the type of treatment used or by a point system. These classification methods make it hard for States to break down by size the systems covered. For example, Maryland has the following five system classifications, that are based on treatment used: class I, systems using disinfection; class II, systems using chemical treatment such as fluoridation; class III, systems using simple iron removal, such as ion exchange; class IV, systems using complete treatment; and class V, any systems using new technologies not covered under the other classes. These classifications make it almost impossible to discern how many small systems in Maryland are required to have certified operators.

Another limitation of the data on small system coverage is implementation. Some States may have laws and regulations requiring small systems to have certified operators but they may not implement them. Additionally, some States may enforce operator certification requirements only if a system is violating another drinking water requirement. States, in general, could not provide data on enforcement of operator certification for small systems. Instead, many States gave only rough estimates of overall enforcement.

Training and Testing Requirements for Small System Operators

To become certified, most small system operators must meet testing requirements. States may require operators to have from one to twenty-four months of experience. New York is the only State that explicitly requires system operators to pass a training course. Virtually all other States mandate, instead, that operators pass an exam. Typically, however, exams and training courses are strictly technical. Because small system operators often are responsible for the entire management of a

system, States may want to include exam material on all aspects of system operation, including operations, finances, and management. To maintain viability, small system operators need to manage system finances, as well as operations and maintenance. States may want to consider addressing the financial and managerial aspects of system operation either in training courses or in exams.

Continuing education is another important element of operator certification for small systems. Sixteen States have no continuing education requirements, and three other States have none for systems in the lowest classification (generally small systems). Continuing education is particularly important for small systems because their operators need to be kept abreast of new State and Federal requirements. As the number of drinking water regulations increase, small systems will have more difficulty complying. States can use continuing education requirements to ensure that system operators are aware of, and can comply with, new regulations.

Enforcement of Operator Certification Requirements for Small Systems

Due to personnel and budget constraints, many States cannot enforce certification requirements. When resources are limited, States tend to target enforcement against larger systems out of compliance. Although small systems represent a large percentage of total PWSs, they serve fewer than 11 percent of the nation's population. For this reason, State drinking water programs focus on large systems. For operator certification to be beneficial, however, States need to enforce the requirements for small systems.

IV. Questions for States to Address

The conventional wisdom of many State regulators is that operator certification is a cost-effective way for public water systems to obtain qualified operators. However, many questions concerning operator certification still need to be answered. For example:

- What is the role of operator certification in promoting system compliance, particularly for small systems?
- Will small system compliance be improved if operator certification is mandatory for all public water systems?
- What are the essential elements of an effective operator certification program for PWSs, in particular small systems?
- What do small system operators need to know; that is, what are the minimum training and experience requirements, regardless of system type?
- Are additional training and experience required for specific types of systems (e.g., those with complex treatment processes)?
- Where does enforcement of operator certification requirements fit into State priorities?

When States contemplate changes to existing operator certification programs, they need to consider these questions.

APPENDICES*

*States last reviewed the data for the appendices in September, 1990.

Appendix A

Summary of States' Operator Certification Programs

State	Program Administration	Systems Required to Have Certified Operator	System Classification Method	Number of System Classes	Experience Prerequisite for Lowest Class Certificate	Operators Required to Take Exams1	Renewal Period	Continuing Education Requirements2	Fees Collected for Certification	Fees Chanelled to Certification Program
AL	Primacy Agency	All CWSs	Treatment	4	6 Months to 1 Year	All Operators	5 years	None	Yes	Yes
AK	Primacy Agency	All PWSs Serving >500 People or 100 Connections	Point System	8	6 Months to 1 Year	All Operators	3 years	3 CEUs/ period3	Yes	Yes
AZ	Primacy Agency	All CWSs	Population and Treatment	4	None	All Operators	3 years	None	Yes	No
AR	Primacy Agency/ Board	All CWSs	Population and Treatment	3	6 Months to 1 Year	All Operators	2 years	24 hours/ period	Yes	Yes
CA	Primacy Agency	All PWSs Using Treatment	Treatment, Capacity, and Operator Responsibility	5	None	All Operators Except those in "remote areas"	1 year, 2 years thereafter	None	Yes	Yes
CO	Primacy Agency/ Board	All PWSs	Capacity and Treatment	4	None	All Operators	5 years	Based on class	Yes	No
CT	Primacy Agency	All CWSs Using Treatment and Distribution Systems Serving >1,000 People	Point System for Treatment, Population for Distribution	7	6 Months to 1 Year	All Operators	3 years	None	Yes	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period

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DE	NO MANDATORY PROGRAM									
FL	Primacy Agency	All PWSs Using Treatment	Capacity and Treatment	4	Less than 6 Months	All Operators	2 years	None	Yes	Yes
GA	Three or More Agencies	All Surface Systems and Groundwater Systems Serving >1,000 People	Capacity and Population	3	6 Months to 1 Year	All Operators	2 years	Based on class	Yes	No
HI	NO MANDATORY PROGRAM									
ID	NO MANDATORY PROGRAM									
IL	Primacy Agency	All CWSs	Treatment and Source of Supply	4	6 Months to 1 Year	All Operators	3 years	None	Yes	No
IN	Primacy Agency	All CWSs Serving >100 People	Population and Treatment	7	6 Months to 1 Year	All Operators	2 years	Based on class	Yes	No
IA	Primacy Agency	Based on System Type	Capacity and Treatment	4	6 Months to 1 Year	All Operators	2 years	Based on class	Yes	No
KS	Primacy Agency	All PWSs	Population and Treatment	4	6 Months to 1 Year	All Operators	1 year	1 day or 6 contact hours/ 4 years	Yes	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period

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KY	Primacy Agency	All PWSs	Population and Treatment	13	6 Months to 1 Year	All Operators	2 years	Based on class	Yes	Yes
LA	Primacy Agency	All PWSs Serving >500 People	Population and Treatment	4	6 Months to 1 Year	All Operators	2 years	8 hours/ year	Yes	Yes
ME	Primacy Agency/ Board	Based on System Type	Population and Treatment	8	6 Months to 1 Year	All Operators	2 years	None	Yes	Yes
MD	Board	All PWSs	Treatment	5	6 Months to 1 Year	All Operators	3 years	Based on class	Yes	No
MA	Three or More Agencies	All PWSs	Population and Treatment	8	Varies by Class and Education	All Operators	2 years	None	Yes	No
MI	Primacy Agency	All PWSs Using Treatment	Population and Treatment	4 classes 3 grades	Point System	All Operators	None	None	No	No
MN	Primacy Agency	All CWSs	Point System	4	6 Months to 1 Year	All Operators	3 years	Based on class	Yes	Yes
MS	Primacy Agency	All CWSs	Treatment	4	6 Months to 1 Year	All Operators	3 years	48 hours/ period	Yes	Yes

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period

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MO	Primacy Agency	All CWSs, Systems Using No Treatment, Serving <200 People May Be Exempt	Point System	5	None	All Operators	3 years	30 hours/ period	Yes	No
MT	Primacy Agency	All PWSs, NTNCs Are Exempt	Treatment and Source of Supply	10	None	All Operators	1 year	Based on class	Yes	Yes
NE	Primacy Agency	All PWSs	Population and Treatment	5	None	Class 4 and 5 Exempt	3 years	15 contact hours/period	Yes	No
NV	NO MANDATORY PROGRAM									
NH	Primacy Agency	All CWSs	Point System	5	None	Class I-A Exempt	2 years	None	Yes	Yes
NJ	Primacy Agency	All PWSs	Point System for Treatment, Population for Distribution	4	None	All Operators	1 year	None	Yes	No
NM	Primacy Agency	All PWSs Serving >2,500 People	Matrix using Population and Treatment	4	6 Months to 1 Year	All Operators	3 years	30 training credits/period	Yes	No
NY	Primacy Agency	All CWSs Using Treatment and Distribution Systems Serving > 1,000 People	Population, Capacity, and Treatment	6	6 Months to 1 Year	No Exam	4 years	Based on class	No	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period.

Appendix A

Summary of States' Operator Certification Programs

State	Program Administration	Systems Required to Have Certified Operator	System Classification Method	Number of System Classes	Experience Prerequisite for Lowest Class Certificate	Operators Required to Take Exams1	Renewal Period	Continuing Education Requirements2	Fees Collected for Certification	Fees Chanelled to Certification Program
NC	Primacy Agency/ Board	All PWSs Using Treatment	Point System	3	6 Months to 1 Year	All Operators	1 year	None	Yes	Yes
ND	Primacy Agency	All CWSs and NTNCs Serving >500 People	Population and Treatment	8	6 Months to 1 Year	All Operators	1 year	Based on class	Yes	Yes
OH	Primacy Agency/ Board	All PWSs Serving >250 People	Point System	4	6 Months to 1 Year	All Operators	2 years	None	Yes	No
OK	Primacy Agency	All CWSs	Point System	4	None	All Operators	1 year	4 CEUs/ year	Yes	Yes
OR	Primacy Agency	Surface Systems Serving >15 Connections and Groundwater Systems Serving >150 Connections	Point System for Treatment, Population for Distribution	8	6 Months to 1 Year	All Operators	1 year	20 hours/ 2 years	Yes	Yes
PA	Primacy Agency/ Board	All PWSs Using Treatment	Matrix using Capacity and Treatment	3 classes 4 grades	2 Years	All Operators	2 years	None	Yes	No
RI	NO MANDATORY PROGRAM									
SC	Board	All CWSs Serving >50 Connections and PWSs Using Treatment 4	Population, Source of Supply, and Treatment	5	6 Months to 1 Year	All Operators	1 year	12 CEUs/ 2 years	Yes	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause

2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report

3 Period refers to renewal period

4 The lowest class systems (Class I) in South Carolina are not required to have certified operators

Appendix A

Summary of States' Operator Certification Programs

State	Program Administration	Systems Required to Have Certified Operator	System Classification Method	Number of System Classes	Experience Prerequisite for Lowest Class Certificate	Operators Required to Take Exams1	Renewal Period	Continuing Education Requirements2	Fees Collected for Certification	Fees Chanelled to Certification Program
SD	Board	All PWSs Serving >500 People	Point System for Treatment, Population for Distribution	8	6 Months to 1 Year	All Operators	1 year	1 CEU/ 4 years	Yes	Yes
TN	Board	All PWSs, Systems Using No Treatment, Serving <50 Connections Are Exempt	Point System for Surface Systems, Treatment for Others	8	6 Months to 1 Year	All Operators	1 year	1 CEA/ 3 years	Yes	No
TX	Primacy Agency	All CWSs	Decided Case-by-Case	6	None	All Operators	Based on class	Based on class	Yes	No
UT	Primacy Agency	All CWSs Serving >800 People	Point System	8	6 Months to 1 Year	All Operators	3 years	Based on class	Yes	Yes
VT	Primacy Agency	All PWSs	Population and Treatment	4 classes 3 grades	6 Months to 1 Year	All Operators	Based on class	Based on class	No	No
VA	Three or More Agencies	All PWSs Serving >400 People	Population and Treatment	4	6 Months to 1 Year	All Operators	2 years	None	Yes	Yes
WA	Primacy Agency/ Board	All PWSs with >100 Connections and All Surface Water Systems	Point System for Treatment, Population for Distribution	8	6 Months to 1 Year	All Operators	1 year	Demonstration of professional growth	Yes	No
WV	Primacy Agency	All PWSs	Point System	5	Less than 6 Months	All Operators	2 years	None	No	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period

Appendix A

Summary of States' Operator Certification Programs

State	Program Administration	Systems Required to Have Certified Operator	System Classification Method	Number of System Classes	Experience Prerequisite for Lowest Class Certificate	Operators Required to Take Exams1	Renewal Period	Continuing Education Requirements2	Fees Collected for Certification	Fees Chanelled to Certification Program
WI	Primacy Agency	Based on System Type	Treatment and Source of Supply	7	None	All Operators	2 years	12 hours/ period	Yes	No
WY	Primacy Agency	All PWSs	Point System	4	6 Months to 1 Year	All Operators	3 years	Based on class	No	No

1 All operators except those exempt from exam because of reciprocity or a grandfather clause
2 Continuing education is measured in different units CEU=Continuing Education Unit, CEA= Continuing Education Activity, other measurements are described in the report
3 Period refers to renewal period

APPENDIX B

Population <500, Groundwater, No Treatment

State	Experience Required*	Exams	Renewal Period	Continuing Education**
AL	1 year	Yes	5 years	None
AK	No requirements.			
AZ	None	Yes	3 years	None
AR	1/2 year	Yes	2 years	24 training hours per period
CA	1 year	Yes	1 year/2 years	None
CO	None	Yes	5 years	2 CEUs per period
CT	No requirements.			
DE	No mandatory program.			
FL	No requirements.			
GA	No requirements.			
HI	No mandatory program.			
ID	No mandatory program.			
IL	1/2 year	Yes	3 years	None
IN	1 year	Yes	2 years	Cannot be determined
IA	Cannot be determined			
KS	1 year	Yes	1 year	6 training hours every 4 years
KY	1 year	Yes	2 years	6 CEUs per period
LA	No requirements.			
ME	Cannot be determined.			
MD	Cannot be determined.			
MA	1/2 year	Yes	2 years	None
MI	1 year	Yes	None	None
MN	1 year	Yes	3 years	8 contact hours per period
MS	1 year	Yes	3 years	48 training hours per period
MO	None	Yes	3 years	30 hours per period
MT	1/2 year	Yes	1 year	5 CEU every 2 years
NE	1 year	No	3 years	15 contact hours per period
NV	No mandatory program.			
NH	No requirements.			
NJ	None	Yes	2 years	None
NM	No requirements.			
NY	No requirements.			
NC	No requirements.			
ND	No requirements.			
OH	1 year	Yes	2 years	None
OK	None	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	1/2 year	Yes	2 years	None
RI	No mandatory program.			
SC	No requirements.			
SD	No requirements.			
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.

**The term "period" refers to to the renewal period.

APPENDIX B

Population <500, Groundwater, No Treatment (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	No requirements.			
VT	1 1/2 years	Yes	5 years	2 hours per year
VA	Varies with education.	Yes	2 years	None
WA	1 year	Yes	1 year	Yes***
WV	1/4 year	Yes	2 years	None
WI	None	Yes	2 years	12 hours per period
WY	1 year	Yes	3 years	14 CEUs per period

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.
***Requires demonstration of professional growth.

APPENDIX B

Population 3,300, Groundwater, Minimal Treatment

State	Experience Required*	Exams	Renewal Period	Continuing Education**
AL	1 1/2 years	Yes	5 years	None
AK	1 year	Yes	3 years	3 CEUs per period
AZ	1 year	Yes	3 years	None
AR	2 years	Yes	2 years	24 training hours per period
CA	1 year	Yes	1 year/2 years	None
CO	None	Yes	5 years	2 CEUs per period
CT	1 year	Yes	3 years	None
DE	No mandatory program.			
FL	1/4 year	Yes	2 years	None
GA	1/2 year	Yes	2 years	6 training hours per period
HI	No mandatory program.			
ID	No mandatory program.			
IL	1 year	Yes	3 years	None
IN	1 year	Yes	2 years	Cannot be determined
IA	3 years	Yes	2 years	1 CEU per period
KS	2 years	Yes	1 year	6 training hours every 4 years
KY	3 years	Yes	2 years	12 CEUs per period
LA	2 years	Yes	2 years	8 hours per year
ME	1 year	Yes	2 years	None
MD	1 year	Yes	3 years	16 training units per period
MA	1 year	Yes	2 years	None
MI	2 years	Yes	None	None
MN	1 year	Yes	3 years	8 contact hours per period
MS	1 year	Yes	3 years	48 training hours per period
MO	1 year	Yes	3 years	30 hours per period
MT	1 year	Yes	1 year	5 CEU every 2 years
NE	6 years	Yes	3 years	15 contact hours per period
NV	No mandatory program			
NH	1 year	Yes	2 years	None
NJ	None	Yes	1 year	None
NM	1 year	Yes	3 years	30 training credits per period
NY	1 year	No	4 years	30 training hours per period
NC	1 year	Yes	1 year	None
ND	1 year	Yes	1 year	12 CECs every 3 years
OH	1 year	Yes	2 years	None
OK	1 year	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	1 year	Yes	2 years	None
RI	No mandatory program.			
SC	1 year	Yes	1 year	12 CEUs every 2 years
SD	1 year	Yes	1 year	1 CEU every 4 years
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.

APPENDIX B

Population 3,300, Groundwater, Minimal Treatment (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	1 year	Yes	3 years	2 CEUs per period
VT	1 1/2 years	Yes	5 years	2 training hours per year
VA	Varies with education.	Yes	2 years	None
WA	1 year	Yes	1 year	Yes***
WV	3 years	Yes	2 years	None
WI	None	Yes	2 years	12 training hours per period
WY	4 years	Yes	3 years	14 CEUs per period

*Some States may allow substitution for experience
**The term "period" refers to to the renewal period
***Requires demonstration of professional growth

APPENDIX B

Population 3,300, Surface Water, Minimal Treatment

State	Experience Required	Exams	Renewal Period	Continuing Education**
AL	2 years	Yes	5 years	None
AK	1 year	Yes	3 years	3 CEUs per period
AZ	1 year	Yes	3 years	None
AR	2 years	Yes	2 years	24 training hours per period
CA	1 year	Yes	1 year/2 years	None
CO	Cannot be determined.	Yes	5 years	Cannot be determined.
CT	1 year	Yes	3 years	None
DE	No mandatory program.			
FL	1/4 year	Yes	2 years	None
GA	2 years	Yes	2 years	12 training hours per period
HI	No mandatory program.			
ID	No mandatory program.			
IL	1 year	Yes	3 years	None
IN	1 year	Yes	2 years	Cannot be determined
IA	3 years	Yes	2 years	1 CEU per period
KS	2 years	Yes	1 year	6 training hours every 4 years
KY	3 years	Yes	2 years	12 CEUs per period
LA	2 years	Yes	2 years	8 hours per year
ME	1 year	Yes	2 years	None
MD	1 year	Yes	3 years	16 training units per period
MA	1 year	Yes	2 years	None
MI	2 years	Yes	None	None
MN	3 years	Yes	3 years	16 contact hours per period
MS	1 year	Yes	3 years	48 training hours per period
MO	1 year	Yes	3 years	30 hours per period
MT	1 1/2 years	Yes	1 year	5 CEU every 2 years
NE	6 years	Yes	3 years	15 contact hours per period
NV	No mandatory program.			
NH	1 year	Yes	2 years	None
NJ	None	Yes	1 year	None
NM	1 year	Yes	3 years	30 training credits per period
NY	1 year	No	4 years	30 training hours per period
NC	1 year	Yes	1 year	None
ND	1 year	Yes	1 year	12 CECs every 3 years
OH	1 year	Yes	2 years	None
OK	1 year	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	1 year	Yes	2 years	None
RI	No mandatory program.			
SC	1 year	Yes	1 year	12 CEUs every 2 years
SD	1 year	Yes	1 year	1 CEU every 4 years
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.

**The term "period" refers to to the renewal period.

APPENDIX B

Population 3,300, Surface Water, Minimal Treatment (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	1 year	Yes	3 years	2 CEUs per period
VT	1 1/2 years	Yes	5 years	2 training hours per year
VA	Varies with education.	Yes	2 years	None
WA	1 year	Yes	1 year	Yes***
WV	3 years	Yes	2 years	None
WI	None	Yes	2 years	12 training hours per period
WY	4 years	Yes	3 years	14 CEUs per period

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.
***Requires demonstration of professional growth

APPENDIX B

Population 5,000, Surface Water, Filtration

State	Experience Required*	Exams	Renewal Period	Continuing Education**
AL	2 years	Yes	5 years	None
AK	1 year	Yes	3 years	3 CEUs per period
AZ	2 years	Yes	3 years	None
AR	2 years	Yes	2 years	24 training hours per period
CA	1 year	Yes	1 year/2 years	None
CO	2 years	Yes	5 years	2 CEUs per period
CT	Cannot be determined.	Yes	3 years	None
DE	No mandatory program.			
FL	1 year	Yes	2 years	None
GA	1/2 year	Yes	2 years	6 training hours per period
HI	No mandatory program.			
ID	No mandatory program.			
IL	3 years	Yes	3 years	None
IN	2 years	Yes	2 years	Cannot be determined
IA	3 years	Yes	2 years	1 CEU per period
KS	2 years	Yes	1 year	6 training hours every 4 years
KY	3 years	Yes	2 years	12 CEUs per period
LA	2 years	Yes	2 years	8 hours per year
ME	2 years	Yes	2 years	None
MD	2 years	Yes	3 years	30 training units per period
MA	1 year	Yes	2 years	None
MI	5 years	Yes	None	None
MN	3 years	Yes	3 years	16 contact hours per period
MS	9 years	Yes	3 years	48 training hours per period
MO	1 year	Yes	3 years	30 hours per period
MT	1 1/2 years	Yes	1 year	5 CEU every 2 years
NE	6 years	Yes	3 years	15 contact hours per period
NV	No mandatory program.			
NH	1 year	Yes	2 years	None
NJ	None	Yes	1 year	None
NM	1 year	Yes	3 years	30 training credits per period
NY	1 year	No	4 years	30 training hours per period
NC	2 years	Yes	1 year	None
ND	5 years	Yes	1 year	20 CECs every 3 years
OH	1 year	Yes	2 years	None
OK	1 year	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	1 year	Yes	2 years	None
RI	No mandatory program.			
SC	3 years	Yes	1 year	12 CEUs every 2 years
SD	3 years	Yes	1 year	1 CEU every 4 years
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.

**The term "period" refers to to the renewal period.

Population 5,000, Surface Water, Filtration (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	3 years	Yes	3 years	2 CEUs per period
VT	3 years	Yes	2 years	4 training hours per year
VA	Varies with education.	Yes	2 years	None
WA	1 year	Yes	1 year	Yes***
WV	3 years	Yes	2 years	None
WI	None	Yes	2 years	12 training hours per period
WY	4 years	Yes	3 years	14 CEUs per period

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.
***Requires demonstration of professional growth

APPENDIX B

Population 10,000, Groundwater, Minimal Treatment

State	Experience Required*	Exams	Renewal Period	Continuing Education**
AL	1 1/2 years	Yes	5 years	None
AK	1 year	Yes	3 years	3 CEUs per period
AZ	1 year	Yes	3 years	None
AR	5 years	Yes	2 years	24 training hours per period
CA	1 year	Yes	1 year/2 years	None
CO	None	Yes	5 years	2 CEUs per period
CT	2 years	Yes	3 years	None
DE	No mandatory program			
FL	1/4 year	Yes	2 years	None
GA	2 years	Yes	2 years	6 training hours per period
HI	No mandatory program.			
ID	No mandatory program.			
IL	1 year	Yes	3 years	None
IN	1 year	Yes	2 years	Cannot be determined
IA	3 years	Yes	2 years	1 CEU per period
KS	2 years	Yes	1 year	6 training hours every 4 years
KY	3 years	Yes	2 years	12 CEUs per period
LA	3 years	Yes	2 years	8 hours per year
ME	1 year	Yes	2 years	None
MD	1 year	Yes	3 years	16 training units per period
MA	3 years	Yes	2 years	None
MI	4 years	Yes	None	None
MN	3 years	Yes	3 years	16 contact hours per period
MS	1 year	Yes	3 years	48 training hours per period
MO	1 year	Yes	3 years	30 hours per period
MT	1 year	Yes	1 year	5 CEU every 2 years
NE	6 years	Yes	3 years	15 contact hours per period
NV	No mandatory program.			
NH	1 year	Yes	2 years	None
NJ	None	Yes	1 year	None
NM	1 year	Yes	3 years	30 training credits per period
NY	1 year	No	4 years	30 training hours per period
NC	1 year	Yes	1 year	None
ND	3 years	Yes	1 year	16 CECs every 3 years
OH	1 year	Yes	2 years	None
OK	1 year	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	1 year	Yes	2 years	None
RI	No mandatory program			
SC	1 year	Yes	1 year	12 CEUs every 2 years
SD	1 year	Yes	1 year	1 CEU every 4 years
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.

**The term "period" refers to to the renewal period

APPENDIX B

Population 10,000, Groundwater, Minimal Treatment (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	3 years	Yes	3 years	2 CEUs per period
VT	1 1/2 years	Yes	5 years	2 training hours per year
VA	Varies with education.	Yes	2 years	None
WA	1 year	Yes	1 year	Yes***
WV	3 years	Yes	2 years	None
WI	None	Yes	2 years	12 training hours per period
WY	4 years	Yes	3 years	14 CEUs per period

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.
***Requires demonstration of professional growth

APPENDIX B

Population 15,000, Surface Water, Filtration/Coagulation

State	Experience Required*	Exams	Renewal Period	Continuing Education**
AL	2 years	Yes	5 years	None
AK	3 years	Yes	3 years	3 CEUs per period
AZ	3 years	Yes	3 years	None
AR	5 years	Yes	2 years	24 training hours per period
CA	2 years	Yes	1 year/2 years	None
CO	2 years	Yes	5 years	2 CEUs per period
CT	Cannot be determined.	Yes	3 years	None
DE	No mandatory program.			
FL	1 year	Yes	2 years	None
GA	2 years	Yes	2 years	12 training hours per period
HI	No mandatory program.			
ID	No mandatory program.			
IL	3 years	Yes	3 years	None
IN	3 years	Yes	2 years	Cannot be determined
IA	4 years	Yes	2 years	2 CEUs per period
KS	2 years	Yes	1 year	6 training hours every 4 years
KY	3 years	Yes	2 years	12 CEUs per period
LA	3 years	Yes	2 years	8 hours per year
ME	4 years	Yes	2 years	None
MD	3 years	Yes	3 years	30 training units per period
MA	3 years	Yes	2 years	None
MI	5 years	Yes	None	None
MN	2 years	Yes	3 years	24 contact hours per period
MS	9 years	Yes	3 years	48 training hours per period
MO	2 years	Yes	3 years	30 hours per period
MT	2 years	Yes	1 year	1 CEU every 2 years
NE	6 years	Yes	3 years	15 contact hours per period
NV	No mandatory program			
NH	1 year	Yes	2 years	None
NJ	None	Yes	1 year	None
NM	1 year	Yes	3 years	30 training credits per period
NY	1 year	No	4 years	30 training hours per period
NC	2 years	Yes	1 year	None
ND	7 years	Yes	1 year	24 CECs every 3 years
OH	3 years	Yes	2 years	None
OK	3 years	Yes	1 year	4 CEUs per year
OR	1 year	Yes	1 year	20 hours every 2 years
PA	2 years	Yes	2 years	None
RI	No mandatory program			
SC	3 years	Yes	1 year	12 CEUs every 2 years
SD	3 years	Yes	1 year	1 CEU every 4 years
TN	1 year	Yes	1 year	1 CEA every 3 years

*Some States may allow substitution for experience.

**The term "period" refers to to the renewal period.

Population 15,000, Surface Water, Filtration/Coagulation (cont.)

State	Experience Required*	Exams	Renewal Period	Continuing Education**
TX	Cannot be determined.			
UT	6 years	Yes	3 years	3 CEUs per period
VT	3 years	Yes	2 years	4 training hours per year
VA	Varies with education.	Yes	2 years	None
WA	3 years	Yes	1 year	Yes***
WV	3 years	Yes	2 years	None
WI	None	Yes	2 years	12 training hours per period
WY	6 years	Yes	3 years	21 CEUs per period

*Some States may allow substitution for experience.
**The term "period" refers to to the renewal period.
***Requires demonstration of professional growth

APPENDIX C:
STATE SUMMARIES

ALABAMA: The law governing certification is Title 22-25-1 through 15 (Health, Mental Health & Environmental Control) and is entitled, "Certification of Operators for Water & Wastewater Systems & Treatment Plants." Contacts: Joe Power and Tom DeLarch, Water Division, Department of Environmental Management.

System coverage: All community water systems are required to have a certified operator. In addition, all surface source systems, including non-community systems, must have a Class III certified operator or higher. There are sixteen non-transient, non-community systems that meet this requirement in Alabama. Systems are divided into four classes based on treatment used: class I includes distribution systems; class II includes basic groundwater treatment systems; class III includes advanced groundwater treatment (e.g. iron removal, sedimentation, coagulation) and standard rate surface filtration plants; class IV includes high rate filtration plants.

Certification process: Experience requirements are as follows: class I, one year of experience in a class I system; class II, 18 months' experience in a class II system; class III, 24 months' experience in a class III system; and class IV, 24 months' experience in a class IV system. Training may be substituted for up to half of the experience requirements. Operators must pass a written exam that is administered twice yearly by the Alabama Department of Environmental Management (ADEM); the exams are changed each time they are given. Certificates must be renewed every five years and there are no continuing education prerequisites for renewal. There are no written reciprocity agreements, but reciprocity may be granted if a State's requirements are comparable and if similar privileges are extended to Alabama operators. Approximately 10 water operators were granted reciprocity in 1989. The ADEM may revoke an operator's license, but it has done so only twice.

Fees: The fees are as follows· application, $25; reciprocity, $25; and renewal/per certificate, $10. Fees go to program revenue and are marked for operator certification; however, they cover only 40 percent of the program expenses.

Compliance: ADEM claims a 98 percent overall compliance rate for the operator certification requirements; the two percent out of compliance are very small systems. Non-compliers are discovered when district engineers conduct yearly sanitary surveys. When non-compliers are discovered, the district will allow them a certain amount of time to obtain properly certified operators. Although administrative fines can be levied, they rarely are. No figures were available for enforcement actions taken in the past year There are approximately 2,000 water system operators. Operator information is computerized, but is not linked with system data. The list of operators is confidential and is not published.

ALASKA: The law governing certification is found in Title 46 (Water, Air, Energy and Environmental Conservation), under "Certification of Operators." Regulatory authority is given to the Alaska Department of Environmental Conservation (ADEC) and the requirements are outlined in 18AAC74.020 of the Alaska Administrative Code under, "Water and Wastewater Operator Certification and Training." Contacts: Judy Ekhart and Dan Garner, Department of Environmental Conservation.

System coverage: All public water systems that serve more than 100 connections or that are intended for use by more than 500 people must have a certified operator. Systems are divided into two categories: distribution and treatment. There are four system classifications which are based on a point system that accounts for population served, source of supply, and treatment used.

Certification process: There are specific education and experience requirements for operators of treatment and distribution facilities. The requirements for distribution operators are as follows: operators-in-training, 12 years of education and three months' experience or an approved training course; class I, 12 years of education and one year' experience; class II, 12 years of education and four years' experience, class III, 12 years of education and six years' education; and class IV, 12 years of education and eight years' experience The requirements for treatment operators are as follows. "operators in training," 12 years of education and three months' experience or an approved training course; class I, 12 years of education and one year of experience, class II, 12 years of education and three years' experience; class III, 14 years of education and four years' experience, two of which must be in responsible charge; and class IV, 16 years of education and four years of experience, two of which must be in responsible charge For classes II, III, and IV, education may be substituted for up to half of the minimum experience requirements Certification exams, which are written and administered by the ADEC, are held in February and September. Each classification has its own exam. There are four regular test sites, and proctored exams may be scheduled at other locations. There is a grandfather clause for operators who were employed before 1976, these operators are exempted from the exam requirement. Only a small percentage of certified operators hold a grandfather certificate. Once a certificate is obtained, it is valid for up to three years To renew a certificate operators must receive three CEUs every three years. No certificates have been revoked in the past year, although the procedures for this exist. Reciprocity is granted on a case-by-case basis, another State must have comparable requirements and must grant similar privileges in return Approximately 75 operators applied for reciprocity in 1989. However, because the law states that applicants must be working for a system to be certified, most of those who applied for reciprocity were denied certification.

Fees: The fees are as follows: application, $10; exam, $10, re-exam, $10; renewal, $30; reciprocity, $10; and training courses, $50 per day. Fees go to an "Operator Receipts" fund. Fees cover almost 100 percent of certification program costs, including training.

Compliance: No compliance figures for the operator certification requirements were available. Enforcement tools include compliance orders by consent, NOVs, and judicial compliance orders. Emphasis has been on education and hands-on-training to bring systems into compliance. A registry with information on operators and systems is maintained There are 488 certified operators The names of newly certified operators, as well as information about future training opportunities and policy changes, are published in an operator newsletter

ARIZONA: The law governing certification is found in Title 49 (Environment), Chapter 2 (Water Quality Control), Article 9 (Potable Water Systems). The regulations are found in R18, Chapter 4 (Drinking Water and Certification), Article 1 (Classification of Treatment Plants and Certification of Operators). Contact: John Dahl, Drinking Water Compliance Unit, Department of Environmental Quality.

System coverage: All community water systems that serve 15 connections or 25 people year round are required to have a certified operator. There are no training and education requirements for operators of systems that chlorinate only and serve fewer than 500 people. Systems are divided into four classifications using a complex matrix that accounts for treatment used and population served. The treatment or distribution processes considered in the matrix are as follows: coagulation/sedimentation; filtration; chemical precipitation; aeration; odor and taste control; chemical addition (stabilization); pressure filtration; ion exchange; chlorination; fluoridation; distribution of treated water; distribution of chlorinated groundwater; and distribution of unchlorinated groundwater. There are five population delineations which are as follows: systems serving between 25 and 500 people; systems serving between 501 and 2,000 people; those serving between 2,001 and 5,000 people; those serving between 5,001 and 10,000 people; and systems serving more than 10,000 people.

Certification process: The education and training requirements are as follows: grade 1, no requirements, grade 2, two years' experience including one year as a grade 1 operator; grade 3, four years' experience including two years' operational experience with at least one of those years as a certified grade 2 operator; and grade 4, a high school diploma and three years' qualifying experience, including one year of operational experience as a certified grade 3 operator. Some substitution of education for experience is allowed. The exams, written by the Association of Boards of Certification (ABC), are administered by the Operator Certification Unit of the Arizona Department of Environmental Quality (DEQ) at least twice a year. The State does not fund a training program. Certificates must be renewed every three years and no continuing education units are required. There are provisions to revoke certificates but they have not been used in the last three years. Reciprocity is granted to States that use ABC. In 1989, approximately 100 operators applied for reciprocity and most were certified

Fees: The fees are as follows· level I and II exams, $10; level III and IV exams, $25; certificate, $15; renewal, $15; and late penalty, $10. Fees have generated $40,000 since January 1, 1989 and the money goes into the general fund. The budget for the operator certification program is approximately $70,000, and comes from general revenue.

Compliance: The overall rate of compliance with operator certification requirements is approximately 83 percent, however, the compliance rate for large community systems is 99 percent while the rate for small systems is 77 percent. Increasing compliance through enforcement was one of the strategy areas for Fiscal Year 1990. There are 3,551 certified operators in water and wastewater. Although operator and water system data is maintained by different units of DEQ, cross-referencing is possible.

ARKANSAS: The law governing certification is found in Title 17 (Professions, Occupations & Businesses), Chapter 44 (Waterworks Operators). Contacts: Harold Seifert and Tom Skinner, Bureau of Health Services, Department of Health.

System coverage: All community water systems are required to have certified operators. Non-transient, non-community systems are not covered by the requirements. The three grades of system classification, based on treatment used and population served, are as follows. Grade A, systems serving more than 10,000 people that use treatment, and all other systems serving more than 25,000 people; Grade B, systems serving fewer than 10,000 that use treatment; and Grade C, all systems serving fewer than 10,000 people, which use no treatment. (Treatment does not include disinfection.)

Certification process: Experience requirements are as follows. class A, five years' experience; class B, two years' experience; and class C, six months' experience. College credits may be substituted for experience. All operators are required to take four exams, covering the following phases of waterworks: water source and pumping; water treatment and filtration; water distribution and metering; and, general practices and finance. The State Health Department writes and administers the exams, which can be taken in any of the nine districts at least two times per year. A "Licensing Committee," composed of five members, oversees the program. Operators must renew certificates every two years, and renewal is contingent upon receiving 24 approved training hours each renewal period. The department offers training, and additional training hours may be obtained by attending Arkansas Rural Water Association, Arkansas Water Works, and Pollution Control Association meetings, or by taking classes at South Arkansas University, Technical Branch. Certificates may be revoked, but this is uncommon. Instead, licenses will not be renewed, or will be temporarily suspended if operators do not meet the training requirements Although reciprocity may be granted, there are no written agreements with other States. In the past year, Arkansas has granted approximately 12 certificates through reciprocity, mainly to operators from Texas and Oklahoma.

Fees: The fees are as follows· exam, $25, license, $10, and renewal, $5 Fees go to program revenue and are earmarked for operator certification. Fees, however, cover approximately 10 percent of the total program expenses.

Compliance: Overall compliance with operator certification requirements is reported at 96 percent. Non-compliers are discovered during annual or triennial sanitary surveys. Approximately 25 NOVs were sent in the past year, and one license was revoked as a result. A registry of certified operators is kept on a data base, but is not published. There are 1,426 full-time operators, and the number of completed licenses for each of the grades is as follows: A, 353, B, 335; C, 259. Because of the exam structure, there are some operators without complete licenses.

CALIFORNIA: The law governing certification is found in the Health and Safety Code under Division 5, Sanitation, and the regulations are found in Title 17 (Public Health) of the Administrative Code. The certification requirements apply only to water treatment operators. Contacts: Robert Burns and Patricia Haynes, Office of Drinking Water, Department of Health Services.

System coverage: All public water systems that treat water, including non-transient, non-community systems, are required to have a certified operator. The grade of certificate required of operators is based on the extent of operator responsibility, the type of treatment used, and the rated capacity of a plant in millions of gallons per day (mgd). Superintendents or Chief Operators of systems serving fewer than one mgd need a Grade II certificate, between one and five mgd requires a Grade III certificate, between five and ten mgd requires a Grade IV certificate, and more than ten mgd requires a Grade V certificate. Shift Operators (ones working eight hours per day) of systems serving up to five mgd need a Grade II certificate, between five and ten mgd requires a Grade III certificate, and more than ten mgd requires a Grade III or IV certificate. Operators of small water systems (serving fewer than 200 connections) are required to obtain a Grade I certificate, however, these operators are not required to meet any education or experience requirements to qualify them for the written examination In practice, these small systems are the responsibility of local health departments Certified operators may work for more than one system.

Certification process: Education and training prerequisites are as follows Grade II, a high school degree and one year of treatment experience; Grade III, a high school degree and two years of experience; Grade IV, a high school degree, one year as a Grade III operator, and three years of general experience; and Grade V, two years as a Grade IV operator and five years' total experience. Some substitutions are allowed. Exams are written and administered by the Operator Certification Section of the Office of Drinking Water in the Department of Health Services. All grades of operators must complete an exam, which is given two times per year at 19 sites throughout the State Exams are updated every year. There is a "remote area" clause that allows suppliers in remote areas to employ an operator who has received a "limited certificate," which does not require a written exam. To obtain this certificate, a system must prove that a regularly certified operator is not available. No reciprocity is granted. Certificates must be renewed one year after the original date of issuance, and every two years thereafter. Renewal is not contingent upon receiving continuing education units. Certificates may be revoked in the case of fraud, negligence, or incompetence. Additionally, operators who do not renew their certificates may have them revoked. Fifty certificates were revoked in the past year, primarily for failure to renew.

Fees: The 1989 fees for initial certificates were: Grade I, $30; II, $40; III, $51, and IV and V, $62. Fees for renewal certificates were: Grade I, $24; II, $35; III, $46; and IV and V, $56 Fees increase annually according to cost of living figures. Fees go to program revenue and cover approximately 95 percent of the operator certification costs. The program does not include training, and the total program cost could not be estimated.

Compliance: The rate of compliance for large water systems required to have certified operators is high; however, a study of 3,000 small water systems, which are regulated by local health departments, was conducted in 1989 and 351 of the systems studied did not have properly certified operators. Enforcement is carried out by field engineers and sanitarians, who conduct on-site system inspections. When a violator is found, the Department field office or County sends a Notice of Violation The department can, but rarely does, issue administrative fines. As of October 5, 1989 there were 9,344 active, certified operators.

COLORADO: The law governing certification is found in Title 25 (Health), Articles 8 & 9 (Water Quality Control & Water and Wastewater Treatment Plant Operators). Contact: Sharon Ferdinandsen, Water Quality Division, Department of Health.

System coverage: The requirements cover all public water systems, including non-transient, non-community systems. The four classes of water systems, based on treatment and volume, are as follows: class D, groundwater systems which use no treatment beyond chlorination; class C, all systems which use filtration and serve fewer than two mgd; class B, all systems which use filtration and serve between two and five mgd; and class A, all systems which use filtration and serve more than five mgd. These classes were created in August, 1989 and replaced classes based on population served. The rationale was that these classes would diminish administrative burden because plant design capacity is easier to determine than population served.

Certification process: There are no education requirements, but the experience requirements are as follows· class A, four years; class B, three years, class C, two years, and class D, no experience required. Exams are written and administered by the Colorado Plant Operator Certification Board, which is composed of members of the water and wastewater fields, the Department of Health, and municipalities The Board offers the exams eight times a year at two central locations Reciprocity is granted on a case-by-case basis, and the Board often accepts operators from Arkansas, California, Nebraska, Illinois, and South Dakota. Approximately 32 operators were granted reciprocity in 1989 Certificates may be revoked, but this has only occurred four times in the past 10 years The major causes of revocation were falsification of records and failure to properly carry out responsibilities. Certificates must be renewed every five years, and renewal is contingent upon receiving the following number of continuing education units: class A, five; class B, four, and class C and D, two. A continuing education committee reviews and approves continuing education courses

Fees: The fees are as follows· application and exam, $15, reciprocity, $15, and renewal, $5 Fees go to general revenue and cover approximately 25 percent of the total program costs. The total program cost, including salaries, is approximately $100,000 per year.

Compliance: The compliance rate for operator certification requirements could not be estimated. There is an enforcement committee composed of board members; district engineers, however, discover non-compliers during on-site visits and send NOVs. Approximately 75 NOVs were sent in 1989, and 96 percent of the violators were brought into compliance. The department maintains a computerized list of the 3,000 certified operators. This list is updated daily, but is not published.

CONNECTICUT: The law governing certification is found in Title 25 (Water Resources) Chapter 32, Part III ("Water and Ice Supplies,") and the regulations are found in Section 25-32 (Certification of Water Treatment Plant and Distribution System Operators) under the Department of Health Services (DOHS). Contact: Robert Rivard, Water Supplies Section, Department of Health Services.

System coverage: All community water systems with treatment facilities and all distribution systems serving more than 1,000 people are required to have certified operators. Water distribution systems are divided into three classifications· class I, systems serving between 1,000 and 5,000 people; class II, systems serving between 5,001 and 50,000 people; and class III, systems serving more than 50,000 people. Water treatment facilities are classified according to the ABC point system, which accounts for treatment complexity, source of supply, lab work conducted, and system size. Class I is the lowest classification and includes groundwater systems with minimal treatment; class IV is the highest classification and includes the most complex treatment facilities. Large water utilities are required to have an additional backup operator. Systems are allowed to hire part-time operators, who may work for more than one system.

Certification process: All operators must have completed 12 years of education. The experience requirements for operators are as follows: class I, one year of experience; class II, two years of experience; class III, three years of experience; class IV, four years of experience. Generally, experience requirements pertain to experience gained in the particular class. There is an "operator-in-training" category for operators who meet training and exam requirements, but do not have the necessary experience. There is also a "provisional operator" category, which is granted by the department and allows operators to have direct responsible charge for up to two years while they become certified. The DOHS offers the ABC exam two times per year at one location. The updated requirements now allow for reciprocity; operators on the ABC registry are not required to take an exam, but must still meet education and experience requirements. Because the regulations were just changed, no operators have applied for reciprocity. De-certification procedures were also recently instituted and have not yet been used. Operators must renew their certificates every three years, and renewal is not contingent upon receiving any continuing education.

Fees: The only fee is $30 for the exam and certificate. Revenue goes to pay ABC for the exam. The other program costs are covered by departmental and federal funding.

Compliance: Compliance with certification requirements is estimated at 90 percent and most of the non-compliers are small groundwater systems. Systems without properly certified operators are discovered during on-site visits or after citizens' complaints. When non-compliers are discovered, the department will issue NOVs Only two systems were sent NOVs in the past year. The department maintains a computerized list of all certified operators, which is not published. To date, there are approximately 568 certified operators.

DELAWARE: There are no mandatory operator certification requirements for water system operators. Additionally, there is no voluntary certification program. The only certified operators come from other States At one time, the department offered training to operators, but that has been discontinued. No changes are expected in the future, unless EPA requires mandatory State operator certification.

FLORIDA: The law governing certification is found in Section 403.10, Florida Statutes, and Chapter 17-602, Florida Administrative Code. Contacts· J. Kent Kimes and Helen Setchfield, Department of Environmental Resources.

System coverage: All public water treatment systems are required to have a certified operator, unless specifically exempted by law. Distribution facilities are not required to have certified operators. Operators are divided into four classifications, based on treatment technology and quantity of water treated. Class A is the highest classification for operators at systems using the most complex treatment and producing the greatest quantity of finished water. Class D is the lowest classification for operators of systems using minimal treatment and producing small quantities of finished water.

Certification process: The training and experience requirements are as follows: class A, 12 years of experience, four of which are on-site, and a minimum of 120 hours of State- approved training; class B, 8 years of experience, two of which are on-site, and a minimum of 144 hours of State-approved training; class C, three years of experience, one of which is on-site, and a minimum of 144 hours of State-approved training; and class D, three months of experience. The class D operator is limited to operating only one water treatment plant. All operators are required to take State exams, which are offered four times per year at 17 locations throughout the State. Vocational training and exams are also offered in the prison system. The exams are written and updated by a committee of class A water operators from the Florida Water and Pollution Control Operators Association in cooperation with the Department. No reciprocity is granted to operators from other States. All operators seeking certification in Florida must comply with all requirements including training, experience, and successful completion of the State examination Certificates must be renewed every two years Renewal may be denied in cases of fraud, misrepresentation or falsification of records, incompetence, or negligence Certificates may also be suspended or revoked for the same reasons Continuing education is not required at this time but is planned for the near future.

Fees: There is a $15 application processing fee and a $25 renewal fee. The collected fees are deposited in the Water Quality Assurance Trust Fund.

Compliance: The compliance rate for operator certification requirements could not be estimated. The district offices of the Department discover violations through on-site inspections, monthly operating reports, or citizen complaints. Enforcement is initiated with a warning letter or NOV. The department maintains a computerized list of all certified operators. To date, 6,900 persons have been certified to operate drinking water treatment plants.

GEORGIA: The rules governing certification are in Chapter 750-3, under, "State Board of Examiners for Certification of Water and Wastewater Treatment Plant Operators and Laboratory Analysts." The rules governing the classification of water systems and the level of certified operator required for each class of water system are in Chapter 391-3-5, (Rules for Safe Drinking Water). Contacts: Fred Lehman, Drinking Water Program, and Deborah Smith, Examining Boards Division, Secretary of State.

System coverage: All surface water systems and all groundwater systems serving 1,000 or more persons are required to have a certified operator. The level of certification required for surface water systems is based on the capacity of the water plant and filtration rate; for groundwater systems and purchase water systems it is based on the number of persons served by the water system.

Certification process: The operator certification program is divided by function. The Environmental Protection Division of the Department of Natural Resources handles the classification of systems and the enforcement procedures; the Certification Board determines whether or not an applicant has the necessary training and experience; the Examination Development and Test Administration Section of the State Examining Boards supervises the administration of the exam; and the State Licensing Board certifies operators. The training and experience requirements are as follows: class III, 27 basic training hours and six months' experience; class II, 48 advanced training hours (of which 24 must be laboratory), two years' experience and a class III certificate; and class I, the same training as class II, three years' experience and a class II certificate. The ABC exam is offered seven times per year at various locations throughout the State. Reciprocity is not granted to operators from other States Operators who provide copies of valid certificates may be considered for certification in a higher class, but they must still take the exam. Certificates must be renewed every two years and operators must obtain continuing education hours according to the certificate they hold distribution, collection, and class III operators need six hours; class II operators and laboratory analysts need twelve hours, and class I operators need eighteen hours The State does not offer continuing education.

Fees: There is a $50 application fee and a $25 renewal fee.

Compliance: No information could be estimated on compliance. The Licensing Board only maintains information on individual operators, no system data were available.

HAWAII: There are no mandatory State operator certification requirements. Instead, individual municipalities have their own certification programs. Honolulu, which serves 85 percent of Hawaii's population, does have a certification program.

IDAHO: There are no mandatory State operator certification requirements. There is a voluntary program, but most of the operators seeking certification operate very large systems. There is some training for operators of small systems, however, it is limited because of funding. Few of the 1,400 non-community systems have certified operators, and only 70 of the 850 community water systems have certified operators.

ILLINOIS: The law governing certification is found in Illinois Annotated Statutes, Chapter 501 under Public Health and Safety, while the regulations are found in Illinois Administrative Code, Title 35 (Environmental Protection), subtitle F (Public Water Supplies) Contact: Barbara Liebman, Division of Public Water Supply, Illinois Environmental Protection Agency.

System coverage: All community water systems are required to have a certified operator. The Department of Health is developing a program to include non-transient, non-community systems in the requirements. The four system classifications, which are based on source of supply and treatment used, are as follows class A, surface water systems using surface treatment (e g. coagulation); class B, groundwater systems using treatment such as Fe removal and zeolite softening, class C, systems using chlorination and/or fluoridation; and class D, distribution systems.

Certification process: The minimum educational requirement is eighth grade The minimum experience requirements are as follows class A, three years; class B, three years, class C, one year; and class D, six months. Some substitutions are allowed. The Illinois Environmental Protection Agency (EPA) conducts exams on the first working Monday of each month at its six regional offices The application for the exam must be accompanied by a letter verifying water treatment experience from the employer. Certificates must be renewed every three years and there are no continuing education requirements. The procedures for revocation involve an investigation by the Illinois EPA, a review of the material by an attorney, and a review by the Pollution Control Board or the Attorney General. Only two certificates have been revoked in the last five years. Reciprocity is extended to operators who have a similar certificate from another State. Two operators applied for reciprocity in 1989, one was granted a certificate while the other applicant is still being evaluated.

Fees: The fees are as follows application review, $30; exam, $10, and renewal, $10 with a late penalty of $10 The fees go into the Environmental Permit and Inspection fund and are not specifically marked for operator certification.

Compliance: The Illinois EPA claims a 91 percent compliance rate Non-compliers are discovered during on-site inspections Informal enforcement actions are commonly used One formal enforcement action was taken in 1989. Information on operators is maintained on a database which is not published or made available to the public. There are approximately 4,000 certified operators, and contract operators are permitted. The Illinois EPA sponsors a bi-monthly operator newsletter.

INDIANA: The law governing certification is found in Indiana Statutes Annotated, Title 13 (Environment), under, "Air and Water Pollution Control," while the regulations are found in Indiana Administrative Code, 330.1 IAC 7-9-1, under, "Water Pollution Control Board--Wastewater Management." Contacts: Arnold Viere and Jackie Tyler, Office of Water Management, Department of Environmental Management.

System coverage: All community water systems serving a population of at least 100 year round residents are required to have a certified operator. There are two classifications for distribution systems and five classifications for water treatment systems. The distribution classes are DS for systems serving fewer than 15,000 people, and DSL for those serving more than 15,000 people. The treatment classes are as follows: CT, systems using chemical feed, chlorination, or fluoridation, but not using filtration; PF, systems using chemical feed to achieve disinfection, and pressure or gravity filtration to treat well sources for iron removal; GF, surface water systems using coagulation, flocculation, or sedimentation which serve fewer than 15,000 people, AT, surface water systems which serve more than 15,000 people or groundwater systems using lime-soda softening; and SP, plants with experimental treatment which are classed as they develop. A provision in the General Laws allows systems to contract part-time operators under certain circumstances.

Certification process: The education and experience requirements are as follows: class DS, high school education and one year of experience; class DSL, high school education and one year of experience; class CT, high school education and one year of experience in a CT plant; class GF, a high school degree and two years' experience in a GF plant; and classes AT and SP, a high school degree and three years' experience in an AT/SP plant Some substitutions of education or more experience at lower level plants are allowed. Exams are administered by the Department of Environmental Management (DEM) once a year in five locations across the State Renewal is every two years One of the recent regulatory changes is the inclusion of a continuing education requirement for renewal. Revocation of certificates occurs after a hearing before the Water Pollution Control Board. Reciprocity may be granted if an operator has met comparable standards in another State and if that State extends similar privileges Seven operators applied for reciprocity in 1989, and most were granted certificates A grandfather clause applies to operators who were certified under the voluntary certification program, or who worked on or before the effective date of the law

Fees: The fees are $30 for the application and $30 for renewal. The fees go to general revenue.

Compliance: The DEM claims a 90 percent overall compliance rate with operator certification requirements; non-compliers are most often class CT systems, which are generally small systems Frequently, non-compliers are discovered during field inspections. The DEM uses formal and informal enforcement actions to bring systems into compliance To date, DEM has not used its authority to impose fines of up to $10,000 per day of violation of operator certification requirements Six systems were sent letters informing them of their non-compliance in 1989; each has since hired a certified operator. Operator information is maintained on a computerized data base There are approximately 3,000 certified operators.

IOWA: The law governing certification is found in Code of Iowa, Chapter 455B (Natural Resource Regulation) and the regulations are found in the Administrative Code of Iowa, Chapters 567-80 and 81 (Department of Natural Resources, Environmental Protection Division). The law applies to both water supply and wastewater treatment operators. Contacts: Daryl McAllister and Dennis Alt, Water Supply Section, Department of Natural Resources.

System coverage: Although State regulations specify that all public water systems are required to have certified operators, in practice, only municipal water systems, benefitted water districts, and rural water districts are required to have certified operators. Systems are classified by a matrix that accounts for treatment used and capacity. There are four system classifications. Class I is the lowest category, for systems which use simple treatment and pump fewer than 0.1 mgd. The other three classes are based on specific treatments used (e.g. zeolite softening), and the systems using more complicated treatment processes are assigned a higher class. The department allows and encourages operator sharing. There is a specific procedure, called "affidavit management," for systems wanting to share operators. Approximately 125 facilities are currently operated under affidavit management. This enhances compliance, because the "secondary" systems have more highly qualified operators

Certification process: Education and experience requirements are as follows class I, 12 years of education and one year of general experience; class II, 12 years of education and three years of general experience; class III, 14 years of education and four years of general experience; and class IV, 16 years of education, and four years of general experience, including one year supervising in a class III or IV facility. The department offers the required exams, consisting of both departmental and ABC questions, ten times per year at locations throughout the State. Reciprocity is granted if operators have passed an equivalent exam and if they meet the training requirements. Approximately 30 operators applied for, and were granted, reciprocity in 1989 (although some were not given the grade of certificate requested). There are de-certification procedures, but they have not been used in the past five years. Certificates must be renewed every two years and renewal is contingent upon obtaining one CEU for class I and II operators, and two CEUs for class III and IV operators.

Fees: Certification fees are as follows· exam, $20, initial certification, $8 (for each six months from the date of issuance to June 30th); renewal, $24 for two years; and penalty fee, $12. Fees go to general revenue, and program costs are covered by departmental appropriations.

Compliance: Approximately 90 percent of the 880 community water supply systems required to have certified operators are in compliance. Enforcement is generally conducted by the field offices, who discover non-compliers during site visits. When field engineers find non-compliers, they send NOVs requiring the systems to submit a compliance schedule. Although administrative penalties may be issued, Notices of Violation are the most common enforcement tool. The number of enforcement actions taken in the past year could not be estimated. The department maintains a computerized list of all certified operators in the State.

KANSAS: The law governing certification is found in Kansas Statutes Annotated, Title 65 (Public Health) under, "Water Supply Systems and Wastewater Treatment." Contact: Jim Current, Department of Health and Environment, Division of Environment.

System coverage: All public water systems, including non-transient, non-community systems, are required to have a certified operator There are four system classifications which are based on treatment used and population served. The classes are as follows: class I, systems using chlorination without fluoridation which serve fewer than 500 people or distribution systems; class II, systems using chlorination without fluoridation which serve between 500 and 2,500 people, or systems using more complex treatment which serve fewer than 1,000 people; class III, systems using chlorination without fluoridation which serve between 2,500 and 20,000 people or systems using more complex treatment which serve between 1,000 and 10,000 people; and class IV, systems using chlorination without fluoridation which serve more than 20,000 people or systems using more complex treatment which serve more than 10,000 people. Systems may share certified operators.

Certification process: Education and experience requirements are as follows· class I, high school education and one year of experience; class II, one year of college and one year of experience, class III, two years of college and two years of experience; and class IV, four years of college and two years of experience Some substitutions are allowed. A correspondence course is available in lieu of classroom instruction Certification exams are administered 15 to 20 times a year throughout the State by the Department of Health and the Environment (DHE). Certificates must be renewed annually, and one day or six contact hours of continuing education is required every four years The procedures for revoking certificates are as follows· finding of cause, notification to operator of revocation, hearing before a State hearing officer, and final decision by the Secretary of the DHE. Reciprocity may be granted if the requirements of the other States are similar. In 1989, 25 operators applied for, and were granted, certification through reciprocity. There is a grandfather clause extended to operators who were certified under the voluntary program, or who were in charge of a plant prior to the effective date of the law.

Fees: The fees are $5 for the exam and $5 for renewal. The fees go to general revenue. The total program costs could not be estimated.

Compliance: The DHE claims an 80-85 percent overall compliance rate for operator certification requirements. Large systems have a higher compliance rate than small systems. Non-compliers are usually discovered during field inspections conducted by district office staff. District staff work with non-compliers to bring them into compliance. Information on operators is computerized and updated weekly. There are approximately 1,700 certified water system operators.

KENTUCKY: The law governing certification is found in Kentucky Annotated Code, Chapter 223 (Public Health) under, "Sanitarians and Water Plant Operators," and the regulations are found in the Kentucky Administrative Regulation 401 KAR 8 040. Contacts: Nancy Fowser and John Smither, Division of Water, Department of Environmental Protection.

System coverage: All public water systems, including non-transient, non-community systems, that serve at least 15 connections or 25 people daily must have a certified operator. Water treatment and distribution systems are classified separately Treatment systems are divided into nine categories based on population served, source of supply, and treatment used. The four major categories, which indicate population served, are as follows: class I, systems serving fewer than 500 people; class II, between 500 and 3,000 people; class III, between 3,000 and 15,000 people; and class IV, more than 15,000 people. The specific categories, which also account for treatment used, are as follows: IAD, systems using physical treatment and disinfection where the operator is also responsible for distribution; IBD, systems using only disinfection where the operator is also responsible for distribution; IIA, systems using complete physical and chemical treatment, IIBD, systems using physical treatment and disinfection, where the operator is also responsible for distribution, IICD systems using only disinfection, where the operator is also responsible for distribution, IIIA, systems using complete physical and chemical treatment, IIIB, systems using physical treatment and disinfection; IIIC, systems using only disinfection; and IVA, systems using complete physical and chemical treatment. The four distribution system classifications, which are based solely on population, are as follows: ID, systems serving fewer than 1,500 people; IID, between 1,500 and 15,000 people; IIID, between 15,000 and 50,000 people; and IVD, more than 50,000 people

Certification process: The education and experience requirements are as follows: class I, a high school degree and one year of experience, class II, a high school degree and two years of experience; class III, a high school degree and three years of experience; and class IV, a college degree and three years of experience. Some substitutions are allowed. Exams, which are administered by the Certification and Training Section in the Division of Water, are offered quarterly across the State after training sessions Certificates must be renewed every two years and renewal is contingent upon receiving between 6 and 12 CEUs, depending on the system classification A certificate may be revoked after a hearing before the cabinet and upon the advice of the Certification Board (composed of representatives of treatment facility management, distribution systems, higher education, and State government). Two certificates have been revoked or suspended in the past year for falsification of application information and for unacceptable operational practices. Reciprocity may be granted if the certification requirements from another State are comparable and if similar privileges are granted. There are agreements with NM, MT, OH, PA, TX, IN, SC, WV, and TN. There is a grandfather clause for operators holding valid certificates prior to June 16, 1966

Fees: The fees are as follows: exam, $30, reciprocity certification, $35; training registration, $10; and renewal, $20. The fees go to program revenue for the Certification Board. The fees covered approximately 38 percent of the program costs, which were $250,000 in 1989

Compliance: There are approximately 70 systems that are required to have certified operators but do not. These systems are primarily camping areas and small trailer parks. Enforcement is carried out by the Field Operation and Enforcement Branches of the Division of Water, which issues NOVs and works with non-compliers to certify operators. Fines up to $5,000 per day can be imposed. Monthly operating reports that must be signed by the operator are used to check compliance with operator certification requirements. Information on operators is computerized and can be easily cross-referenced with system information. Approximately 2,250 certificates have been issued to date.

LOUISIANA: The law governing certification is found in Louisiana Code Annotated, Title 40 (Public Health and Safety) under, "Miscellaneous Provisions " The law applies to both water supply and sewage treatment. Contacts: T. Jay Ray and Larry Fox, Department of Health and Hospital Engineering Services, Office of Public Health.

System coverage: All systems, including non-transient, non-community systems, which serve more than 500 people are required to have a certified operator. There are three kinds of licenses for the various types of systems: a "production license" is required for groundwater systems using no treatment beyond chlorination; a "treatment license" is required for all systems using treatment other than chlorination; and a "distribution license" is required for distribution plants. For the treatment and distribution licenses, there are four classifications which are based on population served: class I, systems serving between 500 and 1,000 people; class II, between 1,001 and 5,000; class III, between 5,001 and 25,000; and class IV, more than 25,000 people. Small systems using simple treatment may be allowed to share operators.

Certification process: The education and experience requirements are as follows: class I, 12 years of education and one year of experience; class II, 12 years of education and two years of experience; class III, 14 years of education and three years of experience; and class IV, 16 years of education and 4 years of experience. The Department of Health offers the certification exams twice a year in different locations throughout the State. The department writes some of its exam questions, but also uses ABC exam questions. Operators must renew their certificates every two years and renewal is contingent upon receiving eight hours of training every year. Reciprocity is granted on an ad hoc basis In addition, operators registered with ABC will be granted reciprocity automatically. Approximately 15 operators applied for, and were granted, reciprocity in 1989.

Fees: The fees are as follows· exam, $5; first license, $20; and every additional license is $10 each for new certificates and renewals. Fees go to general revenue but are returned to the certification program. The total program cost is approximately $60,000 per year, and is covered by the fees.

Compliance: Of the 1,250 water systems in the State, approximately 80 percent are in compliance with operator certification requirements. The majority of non-compliers are systems serving fewer than 1,000 people. Field engineers discover non-compliers during on-site visits. When non-compliers are found, the department sends a letter requesting that the systems submit a compliance schedule. Legal action has not been used. The department maintains a computerized list of certified operators and the systems they serve. This list is periodically sent to the regional engineers to verify the data. A quarterly newsletter is sent to all certified operators.

MAINE: The law governing certification is found in Title 22 (Human Services), Chapter 600 (Water for Human Consumption). The regulations are found in 10-144A (Department of Human Services/Bureau of Health), Chapter 231 (Drinking Water Rules). Contacts: Jeff Jenks and Francis Drake, Division of Health Engineering, Department of Human Services.

System coverage: The requirements only apply to the following types of public water systems: water districts, municipal water departments, and investor owned water utilities serving municipalities, systems such as water associations, mobile home parks, subdivisions, condominiums, and commercial developments are not required to have a certified operator. The eight system classifications, which are based on population served and treatment used, are as follows. class IA, all water systems needing chemical treatment which serve fewer than 15,000 people; class IB, all distribution systems which serve fewer than 15,000 people; class IIA, systems using filtration, coagulation, lime softening and/or chemical/bacteriological treatments which serve fewer than 2,000 people; class IIB, systems using chlorination and requiring bacteriological control which serve fewer than 15,000 people; class IIC, systems using chemical control which serve more than 15,000 people; class IIIA, systems using coagulation and sedimentation and requiring chemical and bacteriological control which serve between 2,000 and 15,000 people, class IIIB, systems using chlorination and requiring bacteriological control which serve more than 15,000 people; and class IV, systems using coagulation and sedimentation and requiring chemical and bacteriological control which serve more than 15,000 people.

Certification process: The education and experience requirements are as follows: class I and II, a high school degree and one year of experience; class III, a high school degree and two years' experience; and class IV, a high school degree and four years' experience. Exams are designed by the Water Certification Board and are administered twice a year across the State by the Division of Health Engineering. The Board is composed of a water operator, a wastewater operator, State government representatives, a water utility manager, an educator, and a member of the general public Applications must be submitted three weeks prior to the exam date and are evaluated by the Board to ensure that experience requirements have been met. The class I and II exams may be taken concurrently. Certificates must be renewed every two years and there are no continuing education requirements. If operators do not renew their licenses after three years, they are revoked. No operators have had their licenses revoked in the last five years. Reciprocity may be granted if another State's certification requirements are comparable; there are written reciprocity agreements with MA and NH. In 1989, two operators applied for, and were granted, reciprocity. There is a grandfather clause for operators in charge of systems as of October 1, 1966. Temporary waivers are granted by the Board to systems while they are training a new operator

Fees: The fees are as follows: combined class I and II exam, $25, class III and IV exam, $25 each, reciprocity, $25; and renewal, $16. The fees go to the Board of Certification The fees cover the entire $2,000 cost of the program The State and the ME Rural Water Association provide an additional $146,000 for training.

Compliance: The Division primarily uses informal enforcement measures to bring systems into compliance. In 1989, the Division worked with 12 systems and all came into compliance or received temporary waivers. Information on operators is computerized and is easily cross-referenced with system data. There are 82 class I operators, 270 class II operators, 112 class III operators, and 52 class IV operators.

MARYLAND: The law governing certification is found in the Annotated Code, Title 12 (Environment) under, "Waterworks and Waste Systems Operators," while the regulations are found in the Code of Maryland Regulations, Title 26 (Department of Environment), subtitle 06 (Waterworks and Wastewater System Operators) Chapter 01 Water supply and wastewater treatment are both covered under the law Contacts: Bill Parrish and Barry K. O'Brien, Department of the Environment.

System coverage: All public water systems, including non-transient, non-community systems, are required to have a certified operator. The five system classifications, which are based on treatment type, are as follows: class I, systems using disinfection; class II, systems using chemical treatment such as chlorination, pH control or fluoridation; class III, systems using simple iron removal such as ion exchange or contact oxidation processes; class IV, systems using complete treatment; and class V, site specific for any new technological plants not covered under the classification system Certified operators are permitted to manage more than one system.

Certification process: Operator certification is monitored by the Board of Waterworks and Waste Systems Operators. The Board is composed of 10 members appointed by the Governor and one member appointed by the Secretary of the Maryland Department of the Environment (MDE), members are chosen based on profession and geographic representation. All operators must have a high school degree or its equivalent. The experience requirements are as follows· class I and II operators need one year of experience; class III operators need two years' experience; class IV operators need three years' experience; and the amount of experience required of class V operators is determined by the Board. For class III and IV certificates, up to one year of college may be substituted for one year of experience. The ABC exams are offered twice a year at five locations across the State. Reciprocity is granted to other States using the ABC exam Operators must meet Maryland's education and experience requirements. In 1989, seven of the ten operators who applied for reciprocity were granted certification There was a grandfather clause for uncertified operators and certified superintendents employed before July 2, 1982. Applications had to have been received prior to 1987 Certificates must be renewed every three years and renewal is contingent upon operators receiving the following number of training units for class I and II, 16 units, for class III and IV, 30 units; and for class V, to be determined on an ad hoc basis by the Board. Certificates may be revoked in the case of fraud, negligence, or professional incompetency Two certificates have been revoked in the past two years.

Fees: The fees are as follows: initial certificate, $15; exam, $25; renewal, $40 for the first certificate and $5 for each additional certificate.

Compliance: Approximately 95 percent of the systems serving more than 3,300 people have certified operators; most of the non-compliers are systems that serve fewer than 500 people. Non-compliers are detected during on-site inspections Informal enforcement measures are used most frequently; no legal action was taken against a system in 1989 There is a computerized list of certified operators which is kept at the Water Supply Program office Arrangements are being made to match operator information with system information by the end of 1990. There are approximately 2,900 certified water and wastewater operators. Almost 50 percent operate multiple plants

MASSACHUSETTS: The law establishing the Board of Certification of operators of Drinking Water Supply Facilities is found in Massachusetts General Laws c112 ss. 66B, 87CCCC and 87DDDD. Acting under this authority the Board has adopted regulations titled 236 CMR. The latest version of these regulations became effective on January 5, 1990. Additional certification requirements have been adopted by the Department of Environmental Protection and are found in 310 CMR 22:11B. Contacts: David Terry, Drinking Water Program, and Betty Boulger and Robert McCracken, Boards of Registration, Division of Registration.

System coverage: All public water systems, including non-transient non-community systems, are required to have a certified operator Currently, the three major system classifications are "distribution"(D), "treatment" (T), and "mixed components--combining distribution and treatment" (C). For distribution systems (D), there are four grades, which are as follows: grade 1, systems designed to serve between 500 and 9,999 people; grade 2, between 10,000 and 24,999 people; grade 3, between 25,000 and 49,999 people; and grade 4, more than 50,000 people. For treatment systems (T) and mixed component systems (C), the grades are as follows: grade 1, systems designed to serve between 500 and 1,999 people; grade 2, between 2,000 and 9,999 people; grade 3, between 10,000 and 24,999 people, and grade 4, more than 25,000 people. A separate category, called "VSS", has been established for very small systems serving fewer than 500 people.

Certification process: The experience requirements vary depending on the system grade and the operator's amount of education The Board of Certification administers the ABC exams twice a year at four different locations (in or around Worcester, Boston, New Bedford, and Springfield). Certificates must be renewed every two years and renewal is not contingent upon receiving any CEUs. The procedures for revocation are found in the State statutes under the "Administrative Practices Act" and call for a hearing before the Board with further recourse to legal action. These provisions have never been used in the area of operator certification Reciprocity is granted grade-for-grade with other ABC States All other operators are discouraged from applying for reciprocity because it is too administratively time-consuming.

Fees: The fees are as follows· application/exam, $73.50; license, $30; renewal, $30, late penalty, $25. The exam fee will increase to cover the cost of the ABC exam. The fees go to general revenue and the program is funded by general revenue.

Compliance: Nearly all of the large water systems are in compliance with the requirements and have at least one certified operator in charge; however, many small and non-transient, non-community water systems do not yet have certified operators. Enforcement is the responsibility of the Department of Environmental Protection. Non-compliers are discovered through yearly sanitary surveys and the mandatory annual statistical reports. When the Board finds a system without a certified operator, it sends an Enforcement Letter outlining the DEP's attempts to work with the system, followed by Administrative penalties (up to $25,000/day) and adjudicatory hearings. Systems usually comply after the initial letter. The DEP worked with approximately 50 systems in 1989. Because of the limited pool of certified operators, the DEP is actively encouraging more people to take the exams and become certified. The Data Processing Section of the Division of Registration is responsible for processing and issuing licenses and a computerized list of all licensed operators is made available. This directory is updated after each examination and during the renewal period. There are approximately 1,200 active, certified operators.

MICHIGAN: The law governing certification is found in the Michigan Compiled Laws Annotated, Chapter 325 (Public Health) in the Safe Drinking Water Act, under "Classification of Treatment and Distribution Systems." Contact. Eric Way, Division of Water Supply, Department of Public Health.

System coverage: All public water systems, including non-transient, non-community systems that use treatment for health-related concerns, are required to have a certified operator. Systems are classified into three general categories based on treatment: F (complete treatment), D (limited treatment), and S (distribution systems). These classifications are further divided according to population served or design capacity and are as follows: class 1, systems serving more than 20,000 people or designed to serve more than five mgd; class 2, systems serving between 4,000 and 20,000 people or designed to serve between two and 5 mgd, class 3, systems serving between 1,000 and 4,000 people or designed to serve between 0.5 and two mgd; and class 4, systems serving fewer than 1,000 people or designed to serve fewer than 0 5 mgd.

Certification process: Education and training requirements are based on a point system, where education ranges from 60 points for a high school diploma to 90 points for a MS in Engineering, Chemistry, or Bacteriology Experience credit is accrued at a minimum of one-quarter point per month The exams are administered by the Department of Public Health (DPH) through a Certification and Training Specialist and the District engineers. The lower level exams are offered twice a year and the upper level exams are offered once a year Operators of non-transient, non-community systems can take a verbal exam. Certificates are good for life; there are no renewal provisions. The DPH is formulating regulatory changes that will include a three year renewal period and will require that operators receive 8 continuing education units per year. Inactive certificates can be activated after a hearing before the advisory board. Only one certificate has been revoked in the last five years. Michigan seldom grants reciprocity because of staff limitations.

Fees: There is no fee system. The program is funded by State and Federal funds.

Compliance: The DPH claims a 90-95 percent compliance rate. Non-compliers are detected during district engineers' inspections. When non-compliers are discovered, the district engineer sends letters to the owners of the systems, followed by Administrative Orders when necessary. Only a few formal enforcement actions were taken in 1989. Information on operators is computerized but not published. Because there is no renewal system, the list of operators is only completely updated once every five years. Routine updates are made after each exam period and when DPH is notified of an operator, address, employer, or status change There are approximately 2,700 active operators, 1,600 inactive operators, and fewer than 1,500 uncertified operators.

MINNESOTA: The law governing certification is found in the Annotated Statutes, Chapter 115 (Environmental Protection) under, "Water Pollution-Sanitation," and the regulations are found in the Administrative Code, Chapter 9400 (Water Treatment Certification). Contact: Bob Smude, Division of Environmental Health, Department of Health.

System coverage: All community water systems are required to have a certified operator. An elaborate point system, based on population served, water supply source, quality of water supply, unit treatment processes, distribution and storage capacity, and number of wells, is used to classify systems. There are four classes of systems, where A is the highest class and D the lowest. A water system accrues the greatest number of points if it uses a surface water source, has more than 20,000 coliform per 100 milliliters before treatment, uses coagulation and/or filtration, and serves more than 100,000 people; a groundwater system that does not use any treatment and that serves fewer than 1,000 people accrues the least number of points.

Certification process: The education and experience requirements are as follows class A, a bachelor's degree in an appropriate branch of engineering or in a physical or biological science, with four years' general experience, and two years as a class B operator; class B, a bachelor's degree in an appropriate branch of engineering, or in a physical or biological science with two years' experience, class C, a high school degree and three years' experience; and class D, one year of experience or approved training credit. Exams are administered by the Department of Health and are given approximately 20 times per year across the State Reciprocity is granted on a case-by-case basis; in 1989 four operators applied for, and were granted, reciprocity. There is a grandfather clause for operators who were certified under the voluntary program or who were employed at a site on or before the date the law took effect. Certificates must be renewed every three years and renewal is contingent upon obtaining the following number of continuing education credits· 32 contact hours for class A operators, 24 contact hours for class B operators, 16 contact hours for class C operators, and 8 contact hours for class D operators Certificates may be revoked in the case of fraud, negligence, and misconduct.

Fees: The fees are as follows application, $15; certificate, $15, re-exam, $15; renewal, $15, reciprocity, $20; and replacement of certificate, $5. Fees go to program revenue. No estimate could be given on the total program cost per year.

Compliance: The overall compliance rate with operator certification requirements is approximately 80 percent. The majority of non-compliers are small systems that have a high operator turnover rate. Non-compliers are discovered by the eight district offices during yearly sanitary surveys. Informal enforcement actions are the most common tool used to bring systems into compliance with certification requirements. No legal action was taken in the past year. A computerized list of certified operators is maintained but not published. Information on operators cannot be cross-referenced with system information. There are 48 class A operators, 293 class B operators, 592 class C operators, and 588 class D operators.

MISSISSIPPI: The certification program is administered by the Mississippi Department of Health, Bureau of Environmental Health, Division of Water Supply. Contacts: Tom Connerly and Jim McDonald, Division of Water Supply, Department of Health.

System coverage: All community water systems are required to have certified operators; non-transient, non-community water systems are excluded from the operator certification requirements. The four classes of systems, which are based on treatment used, are as follows: class D, systems which use no treatment other than chlorination or fluoridation; class C, systems which use aeration, pH adjustment, or closed pressure treatment including zeolite softening or iron removal; class B, two or more C systems with different types of treatment on the same distribution system or systems which use iron and manganese removal procedures and require flocculation or sedimentation; and class A, surface water systems which use lime softening or coagulation and flocculation for the removal of materials other than iron or manganese. Population served is not a factor in system classification.

Certification process: The education and experience requirements are as follows: class D, one year of experience; class C, a high school degree and one year of experience in an A, B or C plant; class B, a high school degree and three years' experience in an A,B or C plant (one year must be in an A or B plant); and class A, a high school degree and nine years' experience in an A or B plant (one year must be in an A plant). Some substitution of advanced education for experience is permissible. The exam is given three times a year (once a year in three locations) after a short course sponsored by the Monitoring, Training and Certification section of the Division of Water Supply. Certificates must be renewed every three years and 48 training hours are required during each renewal period. An operator's certificate may be revoked, but the program is so new that this has never happened. Reciprocity is granted only with States that will sign an agreement of reciprocity with Mississippi; to date there are written agreements with Texas and Louisiana. Of the 10 water operators that applied for reciprocity in the last two years, half were denied because their original States refused to sign reciprocity agreements with Mississippi.

Fees: The fees are $50 for the exam application and $30 for renewal, these fees comprise a program revenue fund which covers the cost of the operator certification program including the short course training sessions.

Compliance: Mississippi claims a 98 percent overall compliance rate with operator certification requirements; the two percent not in compliance are primarily systems which serve fewer than 500 people, e.g., trailer parks. When non-compliers are discovered, they are sent letters from the Monitoring, Training, and Certification section, followed by letters from the Attorney General's office, and then legal action, if necessary. No formal enforcement actions were taken in 1989; however, the section worked informally with approximately 30 systems to bring them into compliance Information on operators is computerized and is available to the public for a fee There are 1,326 water system operators.

MISSOURI: The regulations governing operator certification are found in 10 CSR 60 (the Missouri Public Drinking Water Regulations), Chapter 14 (Operator Certification). Contacts: Virginia Ismey and Jerry Lane, Department of Natural Resources.

System coverage: All community water systems are required to have a certified operator; however, untreated community water systems which serve fewer than 200 people (and 50 connections) and have safe operational histories are exempted from the requirements. A point system based on the ABC model is used to divide the public water supplies into five classes. Class A is the highest grade and includes surface water systems which use complex treatment and serve more than 10 mgd; class E is the lowest category and includes groundwater systems which use little or no treatment and serve fewer than 2 mgd.

Certification process: The experience requirements are as follows: class E, no education or experience required, class D, one year of experience; class C, two years' experience; class B, four years' experience; and class A, six years' experience. Education may be substituted for part of the experience requirement. The Missouri Department of Natural Resources' Division of Environmental Quality (DEQ) has a core exam schedule of 24 exams per year throughout the State, supplemented by a large number of special exams following regional training sessions. The ABC exam is used. Certificates must be renewed every three years, and renewal is contingent upon receiving 30 hours of renewal training over that period. Missouri is a member of the ABC reciprocity register but grants reciprocity to any State with similar certification requirements. Approximately 12 operators applied for reciprocity in the past year; several of these applications were denied because the operators were not currently employed by a water system in Missouri. The regulations contain provisions for revoking operators' licenses; however, they have never been used.

Fees: The fees are as follows: exam, $15; certificate, $15; reciprocity, $15; renewal, $15 every three years, and late fees, $5. Fees go to the Safe Drinking Water Fund. The program, which does not include training, is funded by general revenue and federal funds. The total program costs could not be estimated.

Compliance: The compliance rate for operator certification requirements differs depending on the region of the State: the Northeast region has a 95 percent compliance rate, while the Southern region has a 50 to 60 percent compliance rate. Non-compliers are discovered by the regional offices. Informal enforcement is the primary tool used to bring systems into compliance. The Missouri safe drinking water law contains a penalty provision with a $50 fine for the first offense; however, no legal actions were taken in 1989. Information on operators is kept on a mainframe computer and is linked with system data. Missouri has issued 2,319 operator certificates, but the number of certified operators is lower because an operator may hold multiple certificates.

MONTANA: The law governing certification is found in MT General Laws, Title 37 (Professions and Occupations) under, "Water Treatment Plant Operators," and the regulations are found in the Administrative Rules of MT, Title 16 (Health and Environmental Sciences) under, "Water Treatment Plants and Operators." Contacts. Rosemary Fosum and Dan Fraser, Department of Health and Environmental Sciences.

System coverage: All public water systems, not including non-transient, non-community systems, which serve 10 or more connections are required to have a certified operator. The five water treatment system classifications, which are based on treatment used and source of supply, are as follows: class I, surface water systems using any treatment involving chemical coagulation, filtration, and chlorination; class II, surface water systems not using chemical coagulation; class III, groundwater systems serving over 2,500 people; class IV, groundwater systems serving between 100 and 2,500 people; and class V, groundwater systems serving between 25 and 100 people. The five distribution system classifications, which are based on population served, are as follows: class I, systems serving more than 20,000 people; class II, systems serving between 2,500 and 20,000 people; class III, systems serving between 500 and 2,500 people; class IV, systems serving between 100 and 500 people; and class V, systems serving fewer than 100 people.

Certification process: The direct responsible charge (DRC) experience requirements are as follows: class I, two years' experience; class II, one and a half years' experience; class III, one year of experience; and class IV, six months' experience. There is no experience requirement for class V operators. Applicable post-secondary education may be substituted for no more than one half of the experience requirement. Exams are administered by Water Quality Bureau staff and the Advisory Council for Water and Wastewater Operators at least twice a year. In the spring the exam is given in seven communities across the State; In the fall the examination is given following a four-day training school Operators who pass their examinations before completing the experience requirements are certified as operators-in-training until they obtain the necessary experience. Certificates must be renewed annually. Every two years operators must earn the following number of continuing education units: class I operators need one CEU per certificate and class II, III, and IV operators need 5 CEUs per certificate A regulation specifying the circumstances for disciplinary action is currently under legal review. No operators have had their certificates revoked for fraud or incompetency. Reciprocity may be granted to operators who have passed an equivalent exam in another State and who meet the minimum experience requirements. Six operators applied for, and were granted, reciprocity in 1989. A grandfather clause certified persons who could verify that they were in responsible charge of a system on or before July 1, 1967.

Fees: Application and renewal fees are based on system classification as follows: class I, $27, class II, $22; class III, $17, class IV, $12; and class V, $10. Additionally, the exam fee for all classes is $5. The fees go to program revenue and are earmarked for operator certification. The fees cover approximately 80 percent of the $40,000 cost of the program. The total program cost does not include training, which is conducted by the water section.

Compliance: The compliance rate for operators of class I, II, and III systems is close to 100 percent, while the rate for operators of smaller systems is approximately 85 percent. Informal enforcement actions are used most commonly to bring systems into compliance. Legal action is taken against systems chronically not in compliance with operator certification requirements and other regulations. No fines have ever been imposed solely for a system's failure to have a certified operator. There are approximately 1,250 operators certified in the water and wastewater programs. Information on operators is computerized, but is not yet easily cross-referenced with system information.

NEBRASKA: Nebraska Annotated Code, Title 71 (Public Health and Welfare), Chapter 53 (Nebraska Safe Drinking Water Act); Nebraska Administrative Rules and Regulations, Title 179 (Health and Environmental Engineering), Chapter 2 (Public Water Supply Systems) Contacts· Mark Hammer and Jack Daniel, Division of Environmental Sanitation, Department of Health.

System coverage: All public water systems are required to have a certified operator. The lowest grade of certificate, grade 5, applies to both transient and non-transient, non-community systems The grade 5 certificate is merely a formality: grade 5 operators are not required to meet minimum education or experience standards and they do not need to pass a certification examination. Instead, they qualify by successfully answering seven of ten questions by mail after they have been provided a handbook explaining the State and Federal requirements. The community system operator classifications, which are based on population served and treatment used, are as follows· class I, community water systems which use filtration or other treatment requiring chemical and bacteriological control and are designed to serve more than 15,000 people or all other community water systems designed to serve more than 15,000 people; class II, community water systems which use the treatment processes listed for class I but are designed to serve between 2,000 and 15,000 people or all other community systems serving between 15,000 and 50,000 people; class III, community systems which use the same treatment processes listed for class I but are designed to serve fewer than 2,000 people or all other community systems which serve between 2,000 and 15,000 people and all community systems that purchase water from one or more systems for the purpose of supplementing or providing service to more than 50,000 people; class IV, community systems which do not use a treatment technology involving filtration and which serve fewer than 2,000 people or all other community systems that purchase water from one or more systems for the purpose of supplementing or providing service to fewer than 15,000 people. Operator sharing is permitted if the systems are within a reasonable travel distance and if there is a written agreement between the systems.

Certification process: The education and experience requirements vary based on system class The amount of experience required ranges from one to six years in responsible charge of a system. Class V operators must demonstrate ability to collect water samples, interpret results of biological examination, and maintain required records. Operators of Class I, II, and III systems must take exams that are administered by the Division of Drinking Water and Environmental Sanitation following week-long courses. Operators of class IV systems must attend a 2 1/2 day course and pass a test at the completion, or take a correspondence course offered by the Department. The lower level courses and exams are offered three or four times per year across the State; the upper level exams are offered once or twice a year in Lincoln. Operators must renew their certificates every three years and renewal is contingent upon receiving 15 contact hours during the renewal period. Reciprocity is granted on a case-by-case basis. Approximately three operators applied for, and were granted, reciprocity in 1989 (although not necessarily for the class they desired).

Fees: The fees are as follows· the week-long training course prior to the exam, $200; renewal, $10; and correspondence course, $80. The fees go to general revenue. The total program costs could not be estimated.

Compliance: The overall compliance rate with operator certification requirements is between 70 and 80 percent. Non-compliers are discovered by field inspectors during random inspections every three years or less and by the certification officer annually when re-certification requirements are checked. Violators are sent letters and are given six months to hire certified operators. In 1988, the department worked with 16 systems and brought all of them into compliance. Information on operators and systems is kept on dBASE III. There are approximately 1,000 certified operators.

NEVADA: Nevada does not have a mandatory operator certification program. Operator certification requirements were proposed to the last three State legislatures but were defeated each time. In October of 1990, Nevada adopted operator certification requirements for surface water treatment systems. The requirements mandate that PWSs using surface water, or using groundwater under direct influence of surface water, must have operators who have received a certificate of competency in water treatment operations. Certificates will be issued by the Association of Boards of Certification, and the certification program will be administered by the American Water Works Association, California/Nevada Section. The requirements have not yet been filed with the Nevada Secretary of State's office, and the primacy package is still pending EPA approval.

NEW HAMPSHIRE: The regulations are found in the Code of Administrative Rules Annotated Statutory Authority RSA 332e, Chapter 367 (Public Water Supply) under, "Certification of Water Works Operators." The requirements cover water distribution and water treatment. Contact: Bernard Lucey, Water Supply Engineering Bureau, Department of Environmental Services.

System coverage: All community water systems are required to have a certified operator. Treatment plants and distribution facilities are classified separately. Treatment plants are divided into 5 classes based on a point system which accounts for population served, water supply source, and treatment used. Distribution facilities are classified as follows· class I-A, systems serving fewer than 500 people or 150 connections with no fire protection; class I, systems serving fewer than 1,500 people; class II, systems serving between 1,501 and 15,000; class III, systems serving between 15,001 and 50,000 people; and class IV, systems serving more than 50,000 people. Groundwater sources without treatment (i.e. pumping only) are considered distribution systems.

Certification process: Education and experience requirements for treatment and distribution operators are as follows: class I, 12 years' education and one year of experience; class II, 12 years' education and three years' experience, class III, 14 years' education and four years' experience, and class IV, 16 years' education and six years' experience. There are no education and experience requirements for class I-A operators Substitutions may be made, but at least 50 percent of the experience requirement must be actual operating experience All operators, except class 1-A, must take the ABC exam, which is offered three times per year in Concord. Reciprocity may be granted if operators have comparable certification from another State; there are written reciprocity agreements with Massachusetts and Maine Approximately three operators applied for, and were granted, reciprocity in 1989 Statutory change in 1989 directed that certificates should be renewed biennially rather than annually There are procedures to revoke certificates, but they have not been used.

Fees: Fees are $25 for each initial certificate and $20 per category per year for renewal. Fees go to a restricted account earmarked for operator certification The total program costs are approximately $30,000, revenues, approximately $25,000

Compliance: The overall compliance rate for operator certification requirements is approximately 80 percent, however, the department estimates that at least one-third of small systems do not have properly certified operators. Field engineers discover non-compliers while conducting triennial sanitary surveys When non-compliers are found, the regional offices send NOVs and allow systems additional time to obtain a certified operator. The department was given the authority to issue administrative fines in June of 1989, but has not done so yet in this area. The department maintains a computerized list of certified operators. Currently, there are 825 certified operators in the State

NEW JERSEY: The law is found in the General Laws, Title 58 under "Waters and Water Supply," and the regulations are found in the Administrative Code, Chapter 8 under, "Qualifications of Plant Operators." Contacts: Dottie Petito and Barker Hamill, Department of Environmental Protection.

System coverage: All public water systems, including non-transient, non-community systems, are required to have a certified operator. Water treatment facilities and water distribution plants are classified separately. There are four classes of treatment plants, which are based on a point system that accounts for population served, water supply source, and treatment used. Classification of distribution systems, which is based on population served, is as follows: class W1, systems serving fewer than 1,500 people; class W2, systems serving between 1,501 and 15,000 people; class W3, systems serving between 15,001 and 50,000 people; and class W4, systems serving more than 50,001 people. Operators may be permitted to seek employment at more than one facility if one of the facilities is rate assisted This requires a letter from the full-time employer stating that the operator will be released from the full-time employment in case of emergency at the second facility.

Certification process: There are no experience requirements; however, all operators must complete a Department of Environmental Protection (DEP) training course before taking the required exam. The DEP, Bureau of Revenue, Division of Financial Management, Planning, and General Services offers exams three times per year at locations across the State. The DEP generally uses ABC exams. Certificates must be renewed annually and there are no continuing education requirements. There are procedures for revoking operators' certificates and the DEP usually revokes one certificate per year. Reciprocity is granted only to operators with ABC certificates; other operators seeking reciprocity may have the training course requirement waived, but they must still take the exam. Ten operators applied for reciprocity in 1988 and the eight that had taken ABC exams were granted certificates.

Fees: The fees are as follows: application/exam fee, $35; initial license, $25; renewal, $20 per year; and late fee, $10. Fees go to enforcement division revenue but are not specifically earmarked for operator certification. The total program costs could not be estimated.

Compliance: The compliance rate for community water systems is close to 100 percent, while the overall compliance rate is approximately 90 percent. Non-compliers are discovered during on-site inspections, which occur at least once every two years. When non-compliers are detected, the Enforcement Division sends a NOV, followed by a penalty, and an Administrative Order, as necessary. All enforcement actions are published in local newspapers, and the adverse publicity usually elicits prompt compliance. In FY 1989, the Enforcement Division issued 41 Notices of Violation, 13 Enforcement Directives, eight Administrative Orders, and eight Administrative Penalty Assessments (total penalties are usually at least $5,000); all systems came into compliance. Information on operators, which is computerized and updated monthly, is available to the public upon request. There are approximately 6,000 certified operators.

NEW MEXICO: The law governing operator certification is found in the New Mexico Statutes Annotated, Title 61 (Professions and Occupational Licenses) under, "Utility Operators Certification Act." Contact. Martin Quinpana, Environmental Improvement Division.

System coverage: All public water systems, including non-transient, non-community systems, serving more than 2,500 people are required to have a certified operator. There are four system classes which are based on a matrix that accounts for population served and treatment used. The four population levels are as follows: between 2,500 and 5,000 people; between 5,001 and 10,000 people; between 10,001 and 20,000 people; and more than 20,000 people. The 12 treatment types are as follows: groundwater production only; special--desalinization; fluoridation; chlorination; pressure filtration; chemical addition/stabilization; odor and taste control with activated carbon; aeration; chemical precipitation; coagulation, sedimentation, and filtration; sand or gravity filtration; and ion exchange, softening, or de-fluoridation. Operator sharing is not permitted.

Certification process: A high school degree or GED equivalent and a minimum of one year experience is required for all levels. Higher education may be substituted for experience. The Health and Environment Department, Certification and Training Office, administers the certification exams once a year at each of seven locations throughout the State. The exam is modified quarterly by the Advisory Board to the Water Commission and a certification officer Operators must renew certificates every three years and receive 30 training credits within this period. There is a grandfather clause for operators who were certified under the voluntary program, or who were employed on or before January 1, 1974. Certificates may be revoked in the case of fraud or gross incompetence, but this has never occurred

Fees: The fees are as follows: each certificate, $5; renewal, $6 per certificate; and reciprocity, $20 The fees go to general revenue; a proposal for an operator certification program fund did not pass the legislature in 1989

Compliance: All systems serving more than 2,500 people have a certified operator; however, the operators' certificates may not be for the appropriate classification level. There are many systems serving fewer than 2,500 people that are not regulated. Non-compliers are discovered during operation and maintenance inspections. When non-compliers are discovered, the department works with those systems to devise a schedule of compliance. If this is ineffecuve, legal action is considered. The department took approximately eight enforcement actions in the past year. Information on operators is computerized. There are approximately 1,500 operators.

NEW YORK: The law governing operator certification is found in Section 225 of the Public Health Law, 11.60 through 11.75; the regulations are found in Title 10 (Health), Chapter 1, Part II, Subpart 5-4 Contact: Bill Powers, Training/Certification Officer, Bureau of Public Water Supply Protection.

System coverage: All community water treatment systems and all water distribution systems serving more than 1,000 people are required to have a certified operator. The six system classifications, which are based on rated capacity and treatment used, are as follows: class D, distribution systems serving more than 1,000 people; class C, treatment systems which do not use filtration and serve fewer than 1,000 people; class IIB, treatment systems which do not use filtration and serve more than 1,000 people and fewer than 2.5 mgd; class IB, treatment systems which do not use filtration and serve more than 2.5 mgd; class IIA, treatment systems which use filtration and serve less than 2.5 mgd; and class IA, treatment systems which use filtration and serve 2.5 or more mgd. These classifications are used to determine the certificate necessary for operators, but not assistant operators.

Certification process: The education and experience requirements are as follows: class D, successful completion of distribution system operator courses and one year of operational and maintenance experience in a distribution system serving 1,000 people or more, class C, successful completion of appropriate level water treatment operator courses and six months of overall operating experience at any water treatment plant, class IIB, a high school diploma or New York State Equivalency Diploma, successful completion of appropriate level water treatment operator courses, and one year of overall operating experience at a water treatment plant; class IB, a high school diploma or New York State Equivalency Diploma, successful completion of appropriate level water treatment operator courses, and ten years of overall operating experience at a water treatment plant, class IIA, a high school diploma or New York State Equivalency Diploma, successful completion of appropriate level water treatment courses, and one year of overall operating experience at a water treatment plant with facilities for filtration; and class IA, a high school diploma or New York State Equivalency Diploma, successful completion of appropriate level water treatment operator courses, and ten years of operating experience with one year at a water treatment plant with facilities for filtration. Higher education may be substituted for part of the experience requirement for 1A and 1B class operators There are no exams for operator certification; instead, applicants must successfully complete approved training courses These courses include the Bureau of Public Water Supply Protection training courses, State approved course conducted by community colleges, and various correspondence courses such as, California State University at Sacramento course, and those conducted by the New York State Rural Water Associations Certificates must be renewed every four years, and all levels except D require that operators receive continuing education. Levels IA, IB, IIA, and IIB are required to obtain an additional 30 hours of training every four years. Level C required 15 hours every four years. There are procedures for revoking an operator's certificate, and in the past five years, the Department has revoked two certificates New York grants reciprocity. Operators from other States must demonstrate equivalent training and education In 1989, between 20 and 25 out-of-state operators applied for certification, with all but one being certified

Fees: There are no fees for Department-sponsored training courses Registration fees are charged by independent trainers. The State's program is funded through the general revenue fund

Compliance: The Department of Health claims an overall compliance rate of between 85 and 90 percent. The systems most often found in non-compliance are mobile home parks or other class C systems Formal enforcement actions are used to bring systems into compliance with certification requirements, penalties of up to $2,000 may be issued. There are approximately 6,501 certified operators. The Department maintains a computerized list of certified operators, which can be made available to the public upon completion of a FOIL request and payment of $ 25 per page

NORTH CAROLINA. The law governing certification is found in the North Carolina Statutes Annotated, Article 2, Section 90 A, under, "Water Treatment Facility Operators Board of Certification." Contact: John McFadgyn, Public Water Supply Section, Department of Environmental Health and Natural Resources.

System coverage: All public water treatment systems, including non-transient, non-community systems, are required to have a certified operator. There are three system classifications, which are based on a point system that accounts for population served, source of supply, plant capacity, and treatment used. The highest classification is A and the lowest is C. The Department of Environment, Health, and Natural Resources (DEHNR) is considering raising the point totals because they do not adequately account for groundwater treatment and new treatment technology.

Certification process: The education and experience requirements are generally as follows: grade C, a high school degree and one year of experience; grade B, one year of experience with a C level certificate; and grade A, one year of experience with a B level certificate. Higher education may be substituted for part of the experience requirements. Exams are given twice a year throughout the State by the Water Treatment Facility Operators Certification Board, whose members include State health officials, municipal officials, facility operators, university professors, and representatives of the community Operators must renew certificates annually, and renewal is not contingent upon receiving any continuing education credits. As part of the proposed regulatory changes, the DEHNR would like to require that operators obtain continuing education. Certificates may be revoked after a committee appointed by the Board investigates a complaint and makes a recommendation to the Board. Many certificates have been revoked, mainly for failure to pay the fee. The Board grants reciprocity on a case-by-case basis. In 1989, approximately 12 operators applied for reciprocity and all but one were granted certificates. There is a grandfather clause for operators who were certified under the voluntary program, or who were employed as operators in responsible charge of a system before July 1, 1981.

Fees: The fees are as follows: application/exam, $20; renewal, $15; and reciprocity, $15. The fees are designed to cover the operating costs of the Board and are reset each year; any surplus goes into the general fund. The cost of the program (which does not include any training) was $42,000 in 1989.

Compliance: Approximately 90 percent of the 1,500 systems covered under the requirements have certified operators; most of the systems without certified operators are groundwater systems. The Board has limited enforcement powers; it can only recommend action to the DEHNR Secretary The Board sent approximately 500 letters in 1989 informing systems that they needed to have properly certified operators. The 150 systems that did not come into compliance will be recommended for administrative action. Information on certified operators is currently being computerized. There are approximately 3,000 certified operators, although many are consulting engineers who do not work for a water supply.

NORTH DAKOTA: The law governing certification is found in the North Dakota Century Code Annotated, Title 23 (Health and Safety) under, "Water System Operators," while the regulations are found in the Administrative Code, Article 33-19 under, "Certification of Water Distribution and Wastewater System Operators." Contacts: Ralph Riedinger and Eugene Nelson, North Dakota State Department of Health.

System coverage: All community water systems that serve 500 or more people are required to have a certified operator. Non-transient, non-community systems which serve the same 500 or more people year round are also required to have a certified operator. Treatment and distribution systems are classified separately. The four treatment system classifications are based on a complex matrix that accounts for treatment used and population served. Class I is the lowest classification and class IV is the highest. The four distribution system classifications are as follows: class I, systems serving fewer than 1,500 people; class II, systems serving between 1,500 and 15,000 people; class III, systems serving between 15,000 and 50,000 people; and class IV, systems serving 50,000 or more people.

Certification process: The education and experience requirements are as follows: class I, a high school degree and one year of experience; class II, a high school degree and three years' experience; class III, a high school degree and five years' experience, two of which must have been in a position of direct responsible charge; and class IV, a high school degree and seven years' experience, three of which must have been in a position of direct responsible charge. Operators who have some college credits, or who are college graduates, follow different education and experience requirements. Operators who are not high school graduates may be considered if they have additional acceptable operating experience. The North Dakota State Department of Health and Consolidated Laboratories, Division of Water Supply and Pollution Control administers the required exams at least once a year. Operators must renew certificates annually and continuing education credits (CECs) are required. A certified operator not in compliance with the CECs required is subject to revocation or suspension of the certification. The number of CECs to be earned within a three-year period of time are as follows: grade I, 12 CECs; grade II 16 CECs, grade III, 20 CECs; and grade IV, 24 CECs. There are provisions to revoke an operator's certificate, but they have never been used. Operators certified under a previous voluntary program were automatically certified under the mandatory program. There was a grandfather clause for operators who were employed when the initial certification law took effect.

Fees: All certification fees are $10, which must be received with the application for the certification examination. All renewal fees are $5. Currently, these fees are the maximum allowed by State Law. These fees go to a special operator certification fund, but do not cover the entire expense of the program. Funding is supplemented by State general revenue. The total program costs could not be estimated.

Compliance: Of the 328 community water systems in North Dakota, only 121 are large enough to require certified operators. Of these regulated systems, 95 percent have certified operators. There are a number of certified operators for systems that do not require a certified operator. Non-compliers are discovered during on-site inspections. Historically, enforcement of these non-compliers has not been a high priority. Information on operators and systems is computerized and is in the process of being cross-referenced. There are currently 358 water treatment and 207 water distribution certificates. Operators may be certified in both water treatment and water distribution, but only if qualified.

OHIO: Regulations governing certification are found in Ohio Administrative Code 3745-7, under, "Water Supply Works and Wastewater Works Personnel." Both water supply and wastewater treatment are covered by the requirements. Contacts: Kurt Ridennoer and John Sadzewicz, Facilities and Operations Section, Division of Public Drinking Water.

System coverage: All public water systems serving more than 250 people are required to have a certified operator. Current emphasis, however, is limited to community systems and non-community systems which use surface water sources. Treatment and distribution systems are classified separately. The four system classes are based on source of supply, quality of source, complexity of treatment, design capacity, and potential health hazards. Each system is being reclassified so it is difficult to determine a class category. The regulations specify that operators must be "full time employees," although the department sometimes grants exceptions to small systems.

Certification process: The education and experience requirements vary depending on system classification In general, they are as follows: class I, a high school degree and one year of experience; class II, a high school degree and three years' experience; class III, a high school degree and five years' experience; and class IV, a class III certificate, two years' experience as a class III operator, or two years' experience as an assistant to a class IV operator. The required exams, which are written and administered by the agency in consultation with the Advisory Board of Examiners, are offered twice a year in Columbus. The Board is composed of an agency employee, and representatives from municipal water supply, wastewater works, education, and consulting engineering. The Board may grant reciprocity, but there are no written reciprocity agreements. Approximately ten operators applied for, and were granted, reciprocity in 1989 Operators must renew certificates every two years, and renewal is not yet contingent upon receiving continuing education. The Board has the authority to revoke certificates.

Fees: The fees are based on system classification and are as follows: class I, $25; class II, $35; class III, $45, class IV, $55; renewal, $15; limited certificate, $10; late fees, $10. Fees go to general revenue. The total program costs, which do not include training, could not be estimated

Compliance: Approximately 50 percent of the systems use certified operators with virtually all of the large systems having certified operators of the appropriate class. The district office discovers non-compliers during on-site inspections which occur at least every three years. When non-compliers are found, the department sends warning letters, and then, if necessary, takes legal action. Approximately six enforcement actions were taken in 1989 The department maintains a registry of all certified operators, but it is not yet matched with system information. There are approximately 2,250 certified water operators in the State.

OKLAHOMA: The law governing certification is found in the Oklahoma Statutes Annotated, Title 59 (Professions and Occupations) under, "Water and Sewage Works." Drinking water system operator certificates are administered by the Operator Certification Division of the Occupational Licensing Service Contacts: Laird Hughes, Operator Certification Division, Occupational Licensing Service and John Taylor, Department of Health.

System coverage: All community water systems that regularly serve 10 connections or 25 people are required to have a certified operator. The requirements do not apply to non-transient, non-community systems. There are four grades of general certificates, where A is the highest and D is the lowest. There are also limited certificates that allow the applicant to operate a specific element of a water facility, such as the collection or distribution system. Treatment systems are classified by a point system based on treatment type and population served. All surface water CWSs must have a minimum of grade C Certificate.

Certification process: The experience and training requirements are as follows. Grade D, 12 hours of approved training; Grade C, one year of experience and 24 hours of training, Grade B, three years' experience and 70 hours of training: and Grade A, eight years of experience and 100 hours of training. The Operator Certification Division administers the required exams every Monday in Oklahoma City and at other locations throughout the State following training sessions Operators must renew certificates annually and obtain four CEUs per year. The Division may revoke certificates, but have done so only three times in the last five years. Reciprocity is granted on a case-by-case basis In 1989, 25 to 30 people applied for and received certification through reciprocity There is a grandfather clause for operators who were employed by a city or town with a population of fewer than 3,000 and held certificates prior to 1966

Fees: There is a $30 fee for the exam and a $20 fee for renewal. The fees go to program revenue and are earmarked for operator certification. The total budget is $200,000 and includes certification, salaries, and training.

Compliance: The Department of Health (DOH) claims a 98 to 99 percent compliance rate County sanitarians discover non-compliers during their quarterly inspections and work informally with those systems. Sanitarians worked with approximately 100 systems in 1989 to bring them into compliance. The DOH has the authority to issue Administrative penalties and to take legal action Operator information is currently being computerized. There are approximately 4,000 certified operators

OREGON: The law governing certification is found in section 448.405 (Public Health and Safety) and the regulations are found in 333-61 of the Oregon Administrative Rules (under the Office of the Environment and Health). Contacts: Fred Bolton and Ronald Hall, Drinking Water Program, Department of Human Resources.

System coverage: All surface water systems with 15 or more connections and all groundwater systems with 150 or more connections are required to have certified operators. Non-transient, non-community water systems are not required to have certified operators. Systems without treatment or where treatment consists only of disinfection and/or fluoridation are considered distribution systems. These systems are divided into four classifications on the basis of population served as follows: class I (WD I), systems serving fewer than 1,500 people; class II (WD II), systems serving between 1,501 and 15,000 people; class III (WD III), systems serving between 15,001 and 50,000 people; and class IV (WD IV), systems serving more than 50,000 people. Systems using treatment beyond disinfection and/or fluoridation are classified based on a point system that accounts for treatment used, population served, and source of supply. Operators in direct responsible charge are required to be certified at a level commensurate with the classification of the system. Subordinate positions may be certified at a lower classification.

Certification process: The education and experience requirements are as follows· class I, (WT 1), a high school degree and one year of experience; class II, (WT 2), a high school degree and three years' experience; class III, (WT 3), a high school degree and five years' experience; and class IV, (WT 4), a high school degree, two years post-secondary education, a class III certificate, and six years' experience. Some substitution of education for training is allowed. Applicants who pass the class I exam but do not have one year of experience are awarded an operator-in-training (OIT) certificate. Operators who were certified under the voluntary program or who were working at a system prior to September 1987, may apply to take the exam at the plant level at which they were working regardless of their amount of experience. The Drinking Water Program of the State Health Division administers the required exams twice a year across the State Operators must renew their certificates every year and acquire 20 hours of continuing education over two years. The regulations contain provisions for revocation in case of negligence or misconduct, but these have not yet been used. Reciprocity is available on a case-by-case basis. Reciprocity is commonly granted to operators from California, Colorado, Washington, Arizona, and New York.

Fees: The fees are as follows: exam, $35; renewal, $40; reciprocity, $30; and reinstatement, $50. Operators certified as both Treatment Plant Operators and Distribution System Operators may obtain a dual certification for $60. Fees go to program revenue and are marked for operator certification. The program is new, but the fees are expected to cover the total cost of the program ($120,000, including training)

Compliance: Because the program is new, no compliance rate could be estimated. When non-compliers are discovered, the Division sends them Notices of Violation. New regulations will establish civil penalties No enforcement actions were taken in 1989 A computerized directory of operators is being established. There are approximately 1,400 certified operators.

PENNSYLVANIA: The law governing certification is found in Pennsylvania Statutes Annotated, Title 63 (Professions and Occupations), under Chapter 24, "Sewage Treatment Plant and Waterworks Operators," and the regulations are found in the Administrative Code, Title 25 (Environmental Resources), Article II (Water Resources) under, "Operator Certification." Contacts: Bob Slatick, Walt Harner, and Steve Schmidt, Pennsylvania Division of Environmental Resources.

System coverage: All public water systems, including non-transient, non-community systems, which use at least disinfection for treatment are required to have a certified operator. System classification is based on a complicated matrix that accounts for treatment used and design capacity. Systems are divided into three categories based on treatment: 1, systems utilizing filtration including chemical treatment; 2, systems utilizing chemical treatment but not filtration; and 3, systems utilizing disinfection only. Systems are then divided into four classes (A through D) according to their design capacity. An example would be a 1B system, which utilizes filtration, including chemical treatment, and has a plant design capacity of up to 1,000,000 gpd. Grade D is for distribution systems only.

Certification process: The Board for Certification of Sewage Treatment Plant and Waterworks Operators administers the certification program. The Board is composed of five members including the Secretary of Health, a water system operator, a water system owner, a sewage treatment plant operator, and a professor of civil or sanitary engineering. Experience requirements are generally as follows: grade A, eight years' total experience, of which at least three must be operating experience; grade B, six years' total experience, of which at least two must be operating experience; grade C, four years' total experience, of which at least one year must be operating experience; and grade D, two years' total experience, of which at least six months must be operating experience. Substitutions of education and training may be made. Operators must take the ABC exam, which is given by the Board twice a year at seven locations through the State. The Board grants reciprocity to operators on a case-by-case basis. In 1989 approximately 25 operators applied for reciprocity and nearly all were granted certification. Certificates must be renewed every two years, and renewal is not contingent upon receiving continuing education. Pending legislation would change the renewal period to one year in order to generate more revenue. Certificates may be revoked in the case of fraud, negligence or incompetence; most operators facing revocation, however, turn in their certificates before the hearing stage.

Fees: There is a $20 application fee and a $3 renewal fee; these funds go to general revenue The total program costs could not be estimated.

Compliance: No compliance rate could be estimated. Enforcement is done by the regional engineers, who discover non-compliers during on-site visits. When non-compliers are discovered, the Board sends NOVs; approximately 25 systems were sent NOVs in 1989. The Department of Health maintains a list of all certified operators, which is printed every six months and is available to the public for a fee. To date, there are 4,847 active certified water operators.

RHODE ISLAND: Rhode Island has never had an operator certification program. A program was proposed to the State legislature twice, but failed.

SOUTH CAROLINA: The law governing operator certification is found in 40-23-10 (Department of Health and Environmental Control) of the 1976 Code of Laws of South Carolina. The regulations are found in section 51 of the Environmental Certification Board Rules and Regulations. Contacts: Bill Rowell and Robert Malpass, Department of Health and Environmental Control.

System coverage: All community water systems serving more than 50 connections and all other public water systems which use treatment are required to have a certified operator. The five system classifications, which are based on population served, source of supply, and treatment used, are as follows. class I, community systems which serve fewer than 50 connections and do not use treatment, solely distribution systems, or non-community systems which do not use treatment; class II, community systems which serve more than 50 connections and do not use treatment; class III, systems which use simple chemical addition treatment; class IV, systems which use conventional treatment; and class V, systems which use advanced treatment or serve more than 200,000 people. Class I systems are not required to have a certified operator.

Certification process: The operator certification program is managed by the Board of Environmental Certification and its authority is not derived from the State Primary Drinking Water Regulations. The Board is composed of 10 members including system operators, system owners, and representatives of the Department of Health and Environmental Control, education, and State government The certification levels are designated by letter and apply to the system classifications as follows: class II and III facilities require a grade D operator; class IV facilities require a grade C operator, and class V facilities require either a grade B or A operator depending on the population served and the extent of treatment The experience requirements are cumulative; you must complete a year of experience at each level before being eligible to take the exam at the next level (i e. it will take a minimum of four years to receive an A certificate) The Board administers the ABC exams at least twice a month at locations across the State. Operators must renew certificates every year and renewal is contingent upon receiving 12 CEUs every two years. There are provisions for revocation, but suspension occurs more commonly Reciprocity is granted on a case-by-case basis. Seven operators were granted certificates through reciprocity in 1989.

Fees: The fees are as follows: application, $22; renewal, $22; and exam, $22. Fees go to general revenue and are returned to the Board as part of its operating budget (which is approximately $191,841 per year).

Compliance: The compliance rate for water systems which use treatment is between 80 and 90 percent. Non-compliers are discovered during annual sanitary inspections. When non-compliers are discovered, the District office works with the system to bring about compliance. If this is ineffective, Notices of Violation are sent, followed by Administrative Orders, and hearings before the Board of Environmental Health and Control as a last resort The Board routinely issue fines which range from $1,000 to $3,000 Very few enforcement actions were taken solely because systems did not have certified operators. Usually enforcement actions were taken against systems for other violations as well as certified operator deficiencies. The Board maintains a list of certified operators which is updated at least every three years. There are approximately 1,948 certified operators in the State.

SOUTH DAKOTA: The law governing certification is found in South Dakota Codified Laws, Chapter 34 (Environmental Protection) under, "Water Supply and Treatment System Operators," and the regulations are found in the Administrative Rules of South Dakota, Title 74 (Department of Water and Natural Resources) under Article 21, "Water System Operators." Contacts: Rob Kittay and Darron Busch, Office of Drinking Water, Department of Water and Natural Resources.

System coverage: All public water systems which serve more than 500 people are required to have a certified operator. Because most non-transient, non-community systems serve fewer than 500 people, they are usually not required to have certified operators. Treatment plants and distribution facilities are classified separately. Treatment facilities are divided into four classes based on a point system that accounts for population served, treatment used, source of supply, and laboratory control. Distribution facilities are divided into four classes based on population served.

Certification process: Education and experience requirements are as follows. class I, a high school degree and one year of experience in class I; class II, a high school degree and three years' experience in a class I plant or two years in a class II plant; class III, two years of college with a background in environmental science and four years' experience in a class II plant, of which two years must have been in direct responsible charge; and class IV, a bachelor's degree in environmental science and four years' experience in a class III plant, of which two years must have been in direct responsible charge. Some substitutions are allowed. The Board of Certification administers exams for the different classifications at least 12 times per year throughout the State. Certificates must be renewed annually and renewal is contingent upon receiving one CEU, or 10 contact hours, every four years. The Board grants reciprocity on a case-by-case basis. Approximately five operators applied for reciprocity in 1989, and all but one were granted certification Certificates may be revoked in the case of fraud, negligence or incompetence.

Fees: The fees are based on system classification as follows: exam I, $5; exam II, $7, exam III, $9; exam IV, $10; renewal I, $3; renewal II, $4; renewal III, $5; renewal IV, $6 The total cost of the program, which does not include salaries or training, is approximately $4,000 The fees cover 100 percent of the costs.

Compliance: The overall compliance rate is approximately 80 percent; most of the non-compliers are small systems. The Board uses informal enforcement measures to bring systems into compliance. If these measures fail, the Board may take legal action. In 1989, legal action was taken against six systems. Information on operators is computerized and can be easily cross-referenced with system information.

TENNESSEE: Tennessee Statutes Annotated, Title 63 (Safety and Health) under, "Water Environmental Health." The rules are in the Department of Health and Environment, Board of Certification for Water and Wastewater Operators, Chapter 1200-5-3. They are called "Rules Governing the Water Environmental Health Act." Contacts: Jim Coe and James Haynes, Department of Health and Environment.

System coverage: All public water systems serving more than 15 connections or 25 people for 120 days per year (or 60 consecutive days per year) are required to have certified operators. Water systems that serve fewer than 50 connections and do not use treatment or filtration are exempted from the requirements. There are eight different system classifications. Water treatment plants using filtration are divided into four grades based on a point system that accounts for the following: design flow, water supply source, treatment process (e.g., aeration, coagulation, flocculation, etc.), chemical treatment, and laboratory control. The other four classes are as follows: Grade I Chlorination, treatment systems requiring only chlorination; Grade I Chemical Control, treatment systems requiring only chemical control in addition to using disinfection; Grade I Distribution, distribution systems serving between 50 and 5,000 connections; and Grade II Distribution, distribution systems serving more than 5,000 connections. Certified operators may be responsible for more than one system if the systems are in close proximity to one another.

Certification process: Education and experience requirements vary depending on system classification. The requirements for filtration system operators are as follows: grade IV, a B.S. degree in engineering or science related field and 12 months' operating experience in a grade III or grade IV plant, or a high school diploma or GED certificate and 60 months' experience in a grade III or IV plant; grade III, a high school degree and 12 months' experience at a grade II or III plant or 48 months' experience at a grade I plant; grade II, a high school degree and 12 months' experience at a grade I or II plant; and grade I, an eighth grade education and 12 months' experience at a grade I plant. The requirements for Grade I Chlorination and Grade I Chemical Control operators are the same as those for grade I filtration system operators. Grade I Distribution operators must have an eighth grade education and 12 months' experience and Grade II Distribution operators must have a high school degree and 12 months' experience. Some substitutions of higher education for experience at a higher grade plant are allowed. The Board for Water and Wastewater Certification, which is composed of two water or wastewater operators, one representative of municipalities, one university faculty member, and one representative of the Department of Health and Environment, administers the required exams twice a year at three locations throughout the State. Operators must renew their certificates annually and one "continuing education activity" must be completed every three years. "Continuing education activities" include training courses sponsored by the Operator Training Center, Board seminars, and other approved courses. Reciprocity may be granted if the requirements of another State are comparable and if similar privileges are extended. Each year, between 20 and 30 operators apply for certification through reciprocity and at least 75 percent of them are granted certificates.

Fees: The fees are as follows. exam application, $10; initial registration, $10; and renewal, $10. Fees go to general revenue. The total combined water and wastewater program costs are approximately $67,000 (these do not cover training).

Compliance: The Board claims a compliance rate of approximately 90 percent for community systems, but a compliance rate of fewer than 10 percent for non-community systems. Non-compliers are discovered during sanitary surveys. Enforcement tools range from letters of violation to court proceedings. In 1989 the Board issued between six and twelve civil penalties to systems without certified operators. Information on operators is computerized and is updated when systems send annual reports and when operators renew their certificates. The Board has issued between 1,500 and 1,800 certificates, however, the number of certified operators is lower because many operators hold more than one certificate.

TEXAS: The law governing operator certification is found in Texas Statutes, General Article 44.771, Chapter 341. The regulations are found in the Texas Administrative Code, Title 25 (Health Services), Chapter 337 (Water Hygiene) under, "Certification of Water Utility Personnel." Contact: Charles Maddox, Bureau of Environmental Health, Department of Health.

System coverage: All community water systems are required to have certified operators. There are six grades of operator certificates which are as follows: Grade A Water; Grade B Surface Water; Grade B Groundwater; Grade C Surface Water; Grade C Groundwater; and Grade D Water. Grade A Water is the highest certificate and Grade D Water is the lowest. The Texas Department of Health determines what grade of operator each system requires.

Certification process: Grade A through C operators must have a high school degree or equivalent. The training and experience requirements for operators who do not have a college education are as follows: Grade D Water, 20 hours of training credit; Grade C Groundwater or Surface Water, two years' experience and 60 hours of training; Grade B Groundwater or Surface Water, five years' experience and 100 training hours; and Grade A Water, eight years' experience and 160 training hours. Operators with college or graduate degrees may have the experience requirement reduced. The exams, which all operators must take, are written by the Department of Health and the Certification Advisory Committee. Operators may take the appropriate level exam five days per week at 15 test centers throughout the State Reciprocity may be granted if another State's requirements are comparable and if similar privileges are granted in return. Certificate renewal is dependant on system classification: Class A must be renewed every 8 years, class B every 5 years, class C every 3 years, and class D every 2 years Renewal is also contingent upon receiving a certain number of classroom training hours--class A needs 80 hours, B needs 50 hours, C needs 30 hours, and D needs 20 hours. Certificates may be revoked in the case of fraud, negligence, or incompetence.

Fees: The application fees, which are based on classification level, are as follows: class A, $80; class B, $50; class C, $30; and class D, $20. The renewal fees are the same as the application fees

Compliance: Approximately 85 percent of community water systems comply with the certification requirements. Non-compliers are discovered during on-site inspections conducted by the field offices. Fines and penalties of between $10 and $200 per day may be assessed. Information on operators is computerized, but not published. Approximately 10,300 certificates have been issued since the certification program was started. Operators may hold more than one certificate.

UTAH: The law governing certification is found in the Utah General Statutes, 26-12-5, in the Health Code, and is called the Safe Drinking Water Act. The regulations are found in R449-301 of the Utah Administrative Code and are entitled, "Required Certification Rules for Water Supply Operators in the State of Utah." Contacts· Kenneth Bousfield and Gayle Smith, Bureau of Drinking Water/Sanitation.

System coverage: All community water systems serving more than 800 people are required to have a certified operator. There are separate requirements for treatment and distribution systems. The water treatment classification applies only to those public water supplies operating coagulation and filtration treatment plants. The water distribution classification, however, applies to groundwater systems which may or may not use chlorination. Both the treatment and the distribution classifications are based on a point system with four grades. Grade I is the lowest and grade IV is the highest. The grades vary depending on the following: population served, pumping capacity, treatment used, laboratory equipment employed, and quantities of water produced. The grades generally correlate with population served because large systems often use more complex treatments. Grade I usually applies to systems serving fewer than 800 people, and is thus voluntary for operators. Some systems may require both treatment and distribution operators. Operators may work for more than one system and hold more than one certificate.

Certification process: The experience requirements for both treatment and distribution operators are as follows· grade I, one year of experience; grade II, three years of experience; grade III, six years of experience, of which three must be in responsible charge; and grade IV, ten years, of which five must be in responsible charge. Education may be substituted for experience. For example, a grade IV operator, with a college degree would need four years of experience, of which two must be in responsible charge. The Department of Health (DOH) writes and administers the required exams for each operator class. Exams may be taken twice a year, in November and April, at 12 different locations. Reciprocity may be granted if the operator certification requirements from the other State are comparable. Approximately 12 operators applied for, and were granted, reciprocity in 1989. Certificates must be renewed every three years; operators for the upper two grades must receive three CEUs, and operators for the lower two grades must receive two CEUs. The DOH approves all continuing education. Although de-certification procedures exist, they have not been used.

Fees: The fees are as follows: application, $20; exam, $50; renewal, $50; and reciprocity, $50. Fees go to program revenue to help offset the program costs. Program funds help support the newly-instituted lending library, home-study materials, a semi-annual newsletter, and all administrative costs.

Compliance: Compliance with the requirements is estimated at 99 percent. Notices of Violation are the most commonly used method of bringing systems into compliance; legal action is rarely taken. The department maintains a computerized list of all certified operators, which can be easily cross-referenced with system information. To date, there are 747 certified operators: 138 grade I, 160 grade II, 174 grade III, and 275 grade IV Operators who receive certificates are listed in the newsletter, "Open Line."

VERMONT: The rules governing operator certification are revised from the Department of Health Regulations, Environmental Control, Chapter 5, Subchapter 12. Contacts: Harold Sargent and Harold Reeves, Department of Health.

System coverage: All public water systems serving more than 25 people are required to have certified operators. There are four system classifications based on treatment used and three sub-classifications based on population served. Systems are classified by treatment as follows: class I, non-community systems, both transient and non-transient, using no treatment except ion exchange water softening; class II, community and non-community systems, which use disinfection by chlorination, including ion exchange; class III, community and non-community systems using chemical additions only, and class IV, community and non-community systems using chemical and mechanical treatment. The population classifications are as follows: A, serving between 25 and 500 people; B, serving between 501 and 3,300 people; and C, serving more than 3,300 people.

Certification process: The experience requirements are as follows: operator-in-training, three months; class I, one year; class II and III, one and one-half years; class IVA and IVB, two years; and class IVC, three years. For classes II, III, and IV, post-secondary education may be substituted for up to 50 percent of the experience requirement. All operators must have 12 years of education; however, additional experience may be substituted for some education. Renewal periods depend on system classification: class I and II certificates must be renewed every five years; class III, every three years, and class IV every two years. Continuing education is mandatory for class II, III and IV operators, who must attend State sponsored seminars or other approved instruction each year as follows· for class II, 2 hrs/yr, and for class III and IV, 4 hrs/yr are required. Class I operators are encouraged to attend three hours of State-approved seminar or instruction every two years. Operators from other States may be granted reciprocity if their State has similar requirements and extends the same privileges in return. Operators employed prior to adoption of the date of the certification regulations are not required to take the examination. Certificates may be revoked due to fraud, incompetency, or falsification of records, after a hearing before the Division Director.

Fees: There is no fee system for operator certification. The only fees charged are for training materials.

Compliance: Statistics on compliance were not available.

VIRGINIA: The laws governing certification are found in the Code of Virginia, Title 54.1 (Professions and Occupations), Chapter 23 (Waterworks and Wastewaterworks Operators). Contact: Robert Blauvelt, Office of Water Programs, Department of Health.

System coverage: All public water systems serving more than 400 people are required to have a certified operator. Systems are classified on the basis of treatment and population served as follows. class IV, systems serving between 400 and 5,000 people and using minimal treatment (disinfection, softening, Fe/Mn removal, etc.); class III, systems serving 5,000 people or more and using minimal treatment, systems serving 400 to 5,000 people (under 0.5 mgd capacity) using conventional treatment, and systems serving fewer than 5,000 people using fluoridation; class II, systems serving between 5,000 and 50,000 people (between 0.5 mgd and 5 mgd capacity) using complete treatment, and, systems serving fewer than 50,000 people (5 0 mgd capacity) using high rate filtration; and class I, systems serving 50,000 or more people (or rated capacity of 5.0 mgd or more).

Certification process: The program is split between the Department of Commerce (DOC) and the Department of Health (DOH) The DOC is responsible for operator licensure and compliance, while the DOH is responsible for system compliance. All operators must have a high school degree or its equivalent. The experience requirements vary depending on system classification and the operator's education (B.S. degree, high school, or no diploma) and range from six months to ten years. In Virginia, drinking water system operation is a licensed profession, and it is illegal to practice the profession without a license. Operators must pass a licensing exam that is administered by the DOC's Board for Waterworks and Wastewater Works Operators twice a year at five locations throughout the State. Operators must renew their certificates every two years. State policy prohibits continuing education requirements for license renewal. The Board can fine, suspend, revoke or fail to renew a license if the operator falsifies reports or fails to use "reasonable care" in the performance of job duties. Usually operators receive short suspensions, although two licenses have been revoked in past two years. Reciprocity is granted on a case-by-case basis to operators from States having comparable requirements Almost 100 percent of those applying for reciprocity were granted licenses in 1989 The statutes contain a grandfather clause which will expire in 1994-1995 The grandfather clause was originally intended to apply only to "operators in responsible charge" before 1971, however, the DOC granted certification to anyone working at a system during that time.

Fees: The fees are as follows: application, $55; re-application, $35; renewal, $35; and late penalty for renewal, $35. The fees are set by the DOC and contribute to the budgets of the Miscellaneous Boards of Certification; they are roughly earmarked for operator certification. DOC regulations require the fees to cover the cost of the program. The program does not cover any training because training is the jurisdiction of the DOH.

Compliance: The compliance rate with community water systems is approximately 90 percent, but the compliance rate for non-community systems is much lower because they have only been regulated since July 1, 1989 Non-compliance is discovered during on-site inspections by DOH When the DOH finds non-compliers, it reports to the DOC which can hold hearings before the Board for Waterworks and Wastewater Works Operators. Simultaneous proceedings against the system can be undertaken by the Department of Health. Very few enforcement actions have been taken, although enforcement actions have increased in 1990. Information on operators is maintained by the DOC. This information can be made available to the public for a fee of $65 per category of operator. There are approximately 1,500 licensed waterworks operators.

WASHINGTON: The law governing certification is found in Title 70 (Public Health and Safety), "Water Supply System Operators." The regulations are found in Washington Code, Title 248 (Division of Health), chapter 55, "Waterworks Operator Certification." Contact: Cheryl Burgener, Operator Certification Unit, Department of Social and Health Services.

System coverage: All public water systems with at least 100 service connections, and all surface water systems which serve at least 25 people and which are required by law to use a filtration system, must have a certified operator. Treatment and distribution systems are classified separately. Classification of treatment systems is based on a point system which accounts for treatment used, complexity of the plant, and source of supply Distribution systems are classified according to population served as follows: class I, systems serving fewer than 1,500 people; class II systems serving between 1,501 and 15,000; class III, systems serving between 15,001 and 50,000; and class IV, systems serving more than 50,000 people.

Certification process: Education and experience requirements are as follows: operator-in-training, a high school degree and three months' experience; class I, a high school degree and one year of experience; class II, a high school degree and three years' experience; class III, a high school degree, two years of college, and four years' experience; and class IV, a high school degree, four years of college, and four years' experience (substitutions on education and experience requirements may be allowed in certain cases). The required exams are written by the Department of Health (DOH) and the Water and Wastewater Operator Certification Board of Examiners, which is composed of water and wastewater operators, a Sewer and Water Commissioner, and a member of the DOE and the DOH. Exams are administered three times per year at 10 locations throughout the State. Certificates must be renewed annually and renewal requires demonstration of professional growth every three years. A certificate may be revoked after a hearing before the Board, but this has never been done. Reciprocity is not granted to any State. There was a grandfather clause for persons who were certified under the voluntary program before 1978.

Fees: The fees are $20 for the exam/application and $10 for renewal. The fees go to general revenue. The budget for the program, which does not include training, is approximately $103,000 per year.

Compliance: The overall compliance rate for operator certification is approximately 85 percent. Most non-compliers are small systems that experience a high turnover rate of operators. Non-compliers are discovered when system and operator information are cross-referenced. Some lending institutions ensure that systems are in compliance prior to granting them loans. Informal enforcement measures are commonly used to bring systems into compliance. Non-complying systems can be fined up to $100 per month. Civil penalties may also be used; in the last two years approximately 10 systems were issued civil penalties Information on operators is computerized and is easily cross referenced with system information. There are 2,500 certified operators.

WEST VIRGINIA: The regulations governing operator certification are found in Legislative Rules, Title 64, Chapter 16, Article 1, Section 7(2). Contact: Barbara Thompson, Environmental Engineering Division, Department of Health and Human Resources.

System coverage: The requirements apply to all public water systems. System classification is based on a point system that accounts for treatment used, source of supply, and population served The point breakdowns roughly follow these population sizes: Class I-D, systems serving fewer than 500 people; Class I, systems serving between 501 and 1,500 people; class II, systems serving between 1,501 and 15,000 people; class III, systems serving between 15,001 and 50,000 people; and class IV, systems serving more than 50,000 people.

Certification process: The education and experience requirements are as follows: Class I-D, an 8th grade education and three months of experience at a class I-D plant or higher; class I, a high school degree and one year of experience at I-D plant or higher; Class II, a high school degree and three years' experience, at least one of which must be at a class I plant or higher; class III, a high school degree, 90 CEUs, and five years' experience, at least one of which must be at a class II plant or higher; and Class IV, a high school degree, 180 CEUs, and six years' experience, at least one of which must be at class III plant or higher. Some substitution of advanced education for experience is allowed for classes II, III, and IV only Certification for levels I, II, III, and IV must be attained in sequence. Operators must pass an exam and work for a water system in the State to be certified. Each district office administers the exams once a month and bi-monthly in the Charleston office. Certificates must be renewed every two years and there are no continuing education requirements. The provisions for revocation require a letter from the Division. A hearing may follow if the operator involved so desires. Fewer than 10 operators have had their certificates revoked in the last four years. Reciprocity is not granted; operators from other States must provide a letter of recommendation and pass the appropriate exam.

Fees: There are no fees. The program costs include one day training sessions for level I-D operators and a special area for level I and II operators to come to for training. The total program costs could not be estimated. The program is funded by the general revenue.

Compliance: The overall compliance rate for operator certification could not be estimated. Non-compliers are discovered when systems file monthly operating reports, during in-plant inspections by Division engineers, when complaints are filed, and during certification renewal. Computer files on operators are easily maintained and updated by operation report activity, certification renewals, certification progressions, or any career action involving the operators. The information on operators can be cross-referenced easily with system information by using the system ID number No information was available on the number of enforcement actions taken in 1989.

WISCONSIN: The laws governing operator certification are found in Section 144.025(e) of the Wisconsin Statutes. Contacts. Tom Nicholson and Robert Baumeister, Bureau of Water Supply, Department of Natural Resources.

System coverage: All municipal water systems are required to have a certified operator; certification requirements do not apply to non-municipal community, and non-transient, non-community systems. Classification of systems is based on the treatment used and the source of supply. The classes are as follows: groundwater systems using no treatment; distribution systems; systems using lime softening; systems using zeolite softening; systems using iron removal; systems using volatile organic removal; and surface water systems using no treatment. Water systems may have multiple classifications (e.g., systems using both lime softening and iron removal).

Certification process: There are no education or experience requirements There are two levels of certificates for each system class· "T", for operators who pass an exam but have no experience; and "1", for operators who pass an exam and have one or more years of experience The Certification and Testing Office of the Department of Natural Resources (DNR) administers the exams twice a year at four locations throughout the State. It is possible for a system to fall under multiple classes in which case the operator would need more than one certificate. Certificates must be renewed every two years and all levels must receive 12 hours of continuing education per renewal period. Operators may have their certificates revoked. A few years ago, the DNR began publishing an annual operator newsletter with the names of operators whose certificates had been revoked. Following this, the number of revocation proceedings dropped from between six and seven per year to zero. Reciprocity is granted to applicants who have at least one year of experience. Approximately 30 operators were certified through reciprocity in 1989.

Fees: The fees are as follows· exam, $15; reciprocity, $40; renewal, $20; and late penalty, $20. The fees go to general revenue; however, the DNR is currently working to establish a Water Supply Fund to support salary and training costs. The total program costs are approximately $200,000

Compliance: The overall compliance rate is approximately 93 percent; the majority of systems not in compliance are small systems. Non-compliers are discovered during sanitary inspections and through yearly turnaround documents. When a non-complier is found, the District office meets with that system to establish a schedule of compliance. If this is ineffective, enforcement proceedings are initiated Between five and six enforcement proceedings were taken in 1989 Information on operators is computerized and can be easily cross referenced with system data. There are approximately 1,200 certified operators.

WYOMING: The laws governing certification are found in Wyoming Statutes 35-11-302. The regulations, entitled, "Certification of Operators of Public Water and Wastewater Treatment Plants, Public Collection and Distribution Systems," are found in the Water Quality Division, Chapter V. Contact: Louise Emerson, Wyoming Drinking Water Program.

System coverage: All public water systems, including non-transient, non-community systems, which have twenty or more service connections are required to have a certified operator. There are four system classifications. Systems are classified according to a point system based on population served, treatment used, and source of supply. All systems are required to have at least two certified operators; some of the largest systems may have as many as 40 certified operators.

Certification process: The experience requirements are generally as follows: class I, one year of experience; class II, four years' experience; class III, six years' experience; and class IV, eight years' experience. Education, training hours, and experience at the previous level system may be substituted for part of these requirements. The chief operator must have certification equal to that of the plant classification, and the backup operator must be certified at no lower than the previous level. There is an operator-in-training classification for operators who have not obtained the necessary amount of experience. Exams are administered by the Department of Environmental Quality (DEQ), Water Quality Division, twice a year throughout the State. Special oral exams may be given. Certificates must be renewed every three years and renewal is contingent upon receiving continuing education. Operators must receive between 14 and 28 CEUs per three years depending on their classification. Revocation requires a hearing before the Water Quality Board, but this has never occurred. Reciprocity is not granted; operators from other States are given two exam cycles in which to pass the Wyoming exam.

Fees: Because the State is sparsely populated and operators may have to travel long distances to take the exams, the State does not require fees for certification. The only fees are for department-sponsored training sessions. The total program costs could not be estimated. The program is funded through State and federal revenue.

Compliance: Approximately 15 percent of the systems in Wyoming are in compliance with all applicable operator certification requirements. The Department is currently working with systems to inform them of their required operator classifications. Non-compliers are discovered during on-site inspections. The DEQ uses informal enforcement to bring systems into compliance. Approximately 80 Letters of Violation were sent in 1989 Administrative Orders are authorized by regulation, but have never been used. Information on operators is computerized and is cross-referenced easily with system data. There are approximately 650 operators.