

# STATE OF COLORADO

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Colorado Department  
of Public Health  
and Environment

## **Drinking Water Capacity Development Program Report to the Governor**

Submitted to the Governor

By the Water Quality Control Division  
Colorado Department of Public Health and Environment  
September 30, 2005



# Drinking Water Capacity Development Program Report to the Governor

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*Submitted by*

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## EXECUTIVE SUMMARY

The 1996 Safe Drinking Water Act amendments require that a report of the effectiveness of Colorado's capacity development program be provided to the Governor by September 30, 2002, followed by a new report every three years. Failure to provide the reports to the Governor by the specified dates will result in the loss of 20 percent of the federal capitalization grant Colorado is otherwise eligible to receive. This capitalization grant (\$13 million in 2005) augments the annual EPA Drinking Water Performance Partnership Grant (\$1.3 million) and provides Colorado funds for loans to build drinking water system facilities and to assist in implementing the state Drinking Water Program.

The Safe Drinking Water Act (Act) establishes minimum national requirements applicable to public water systems, and provides federal funding to states that develop and implement programs to enforce these minimum requirements. The 1996 amendments to the Act recognize the importance of the use of prevention activities to ensure delivery of safe drinking water, rather than only responding to violations, a strategy that may only fix problems once consumers are adversely affected. These amendments established major new program requirements and provided incentive-based funding mechanisms, including the capacity development program.

The Colorado Drinking Water Program continues to meet all of the 1996 Act's mandatory requirements to retain primary enforcement authority. In addition, it meets all of the required additional administrative requirements, including strategy development and implementation, necessary to retain full funding of the new federal capitalization grant. Finally, the Drinking Water Program has successfully designed, coordinated, and is now implementing a capacity development program that meets the federal requirements for full funding. More importantly, the Capacity Development Program is helping public water systems identify and respond to capacity deficiencies that, if unresolved, may endanger the safety of the water provided to consumers.

The strategy developed for the program provides elements to assist both new and existing public water systems. This strategy focuses on four key elements: 1) assist Public Water Systems (PWSs) to comply with all pertinent regulations, 2) gather information on capacity deficiencies, 3) encourage the development of partnerships, and 4) assist with training and operator certification. A primary tool is the newly developed Systems of Concern project, where resources are directed to those systems requiring the greatest assistance. Other projects are also directed at all four key elements.

There are many positive results that can be attributed, at least in part, to Capacity Development Program activities. For example, new systems are reviewed prior to start-up, and are required to meet minimum criteria in technical, managerial, and financial capacity. With one minor exception, these systems are staying in compliance with all applicable regulations.

The Systems of Concern Project has assisted 32 drinking water systems (23% of 140 systems) achieve full compliance, (some are awaiting full testing results to confirm compliance).

Sanitary surveys and inspections are completed for approximately 850 community and non-community drinking water systems each year, to assure proper operation and to identify any deficiencies in the design and operation of these systems that may compromise the safety of the water.

Comprehensive Performance Evaluations and Technical, Managerial, and Financial Assessments are conducted at selected public water systems each year. Selection is based on historical compliance and inspection issues, so as to assist these systems to identify and resolve significant performance limiting factors.

Training in nearly every facet of drinking water system management and operation is conducted or supported by the Capacity Development Program. Hundreds of drinking water system managers and operators participate in this training each year.

The preventive approach to

## DEFINITIONS

Public water systems are those that serve 25 or more people daily for at least 60 days of the year. There are two kinds of public water systems: community and non-community.

**Community public water systems** (e.g., cities, towns, subdivisions, etc.) serve 25 or more year-round residents.

**Non-community systems** are defined as those that are not community public water systems. There are two categories of non-community public water systems:

- **Transient** (e.g. restaurants, campgrounds, etc.) serve 25 or more different people daily.
- **Non-transient** (e.g. school, business, etc.) serve 25 or more of the same people daily for six or more months of the year.

**Maximum Contaminant Level Goal (MCLG):** the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. Maximum contaminant level goals are non-enforceable health goals.

**Maximum Contaminant Level (MCL):** the maximum permissible level of a contaminant in water, which is delivered to any user of a public water system.

**Maximum Residual Disinfectant Level Goal (MRDLG):** the maximum level of a disinfectant added for water treatment at which no known or anticipated adverse effect on the health of persons would occur, and which allows an adequate margin of safety. MRDLGs are non-enforceable health goals and do not reflect the benefit of the addition of the disinfecting chemical for control of waterborne microbial contaminants.

**Maximum Residual Disinfectant Level (MRDL):** a level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap without an unacceptable possibility of adverse health effects. For chlorine and chloramines, a PWS is in compliance with the MRDL when the running annual average of monthly averages of samples taken in the distribution system, computed quarterly, is less than or equal to the MRDL.

**Action Level:** The level of lead or copper which, if exceeded in over 10% of the homes tested, triggers treatment or other requirements that a water system must follow.



building full water system capacity is embodied in the 1996 SDWA amendments and associated Capacity Development Program support. This approach is essential to prevent public water systems' failures, and from a public health perspective is preferential to responding with enforcement after consumers have been adversely affected.

A major challenge for the future is to maintain consistent program funding sufficient to ensure retention of primary enforcement authority in the face of new regulatory requirements and to continue implementation of a prevention-based drinking water system capacity development program. It is also important for Colorado to continue to provide the state resources required to maximize the Drinking Water Program funding from federal sources.

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## I. INTRODUCTION

This report provides an overview of the Capacity Development Program implemented by the Water Quality Control Division (WQCD) of the Department of Public Health and Environment (CDPHE). The report is a requirement of the Safe Drinking Water Act. It also provides a review of the program's impact on Colorado public water systems and their associated compliance rates and operational practices that ultimately affect the health and well being of the citizens of Colorado.

Capacity Development is a frequently misunderstood term, but the simplest description is a program designed to build capabilities in public water systems (PWS) to provide continuously safe drinking water to their customers. The program is not designed to build physical infrastructure per se, but to enhance the ability of the PWS to manage and operate their existing infrastructure effectively, and to identify those situations where infrastructure changes are essential. Other efforts within the Drinking Water Program focus on ensuring that infrastructure of the system is adequate. Capacity Development is separated into three parts, Technical Capacity, Managerial Capacity and Financial Capacity, known as TMF Capacity.

This report covers efforts during state fiscal years 2003 through 2005. Many of the projects and efforts of the Capacity Development Program are continuous, so projects started during the previous reporting period are still ongoing. Others have terminated, been modified, or replaced with more appropriate efforts. The key consideration is that a Capacity Development Program is a long-term effort with results often becoming visible only years after a project is initiated. Measurement of the outcomes of such an effort should be made over a similar timeframe, and are described in the section of this report titled Program Efficacy.

The Colorado Capacity Development Program is funded from several sources that are integrated into one comprehensive program. The funding for these efforts include several specific set-asides from the Capitalization Grant for the Drinking Water Revolving Loan Fund, specifically the Program Management Set-Aside, the Capacity Development Set-Aside, the Small Systems Training and Technical Assistance Set-Aside and the Well Head Protection Set-Aside. In addition, Colorado received a one-time grant from EPA, the Operator Certification Expense Reimbursement Grant, which is also used in an integrated manner to provide resources to develop training materials and programs.

This report describes the genesis of the program, the strategic planning that guides the program, work plans developed annually to implement the strategy, and specific accomplishments highlighted by examples of some of the more successful efforts. The report concludes with a measurement of the impact of the program, description of future expectations and challenges, and a summary.

The 2002 Drinking Water Capacity Development Program Report to the Governor should be consulted if additional historic information is desired. That report can be found at [http://www.cdphe.state.co.us/wq/Drinking\\_Water/pdf/CapacityDevelopment/GovernorsReport\\_093002.pdf](http://www.cdphe.state.co.us/wq/Drinking_Water/pdf/CapacityDevelopment/GovernorsReport_093002.pdf).

#### A. Overview of the Safe Drinking Water Act

The Safe Drinking Water Act, originally enacted in 1974, established a national program to ensure the safety of public drinking water systems. The Act's emphasis was directed primarily at establishing maximum contaminant levels (MCLs) in the water delivered at the consumer's tap by public water systems. It also provided grant funding and authority for states to implement the Public Water System Supervision program after receiving Environmental Protection Agency (EPA) approval called "primacy."

The Safe Drinking Water Act was significantly amended in 1986 to improve control of microbiological contaminants, control organic contaminants from natural and man-made sources, control sources of contamination after water treatment and during distribution, and to encourage protection of sources of drinking water.

The regulations developed by EPA to address the requirements of the 1986 amendments began the transition to a set of significantly more complicated regulations than their predecessors. But the sea change for the Safe Drinking Water Act and its implementing framework arrived with the 1996 amendments. In addition to continuing the traditional regulatory approach on a more demanding schedule, the 1996 amendments established a strong new emphasis on preventing

#### RECENT PRIORITY RULEMAKINGS

**Arsenic Rule Revisions:** The rule revises the existing 50 parts per billion (ppb) standard to 10 ppb. Primacy application submitted to EPA on 12/06/02.

**Consumer Confidence Reports:** EPA requires suppliers to put annual drinking water quality reports into the hands of their customers.

**Disinfectants/Disinfection Byproducts Rule:** A major challenge for water systems is how to balance the risks from microbial pathogens and disinfection byproducts. Primacy application submitted to EPA on 9/30/02.

**Interim Enhanced Surface Water Treatment Rule:** Builds upon the treatment approach and requirements of the 1989 Surface Water Treatment Rule. Relies on existing technologies currently in use at water treatment plants. Primacy application submitted to EPA on 9/30/02.

**Lead and Copper Rule Revisions:** EPA estimates that approximately 20 percent of human exposure to lead is attributable to lead in drinking water. Primacy application submitted to EPA on 5/07/04.

**Public Notification Rule:** Public notification immediately alerts consumers if there is a serious problem with their drinking water (e.g., a boil-water emergency). Primacy application submitted to EPA on 12/16/02.

**Radionuclides Rule Revisions:** EPA has updated its standards for Radionuclides in drinking water. Primacy application submitted to EPA on 12/06/02.

**Unregulated Contaminant Monitoring Rule:** EPA uses data gathered by the rule to evaluate and prioritize contaminants EPA is considering for possible new standards. No adoption by Colorado is required, but Colorado assists EPA with sample collection at small systems to ensure sampling quality, and applied for primacy on 10/29/04.

**Long Term 1 Surface Water Treatment Rule:** EPA has extended the requirements of the SWTR to systems serving fewer than 10,000 people. Primacy application was submitted to EPA on 5/07/04.

**Filter Backwash Recycle Rule:** In order to prevent the reintroduction of microorganisms previously removed by filtration, EPA requires control of the recycle stream in water plants. Primacy application

contamination, and preventing the formation of new systems without adequate capacity; it also provided funding for the associated costs through a new and unique approach: the use of set-asides from the newly authorized revolving fund capitalization grant. This emphasis transformed the previous law, which had an after-the-fact regulatory approach, into a statute that recognized the need for and provided capital resources to prevent the multiple risks of contamination that threaten the public's drinking water. Four explicit themes characterize the 1996 SDWA amendments:

- Making more and better information about drinking water available to consumers;
- Improving drinking water regulation development with better science, risk assessment and prioritization of effort;
- Providing new funding for infrastructure construction through the Drinking Water State Revolving Fund, and for state drinking water programs through use of set-asides from the loan fund capitalization grant; and
- Encouraging new and stronger approaches to prevent drinking water health risks through source water protection, operator certification and capacity development programs.

A fifth theme, not clearly visible, also is woven into the Act's 1996 amendments: the need for significantly increased resources for states to adopt and implement, in a relatively compressed timeframe, a vast array of new and highly complicated regulations and administrative requirements. State programs are required to accomplish these tasks or face losing either primary enforcement authority or a substantial portion of their capitalization grant under the State Revolving Fund provisions of the Act's 1996 amendments.

## B. Colorado Program Changes Since 2002

### 1. Staffing Levels

During the period 2002-2005, six federally funded FTEs have been added to the Drinking Water Program staff to assist public water systems meet the requirements of the new rules and for the program to meet SDWA responsibilities. Of these, 2.8 positions specifically support capacity development activities, bringing to five the total number of federally funded positions devoted to capacity development activities.

### 2. Drinking Water Program Data System

The Drinking Water Program database is at the heart of the program's ability to track public water system compliance and respond to violations. The Colorado drinking water data system has undergone significant changes since 2002, as described later in the section on program activities. However, significant challenges remain to develop and implement a system that provides adequate management information in a timely manner.

### 3. Drinking Water Program Revisions – Required Activities

Activities that are necessary to maintain primacy are mandatory in that failure to perform these activities ultimately would result in revocation by the EPA of Colorado’s primary enforcement authority and all associated federal funding (federal program grant and capitalization grant – approximately \$14 million annually) to support the Drinking Water Program. Under these circumstances, Colorado public water systems would still be subject to compliance with all of the national primary (health-related) drinking water regulations, but would not have the compliance assistance or infrastructure improvement resources provided, primarily through the capitalization grant to prompt compliance.

Table 1 depicts all recent primacy-mandated activities and their associated due dates. EPA primacy approval has been received for each and requires Colorado to develop and adopt regulations at least as stringent as the federal regulations and to submit a formal primacy application. The Colorado regulations must be developed with public participation and must be formally adopted by the Colorado Board of Health following applicable administrative procedures.

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Table 1. Primacy-Mandated Activities

<b>Primacy-Mandated Activity</b>	<b>Date Due</b>	<b>Status</b>
Adopt Radionuclides Rule	12/07/02	Completed
Adopt Public Water System’s Definition	12/16/02	Completed
Adopt Analytical Methods	12/16/02	Completed
Adopt Interim Enhanced Surface Water Treatment Rule	12/16/02	Completed
Adopt Disinfectants/Disinfection Byproducts Rule	12/16/02	Completed
Adopt Public Notice Rule	12/16/02	Completed
Adopt Arsenic Rule	1/23/03	Completed
Adopt Variance and Exemptions Requirement	01/12/04	Completed
Adopt Lead and Copper Rule	1/12/04	Completed
Source Water Protection Program Assessments	04/01/04	Completed
Adopt Long Term 1 Interim Enhanced Surface Water Treatment Rule	1/12/04	Completed
Adopt Filter Backwash Recycle Rule	1/12/04	Completed

4. Drinking Water Program Revisions - Voluntary Activities

The “voluntary” activities described in the 1996 SDWA amendments included the state operator certification, revolving loan fund and capacity development programs.

Failure to implement the voluntary activities would not result in loss of Colorado primacy, but would result in more losses to the capitalization grant than it would cost to implement the voluntary activities. Further, the voluntary activities represent essential components in a public health-based program i.e., one based on prevention rather than after-the-fact reaction.

Operator Certification – Since the reorganization of the State’s Operator Certification Program in 2000, the Water and Wastewater Facility Operators Certification Board (WWFOCB) has issued 3,461 individual certifications in water treatment and water distribution. Compliance with the new certification regulations has increased substantially, with 95% of community and non-transient non-community water treatment facilities and 85% of water distribution systems currently under the supervision of an appropriately certified operator.

The WWFOCB reorganization in 2000 privatized the administration of the certification aspects of the Program. Testing, certification, renewals, and data management are conducted by two non-profit groups of professional experts under contract with the WWFOCB. The WWFOCB is responsible for the discipline of all certified operators. Compliance and enforcement of the requirement that public water systems have a certified operator remain the responsibility of the Water Quality Control Division.

The Program underwent a “Sunset Review” in 2004. As a result of that review, the authorizing statute for the program was amended as follows: the role of the Water and Wastewater Facility Operators Certification Board vis-à-vis administrative subcontractors was clarified; the statute clarified the requirement that operators be provided with an examination review; and the composition of the Board was changed from 13 to 9 voting members in order to better reflect the composition of similar boards.

State Revolving Loan Fund - The State Revolving Loan Fund is managed by a partnership consisting of WQCD staff, working with the Department of Local Affairs and the Colorado Water Resources and Power Development Authority. EPA has been very satisfied with the progress Colorado has made in implementing the Revolving Loan Fund Program, including the various set-aside activities described in this report.

Capacity Development Program – This effort includes work on three separate Capitalization Grant set-asides: Capacity Development Set-Aside, Program Management Set-Aside and Small Systems Training and Technical Assistance Set-Aside, which are made available each year from the State Drinking Water Revolving Fund Capitalization Grants, and a separate, one-time fund entitled the Operator Certification Expense Reimbursement Grant. Each of these funding sources is designated for specific activities, but all efforts focus on building capabilities in the drinking water systems and their staff throughout the state.

## C. Current EPA Strategy and Work Plan Requirements

### 1. Capacity Development Defined

The 1996 amendments charged EPA with developing guidance for states in the development of their capacity development programs. Subsequently, EPA defined the concept of capacity as applied to public water systems, but delegated to individual states the task of structuring their capacity development programs. EPA defined drinking water system capacity and its elements as follows:

Capacity Development: the process of water systems acquiring and maintaining adequate technical, managerial and financial capabilities to enable them to consistently provide safe drinking water. A conceptual relationship between the three areas of capacity is provided in Figure 1.

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**Technical Capacity:** the physical and operational ability of a water system to meet the Act’s requirements. Technical capacity refers to the physical infrastructure of the water system, including the adequacy of source water and the adequacy of treatment, storage and distribution infrastructure. It also refers to the ability of system personnel to adequately operate and maintain the system and associated components.

**Managerial Capacity:** the ability of a water system to manage its system to achieve and maintain compliance with the Act’s requirements. Managerial capacity refers to the system’s institutional and administrative capabilities and considers the accountability of the ownership, an effective staffing and organizational structure and constructive linkages to external entities including customers, regulators and assistance sources.

**Financial Capacity:** a water system’s ability to acquire and manage sufficient financial resources to achieve and maintain compliance with the Act’s requirements. Associated elements include having sufficient revenue to cover costs; access to credit through public or private sources; and use of standardized and accepted accounting, budgeting and planning techniques.

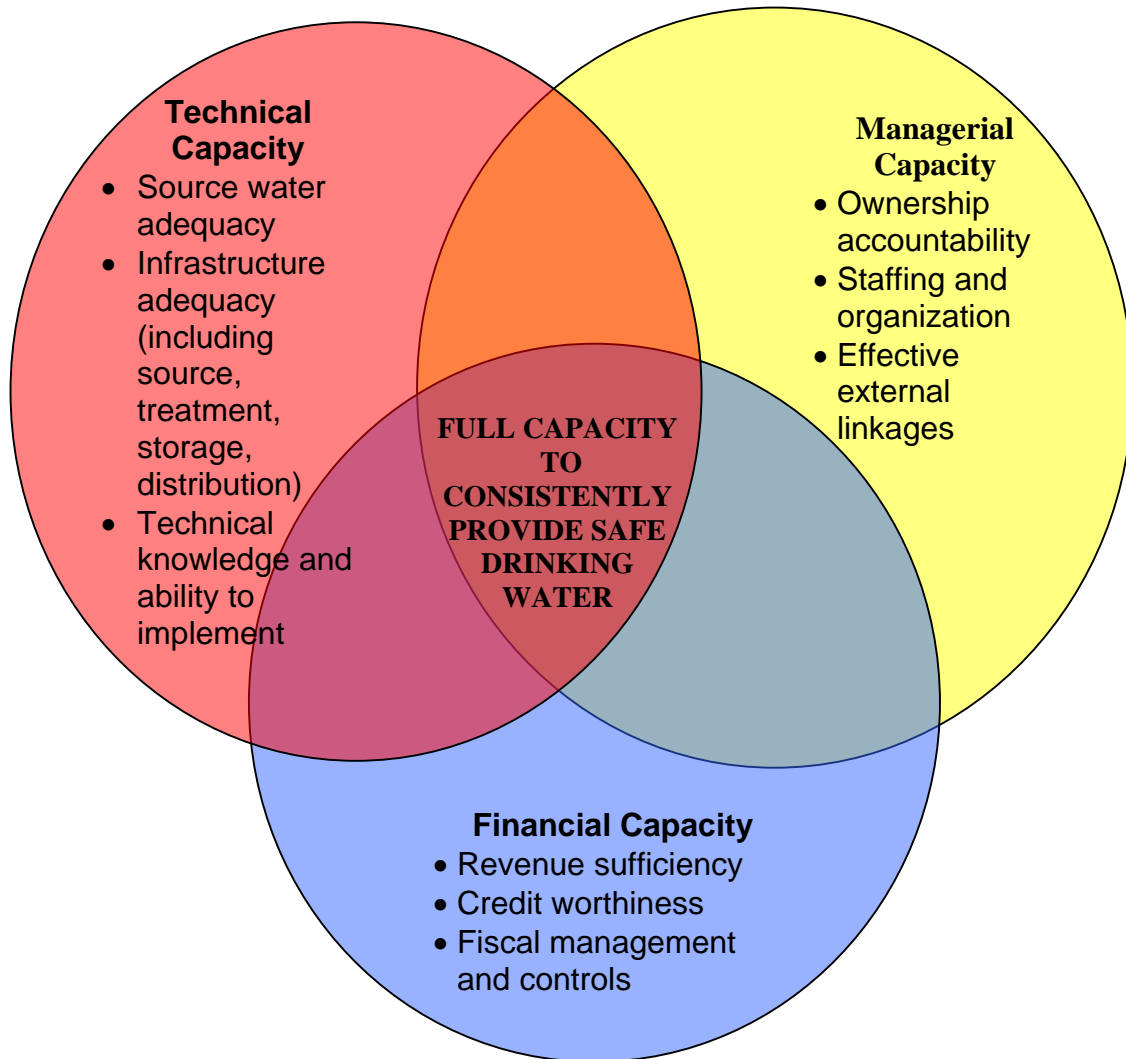
## 2. Capacity Development Strategy Requirements

EPA guidance requires the state to develop a capacity development strategy, and in its development, solicit public comment and include as appropriate:

- The methods or criteria to be used by the state to identify and prioritize the public water systems most in need of technical, managerial and financial capacity;
- A description of the institutional, regulatory, financial, or legal factors at the federal, state or local level that encourage or impair capacity development;
- A description of how the State will use the authorities of the Safe Drinking Act and other means to:
  - Assist public water systems in complying with national primary drinking water regulations;
  - Encourage the development of partnerships between public water systems to enhance the technical, managerial and financial capacity of the systems; and
  - Assist public water systems in the training and certification of operators;



Figure 1. Technical, Managerial and Financial Capacity



- A description of how the state will establish a baseline and measure improvements in capacity with respect to primary drinking regulations and state drinking water law; and
- An identification of the persons that have an interest and are involved in the development and implementation of the capacity development strategy, including all appropriate agencies of federal, state, and local governments; private and nonprofit public water systems; and public water system customers.

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### 3. Capacity Development Work Plan

EPA guidance also requires the development of a capacity development work plan that builds on the state's strategy and describes specific projects designed to achieve the goals contained in the strategy. EPA reviews and approves the work plan. Colorado also identifies these work plan activities and costs in the state's annual Intended Use Plan for the Capitalization Grant. This allows the state to charge associated program costs to the various set-asides.

## II. COLORADO CAPACITY DEVELOPMENT STRATEGY

### A. Strategy Overview

Water system capacity development is not an endpoint, but an ongoing process. Systems must plan for, acquire and maintain adequate technical, managerial and financial capabilities to enable them to consistently provide safe drinking water. Accordingly, an individual system's priority at any one time may be focused on one or more aspects of capacity. As it addresses these areas, its focus will shift to the next priority. The Colorado strategy must reflect, on a statewide basis, this same flexibility and ability to evolve in a continually changing environment. The Colorado Capacity Development Strategy has both short and long-term goals. The short-term goals of the state's capacity development strategy are to: 1) to substantially reduce violations among existing public water systems, and 2) to prevent the formation of new public water systems that lack adequate capacity to ensure consistent delivery of safe drinking water. The long-term goal is to assure the consistent provision of safe drinking water by all systems through their systematic acquisition and application of adequate technical, managerial and financial capacity.

### B. Strategy Elements

The Drinking Water Program's strategy encompasses the following elements, which also are reflected in the current year's capacity development work plan:

1. Help public water systems to comply with Colorado Primary Drinking Water Regulations
2. Gather information on capacity deficiencies
3. Encourage development of partnerships
4. Assist system operators to access appropriate training and certification
5. Update and revise the capacity development strategy

For new drinking water systems, the strategy requires all new community water systems and non-transient non-community water systems to demonstrate technical, managerial, and financial (TMF) capacity using the criteria contained in the New Water System Planning Manual. This approach has been effectively demonstrated, and reduces the resource demand on the program

for these new systems. As the proportion of systems that have undergone this process increases, the increasing demand for program resources will also be controlled.

For existing systems with compliance violations, the strategy relies heavily on a process called Systems of Concern. This process focuses Drinking Water Program resources on those systems that are having difficulty staying in compliance with all of the complex requirements of the primary (health-related) drinking water regulations.

Figure 2, Systems of Concern (“S of C”) Compliance Assurance Process is a model that depicts how the Drinking Water Program implements its compliance assurance process. Interdisciplinary teams that have been established to implement the process for each major group of contaminants.

The process allows systems to be identified based on their past compliance record or other input such as on-site inspections. Based on the violation, the system is assigned to an interdisciplinary team, which further assesses the system’s capacity, develops an assistance program, and implements a plan to help the system return to full compliance and full capacity. None of the steps interfere with the existing enforcement procedures, which require the system to return to compliance or face the possibility of penalties, but can often obviate the need for, or complement enforcement, thereby returning the system to compliance as soon as practical.

For existing systems that do not have compliance issues, the strategy focuses on maintaining the capacity of these systems, and enhancing existing capacity through delivery of training, compliance assistance, and technical and managerial assistance.

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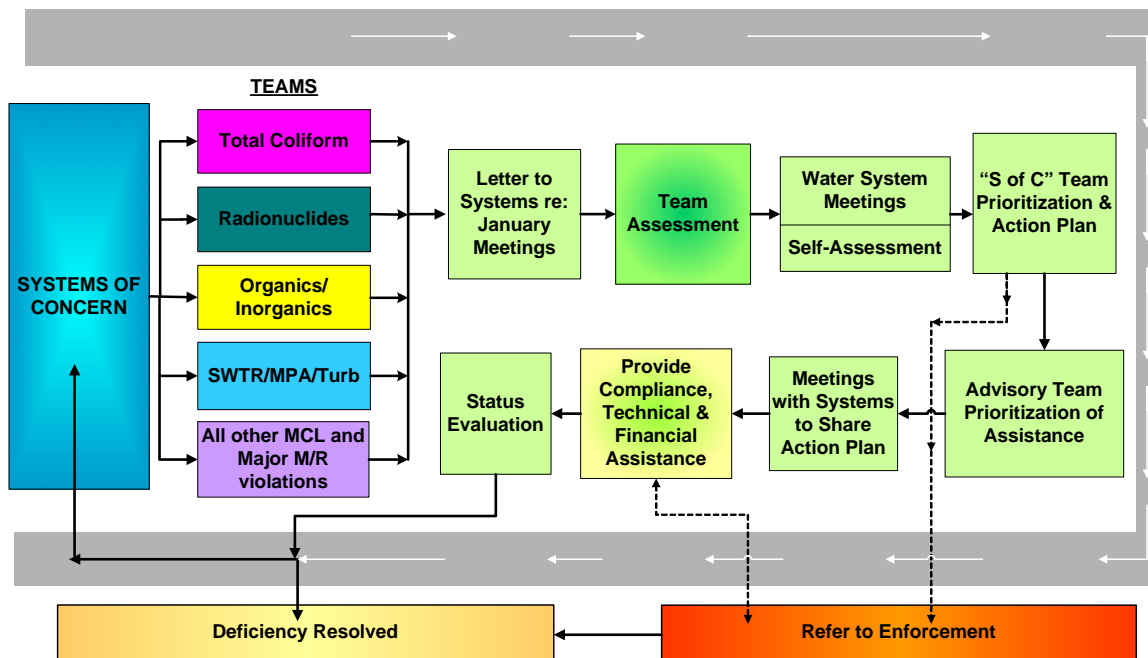


Figure 2.

All of the efforts described above are conducted using a variety of resources, including Division staff expertise, partnerships with associations and other technical assistance providers, partnerships with the Department of Local Affairs, and the Colorado Water Resources and Power Development Authority, and contractors with specific expertise in technical areas for training, evaluations, and technical assistance.

### III. COLORADO CAPACITY DEVELOPMENT PROGRAM WORK PLANS

For each annual Capitalization Grant to be approved, an Intended Use Plan must be developed and approved by EPA. Work Plans are developed in concert with the Intended Use Plan so activities are eligible for funding from the appropriate set-asides from the Capitalization Grant. The Work Plans provide details on the various activity categories that will be carried out during the work plan period – currently developed as three-year plans to allow for flexibility in the staging of projects. An individual work plan is developed for each of the set-asides: Capacity Development, Program Management, Small System Training and Technical Assistance (SSTTA), and Wellhead Protection. In addition, work plans were developed for two efforts funded in the past, but implemented over a longer time period. These two are the Operator Certification Expense Reimbursement Grant and the Source Water Assessment and Protection Program Set-Aside.

The plans describe the activities in the following general categories:

- Compliance Assistance
  - Response to public water systems questions
  - Informational materials preparation and dissemination
  - Sanitary Surveys for community and non-community public water systems
  - Consumer Confidence Report preparation
- Public Water System Assessments
  - Operational assessments using Comprehensive Performance Evaluations
  - Technical, Managerial, and Financial Onsite Assessments
  - Source Water Assessment and Protection
- Operator Training
  - Small System Technical Assistance funded training
  - State developed regulatory training
- Technical Assistance
  - Surface water Treatment Process control
  - Technical, Managerial, and Financial Toolbox
  - Radionuclide Disposal Options Toolbox
- Financial Assistance
  - SSTA Planning and Design Grants
  - Public Improvement District Formation Assistance for Privately Owned Public Water Systems
  - Disadvantaged Community Program loan subsidy reimbursement for State Revolving Fund Loans

The specific projects and activities are not listed here, but are described in the section on accomplishments, since that provides the results of these efforts.

#### IV. COLORADO CAPACITY DEVELOPMENT PROGRAM ACCOMPLISHMENTS

The vast majority of systems are existing systems, with no current compliance problems. However, this does not imply these systems all have: the full capacity to continuously assure safe water; optimal operations and management; and appropriate financial management. Accordingly, the Program has prepared a variety of efforts to help these systems gain full capacity. In addition, the Program has developed a toolbox of supporting efforts to assist violating systems achieve compliance. The following discussion provides details on the existing operational and in-development projects, and the results of these efforts.

##### A. New Systems

The *New Water System Capacity Planning Manual* identifies the criteria new community and non-transient non-community public water systems must meet in order to be approved for

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operation in the state. Division staff use this document to guide the review and, if appropriate, approval of new public water systems in these categories. The division has approved thirty-one new public water systems during 2002-2005.

The compliance status for these systems is shown in Table 2, which lists both 1) monitoring and reporting violations, which prevent the system's and Division's ability to determine if poor water quality is being delivered to customers, and 2) MCL or Treatment Technology violations, which indicate poor quality water, that may have significant adverse health effects. There is no historical data for new systems to which these compliance rates can be compared to determine if this program is reducing the rate of non-compliance. However, there data indicate that only one failure to monitor (FTM) violation and no MCL violations were observed in these systems, although only ten of these systems are operational. This would suggest that our new system Capacity Review process is preventing the development of non-compliant systems.

Those new systems with MCL or Treatment Technique violations, if any, would be placed on the Systems of Concern Process list, and assistance provided to help them return to compliance. In addition, the standard enforcement escalation procedure will be taken with all violations within these systems. It may be necessary to develop a better data tracking system to more completely identify all new systems and to track their compliance rates.

Table 2

New Systems TMF Review and Violation Status  
SFY 2003-2005

#	PWSID	FACILITY NAME	Compliance Status
1	Not yet assigned	Rock Creek Industrial Park -	Not yet operational as a PWS
2	CO0120003	Clearwater MD - New System Capacity Review	No Violations
3	CO0120245	Elbert & Highway 86 Water District - New Water System	No Violations
4	Not yet assigned	Elkhorn Ranch - Water System	Not yet operational as a PWS
5	CO0107719	Spring Valley Ranch Water System - New Water System	No Violations
6	Not yet assigned	Falcon Highlands Metropolitan District	Not yet operational as a PWS
7	Not yet assigned	Hidden Springs Ranch - New System	Not yet operational as a PWS
8	Not yet assigned	Sidney Peak Ranch - New WTP	Not yet operational as a PWS
9	Not yet assigned	Cavanaugh Hills HOA - New Cavanaugh Hills Water System	Not yet operational as a PWS
10	Not yet assigned	BP Florida Plant	Not yet operational as a PWS
11	Not yet assigned	Dolores River Ranch - New Water System	Not yet operational as a PWS
12	CO0149160	Buttermilk Metro District - New Water System	No Violations
13	Not yet assigned	Gilead Gardens Subdivision Water System	Not yet operational as a PWS
14	Not yet assigned	Lake Springs Ranch PUD	Not yet operational as a PWS
15	Not yet assigned	Aspen School District - West Ranch Employee Housing - New Water System	Not yet operational as a PWS
16	CO0162707	Town of Severance - new PWS review	No Violations
17	Not yet assigned	Sunset Metropolitan District/Ellicott Springs Resources, LLC	Not yet Operational as a PWS
18	Not yet assigned	South Fork Ranches Water System	Not yet Operational as a PWS
19	CO0143525	Mustang Water Authority - (Town of Naturita and Nucla) –Treatment Plant and Transmission Line	No Violations
20	Not yet assigned	Saddle Ridge Ranch Estates Water Company - New WTP	Not yet Operational as a PWS
21	CO0234150	BP Amoco Company - New Water System	No Violations
22	Not yet assigned	River Valley Estates - New Water System	Not yet Operational as a PWS
23	Not yet assigned	Bailey Loaf & Jug Well	Not yet operational as a PWS
24	Not yet assigned	Camelot Subdivision	Not yet operational as a PWS

#	PWSID	FACILITY NAME	Compliance Status
25	Not yet assigned	Tres Valles West	Not yet operational as a PWS
26	CO0119720	Two Rivers Village Metro Dist	FTM Lead
27	Not yet assigned	Stillwater Metropolitan District No. 1	Not yet operational as a PWS
28	Not yet assigned	Valley at Winter Park Water System	Not yet operational as a PWS
29	Not yet assigned	Shores of Shadow Mountain - New PWS - 2002	Not yet operational as a PWS
30	CO0123152	Blue Creek Ranch - Aspen Equestrian Estates Community Water System,	No Violations
31	CO0123169	Cerise Ranch Subdivision - Willow Well, Chlorination System and Storage Tank	No Violations

<b>SUMMARY</b>	
Number of New Systems Reviewed	31
Number of Systems In Operation	10
Number of Systems With Violations	1 (3% of total, 10% of Operating Systems)

#### B. Projects and Activities to Assist Public Water Compliance For Existing Systems

Assisting systems to achieve and maintain compliance is a key activity in the Capacity Development Program. The following list describes the efforts extended toward these existing systems.

- Consumer Protection/Local Health Sanitary Surveys - this project involves a partnership between the Water Quality Control Division, the Department's Consumer Protection Division, and local health departments to inspect approximately 800 non-community groundwater systems throughout Colorado. Each year, approximately 550 systems are visited, with a report prepared to identify compliance problems, sanitary deficiencies or other observations. A letter specifying actions to be taken to correct these deficiencies is sent to each system.
- Sanitary survey requirements for community water systems have been expanded in breadth of focus and frequency through the new EPA-promulgated Interim Enhanced Surface Water Treatment Rule. Each year, Division staff conduct approximately 300 on-site sanitary surveys. Site visits are followed by a report identifying any deficiencies and a notice to correct these problems. While conducting the on-site surveys, district



engineers provide owners and operators limited technical assistance on operation and maintenance of the water system and ideas for ways to eliminate any sanitary deficiencies identified. A portion of these activities are supported by capacity development funded staff.

- Surface Water Technical Assistance Comprehensive Performance Evaluation - this project utilizes specialized consultants to resolve capacity issues at surface water treatment systems. This effort includes comprehensive performance evaluations (CPE) to assist systems in identifying the cause of performance-limiting factors (PLFs) at the treatment facility. A total of 90 systems have received a CPE, with a required response of corrective actions planned to eliminate these PLFs. These corrective actions are reviewed during the next sanitary survey, closing the feedback loop to ensure progress is being made.
- Web Page Access and Posting of New Information Materials. Guidance materials and updated forms have been posted on the Drinking Water Program's Web site to help systems to comply with the drinking water regulations. Development of new guidance materials is on-going and is made available in both written form and on the Web site.
- Regulations Guidance for Colorado Systems - Drinking Water Program staff are developing simplified guidance to explain the requirements applicable to various categories of drinking water systems. This effort started with a comprehensive review of state regulations and identification of provisions that pertain to each category of public water system. Region VIII EPA has followed the leadership of Colorado, and is developing a similar review for federal regulations.
- On-site sampling to verify compliance. Samples are collected at approximately 60 systems each year to verify the self-reported monitoring that is the foundation of the drinking water quality compliance program.
- Capacity reviews, similar to those for new systems, are required for all systems applying for loans from the Colorado Drinking Water Revolving Fund, and any capacity shortfalls are included as a condition of the loan. Table 3 below provides a brief summary of the regulatory compliance status of these systems.
- COSTAR Project - This project has five phases that will assist public water systems comply with the new and more stringent arsenic maximum contaminant level (MCL). Phase 1 evaluated and assessed existing system monitoring data from previous water system arsenic testing using the division's compliance database. Phase 2 involved sampling and analysis, by source, for any water systems with levels of arsenic suspected to exceed the limits of the new MCL. In phase 3, division engineers are evaluating the treatment processes available. Phase 4 will estimate the cost for the public water systems to achieve compliance. The Drinking Water Program's Financial Assistance Program will direct these public water systems to the available funding sources once the treatment

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options and costs have been determined. Phase 5 will be implementation to achieve compliance with the revised arsenic regulation.

The Capacity Review for public water systems requesting loans from the Drinking Water Revolving Fund should also prevent future violations by these systems, since the objective of the Capacity Review is to ensure the system has all of the capabilities required to continuously produce and deliver safe drinking water. While there are several failure to monitor violations reported for some of these systems, the MCL or treatment technique violations are limited to one nitrate violation, one lead violation, one disinfection byproduct violation, and two surface water treatment rule violations, one of which used a plant shut-down to prevent unsafe water delivery to customers. The program is designed to avoid these violations, but it must be recognized that these systems are frequently coming to our loan program because they have been underfinanced in the past, and have accumulated numerous operational and plant capacity issues. The loans provided to these systems contain conditions that require the resolution of the violation or capacity limitation before acceptance of the loan. These systems are also added to our Systems of Concern project in order to continue to provide them with assistance in resolving these difficulties, and referred to our standard enforcement escalation process.

Table 3  
**Existing System Capacity Reviews**  
**For DWRF Loans**  
SFY 2002-2005

<b>System Identification Number</b>	<b>System Name</b>	<b>Violations Identified</b>
CO0118005	Castle Pines MD/Aslan WC Phase 1	No Violations
CO0111600	La Jara, Town of - Install Water Meters	Monitoring organic and inorganic chemicals
CO0134150	City of Durango, WTP Improvement - Phase III expansion to 15.4 MGD	No Violations
CO0149611	Pitkin Iron HOA - Water System Upgrade	Nitrate, Lead Monitoring
CO0230090	Aspen Park MD	Lead Exceedence
CO0107485	Longmont Water Treatment Plant Design-Build Project	Surface Water Treatment Violation
CO0224174	Taggerts (CJ Country Store - Drinking Water Treatment Plant Improvements)	Microbiological Violation
CO0154566	Oak Creek, Town of - Plant Modifications	No Violations
CO0103035	East Cherry Creek Valley Wells and Pump Station A-16/L-15	Monitoring Organic Chemicals
CO0145420	La Junta, City of - New Water Treatment Facility	Monitoring Organic Chemicals

CO0210710	Shadows Ranch Events Center - Water Treatment Facility for GWUISW	Surface Water Treatment and Disinfectant Byproduct violations
CO0121060	Bobcat Meadows Metropolitan District	Monitoring inorganic chemicals and Lead
CO0160750	Westwood Lakes Water District	No Violations

### C. Projects and Activities to Gather Information on Capacity Deficiencies In Existing Systems

In addition to the information available to the Drinking Water Program regarding compliance status from self-monitoring reports, projects within the Capacity Development work plan help the Drinking Water Program gather information on water system capacity deficiencies. In particular, results of the comprehensive performance evaluations, Consumer Protection Division site visits, and Division-conducted sanitary surveys identify water system deficiencies. That information is incorporated into the Systems of Concern program described earlier, where staff assesses the system history, evaluates the many tools available to help achieve compliance, and works with the system to develop a return to compliance program. This is a long-term program, but has already achieved some degree of success during the past year. To date, out of 140 systems originally identified as Systems of Concern, 26 have been moved to a watch list (water quality issues have been resolved, although full compliance may take up to a year as additional samples are collected to demonstrate continuous compliance), and six systems have been moved to the success list, where compliance has already been achieved. This is a 23% success rate within one year of program start-up. While additional systems that have new violations will be added to the list each year, it is anticipated the list will shrink over time.

However, some systems face very difficult challenges, which will be expensive to remedy. For example, a number of systems have radionuclides above the allowable level in their raw water, and the systems are frequently small, rural, and below average in median household income. Even though there are well known techniques to remove some of these contaminants, they are relatively expensive. Moreover, the disposal of wastes, concentrated by the treatment process, often result in even more expenses. These difficulties present challenges both for the system itself, and for the Drinking Water Program, since the Program is striving for compliance by all systems.

Compliance Assurance consists of activities, including the use of formal enforcement actions, designed to ensure water systems comply with drinking water regulations. Many of the activities listed above (technical assistance, training, improved information dissemination) can be considered “compliance assistance” activities. They are designed to informally assist regulated entities to voluntarily comply with regulations. However, for systems that fail to follow this path, formal enforcement becomes necessary and appropriate. The full range of compliance assurance provides the means to protect public health and to ensure compliance.



#### D. Projects and Activities to Encourage Partnerships

There are many individuals, interest groups and professional organizations that are deeply concerned with ensuring that water provided by all public water systems is consistently safe. The purpose of encouraging partnerships is to find ways to leverage the resources of interested parties and cost-saving approaches to help guarantee the continuous provision of safe drinking water by all public water systems.

The capacity development staff has developed a close working relationship with staff of the Colorado Rural Water Association (CRWA) to provide assistance to drinking water systems. An example project provides a list of systems with monitoring and reporting violations for the Total Coliform Rule to CRWA. CRWA staff, who are visiting many of these systems already, or are routinely visiting a neighboring system, will visit the violating system to discuss sampling techniques and schedules, provide suggestions on reporting, etc.

Division staff meet periodically with the Colorado Water Utility Council, the Colorado Board of Health, The Department of Local Affairs, and the staff and Board of the Colorado Water Resources and Power Development Authority. Capacity Development Strategy and Small Systems Training and Technical Assistance Stakeholder work group meetings provide a forum for information and encourage partnerships among members and the Drinking Water Program. Joint training activities are sponsored by the Drinking Water Program and involve technical assistance providers including the American Water Works Association, the Colorado Rural Water Association, Rural Community Assistance Program, the Department of Local Affairs, and others.

#### E. Projects and Activities to Assist System Operators Access Appropriate Training and Certification

Training events for new regulatory requirements, as well as training to assist operators, engineers and managers in the day-to-day operational and management requirements of an effective drinking water system have been conducted by the Capacity Development Program, with a focus on delivering training that is well designed, has measurable training outcomes, and provides a proper learning environment for the students. This effort has focused on obtaining professionally trained instructors, along with specific technical experts in the subject matter being taught. The training provided includes:

- Operator Training for Stage 1 and 2 Disinfectants and Disinfection Byproducts and Interim Enhanced Surface Water Treatment Rule were delivered during 2003 and 2004. Both an introductory program and an advanced course were delivered, and 427 system operators or managers participated in the training.
- Operator Training for Laboratory Methods for Disinfection and Disinfection By-Products, with a focus on quality assurance was delivered during 2004 and 2005. Twenty-one sessions will be completed by fall of 2005, with 630 operators trained in these classes.

- Treatment Techniques for Wildfire Affected Drinking Water Supplies was delivered following the severe wildfires of 2002. Three sessions, with 68 participants assisted many small and medium sized systems with surface water impacted by wildfires.
- Show-Me Ratemaker Training continues to be delivered by the Colorado Rural Water Association, based on a train-the-trainer program developed by the Capacity Development Program.
- Financial management training is provided each year as a joint effort with the Colorado Department of Local Affairs. Typically, eight or nine sessions are held throughout the state, with approximately 120 participants from communities and water systems.
- Short schools are hosted by partnership organizations, and are held each year in two locations. Each school is typically four or five days, and covers the basics or advanced programs in drinking water treatment or distribution system management. An average of 6,500 classroom hours are logged each year with these schools.
- Monthly training classes are held by the Rocky Mountain Section of the American Water Works Association and the Colorado Rural Water Association, with support from the Small Systems Training and Technical Assistance Set-Aside. These programs typically draw about 30 participants each, although there is considerable repeat participation. Approximately 14,000 classroom hours of training are provided by these events.
- Presentations are given on regulatory requirements and financial management for elected officials at the Colorado Rural Water Association.

#### F. Projects And Activities That Update And Revise The Capacity Development Strategy

The capacity development staff annually considers updating and revising the strategy. Information gathered throughout the year is used to adjust the strategy and/or add projects to the work plan. Staff also discuss the strategy with the Capacity Development Workgroup, and incorporate their ideas and suggestions into the planning of the revised strategy.

#### G. Projects and Activities to Gather Information on Existing System Capacity

Upgrading and strengthening the data system continues to be a challenge for the Drinking Water Program. In addition to existing state and federal drinking water program funds, the resources of the Capacity Development Set-Aside and the Program Management Set-Aside have been used to help make this system more effective for the Drinking Water Program, and be of more assistance to the drinking water systems of Colorado. During the past three years, data migration from the legacy data system has continued. While this has been a long, involved, and sometimes aggravating process, it is now beginning to show results. The primary software for the system, called the Safe Drinking Water Information System, or SDWIS, was designed by EPA primarily as a data reporting tool. This allows states like Colorado to transmit compliance information to EPA on a regular basis with fewer errors than past systems. However, the software does not provide all of the management information required to operate an efficient Drinking Water Program. Additional software modules from commercial vendors have been required in order to

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improve the efficiency of data entry and transfers, and for obtaining all of the management reports desired.

During the past three years, the Drinking Water Program has added the necessary software to allow access to the stored data, and has just recently purchased and installed software necessary to export SDWIS data to field unit portable computers, and import the field-collected data (after quality assurance screening) into the primary database. This most recent addition to the system is undergoing debugging and pilot testing at this time, and staff is being trained in its use. It is believed the efficiency and quality of data gathering will greatly improve once the system is fully functioning. These changes will also improve the on-site assistance inspectors can provide. Other changes that have been implemented include the new capability to import laboratory data electronically from both private and public laboratories. This provides communities throughout Colorado with the capability to conduct their required water quality monitoring at lower cost, with greater accuracy of reporting.

The SDWIS system has been modified so the state can provide the 850 community water systems with a draft of the required annual Consumer Confidence Report. This report provides the customers of the system with information on the quality of their water, health implications of contaminants found in the water, and pertinent system information. The water system is able to customize the report to add information they believe their customer might be interested in. This capability can save each community many hours of work gathering and collating the data, and ensures that the regulatory required language is used.

The Division sends an annual monitoring schedule to each of 2,000 public water systems, itemizing the required sampling that system must complete each year. The complexity of the regulatory requirements imposed by the Safe Drinking Water Act make this effort difficult for the systems, yet the SDWIS software can help generate these schedules, again lifting a considerable burden from the public water system. This in turn helps ensure the system will collect samples on an appropriate time schedule, and avoid monitoring and reporting violations.

## V. EFFICACY OF THE COLORADO CAPACITY DEVELOPMENT STRATEGY

The primary purpose of the capacity development program is preventing system failures and assisting systems to attain long-term compliance. The Drinking Water Program is attempting to track the effectiveness of the state capacity development program, using a number of different approaches. These include:

- The noncompliance rate of new systems that were approved after October 1999 and that were the subject to the complete technical, managerial and financial capacity review prior to approval.
- Annual noncompliance rate comparisons.

- Increases in the number of sanitary surveys or other on-site evaluations conducted using capacity development funds.
- Decreases in the number of deficiencies identified during site visits, and increases in the number of deficiencies resolved.
- The effectiveness of on-site third-party training and technical assistance in helping systems achieve and maintain compliance.
- Effectiveness of Systems of Concern Project in assisting systems with compliance difficulties to resolve their problems.
- Changes in the compliance status of systems listed as significant non-compliers as defined by EPA.

Noncompliance rates, as developed by the current software incorporated into SDWIS, do not provide a complete picture of the true state of safe drinking water for the public. There is no specific capability to track capacity weaknesses or specifically when a system became non-compliant, and when the system corrected the problem to eliminate the risk. Frequently, return to compliance requires a period of time over which samples are collected to document the continued safety of the drinking water, but there is no way to calculate the number of days when potentially unsafe water was provided. In addition, noncompliance is a moving target, as new regulations have been developed and implemented during the period covered by this report. Therefore, compliance rates need to be divided between those regulations in existence in prior years and those implemented during this reporting cycle.

Compared to previous reporting years, average violation rates remained generally steady, however, the data show an increase in the percent of systems violating chemical, lead and copper and total coliform monitoring/reporting requirements. The increased violation rates may be due, in part, to the increased attention given by program staff to monitoring compliance with these rules and the implementation of the new data management system, SDWIS/STATE. The SDWIS/STATE software determines candidate violations based on established monitoring schedules, and as each rule is implemented the division will be able to identify non-compliance more accurately.

Sanitary surveys have been conducted for many years, but the SDWA requires an increase in the frequency as well as the content of sanitary surveys. Five drinking water engineers conduct sanitary surveys, provide technical assistance (especially for Systems of Concern), and TMF Capacity reviews for new drinking water systems. New software will allow tracking of the changes resulting from these sanitary surveys to more precisely define the benefits of these activities.

On-site third-party training is provided through associations (Colorado Rural Water Association and Rocky Mountain Section of the American Water Works Association), the University of

Colorado, and the Colorado Mountain College in Leadville. Technical assistance is provided directly by Drinking Water Program staff and contractors hired for specific projects.

The TMF Capacity review for existing systems applying for loans has highlighted the need to improve identification of deficiencies and expeditious correction. The capacity development program is looking to improve in this area.

## VI. CONCLUSIONS

The 1996 SDWA amendments presented many challenges to the Colorado Drinking Water Program including new regulatory requirements, source water protection, operator certification, revolving loan fund and capacity development program requirements. The Act also presented many challenges to the drinking water systems of the state, challenges that many smaller systems have a difficult time addressing. However, the Act also provided states with a funding mechanism to augment state and other federal funding to complete the many tasks required of the state. This mechanism includes specific set-asides from the revolving fund capitalization grant that provide funds for capacity development, program management, wellhead protection, and small system training and technical assistance. Colorado has put a robust system in place to use these set-asides to fund needed activities to complete our own requirements and to assist systems in meeting their goal of providing safe water to their customers on a continuous basis.

This report has provided details on the use of these set-aside funds to accomplish these tasks, and demonstrates that it is in Colorado's best interest to continue to support these efforts, provide the necessary state funds to keep the drinking water programs effective and viable, and to continue to support program growth with the necessary state resources to make all drinking water systems in the state a strong, integral part of the state's public health protection efforts.

### A. Retention of Drinking Water Program Primary Enforcement Authority

The Colorado capacity development program is one part of the overall Drinking Water Program and federal funding will not be available to fund its activities unless Colorado retains primary enforcement authority for the Safe Drinking Water Act. The Drinking Water Program staff has continued to meet all EPA requirements to retain primary enforcement authority. This ensures that Colorado public water systems receive the benefit of a Drinking Water Program that provides helpful assistance activities that encourage compliance. The Drinking Water Program will continue to implement all activities under the SDWA to ensure full federal funding for the drinking water program grant and the capitalization grant.

### B. Retention of Capacity Development Set-Aside

In addition to the requirements to retain primary enforcement authority, there are requirements that must be met in order to retain the Capacity Development Program, and the related set-aside funding. These requirements include the development, and subsequent approval by EPA of an



annual capacity development strategy, work plan, and implementation report. Inadequate response in any of these areas can result in EPA withholding a portion of the Capitalization Grant. Colorado has successfully complied with all requirements of this program during the three years of this report period.

### C. Future Challenges

Of all of the challenges facing the program, the most important is adequate program funding. In the past, state drinking water programs with primary enforcement authority received federal funding only through an annual drinking water program grant, but the 1996 SDWA amendments provided additional funding through the annual federal capitalization grants. The capitalization grant provides approximately \$13 million of funding annually for infrastructure improvements for Colorado public water systems and allows set-asides that can supplement state program funding levels. Colorado uses about 28% of these funds for program support and system assistance. However, with the exception of these grant set-asides, federal funding for state drinking water programs has not substantially increased since 1996. Levels of state funding need to continue to be sufficient to retain the federal support to the Colorado Drinking Water Program and the associated advantages.

Regulations cannot cover all contingencies, monitoring is not continuous but fixed in time, and enforcement actions are only taken after a problem has occurred. Regardless of the regulations, monitoring, assistance, and enforcement, the only way to assure continuously safe drinking water is to ensure all systems have TMF Capacity and operate at the very best of their capabilities, and operators and managers strive for excellence in their daily operations.

A future challenge to the Drinking Water Program is the development of an incentive program to recognize, and expand the universe of those public water systems that have adopted and continue to implement high quality processes in management and operations that guarantee the delivery of continuously safe drinking water.

### D. Report Availability

This report is available in several forms for the public and interested stakeholders for review. The primary availability is on the Internet, at: <http://www.cdphe.state.co.us/wq/wqhom.asp> under the heading of reports.

The report can also be viewed at our offices during normal business hours. An appointment will make scheduling this viewing more efficient, by calling 303-692-3604.

Copies of the report have also been made available to the Capacity Development Workgroup members for their input and review.