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System Partnership Solutions to Improve Public Health Protection

Examples of One-Page Case Studies, designed to help us work with small systems to enhance their ability to provide safe and affordable drinking water.

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System Capacity Challenges and Partnership Solutions Overview

Water system capacity is the ability to plan for, achieve, and continually provide safe and affordable drinking water to customers, thereby increasing public health protection. Capacity development is the process through which drinking water systems acquire and maintain the technical, financial and managerial capabilities to consistently provide safe drinking water. All states are currently implementing state-specific capacity development programs tailored to meet their water systems' needs. One tool for building capacity is system partnership solutions.

Small System Challenges

Technical

- Inadequate & deteriorated infrastructure
- Limited/poor source quality/quantity
- Lack of operations & maintenance expertise/certified operator

Financial

- Diseconomies of scale (few households = high costs)
- History of low rates = resistance to full-cost pricing
- Limited knowledge of financing options
- Small systems are often in economically disadvantaged areas

Managerial

- "No time" or limited part time management attention
- Lack of expertise in long-term water system planning/ operations
- Lack of focus - providing water is not the system's primary purpose

System Partnership Solutions

- System partnership solutions can range from informal cooperation, such as mentoring programs, to ownership transfer with managerial and/or physical consolidation

- These system partnership solutions serve as a capacity building tool and involve changing the operational, managerial or institutional structure of a water system. The changes serve to meet the increasing costs and responsibilities of consistently providing safe water that meets the Safe Drinking Water Act standards

System Partnership Spectrum

Informal Cooperation	Contractual Assistance	Joint Powers Agencies	Ownership Transfer
Coordinate with other systems, but without contractual obligations	Utilities contract with another system or service provider, but contract is under the system's control	Creation of a new entity designed to serve the systems that form it	Takeover by an existing entity or a newly created entity

Increasing Transfer of Responsibility

System Capacity Challenges and Partnership Solutions Overview

System Partnership Solutions

Potential Outcomes

Technical

- Shared, new, or upgraded infrastructure
- Locate higher quality/quantity source water
- Access to a certified operator and additional expertise
- Better treatment technologies available

Financial

- Reduced costs = safe and affordable water at full pricing
- Greater economies of scale achieved through shared services
- Better access to funds

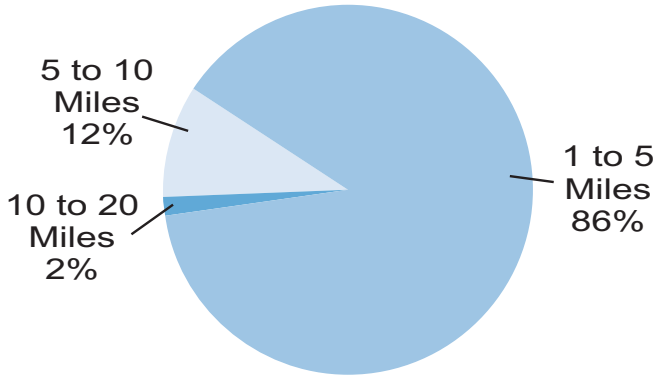
Managerial

- Expertise in water system planning/operations
- Accelerated path to obtaining the managerial skills and structure required to adequately oversee the water system

Opportunities for System Partnerships

- 86% of America's 54,000 community water systems are small systems serving less than 3,300 people
- 86% of these small systems are within 5 miles of another system*
- The proximity of these systems to potential partners demonstrates many opportunities for small systems to form cooperative agreements, share services, or join together under common management
- The feasibility of physical interconnection should be analyzed carefully and compared with the economic savings that other partnership solutions may achieve

Distance to next closest Community Water System*



*AWWARF study: findings based on data collected from 17 states

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System Capacity Development Case Study

City of Panora Water System, Iowa, 2002

Background

The City of Panora Water System is located about 45 miles from Des Moines Water Works in a small town of 1,175 people and 700 connections, primarily residential.

Public Health Challenges

Panora's raw and finished water supply consistently violated the Maximum Contaminant Level (MCL) for nitrate in the spring and early summer months. Panora received a notice from the Iowa Department of Natural Resources to address their high nitrate problem.

Capacity Issues

Technical	▶ Panora's finished water nitrate levels exceeded the MCL by 20-40% during the spring and early summer months. ▶ Panora's grade 2 certified operator needed to obtain grade 3 certification, a state requirement for operating a surface water treatment plant.
Managerial	▶ Panora has had difficulties retaining operators and has relied on Des Moines' operators to fill in when necessary.
Financial	▶ Panora lacked the financial resources to install nitrate treatment and pay competitive wages to attract a grade 3 certified operator.

Actions: Informal Cooperation

✓	The City of Panora completed a joint water study with Lake Panorama and Xenia Rural Water Association to assess potential partnerships based on source water and system needs.
✓	This study demonstrated that the most cost effective long-term solution to the high nitrate levels was for Panora to connect to and purchase water from Lake Panorama's low-nitrate source water and blend this water with their current source in order to meet the nitrate MCL.
✓	Panora worked with Des Moines Water Works to evaluate their treatment plant's remote monitoring capabilities. The systems decided to pursue this partnership opportunity and are currently testing remote monitoring of Panora's treatment plant from Des Moines Water Works.
✓	Panora and Des Moines are drafting a memorandum of understanding to allow the systems to work together to operate the treatment plant. This informal agreement will allow Des Moines to remotely monitor Panora's treatment plant.
✓	Des Moines operators are mentoring Panora's grade 2 certified operator to obtain grade 3 certification.

Outcomes

Panora will avoid installing expensive nitrate treatment as the City will have access to water from the Panorama Lake Association to blend with its current supply, which will ensure compliance with nitrate requirements during peak months. **The risk of blue baby syndrome will virtually be eliminated**.

Des Moines will remotely monitor Panora's treatment plant, reducing the full-time attention required of an onsite operator to about 2.5 hours per day. Panora will be able to utilize onsite operators for other city duties, **relieving the city of hiring additional staff and reducing costs.**

Questions about Iowa's Capacity Development Program? Contact Jennifer Simons • Iowa Department of Natural Resources • 401 SW 7th Street • Suite M • Des Moines, IA • 50309-4611 • (515) 725-0298 • jennifer.simons@dnr.state.ia.us

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System Capacity Development Case Study

Lee County Water Plant, Sanford, North Carolina, 1993

Background

The Lee County Water Plant serves 149 customers, including 60 residential connections and a large poultry company in central North Carolina.

Public Health Challenges

The system faced operational challenges, including numerous monitoring and reporting violations, which may have prevented them from providing safe water.

Capacity Issues

Technical	▶ Lee County lacked the expertise to make necessary operational improvements. ▶ Lee County lacked the regular supervision of a qualified operator. ▶ Lee County received only periodic technical assistance from a circuit rider.
Financial	▶ Lee County did not have the resources to hire a qualified operator.

Actions: Contractual Assistance

- ✓ Lee County entered into a management, operation and maintenance contract with a private-sector operations and maintenance firm. Lee County has renewed the contract through 2002.
- ✓ The firm hired and supervises the system's three full-time employees.
- ✓ The firm provides a part-time qualified operator with extensive technical expertise.
- ✓ The firm conducts some activities (financial management and billing) through a central office to take advantage of economies of scale.

Outcomes

- Lee County Plant now provides high-quality water that is in full compliance with drinking water standards, **reliably protecting public health**.
- Lee County works with the operation and maintenance firm to plan for capital improvements and secure local and federal funding, **guaranteeing the long-term production of safe drinking water**.
- Lee County benefits from the firm's bulk purchasing agreements **to save money**.

Questions about North Carolina's Capacity Development Program? Contact Bob Stea • NC Department of Environment and Natural Resources Public Water Supply Section • 1634 Mail Service Center • Raleigh, NC 27699-1634 • (919) 715-3269 • bob.stea@ncmail.net

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System Capacity Development Case Study

Aurora, South Dakota, 1992

Background

Aurora, South Dakota, is a small residential town with a population of 500. The town water system has 250 connections. Aurora is located five miles from the City of Brookings, which has a population of 22,000 including the local university.

Public Health Challenges

The system did not have the capacity to provide water that met National Primary Drinking Water Regulations, consistently violating the Maximum Contaminant Level for nitrate.

Capacity Issues

Technical	▶ Aurora's finished water nitrate levels exceeded the MCL by up to 50%. ▶ Other nearby wells had high nitrate levels, so Aurora could not easily find a new source. ▶ The treatment plant operator was not adequately certified and had a range of other municipal responsibilities.
Financial	▶ The system lacked the financial resources to install treatment for nitrate.

Actions: Contractual Assistance

- ✓ Aurora and Brookings shared the cost of constructing a transmission pipeline to interconnect the two systems.
- ✓ Aurora customers now pay slightly more for water, but less than if nitrate treatment had been installed.
- ✓ Aurora uses its old well for fire protection.

Outcomes

- Brookings provides Aurora residents with drinking water that consistently meets the nitrate MCL. **The risk of blue baby syndrome has virtually been eliminated**.
- Brookings has back-up systems for power outages and redundant treatment facilities, **ensuring the reliable provision of safe drinking water**.
- Aurora's contract with Brookings has allowed it to **avoid installing expensive nitrate treatment**.

Questions about South Dakota's Capacity Development Program? Contact Kevin Espeland • SD Department of Environment and Natural Resources • Joe Foss Building • 523 E. Capitol • Pierre, SD 57501 • (605) 773-3754 • kevin.espeland@state.sd.us

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System Capacity Development Case Study

Jefferson Communities Water System, Florida, 2002

Background

Jefferson County is a rural, economically distressed area in the Florida panhandle with about 13,000 residents. Lloyd Water Works Authority (LWWA) was a small water system in the County that served only a portion of one community, totaling 32 residential connections.

Public Health Challenges

Jefferson County residents not connected to LWWA were facing acute health risks from using private ground water wells with high concentrations of coliform bacteria. LWWA did not have the capacity to extend service to these residents.

Capacity Issues

Technical	▶ The Jefferson County residents' private ground water wells lack the depth and proper casing to avoid contamination from nearby septic tanks and are susceptible to surface runoff, petroleum leaching from underground gasoline tanks, and a potential leak from an area chemical plant. ▶ LWWA lacked the facilities to provide service to the Jefferson County residents.
Managerial	▶ LWWA did not have a formal management structure.
Financial	▶ LWWA lacked the financial resources to expand service to other areas of the County.

Actions: Joint Powers Agencies (Regionalization)

✓	Local residents, unhappy with the quality of their water, initiated the development of a new county-wide system to replace and expand LWWA. A public awareness campaign that included community meetings, political and health department support, and newspaper coverage led to the development of JEFCOM, a new system that will serve 1,000 connections and approximately 2,500 customers.
✓	JEFCOM received grants and loans from DWSRF and USDA Rural Development for chlorine treatment and system expansion.
✓	JEFCOM is operated under a new organizational structure which consists of one system manager and a board with one representative from each of the nine communities served.
✓	Construction has begun on the new system and will be completed by November 2002.

Outcomes

- JEFCOM consumers will be **protected from acute illnesses caused by microbiological contamination**.
- JEFCOM consumers will be provided with **safe, reliable water** that complies with drinking water standards for the first time. The water will be provided at a reasonable cost, with water bills expected to be between $20 and $25 per month.
- JEFCOM will likely **receive widespread support in the future**, because customers have been involved with the planning and development of JEFCOM since its creation.

Questions about Florida's Capacity Development Program? Contact Greg Parker • FL Drinking Water Section • Twin Towers Office Building • 2600 Blair Stone Road • Tallahassee, FL 32399-2400 • (850) 487-1762 • greg.parker@dep.state.fl.us

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System Capacity Development Case Study

Pittsfield, New Hampshire, 1998

Background

Pittsfield Aqueduct Company, an investor-owned utility, had been designed to provide water to several textile mills. Water quantity for the mills drove this system's design in the 19th century. Pittsfield currently has 620 connections, 75% of which are residential. The system's 1,860 residential customers no longer require the same high water quantity.

Public Health Challenges

Pittsfield consumers were exposed to high levels of bacterial contamination and high turbidity levels due to an unfiltered surface water supply. Stagnation of water in the distribution system was also a problem, potentially leading to microbial contamination.

Capacity Issues

Technical	▶ Pittsfield's transmission and distribution systems were oversized. ▶ Pittsfield experienced frequent water main breaks. ▶ Pittsfield was in violation of Surface Water Treatment Rule requirements and was facing heavy fines. ▶ Pittsfield's part-time operator did not have time to adequately oversee system operation or communicate with customers.
Managerial	▶ Pittsfield's ownership did not communicate effectively with its customers.
Financial	▶ Pittsfield had begun construction of a treatment plant. However, the cost was a burden because Pittsfield could not secure a low interest loan.

Actions: Ownership Transfer (Acquisition and Satellite Operation)

✓	The investors put the Pittsfield Aqueduct Company up for sale. After a year on the market, the nearby Pennichuck water utility -- a larger utility with substantial technical, managerial and financial resources -- purchased the system.
✓	Pennichuck secured a State grant and refinanced a loan procured to complete the new Pittsfield filtration plant.
✓	Pennichuck received a HUD Community Development Block Grant to upgrade the distribution system and improve water quality.

Outcomes

- Pennichuck finished construction of the treatment facility and upgraded the distribution system, dramatically improving the quality of the finished water. **Customers are now better protected from the acute illness that can result from exposure to microbiological contaminants**.
- Pennichuck installed a computer control system to monitor the facility from a remote location and designated an operator to make daily visits to the plant, **ensuring the consistent provision of safe water**.
- Pennichuck initiated a customer service program to educate Pittsfield customers about their water system, **promoting the public's right to know and building trust and support in the community for continued provision of safe water**.
- Pittsfield customers **benefited from a 5% reduction in water rates**.

Questions about New Hampshire's Capacity Development Program? Contact Robert Mann • NH Department of Environmental Services Water Supply Engineering Bureau • PO Box 95 • 6 Hazen Drive • Concord, NH 03302-0095 • (603) 271-5171 • rmann@des.state.nh.us

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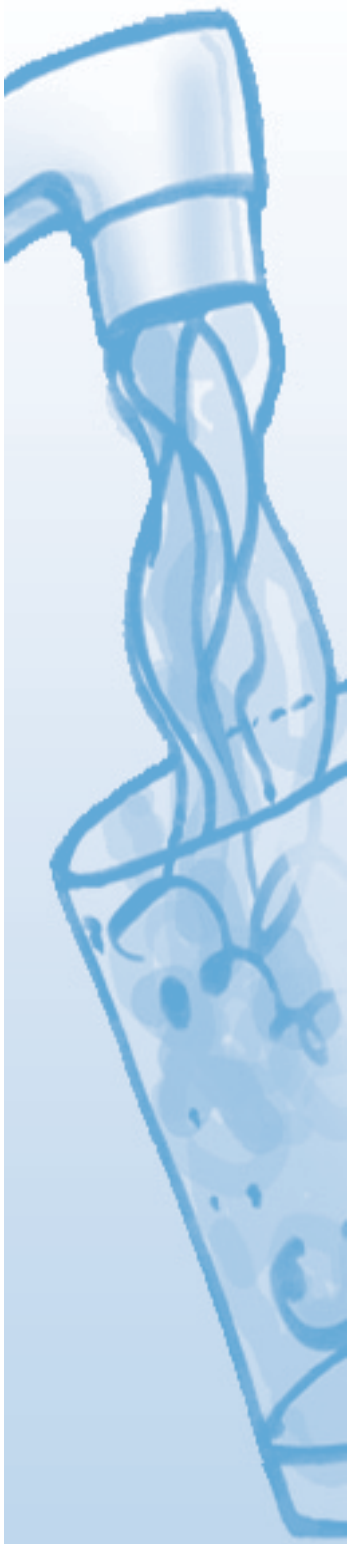
System Capacity Development Case Study

Clarion Township General Authority, Pennsylvania, 1998



Background

Clarion Township is a rural community in western Pennsylvania. The Clarion Township General Authority (CTGA) purchased drinking water for its 203 connections from the Pennsylvania-American Water Company (PAWC), a large investor-owned system.

Public Health Challenges

CTGA was unable to cost-effectively provide water to households nearby that were inadequately served by private wells. Some wells had microbial contamination, others had high levels of iron and manganese, and some could not produce adequate quantities of water.

Capacity Issues

Technical	▶ The distribution system required upgrades – water loss from leaks was high and meters did not function properly. Main breaks would sometimes go unnoticed until major portions of the distribution system had lost service.
Managerial	▶ CTGA was managed by a board of part-time volunteers who were unable to address the technical and financial difficulties of the system.
Financial	▶ CTGA became unable to meet their financial obligation to PAWC for the purchased water. ▶ CTGA's water rates were approximately 20% higher than PAWC's statewide single tariff pricing.

Actions: Ownership Transfer (Privatization)

- ✓ CTGA sold the water system to PAWC for the amount of the debt owed to PAWC.
- ✓ PAWC obtained a low-interest loan from PENNVEST (the Drinking Water State Revolving Fund in Pennsylvania) for service connections to households with contaminated and inadequate wells.
- ✓ PAWC assigned a part-time certified operator to oversee the system.

Outcomes

- PAWC extended service to 148 households in the Clarion Township, increasing the number of people with access to safe drinking water. **These customers are now protected from the acute illness that can result from exposure to microbiological contaminants**.
- PAWC conducted a comprehensive leak detection survey to investigate the high rate of water loss. In response, they replaced critical sections of distribution piping and the system's aging meters. They also installed equipment to automate the water distribution system, **ensuring continuous water service to customers**.
- PAWC **reduced rates for Township customers** to the statewide single tariff price of approximately $5 per 1,000 gallons, or $100 per household per year.

Questions about Pennsylvania's Capacity Development Program? Contact Dennis Lee • PA Department of Environmental Protection • Rachel Carson State Office Building • PO Box 8466 • Harrisburg, PA 17105-8466 • (717) 772-4058 • denlee@state.pa.us

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