

Executive Summary: Phase II Final Report

Background

The Alaska Native Health Board is administering a demonstration grant program intended to improve the capacity of rural Alaska communities to operate and maintain their water and sewer systems. This multi-year program began in 1996 and is funded by the U.S. Environmental Protection Agency, Office of Wastewater Management. The Institute of Social and Economic Research at the University of Alaska Anchorage is evaluating the individual projects and the program overall.

This report is the final evaluation of the 16 Phase II community projects for which data collection was substantially complete as of September 30, 1999. Phase II started in 1997. A coordinating committee for the project reviewed applications from 68 communities. It selected 18 whose proposed plans focused on improving operations and maintenance by improving utility structure and management and by educating customers about utility operations. ANHB also offered two Phase I communities continuation funding. We report here on 16 rather than 20 communities because several extended their projects past September 1999 and one was dropped from the program.

Characteristics of Phase II Communities

The Phase II communities are scattered across vast areas of Interior and Western Alaska. These communities are all small—but their populations range from as few as 85 residents to as many as 800. Many households in the project communities have limited incomes. A quarter of all the households in the Phase II communities had 1990 incomes of less than \$10,000; in some communities the share was as high as 40 percent.

Sanitation systems in the project communities serve anywhere from 44 to 184 households. Residents of many of these communities still hauled their water from central watering points and relied on honey buckets or outhouses as of 1997. Table E-1 shows characteristics of the project communities and 1997 water and sewer systems.

Goals of Project and Research Methods

Program goals include protecting the health of rural Alaskans through better operation and maintenance of sanitation systems; protecting government and community investments in sanitation facilities; and building community capacity for operating and maintaining sanitation facilities. It is that last goal that most Phase II project activities address. Improving operations and maintenance and financial self-sufficiency are the key outcomes we use to measure program success. Our evaluation method is multiple case study. We use similarities and differences across communities to strengthen our conclusions.

Data Sources

Our data sources include community surveys, community records, and interviews with project managers and utility operators. We also relied heavily on field notes and phone logs of the ANHB staff members who monitored project implementation, as well as on ANHB's project documents for each community.

TABLE E1. STUDY COMMUNITIES

Community	Regional Health Corporation	Water & Sewer Operator	1997 Population	1990 Mean Household Size	1990 Median Household Income	1990 Percent Below \$10,000	Water System (Number of households served)	Sewage System (Number of households served)
Chefornak	NSHC	city	405	5.00	\$20,278	17%	watering point (90)	honey bucket haul (85)
Deering	Maniilaq	public util.	158	3.57	\$15,208	10%	watering point (44)	honey bucket (44)
Galena	TCC	city	543	2.79	\$28,611	13%	FHT (97), piped (28), watering point (75)	FTH (115), septic (36), honey bucket (38), outhouse (13)
Kiana	Maniilaq	city	415	4.23	\$28,125	30%	piped (76), watering point (8)	sewer (73), FTH (6), honey bucket (6)
Kongiganak	YKHC	tribe	349	4.90	\$33,250	25%	watering point (75)	honey bucket (73), community haul (2)
Koyukuk	TCC	city	126	3.15	\$13,929	38%	watering point (45)	honey bucket, outhouses
Mekoryuk	YKHC	city	192	2.81	\$14,792	26%	watering point (64), piped (34), FTH (30)	honey bucket (34), sewer (31), FTH (30)
Napaskiak	YKHC	tribe	399	4.43	\$18,750	24%	watering point	honey bucket
New Stuyahok	BBAHC	city	452	4.44	\$12,083	18%	piped (85), watering point (1)	FTH (80)
Noatak	Maniilaq	tribe	401	4.50	\$36,458	7%	piped (70)	sewer (70)
Nondalton	BBAHC	city	221	3.30	\$21,750	20%	piped (75)	sewer (69), septic tanks (10)
Nunapitchuk	YKHC	city	489	4.34	\$17,083	19%	haul (6)	flush haul (6)
Saint Michael	NSHC	city	341	4.28	\$23,194	18%	watering point	honey bucket
Shaktoolik	NSHC	city	226	3.87	\$18,438	8%	piped (44)	sewer (44)
Shishmaref	NSHC	city	542	3.83	\$15,625	30%	watering point, haul (20)	honey bucket (), flush haul (20)
Stebbins	NSHC	city	475	4.65	\$23,333	27%	watering point (79)	honey bucket hand (79)
Tanacross	TCC	tribe	85	3.03	\$14,750	25%	piped (26), watering point (21)	septic tanks (24), honey bucket (19), outhouse (12)
Tanana	TCC	public util.	299	2.70	\$17,000	34%	watering point.	outhouses
Unalakleet	NSHC	city	803	3.45	\$34,531	9%	piped (184)	sewer
Venetie	TCC	tribe	241	3.64	\$14,688	39%	watering point (73), piped (12)	outhouses (73), sewer (12)
mean			361	3.73	\$20,757	24%		

Source: Alaska Department of Community and Economic Development community database and project applications

Finally, we benefited greatly from the observations and reports of other agency personnel who work with rural sanitation facilities, especially the rural utility business advisors (RUBAs) from the Alaska Department of Community and Economic Development and the remote maintenance workers (RMWs), who are typically employed by the Native regional health corporations but coordinated through the state's Village Safe Water program. The RUBAs provide rural communities with technical assistance and training on the business and financial administration of their utilities. The RMWs concentrate on direct assistance for local utility operators, keeping the systems running and responding to emergencies.

Project Profiles

Most Broadly Successful Communities

Measured by the broad program goal of building long-term community capacity for effective utility operation and maintenance (O&M), the four most successful projects were in Shaktoolik, Tanana, Unalakleet, and Shishmaref. What those communities have in common is leadership, commitment, and a broad base of support for improving utility operation and maintenance.

Shaktoolik

Shaktoolik is a Malemiut Eskimo village of about 225 on Norton Sound. It has a broad base of leadership and skills, from a forward-looking city council and capable staff to a strong partnership with RUBA. A city council member drafted a thoughtful work plan before ANHB staff visited. The mayor, city council, city clerk, utility clerk, utility operator, RUBA, and local government specialist all worked together to tackle the issues one by one. Everyone was committed to improvement. Shaktoolik's specific project accomplishments were:

- Hiring and training a utility clerk
- Forming a separate account for utility revenues and expenses
- Conducting a rate study and having council enact rate increase
- Increasing collections and covering utility clerk's salary
- Improving coordination between the city and outside agencies
- Performing maintenance on septic system leach fields
- Educating customers to help reduce maintenance costs

Tanana

Tanana is an Athabascan Indian village of about 300 at the confluence of the Tanana and Yukon rivers. In Tanana, water and sewer systems were the number one priority. In earlier years, the community had separate utility systems operated by the city and the tribal government. But by 1996 the city and tribe were working to consolidate water and sewer operations in one non-profit corporation, with the goal of constructing a new piped system. A number of outside agencies supported and invested in that effort. The ANHB grant supported the utility manager position during this

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transition period. The manager was very capable and a key component of project success. Unfortunately, with delays in bringing the new system on line, revenues have not increased enough to fund the position without the grant, even though collections are at 100 percent. Project accomplishments were:

- Hiring and training a utility manager
- Developing a management agreement transferring utility operations to Too'gha, a nonprofit corporation
- Developing a utility accounting system
- Transferring accounts from paper to computerized bookkeeping
- Developing personnel policies and procedures
- Obtaining additional outside funding for utility planning and operations
- Developing a utility business plan

Shishmaref

Shishmaref is an Eskimo village of about 550 on Sarichef Island in the Chukchi Sea. This community is the project's best turnaround story. Shishmaref began the project with poor management and administrative capacity and massive debt. But because of the community's focused desire to establish a planned flush-haul system, and the willingness of managers and administrators to work through internal problems and with outside agencies, the community made major gains in its capacity to operate and manage the utility. The council steadily improved its understanding of utility management and provided leadership and oversight for the staff. The new utility clerk worked with RUBA to learn financial management skills—which she then used to resolve financial problems she had inherited, provide better information to the council, and respond more quickly to the operator when he wanted to order parts. The ANHB grant—which provided money for parts—and the focused support of the new RMW greatly improved the operator's productivity and morale. While many challenges remain, including problems with the flush-haul system, high O&M costs, and high staff turnover, it appears that Shishmaref's gains in administrative capacity are enduring. Project accomplishments include:

- Improving financial management
- Improving washeteria maintenance
- Improving the water treatment plant
- Increasing collections
- Improving relations between the city and outside agencies

Unalakleet

Unalakleet is an Inupiaq village of 800 on Norton Sound at the mouth of the Unalakleet River. It is the largest of the project communities and, as the headquarters for the Bering Straits School District, has a comparatively well-paid and well-educated work force. It also has the most sophisticated management and accounting system in the group, as well as the oldest and largest piped water and sewer system. Unalakleet does not need management coaching—just money to maintain its aging system. Unalakleet’s broad pool of skills and leadership and high level of organizational development enabled the community to complete its project smoothly, despite turnover in every city position associated with the project. Project accomplishments were:

- Purchasing and using new utility billing software
- Installing a turbidity meter near the well field
- Purchasing parts for maintenance of facility
- Repairing stand-by generators for utility
- Repairing sewer lift-station pumps

Successful Projects but with Narrower Implications

Like the first four projects, the projects at Nondalton, Noatak, Napaskiak, Galena, and Tanacross were all solidly successful and showed strong leadership. But the scope of work or the implications of their success were narrower in some respects.

Galena

Galena is a community of about 550 on the north shore of the Yukon River in Interior Alaska. It is a regional center with good administrative capacity. The community hosts an innovative boarding school and Internet-based distance education school as well as an Air Force base. Galena’s city leaders knew exactly what they wanted to do with the ANHB grant: they conducted a customer survey, rate study, and engineering study—which they then used to leverage construction grants. Project accomplishments were:

- Completing a customer survey
- Developing better understanding of utility rate structure
- Completing an engineering report on alternative wastewater treatment technology
- Involving the community in discussions about utility improvements

Nondalton

Nondalton is a Tanaina Indian village of about 220 on Six-Mile Lake, between Lake Clark and Iliamna Lake. It developed a well-focused project and executed that project largely by itself. Repairing leaks and installing curb stops enabled Nondalton to save money in operations, enforce collections, and shut off water to homes while occupants were away, preventing freezups. Project accomplishments were:

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- Replacing leaky water service lines
- Reducing water use by 30 percent through line repairs and customer education
- Installing shutoff valves in residential lines
- Purchasing and putting into operation a new utility billing system
- Increasing customer awareness about conserving water and paying bills
- Coordinating continuing education for the water operator

Napaskiak

Napaskiak is a Yupik village of about 400 on the east bank of the Kuskokwim River. The Napaskiak Tribal Council provided consistent leadership, planning, and follow-through to craft innovative, village-appropriate solutions. It consolidated water and sewer operations from the city, purchased and operated a sewage haul unit, and supported the utility with gaming revenues. Project accomplishments were:

- Gaining experience operating and maintaining sanitation systems
- Buying equipment to improve collection and disposal of honey bucket waste
- Training operators to use new equipment
- Educating customers about improved waste disposal

Tanacross

Tanacross is a very small Athabascan Indian village—with a population of about 85—on the south bank of the Tanana River. In Tanacross, effective leadership and commitment to improving water and sewer were concentrated in the tribal administrator. The administrator, who wrote the grant application, had a strong working relationship with outside agencies, a good maintenance supervisor, and a very capable bookkeeper. However, some months after the project ended the administrator quit. It is unclear whether Tanacross's momentum for improving its water and sewer systems will be sustained in his absence. Project accomplishments were:

- Developing a prioritized list for purchasing spare parts
- Developing a replacement parts inventory and information file
- Purchasing and replacing a boiler
- Enacting a tribal ordinance of water and sewer operation
- Providing training for the water plant operator

Noatak

Noatak is an Inupiaq village of about 400 on the north shore of the Noatak River. It is an example of a well-run utility that for the most part did a good job on its O&M project activities, but suffered a major financial setback when a pump failed and the community faced extraordinary expenses for the improvised operations while the pump was being repaired. To cover these costs, the community spent down its reserves, which in turn created a cash flow and budget problem and eventually led to reducing the utility operator's hours. Had the ANHB project occurred a year earlier, Noatak

might have had a spare pump in inventory and saved thousands of dollars. But on the other hand, if it had not had the grant at all, it would have been in worse financial straits, further compromising utility O&M. This breakdown illustrates how thin the margin is for many rural utilities, even if they are well-run: one problem can precipitate a chain of problems. Project accomplishments were:

- Purchasing a new computer and upgrading software
- Dealing with a major maintenance problem
- Improving customer awareness about the utility system
- Attending utility management training

Limited Success

Chefornak, Kongiganak, and Mekoryuk had some success with their O & M projects, but it was more limited than the successes we discussed above.

Mekoryuk

Mekoryuk is a Cup'ik Eskimo village of about 200 on Nunivak Island. With help from RUBA, Mekoryuk made gains in financial management capacity but could not sustain them. High turnover in the city clerk position and the end of the grant-funded city administrator position undermined local efforts. Project work included:

- Hiring a city administrator
- Coordinating installation of flush-tank haul units
- Purchasing computers for city staff
- Attending utility management training
- Working with RUBA staff to improve financial management

Kongiganak

Kongiganak is a Yupik village of about 350 on the west shore of Kuskokwim Bay. Kongiganak's work plan focused on building administrative capacity for a new piped system—but when the new system was delayed, the work plan tasks no longer fit. Between turnover in key positions, slow evolution of circumstances, and little impetus to re-assess its priorities, Kongiganak never revised the work plan. The community instead carried out the project activities based on the existing system of honey-bucket haul. Project work included:

- Forming a sanitation committee made up of young people from the village
- Conducting a customer survey
- Attending utility management and operator training
- Developing and distributing a honey-bucket user manual to households

Chefornak

Chefornak is a Yupik Eskimo village of about 400 in the Yukon-Kuskokwim Delta in Southwest Alaska. It started at a very low level of administrative capacity and made solid gains in developing an accounting system and in management training and organization. The largest gains did not come from the ANHB project per se, but from the transfer of water and sewer operations from the city to the tribe, which was able to provide stronger leadership and support for the utility. Project accomplishments were:

- Purchasing a computer and software for utility billing and collections
- Training employees to use computer
- Establishing utility billing files

Least Successful

The five least successful projects were in Koyukuk, Kiana, New Stuyahok, Venetie, and Stebbins. They all lacked consistent leadership and follow through.

Koyukuk

Koyukuk is an Athabascan village of about 130 on the Yukon River. The community went through staff turnover and turmoil and leaders left the village. Because the city could not demonstrate the required financial and management capacity, the planned flush-haul system was postponed. Without a flush-haul system, the O&M work plan activities no longer made sense. While the record is very thin, it appears that the community may have spent ANHB funds on washeteria operations and on billing and collections for electricity. Project work included:

- Hiring a washeteria manager
- Improving the accounting system
- Posting notices about proper use of the washeteria
- Provided training for water operators

Kiana*

Kiana is an Inupiaq village of about 420 on the Kobuk River. It suffered from isolated leadership and high turnover. The community had four administrators over two and a half years, plus turnover in the city clerk and both utility operators. The utility manager was laid off when the grant money ran out. The city council didn't appear to support the project. Much of the community's work plan was never completed, due in part to lack of consistency in supervision and support from either the council or the administrator. When the utility manager proposed a collections incentive that had been successful in other villages, the council did not approve her recommendation. Project work included:

* While the project record for Kiana showed little evidence of long-term improvement, more recent reports say, "Revenue has risen dramatically by simply enforcing the related ordinances." The city administrator credits the O&M demonstration project with jump-starting significant improvements in utility governance, management, and community support.

- Hiring a utility manager (who was laid off when project funds ran out)
- Improving the computer billing system
- Working with RUBA and RMW staff to improve operations
- Attending utility management training
- Preparing utility management reports for city council

New Stuyahok

New Stuyahok is a Yupik village of about 450 on the west bank of the Nushagak River. New Stuyahok's plan to computerize billing and collections failed, apparently due to staff no-shows for training and unresolved scheduling conflicts between RUBA visits and the fishing season. The community's modest effort at customer education was not enough to raise collection rates significantly above the historic trend of 10 to 25 percent. In developing the work plan, community leaders passed up the idea of installing curb stops to enforce collections. The city administrator seemed to be more interested in the ANHB grant as a revenue source than as an opportunity to solve tough problems. The city is at a low level of administrative development and does not take advantage of development assistance from outside agencies. Project work included:

- Carrying out door-to-door customer education and collections
- Increasing utility operator skills
- Somewhat increasing community support for and awareness of utility operations

Venetie

Venetie is a Gwichin village of about 240 on the Chandlar River in Interior Alaska. After six months of intermittent contacts by ANHB staff, the village council hired a utility manager. But the manager was not supervised and the record provides no evidence of any work activities undertaken. Following tribal elections, the priorities of the First Chief changed. ANHB offered to revise the work plan accordingly, but Venetie did not follow through. Project work included:

- Hiring a utility manager
- Discussing with ANHB how to improve utility management

Stebbins

Stebbins, a community of about 475 on Norton Sound, did not even follow up on ANHB's award of grant money. The administrator was never able to get the council to help her develop a work plan and partnership agreement. After a site visit, many phone calls, and several letters from ANHB, Stebbins was dropped from the program in December 1997.

Key to Project Success

In summary, community commitment to improving water and sewer systems and supporting those systems with local revenues needs to be broad based. Strong leadership is not enough without council support.

Outcomes of Activities

Activities included in the work plans of the project communities fall under the broad categories of activities to improve operation and maintenance (O&M); to improve utility management; and to improve customer education. One way of assessing the effects of those activities is to compare compares changes in collections, operator skills, and other indicators in communities that did and did not undertake specific activities. Figure E-1 summarizes those comparisons.

Communities with specific activities in most cases saw more improvements in related indicators than communities without. The figure shows that:

- Training operators resulted in more improvements in facility condition, cost efficiency, and availability of parts and supplies.
- Providing operator support or O&M planning resulted in much bigger improvements in hours operators worked, in completion of scheduled maintenance, in operator skills, in availability of parts and supplies, and in facility condition.
- Establishing utility boards or committees brought much larger improvements in collections, in utility management and policies, and in community involvement.
- Educating utility customers resulted in more improvements in collections and in community involvement.
- Training managers brought very much larger improvements in collections and substantially more improvements in financial and utility management.
- Undertaking utility planning and writing ordinances sharply improved collections and utility management.

Strategies to Improve Operations and Maintenance

Besides examining the effects of specific project activities, we also looked at the effectiveness of some broader strategies communities tried.

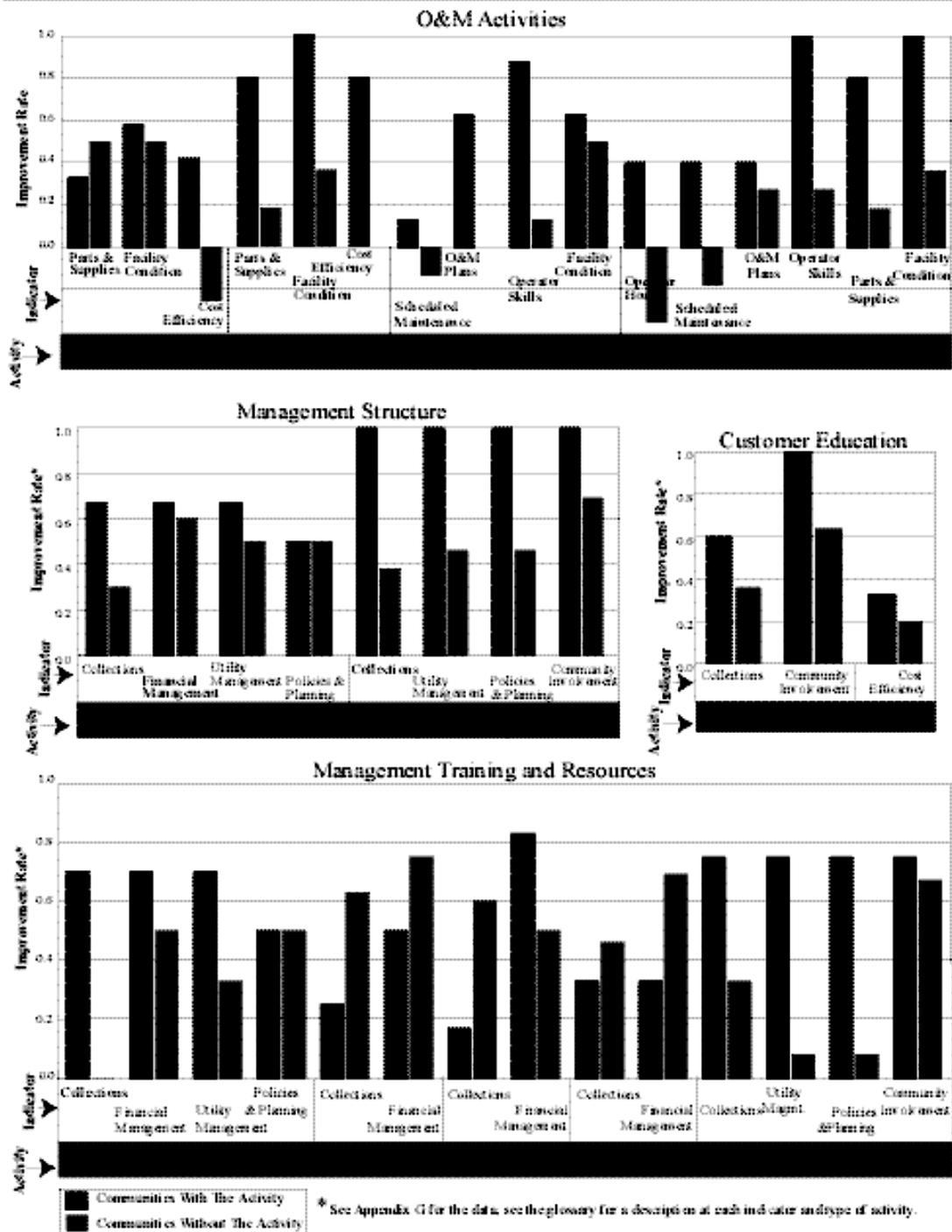
Partnerships

A conscious effort toward building partnerships—between community administrators and others and between communities and outside agencies—improves utility O&M and management. While communities do not always want or need agency assistance, it is an instrumental resource for community leaders who are ready to make changes and welcome outside help. Improved communication and coordination among agencies serving a community also help local leaders focus and coordinate their efforts.

Utility Manager or Clerk

Utilities that have the focused attention and expertise of a utility manager or clerk are way ahead. In ISER focus groups, RUBAs and RMWs said that a utility manager or clerk was key in communicating with the community leadership, coordinating training opportunities for the operators, and purchasing spare parts. The unresolved problem is how to pay salaries for utility managers.

FIGURE E1. COMPARISON OF OUTCOMES, COMMUNITIES WITH AN WITHOUT THE ACTIVITIES



* Improvement rates are calculated as the number of communities that showed improvements (not necessarily project related), less the number of communities that showed declines, divided by the number in the group.

Revenue Enhancement

Consistent, committed leadership is a key to increasing revenues. Where this is present, these strategies help increase utility revenues:

- Public education about the need to pay for utilities and discussion of what the money is used for
- Computerized monthly billing and accounting
- Raffles rewarding customers with zero balances
- Credible enforcement of payment policies
- Rate studies and fee increases
- Improved maintenance and service
- Allocation of gaming revenues to help pay for utilities
- Capable, committed or aggressive utility managers or clerks
- RUBA coaching and training on financial management

Preparing for New System

Communities that tried to improve O&M by preparing to manage planned new systems had limited success, because either: (1) construction delays put the O&M project out of sync with the new water and sewer system, so project activities were less meaningful and grant funds not well used; or (2) the O&M and management requirements for the new systems proved too expensive for the communities to sustain from utility revenues.

Maintenance on Existing Systems

There may be significant opportunities to improve the cost efficiency of old systems through system maintenance and repairs. As a good example, Nondalton succeeded in reducing water use 30 percent by repairing leaking lines and educating customers about wasting water. In the long run these changes will reduce the community's O&M costs. Also, enforcing homeowners' responsibilities can lead customers to take better care of their plumbing and service lines, as well as shift some of the expense off the utility.

Customer Education

Community education is a critical element in the effort to lower maintenance costs and increase revenues for village water and sewer utilities. Utility managers in project communities tried two kinds of customer education during the project: education about the need to pay utility bills, and education about how to use the new sanitation systems.

While the record shows few short-term effects of efforts to increase collections through customer education, there is some evidence of changing awareness and attitudes that may have long-term benefits. Most residents of these communities have limited cash income and little or no experience paying for local services. Collections and customer attitudes toward utility fees are the biggest challenges rural utilities face.

Basic information provided in an easy-to-understand format goes a long way toward creating a smoother running, lower-cost system. Community residents have limited experience with household plumbing, especially with the new vacuum-sewer and flush-haul technologies. Many don't know what can safely be put down toilets, the best ways to prevent freeze-ups, or how to make simple repairs to their units.

Conclusions

The approach ANHB used for this project makes a unique contribution to the joint effort to build water and sewer management and O&M capacity in rural Alaska. Attributes of the ANHB approach that community leaders widely endorsed include:

- Inclusivity, making the grants accessible to communities with all levels of administrative capacity
- Emphasis on partnership, both internal and external
- Emphasis on community initiative and design, building strategic planning skills
- Flexibility in the kinds of activities funded as well as the timeline, tailored to the needs and priorities of each community
- Very personal staff support, including multi-day site visits, generous telephone consultation, and willingness to talk through or help with any issue

Overall, we want to emphasize that strong community leadership, a broad base of support for improving utility management, and cooperation among local officials and outside agencies are crucial to improving operation and maintenance of water and sewer systems in rural Alaska.

But even with strong leaders and broad support, small rural places face a myriad of problems endemic to operating and maintaining sanitation systems in a harsh climate. In particular, these case studies highlight an issue that warrants further study and policy deliberation: the question of whether small, remote communities have the fiscal capacity to support full-service, Arctic-design water and sewer systems. We found that even the most capable communities and successful projects in the group are stretched financially. Small systems have great difficulty meeting the fixed cost of management overhead. And even if communities manage to cover the cost of routine operations, they lack the fiscal capacity to buffer risk. They are unable to build up the cash reserves to pay for large, non-routine maintenance and facility upgrades or to weather bad years—whether due to a poor economy and low revenues or to extraordinary expenses.