EVALUATION OF THE ALASKA NATIVE HEALTH BOARD SANITATION FACILITY OPERATION AND MAINTENANCE PROGRAM

FINAL REPORT ON PHASE I PROJECTS

PREPARED BY
INSTITUTE OF SOCIAL AND ECONOMIC RESEARCH

PREPARED FOR
ALASKA NATIVE HEALTH BOARD AND
U.S. ENVIRONMENTAL PROTECTION AGENCY,
OFFICE OF WASTEWATER MANAGEMENT

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The O&M Project is almost a spiritual project related to self-determination and self-governance: accepting responsibility for our own quality of life.

Anne Walker
Executive Director
Alaska Native Health Board
March 25, 1997
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PART I: PROGRAM SUMMARY
Introduction

The Alaska Native Health Board (ANHB) is engaged in a multi-year project funded by the U.S. Environmental Protection Agency, Office of Wastewater Management, to administer sanitation facilities operations and maintenance (O&M) demonstration grants in rural Alaska. Nine projects were funded in the first phase, commencing in April 1996. Nineteen projects, including two carry-overs from the first group, were funded in the second phase, commencing in April 1997. The third and last phase, including seven projects, commenced in April 1998.

The Institute of Social and Economic Research (ISER), funded initially by EPA and later by ANHB, is monitoring and evaluating the various sanitation facility O&M projects and the program overall. The research design and the underlying program design differ somewhat across the three phases. This report comprises the final evaluation for the seven Phase I projects that were not continued in Phase II.

More than 100 rural communities submitted interest forms for the demonstration grant program and 50 prepared grant applications for Phase I. The coordinating committee members each scored the applications on nine criteria; the scores were tallied and averaged and the applications ranked by overall score. Staff analyzed which types of proposed activities were highly rated in the scoring. At its meeting, the committee discussed which types of activities or themes should be the focus; then, with extensive discussion on the merits of each, selected a mix of applications addressing these priority themes. The committee sought diversity and balance in each cluster and overall, deliberately including some communities with less O&M management capacity (and perhaps lower ranked applications) along with the highly ranked applicants. The scores and rankings were suggestive but not determinative in selecting applications. Based on the coordinating committee’s recommendations, in April 1996 ANHB funded O&M demonstration projects in nine rural Alaska communities. Those nine communities are Hooper Bay, Kotlik, and Sleetmute in southwest Alaska; Shismaref, Noorvik, Nulato, and Ambler in northwest Alaska; Tanana in the Interior; and Hydaburg in southeast Alaska. Below we first profile the communities, describing their existing sanitation systems and other community characteristics. Then we describe our study methods and discuss project implementation and outcomes. We conclude Part I with our evaluation findings and discussion of what we learned. Part II discusses project objectives, implementation and outcomes for each of the seven communities not continued in Phase II.

Profile of the Communities

Map 1 shows the sanitation status of 191 villages, highlighting the nine with Phase I O&M projects. The nine communities and their current water and sewage technologies are profiled in Table 1. The communities were selected to represent diverse sanitation conditions and challenges in village Alaska. They are dispersed

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1 The coordinating committee is an advisory council for the project composed of representatives of federal, state and regional organizations.
across six regions and use ten types of water and sewer technology. They range in population from 102 to 1,012 and from 55 to 210 in numbers of households served. The average household size varies from 2.7 to 5.0. They also differ in their ability to pay for utility services. The 1990 median annual household income in the nine communities ranged from $15,600 to $33,000[3]. The communities with higher household income also tend to have more people per household. In two-thirds of the study communities, a quarter or more of the households had incomes of less than $10,000 in 1990.

### TABLE 1. STUDY COMMUNITIES

<table>
<thead>
<tr>
<th>Community</th>
<th>Regional Health Corp.*</th>
<th>1998 Population</th>
<th>Number of Households Served</th>
<th>Mean Household Size</th>
<th>Median Household Income</th>
<th>Percent Below $10,000</th>
<th>Water System</th>
<th>Sewage System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noorvik</td>
<td>MA</td>
<td>631</td>
<td>83</td>
<td>5.0</td>
<td>$32,969</td>
<td>5</td>
<td>circulating, watering point</td>
<td>vacuum piped, honey bucket</td>
</tr>
<tr>
<td>Ambler</td>
<td>MA</td>
<td>333</td>
<td>55</td>
<td>4.4</td>
<td>$22,500</td>
<td>20</td>
<td>circulating, watering point</td>
<td>gravity with lift</td>
</tr>
<tr>
<td>Hydaburg</td>
<td>SEARHC</td>
<td>425</td>
<td>150</td>
<td>3.3</td>
<td>$20,139</td>
<td>29</td>
<td>non-circulating septic tank</td>
<td>septic tank</td>
</tr>
<tr>
<td>Kotlik</td>
<td>YKHC</td>
<td>543</td>
<td>116</td>
<td>4.6</td>
<td>$20,417</td>
<td>16</td>
<td>watering point</td>
<td>honey bucket</td>
</tr>
<tr>
<td>Hooper Bay</td>
<td>YKHC</td>
<td>1,012</td>
<td>210</td>
<td>4.5</td>
<td>$18,125</td>
<td>36</td>
<td>watering point</td>
<td>honey bucket</td>
</tr>
<tr>
<td>Nulato</td>
<td>TCC</td>
<td>365</td>
<td>90</td>
<td>4.0</td>
<td>$17,143</td>
<td>24</td>
<td>non-circulating</td>
<td>honey bucket</td>
</tr>
<tr>
<td>Tanana</td>
<td>TCC</td>
<td>299</td>
<td>111</td>
<td>2.7</td>
<td>$17,000</td>
<td>25</td>
<td>watering point</td>
<td>outhouses</td>
</tr>
<tr>
<td>Sleetmute</td>
<td>YKHC</td>
<td>102</td>
<td>32</td>
<td>3.2</td>
<td>$10,000</td>
<td>50</td>
<td>watering point, circulating</td>
<td>septic tank and honey bucket</td>
</tr>
<tr>
<td>Shishmaref</td>
<td>NSHC</td>
<td>542</td>
<td>154</td>
<td>3.8</td>
<td>$15,625</td>
<td>24</td>
<td>watering point, community haul</td>
<td>honey bucket, flush haul</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>472</td>
<td>111</td>
<td>3.9</td>
<td>$19,324</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td></td>
<td>425</td>
<td>111</td>
<td>4.0</td>
<td>$18,125</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Abbreviations:** * MA=Maniilaq Association; SEARHC= Southeast Alaska Regional Health Corporation; YKHC= Yukon-Kuskokwim Health Corporation; TCC= Tanana Chiefs Conference; NSHC= Norton Sound Health Corporation.

**Sources:** Community interest forms, pilot project applications, and 1990 census.

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[3] This 1990 census data is a weak indicator of ability to pay. It is nine years out of date, and does not reflect inflation, the substantial increase in Permanent Fund Dividends, or equally dramatic decreases in other state funds over that period. Nor does it provide comparative information about the expenditure side of the household budget. It is the best data we have, and may be a fair indicator of relative ability to pay across project communities.
Map
Table 2 shows the distribution of the nine communities by sewage technology and percent of households with incomes less than $10,000.

<table>
<thead>
<tr>
<th>Share of Households With 1990 Income Below $10,000</th>
<th>1998 Sewage Systems</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Piped</td>
<td>Septic Tank or Flush Haul</td>
</tr>
<tr>
<td><strong>20% or fewer</strong></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Noorvik</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotlik</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>21% - 30%</strong></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Hydaburg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kooper Bay</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Nulato</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tanana</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>More Than 30%</strong></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Shishmaref</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleetmute</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Note: "X" indicates primary system, "☆" indicates secondary system.

Table 3 summarizes the types of interventions proposed by the communities, grouped under two general themes. Eight of the communities planned O&M interventions, and four planned finance interventions; three of them had activities in both areas.

<table>
<thead>
<tr>
<th>Community</th>
<th>O &amp;M Interventions</th>
<th>Finance Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambler</td>
<td>parts inventory, operator training, community ed.</td>
<td>rate setting</td>
</tr>
<tr>
<td>Hooper Bay</td>
<td>planning, community ed.</td>
<td>community ed., fee collections</td>
</tr>
<tr>
<td>Hydaburg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kotlik</td>
<td>subsidize operations</td>
<td></td>
</tr>
<tr>
<td>Noorvik</td>
<td>parts, operator training, community ed.</td>
<td></td>
</tr>
<tr>
<td>Nulato</td>
<td>planning, training, parts inventory, community ed.</td>
<td>billing system</td>
</tr>
<tr>
<td>Shishmaref</td>
<td>community ed., operator training, planning</td>
<td></td>
</tr>
<tr>
<td>Sleetmute</td>
<td>clean &amp; repair sewage system</td>
<td>rate setting</td>
</tr>
<tr>
<td>Tanana</td>
<td>training, planning</td>
<td></td>
</tr>
</tbody>
</table>
Evaluation Methodology

Multiple Case Study Design

For the project evaluation we are using a multiple-case study research design because: (1) our primary research questions are exploratory and explanatory (what, how and why); (2) the phenomena we are studying are complex and context dependent; and (3) we have many more variables of interest than we have data points. We use similarities and systematic differences across study communities to strengthen our analytic conclusions.

Research Questions

The Alaska Native Health Board (ANHB) program goals as set out in the grant are:

1. to protect the public health of rural Alaskans through effective water and sanitation facility operation and maintenance;
2. to protect government and community investments in sanitation facilities; and
3. to build community capacity for sanitation facilities operation and maintenance.

We determined early on that it was not feasible to directly measure outcomes for public health or public investments in facilities. In our program model these outcomes are directly linked to the effective operation and maintenance of water and sanitation facilities. Our design therefore focuses on O&M indicators to measure progress toward the first two goals.

Community capacity for O&M is multi-faceted. Operator skills, financial support for operator hours and parts and supplies, effective utility planning and administration, household attitudes and practices regarding O&M of in-home units, community facilities (e.g. washeterias, dumps, sewage receptacle), and utility fees, cooperation among local leaders and institutions, and effective partnering with outside agencies are just some of the elements. In our case study narratives we address many of these aspects. As a summary measure, however, utility finance is a key indicator of community capacity.

4 The fourth goal—to demonstrate the feasibility of reducing life cycle costs through alternative technologies—was dropped from this project and picked up by ISER as a separate study analyzing the life-cycle costs of flush haul technology.
5 Major illnesses from poor sanitation have low enough incidence that large data samples and good controls are required to definitively measure changes. And the common minor illnesses usually go unreported. Studies in Canada have, however, demonstrated a clear link between water quantity and public health outcomes, presumably through improved personal hygiene. (Robinson, B.A. and G.W. Heinke, Northwest Territories Department of Municipal and Community Affairs, Canada, The Effect of Municipal Services on Public Health in the Northwest Territories, March, 1990). Per capita water consumption over six gallons per day is therefore a possible intermediate measure. It is not a sensitive measure for our purposes, however, since it tracks changes in technology more than changes in O&M. Our communities consume more than six gallons a day on average anyway, though in some cases the distribution may be skewed by a few high users with pipes. Measuring changes in the life cycle costs of facilities would require a longitudinal study.
The general research questions posed for all communities in this study derive from the two Phase I project themes: improving water and sanitation operations and maintenance and financial self-sufficiency:

a. Has the demonstration community, as a result of this program, improved its operations and preventive maintenance?

b. Has the demonstration community, as a result of this program, become more financially self-sufficient in operating and maintaining its water and sewer systems?

Each of these questions may be broken down into numerous subsidiary questions, as shown in Table 4. We will use all seven completed community project evaluations to address some larger research questions, which are also detailed in Table 4:

• What interventions work to improve O&M?
• Do community initiative and control contribute to program success?
• Can these models be extended to other rural communities throughout Alaska?
• Was the O&M pilot program successful in moving us toward long-term solutions to rural O&M problems?
### TABLE 4. RESEARCH QUESTIONS

**I. Within-case research questions:**

A. Has the demonstration community, as a result of this program, improved its operations and preventive maintenance?
   1. Did the O&M indicators change over the period?
      a. Was there a change in operator hours or in the percentage of scheduled maintenance activities completed?
      b. Was there a change in policies, procedures or planning in support of O&M?
      c. Was there a change in operator skills or resources for O&M tasks?
      d. Was there a change in operator attitude or perceptions of community support?
      e. Was there a change in the physical condition of the facilities?
   2. Did the program interventions cause the change?
   3. What about the interventions caused the change: the intervention itself, or the implementation process?
   4. How did the implementation work?
   5. What were the important factors in determining program outcomes: key individuals? community organization? community composition or social structures? outside assistance or catalyst? program philosophy of community empowerment?

B. Has the demonstration community, as a result of this program, become more financially self-sufficient in operating and maintaining its water and sewer system?
   1. Did the financial indicators change over the period?
      a. Have collections increased?
      b. Have savings been realized?
      c. Was there a change in utility finance policies, procedures or planning?
      d. Was there a change in financial management skills or resources?
   2. Did the program interventions cause the change?
   3. What about the interventions caused the change: the intervention itself, or the implementation process?
   4. How did the implementation work?
   5. What were the important factors in determining program outcomes?

C. How might these changes improve public health, protect facility investments and build community capacity?

**II. Cross-case research questions:**

A. What interventions work to improve O&M?
   1. Were the successful interventions successful across different types of communities?

B. Do community initiative and control contribute to program success?

C. Can these findings be generalized?

D. Did the O&M pilot program move us in the direction of long-term solutions to rural O&M problems?
Data Collection

Operation and maintenance of rural sanitation facilities can be broken down into four dimensions (Figure 1): operations, management, finance, and community support. Each of these dimensions in turn can be broken into components. To measure improvements in O&M, we have attempted to collect information on each of the ten O&M program components shown in Figure 1. We augment these O&M indicators with information on community context and project implementation to address the other research questions in Table 4. We collected a variety of qualitative and quantitative information from the project communities and secondary sources addressing these topics:

- **Description** of water and sanitation systems and facility condition;
- **Project implementation**: plan, objectives, and description of implementation process, problems and successes;
- **Operations**: operator training, turnover, hours and pay, O&M activities, violations, O&M plans and procedures, resources and equipment;
- **Management**: manager training, hours and pay, administrative tools and systems, planning and analysis activities;
- **Finance**: fees, billings, collections, expenses, record keeping, reporting;
- **Community support**: formal policies, community education, and community attitudes.

**Figure 1. Program Components for Operation and Maintenance of Rural Sanitation**

Table 5 identifies the sources for each of these data clusters. The sources are described further below.
<table>
<thead>
<tr>
<th>Data</th>
<th>Community Survey</th>
<th>Project Documents</th>
<th>Field Notes &amp; Phone Logs</th>
<th>Operator Interviews</th>
<th>RMW Assessments</th>
<th>State Records</th>
<th>Overall Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background Information</strong></td>
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<td>Operator job, hours, skills, turnover</td>
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<td>Fees, billings and collections</td>
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<td>Revenues and expenses</td>
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<td><strong>Agency Effectiveness</strong></td>
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</tbody>
</table>

*Final Phase I Report*
Community Survey and Community Records

The community survey is a 12-page structured mail survey (Appendix A). The questionnaire requests current and historical information for the prior five years regarding operations, maintenance, finance, utility operators, the utility manager, and community education related to the water and sanitation systems in the communities. This baseline information serves as a reference point for assessing the outcomes of the pilot projects.

The survey was faxed to three communities and mailed to all nine of the selected communities on April 24, 1996. The communities were asked to mail their responses to ISER. Six out of nine complied, two with extensive supporting documents attached. In October and November 1997, we sent the three who had completed their projects a copy of their completed surveys and asked community officials to update the information. (In one case we sent a blank survey and asked them to fill it out with information for both times.) We also sent a set of self-evaluation questions. We received only one response.

In April 1998, we re-sent the same information to the two communities which had not responded. We sent a similar packet to the last three communities, which had by then completed their projects. We received one response.

Field Notes, Phone Logs and Project Documents

The project director for village sanitation support, Joe Sarcone, was a key investigator in this study. His field notes were a primary source of information describing project implementation in each community. With the research questions in mind, Mr. Sarcone recorded his observations and interpretations during his trips to negotiate the partnership agreements with each community, as well as his follow-up contacts throughout the project. Project documents such as the community interest form, the project application, the cooperative agreement, and any progress reports were also sources of primary data. Phone logs kept by project staff are a valuable source of information on project implementation. At the end of each project, Joe Sarcone and Nina Miller, his replacement as project director, conducted telephone interviews reflecting on project achievements.

Operator Interviews

Another primary means of data collection was a structured telephone interview of utility operators in each community. There were 13 operator interviews at the beginning of the project (May, June and September, 1996); we repeated interviews with 11 of them at the end of the project (May, June and August 1998). Each interview was scheduled at the respondent’s convenience and lasted about 30 minutes. The questions addressed work hours, duties, availability of tools, materials and parts, operator attitudes, and support from the community council, supervisor, and residents. A copy of the instrument appears in Appendix B.
State Program Records

The Rural Utility Business Advisor Program (RUBA) in the Alaska Department of Community and Regional Affairs offers technical assistance and training to rural communities on the business and financial administration of their utilities. The RUBA advisors are assessing the budgeting, record keeping, and accounting practices in most of the pilot communities, as well as the proficiency of community personnel. Their reports supplement our data on the financial operations of the community and its utility and in particular the unique training needs of each community.

The Department of Community and Regional Affairs (DCRA) also maintains an on-line Alaska Community Database. These profiles contain a description of each community and its facilities, data from the U.S. census, and information from other government sources on the economy, employment, schools, rural businesses, municipal finances, rural grants, and ANCSA land status.

DCRA collects revenue and expenditure data from the certified financial statements of municipalities throughout the state. For each project community that is incorporated, we have up to ten years of financial data on enterprise (utility) funds. Our analysis of it will be limited, however, due to the lack of detail by utility and inconsistencies in reporting.

The Rural Issues

The Drinking Water Program in the Department of Environmental Conservation, Division of Environmental Health, keeps records we used of community water sampling.

Remote Maintenance Worker Assessments

The eight remote maintenance workers (RMW) and IHS operations and maintenance program specialists who work with the selected communities were asked to complete short assessments of facility conditions (Appendix C). They were also asked to review our draft community reports summarizing the data collected to fill gaps in our information, correct our misunderstandings, and add comments from their perspective. In October 1996, we received responses concerning four communities. In August 1998, they were asked to update their assessments. None responded.

Overall Evaluation Interviews

In addition to the above efforts to document project outcomes, we conducted telephone interviews with all community project managers concerning their experiences with the ANHB grant program. Questions addressed whether and how the program helped them with long-term O&M and how ANHB and other agencies could better serve them. The interviews were in December 1998, after the project close-out.

Project Implementation

The project director visited each of the demonstration communities in April and May 1996 and worked with them to prepare partnership agreements. Prior to each visit,
he coordinated with the various federal, state, and regional agency staff (remote maintenance workers, public health service engineers, and rural business advisors) who provided technical assistance to each community concerning water and sanitation management, operations, and maintenance. During the visits, he facilitated planning sessions with community members to prepare draft work plans (scope of work) and budgets. Seven communities finalized work plans and budgets and signed O&M Pilot Project Partnership Agreements with Alaska Native Health Board (ANHB) in July 1996. The remaining two completed these tasks and signed partnership agreements by early September 1996.

Under the terms of the partnership agreements the communities were obligated to submit quarterly reports of their activities. A second site visit was made by the project director in the winter of 1996-97. There was also extensive follow-up communication and problem solving by telephone. Many of the communities experienced delays in implementing their projects. In some cases the scope of the project was revised part way through. All were given extensions of one to three quarters. Six communities completed their projects and were closed out; two were awarded Phase II grants to continue or expand their projects another year; one community never made substantial progress and was eventually dropped from the project. The project start and end dates, award amounts, percent of the award actually claimed, and community matches for the nine communities are shown in Table 6.

<table>
<thead>
<tr>
<th>Community</th>
<th>Start Date</th>
<th>End Date</th>
<th>Award Amount</th>
<th>Percent Claimed</th>
<th>Community Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambler</td>
<td>7/1/96</td>
<td>9/30/97</td>
<td>$40,000</td>
<td>100%</td>
<td>$80,383</td>
</tr>
<tr>
<td>Hooper Bay</td>
<td>7/1/96</td>
<td>12/31/97</td>
<td>$37,500</td>
<td>83%</td>
<td>$36,926</td>
</tr>
<tr>
<td>Hydaburg</td>
<td>9/1/96</td>
<td>2/28/98</td>
<td>$27,525</td>
<td>25%</td>
<td>$75,305</td>
</tr>
<tr>
<td>Kotlik</td>
<td>7/1/96</td>
<td>9/30/97</td>
<td>$37,000</td>
<td>100%</td>
<td>$10,489</td>
</tr>
<tr>
<td>Noorvik</td>
<td>7/1/96</td>
<td>2/28/98</td>
<td>$11,818</td>
<td>100%</td>
<td>$10,700</td>
</tr>
<tr>
<td>Nulato</td>
<td>7/1/96</td>
<td>3/31/98</td>
<td>$32,800</td>
<td>75%</td>
<td>$14,098</td>
</tr>
<tr>
<td>Shishmaref</td>
<td>9/1/96</td>
<td>Phase II</td>
<td>$40,000</td>
<td>100%</td>
<td>$39,603</td>
</tr>
<tr>
<td>Sleetmute</td>
<td>7/1/96</td>
<td>8/31/98</td>
<td>$32,311</td>
<td>100%</td>
<td>$15,222</td>
</tr>
<tr>
<td>Tanana</td>
<td>7/1/96</td>
<td>Phase II</td>
<td>$39,999</td>
<td>100%</td>
<td>$122,820^{b}</td>
</tr>
</tbody>
</table>

*aAny non-federal services or funds the community used to manage, operate, and maintain the sewer and water system during the project year. Documentation was supplied by each community.

*b Includes capital improvements to the effluent discharge line.
Project Outcomes

Because the community questionnaire was largely unsuccessful, and because much of the information we did collect from various sources was inconsistent, we were unable to systematically document and compare many of the outcome indicators in the research design. As a result, and because we had only seven cases at this stage, this evaluation is primarily qualitative, based on project document interviews. We hope to assemble a stronger record of outcome indicators for the nineteen Phase II projects.

Project achievements for seven of the Phase I communities are summarized below. Tanana and Shishmaref are not included in the analysis because their projects were continued into Phase II.

Ambler

Ambler largely accomplished its project activities and objectives, including:

- Hiring a utility manager 20 hours per week for the duration of the project, and purchasing a computer and software for her use; the utility manager made a “big difference” in the smooth operation of the utility, including increased collections, improved economy, and timeliness in purchasing, planning and rate setting.

- Increasing operator hours by three hours per week, to develop the parts inventory and for on-going preventive maintenance; purchasing needed parts and protective clothing for the operators. The operator claimed that having spare parts on hand improved his efficiency in repairs and maintenance.

Ambler didn't obtain additional training for operators (though the goal of Level I certification was achieved through other means).

Hooper Bay

Hooper Bay accomplished only a few of its goals. It is doubtful that any long-term benefits will ensue. The short-term achievements include:

- Hiring a project manager for the duration of the project, and purchasing a computer for her use. Though she was conscientious, she did not have the institutional support to be effective. She did gain valuable knowledge, skills and experience, and now serves as city clerk. She is OIT certified.

- The project manager drafted a water and sewer ordinance, a litter ordinance, and a solid waste management plan; to date the council has not acted on them.

- Completing a household survey of water and waste management practices.
**Hydaburg**

The primary goal of the Hydaburg project was to increase collections. However, the city was torn with political and administrative turmoil and was unable to complete its project. Hydaburg’s few achievements include:

- Repairing one sewer line and a few water lines, thus improving public health and system integrity and economy.
- Attaining operator OIT certification.

**Kotlik**

The goals of the Kotlik project were to improve operation of the honey-bucket haul system, to develop financial management capacity, and to forward fund O&M. For the short run, these were achieved, including:

- Paying operator salaries and increasing their hours. The result was more frequent hauls, decreased spillage, better maintenance of the equipment, and improved operator morale and customer service.
- Purchasing a new four-wheeler; it proved to be more fuel efficient than the old one and more economical to operate.
- Establishing an O&M account and building a balance to serve as a budget reserve. This serves to cushion the irregular revenues from bingo and special fund-raising events, as well as to defer fiscal crisis. The accounting for the project clarified for them how much fund-raising will be required annually to sustain the system.

**Noorvik**

Noorvik has the oldest vacuum sewer system in the state. The foremost objective of its project was to lower O&M costs. Accomplishments include:

- Replacing 24 obsolete and problematic activators for home plumbing, dramatically reducing the frequency of home repairs. During installation, the operators trained household members in the proper care of the units.
- Producing and distributing a simple, illustrated homeowner’s manual, teaching the basic dos and don’ts of operating and maintaining home units. This was well received, and further reduced the demand for home repairs.
- Instituting customer use agreements, along with a policy requiring households to be current in their utility bills before home repairs would be performed. The intent was to clear up the backlog of unpaid bills for home repairs; repairs to the home plumbing units are very expensive, and non-payment was common. This also served to reduce the call for home repairs. Overall, the primary operator estimated that home repairs declined 25 percent.
• Training operators, especially on-site training by a manufacturer's representative, for the town's particular equipment. It took more than a year and a half to arrange, but the persistence of the RMW paid off: the operators said this was the most informative training they'd ever had, though it was too short. An additional benefit was that the company representative figured out that the remaining old activators were compromising the system, causing the vacuum pumps to operate excessively. With this information, Noorvik worked with PHS to obtain $200,000 to replace the old toilet units and controls, greatly improving system operation and extending the life of the pumps.

The Noorvik project was an unqualified success. The small grant of $11,818 leveraged much greater benefits in improved levels of service, customer relations, household O&M, operating efficiency, operator knowledge and skills, system maintenance, effective use of operator time, and financial self-sufficiency. Not only did community officials learn a lot, but they are sharing what they learned: in addition to other venues, Noorvik is mentoring a Phase III project community.

Nulato

Nulato had a new water and sewer system. The town wanted to start off on a strong footing for efficient operation, maintenance and financial management, as well as for quality service. Though there was a lengthy period of inactivity in the middle, in the end the project achieved a lot, including:

• Reviving, training, and actively involving the utility board in the management of the utility. In particular, Nulato came to recognize the need for organizational development and strengthened personnel management for the city.

• Producing and distributing a simple easy-to-understand homeowner’s manual, teaching new users how to properly operate and maintain their home plumbing— in particular, how to prevent freezing.

• Training operators and upgrading their certification.

• Inventorying and purchasing critical spare parts, equipment, supplies and protective clothing.

• Purchasing a computer and software and greatly improving the system for billings, collections and record keeping.

What Nulato did not achieve is just as notable: it did not hire a utility manager, because it could not afford to. Without a utility manager or some other administrative help, the city treasurer cannot keep up with the city paperwork, let alone management tasks such as supervision, oversight, planning or organizational development. Without direct supervision, the operators are having difficulty implementing a preventive maintenance plan. And despite monthly fees of $115 per household and collections enforcement, the system still operates at a loss; Nulato has not figured out how to finance its new system over the long term.
Sleemute

Though it started well enough, the Sleemute project languished for more than a year and a half when the village council effectively dissolved. ANHB was very persistent in attempting to revive the project, because it was clear that a public health disaster was imminent: the septic tanks had not been pumped for six years. Indeed, one backed up into a home. In the end, these were the project’s accomplishments:

- Repairing the road to the septic sludge dump and the solid waste dump. With access restored, households delivered their garbage to the solid waste dump instead of leaving it at the sludge dump or along the road.
- Re-excavating the sludge dump and cleaning the area up. In conjunction with improvements to the dump, funded by the village corporation, the whole area was greatly improved.
- Repairing the pumper and pumping nine septic tanks. The fringe benefit of this activity was that the village developed good cost information to set fees for future septic pumping, including for the school. And perhaps residents will know to pump their tanks again in a few years.
- Insulating the well head and pipe to the pump house, saving the utility as much as $200 per month in electric bills for operating heat tape in the winter.

Summary of Findings

Because these seven Phase I cases are only one quarter of the pilot projects under study, generalizing from these few cases is unwarranted. Still, some preliminary discussion of the themes I see in the data is in order. In this summary I address the cross-case research questions originally posed in Table 4:

A. What interventions work to improve O&M?
B. Do community initiative and control contribute to program success?
C. Can these findings be generalized?
D. Did the O&M pilot program move us in the direction of long-term solutions to rural O&M problems?
Which Projects Worked?

The most successful projects were in Noorvik and Ambler. These are also the communities that began with the most community capacity: long-established piped sewer and water systems; stable administrative systems for management, billing and collections; and comparatively more economic resources. Targeting the communities most likely to succeed would not move us in the direction of long-term solutions to rural O&M problems. The hard-to-serve communities are precisely the ones that present the most O&M challenges.

The least successful projects were in Hydaburg and Hooper Bay. In both cases, the fundamental problem was internal: political conflict and administrative turmoil, which make it difficult to work together toward a common goal. From the perspective of public policy, it is not clear that there is any sort of external assistance or role for outside agencies which would make a difference in these cases. The one possible tack would be to somehow establish utilities as self-supporting enterprises with governing bodies independent of local politics. This is the approach Tanana is taking. It is also a factor for success identified by Cornell (1996) in his study of economic development on Indian reservations. Even if the utility is formally independent, however, it is not likely to be immune from the political conflicts rending the community, unless it has a larger constituency—for example, a regional utility or a consortium of communities like AVEC (Alaska Village Electric Cooperative).

Kotlik and Nulato represent the in-between communities, which have less developed capacity but stable political and administrative leadership ready to take on new sanitation challenges. While the tangible results of their O&M projects were more modest and their long-term prospects for financial self-sufficiency more ambiguous when compared to those of Noorvik and Ambler, the intangible results in the form of learning may be substantial.

What Types of Interventions Worked?

We do not have enough cross-case information to fairly address this question. Still, the data is rich enough to generate some preliminary insights and promote thoughtful discussion.

It comes as no surprise that subsidies work to improve O&M. The operator subsidies in Kotlik clearly improved operations and maintenance, thereby improving the level of service and public health in the community. The operator subsidies in Ambler clearly improved preventive maintenance, both directly and indirectly through the spare parts inventory. The subsidy of a utility manager in Ambler clearly improved economy and timeliness in purchasing parts, in collections, and in planning and rate setting. These improvements, however, are largely temporary, lasting only as long as the funding; it is an open question whether the public benefits of on-going subsidies would exceed the costs. (A cost-benefit study would have to be done to assess this; since many of the benefits are intangible, this would be difficult. There may be some

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enduring benefit from temporary subsidies through the “demonstration effect,” or learning from the experience of fully funded O&M. There is some evidence of this in Kotlik. We would need more time, however, to document long-term effects.

There is evidence from these seven cases of real opportunities for improving the cost effectiveness of systems, particularly energy efficiency. Insulating the well head and pipe to the pump house saved Sleetmute an estimated $200 per month in the winter. Replacing the old activators in Noorvik greatly improved system operation, extended the life of the pump, and reduced home repairs dramatically. Fixing the leaking distribution lines in Hydaburg saved the utility an estimated tens of thousands of gallons of treated water per month. The new four-wheeler in Kotlik saved on gas and repairs. A systematic assessment of each system (or a pilot sample) by a qualified individual analyzing costs and looking for opportunities to increase efficiency might be very useful. There also might also be technological innovations that make small systems more cost effective.

Community education paid off in Noorvik and Nulato. An easy to read, illustrated manual instructing homeowners what not to put down their drains or toilets and how to prevent freezing saved on home repairs. Having fewer poorly functioning home units improved the vacuum pressure and efficiency for the whole system. In Ambler, a newsletter enclosed with billings, explaining to customers the operating costs of the system, and a posting of the names of delinquent customers on the cable scanner, both served to increase collections.

For most of the projects, the first activity listed in the work plan was establishing a partnership among operators, local administrators, the city or tribal council or utility board, various regional, federal or state agency personnel, and the ANHB project director. The intent was to establish regular communications and collaboration for problem solving, planning and implementing tasks. This was a notable success in Ambler and Noorvik and to a lesser extent in Sleetmute, Nulato and Kotlik. The collaborative relationships forged in the course of the project endured well beyond the project end. This represents a long-term increase in community capacity for effective problem solving and O&M. Partnership was notably absent in the work plan for Hooper Bay.

Was the Pilot Program Effective?

While the ANHB grant program is only about half complete and less than one quarter of the overall evaluation data has been assembled, we nevertheless have a few preliminary observations and conclusions to report.

In virtually every case reviewed, it is manifestly clear that the RMW and RUBA programs are basic and critical to improving O&M in rural Alaska water and sanitation systems. If these programs are sustained and expanded, what is left to be done? In evaluation interviews, communities emphasized three unique contributions of the ANHB grant program:

1. the communities themselves defined their needs and priorities, with some facilitation, collaboration and support from the ANHB project director;
(2) the funding was flexible enough to cover whatever was needed to make the project as a whole work, and the work plan activities and timeline were flexible enough to adapt to the communities’ evolving priorities and unfolding abilities; and

(3) the work plans emphasized teamwork: active communication, collaboration and joint problem solving involving the operators, the utility manager, city clerk or administrator, and outside resource people.

The administrator in Ambler compared its experience with the Local Utility Match Program (LUMP) (1993-94) to the ANHB O&M grant. Both were pilot projects providing supplemental support for water and sewer O&M. One advantage of the ANHB project was greater flexibility in the use of the funds. This allowed a more holistic approach to resolving problems. For example, communities were allowed to purchase parts, a computer, and hire a utility manager as well as fund additional operator hours. These expenditures were complementary, allowing the whole inventory project to be finished; the finished inventory and purchasing system enhanced the operator’s efficiency in preventive maintenance.

A second advantage of the ANHB approach was its emphasis on partnering. Building collaborative relations between operators, administrators, and outside resource people enhanced their problem solving ability, both current and future. The Ambler administrator noted that in working on ANHB programs (including solid waste management demonstration grant programs), “staff at ANHB helped us get started on all of this… [and gave us] a greater awareness of what needs to be done. We do talk… on the phone periodically for questions and support.” Overall she was “very satisfied” with the ANHB program: “They were very willing to help. I was only disappointed that we could not get larger funding.”

The president of the Sleetmute village council said, “the ANHB office was always very helpful and a pleasure to work with.” In addition to ANHB being very helpful in referring him to other agencies that could help the community, ANHB was “understanding of the situation there with the turnover in the council….” He appreciated ANHB’s patience and said “if ANHB had been another organization the money might have been taken away for this project, because of the amount of time that it took the community to fully implement it … the money would have been given to another village due to the long period of inactivity….”
The Nulato city treasurer said:

They [ANHB] mostly provided dollars and some staff support and then answered questions we might have and gave ideas…. They always supported our village decisions and I think they did a very good job…. [Without the ANHB grant] we would have made some improvements, but there is probably a lot we would not have done. We would have done operator training at some point, but the training would not have been of the same quality and there is no telling how long it would have taken us. It could still be on hold. Our homeowner's manual would not have been done; we would have not even thought about it.

In the overall evaluation interview, the Noorvik city administrator was highly complimentary about the O&M grant program in general and the project director in particular, saying: “He understands where we are coming from… From the beginning he asked what our needs were.”

We would be hard pressed to have done anything, because we had very poor direction for ourselves. [The ANHB project director] did not tell us what to do but he gave us ideas that we could consider. The ANHB helped us over the hump so to speak.

I think there is a fourth contribution of the ANHB program approach as well. In the most successful projects, the activities were integrated, focused on achieving one common goal. The taskforce type of intervention, harnessing resources across agencies and the community to flexibly and creatively address one targeted problem at a time, not only works but builds community resources.

Alaskan villages are in transition and must grapple with many different kinds of issues all at once. Each issue is complex, involving many different aspects, most of which are outside the control of any one person or organization. Complex problems entail complex solutions, and success or failure is determined by the weakest link. The divisions in job responsibilities and differences in mission between various staff and agencies often generate more conflict than cooperation. Community staffs have so many demands on their time and attention that they cannot give any one thing the attention it requires. Often they are so caught up in the day to day tasks and crises in their jobs or personal lives they have little opportunity for, or experience with, the reflection, analysis, and planning that problem solving entails. Unsuccessful efforts breed frustration, demoralization and burnout.

The task force approach which characterized some of the pilot projects meets these challenges head on. It simplifies the complex of issues by focusing on one priority. It mitigates conflict by defining a common objective. The differing expertise and institutional resources of each collaborator enhance the pool of resources for joint problem solving. The taskforce approach builds teamwork: individual efforts are coordinated and supported, not isolated. Individuals learn from each other. And nothing succeeds like success: positive results generate enthusiasm and more collaboration and effort. These benefits often endure well beyond the task itself.
Complex problems require holistic solutions. There is no one program or approach that will meet the challenges and solve rural water and sanitation O&M problems. While a cost-benefit analysis has not been done, from this qualitative assessment of program effectiveness it appears that the rural development approach taken by the ANHB O&M grant program is a valuable complement to the other public agencies and programs serving rural Alaska.
Challenges for Rural O&M

From these cases and my other experience in the field, I have identified six factors which contribute to the difficulties with sanitation O&M in rural Alaska. I introduce them below and elaborate related themes in the sections that follow.

1) **Complexity.** Sanitation O&M is complex, and complexity makes it vulnerable. The technology, operators, customers, administrative staff, management, finances, and political leadership must all work *in concert*. A weak link or failure in any one part will undermine effective O&M as a whole.

2) **Isolation.** Geographic remoteness and extreme weather increase costs and complicate logistics for equipment, parts and supplies, and support personnel. It also limits opportunities for interaction and learning with peers.

3) **Limited economic base.** Not only does this mean that communities have very limited financial resources to support water and sanitation, it also means that the residents have very limited opportunities—either direct experience or role models—to develop their wage-work habits and skills.

4) **Small size.** The small size of the water and sanitation systems creates a diseconomy of scale, with high fixed costs of O&M and management spread over a small customer base. It also means administrative and political systems in the community draw personnel from a small pool, making the community vulnerable to the normal variations in administrative and political skills. And with a small staff, the opportunities for specialization and division of labor are limited, requiring each staff person or community leader to juggle a broader mix of responsibilities and have a broader mix of skills. It also makes it impossible to build a career ladder, with employees starting at entry level and moving up into more responsible jobs as they gain experience and skills.

5) **Learning curve.** The water and sanitation, financial, and administrative systems in these communities are relatively new. Not only must individuals—both staff and customers—learn new skills and behaviors, but these roles must be coordinated: new *institutional* roles and relations must be learned. Learning—especially organizational learning—takes *motivation*, opportunity, support, practice, resources and *time*. Resources include mentors and role models as well as workshops or training materials. To be effective, these resources must be *tailored* to the learning style and situation of individuals and groups.

6) **High turnover.** Villages have higher turnover in personnel than their urban counterparts. High turnover, particularly when there is no overlap or cross-training of employees, destroys continuity in procedures, record keeping, knowledge and leadership.
Money, Money, Money

Money plays many, many roles. First, effective operation and maintenance of a water and sewer system requires money to pay operators, buy parts, and support utility management functions. Without enough money for these basic, on-going functions, systems are doomed to failure.

But money—or lack of it—has secondary effects as well. Along with failure come frustration, demoralization and burn-out for those involved. These in turn cause poor performance and high turnover, precipitating more failure. In addition to the high social costs of system failure, the personal costs to those involved are also high.

Third, money is required to build management capacity. People learn how to manage money by having money to manage. And administrative skills are not innate: new personnel need time, training, travel, experience and mentoring to become fully capable. And you can’t do it in a vacuum: you need fully functional office technology as well as adequate staffing for all the things that have to be done. All these things cost money. One RUBA told me that she thought tribal governments in her region were better administered than city governments because the federal government increased various kinds of support for tribal administration, while state support for municipal government declined 60 percent over ten years.

And finally, the financial burden on villages and households of supporting small-scale, arctic-design piped water and sewer systems is both unprecedented and an order of magnitude greater than what urban households and cities finance. Actual costs of operating and maintaining such systems may run about $120 per household per month. In communities where one quarter of the households have (1990) incomes under $10,000 per year, this is a very substantial burden. Compare this to urban Alaska, where the average cost is about $49 per month and only five percent of households have incomes under $10,000. Nationally, households spend less than one percent of their income on water and sewer. While many rural communities are raising utility fees and increasing their pressure to collect on overdue bills, this alone will not close the fiscal gap; communities must subsidize water and sewer with other revenues. The strain on both household and local government finances is huge. As is well documented in the social science literature, financial pressures may aggravate other community problems.

The crisis of community capacity to support O&M in Nulato is alarming in that Nulato is a community with good administrative resources and it has made every effort to “do it right:” it planned ahead for the new system, it passed a water and sewer ordinance, it signed customer service agreements, it levied one of the highest monthly service fees in the state, it enforces collections with service disconnects, it established and trained a utility board, it has a model community education program. The fundamental problem is economic. The fixed costs of operating and maintaining a small

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water and sewer system are nearly as large as for a large system, but the costs are spread over a much smaller customer base. While a careful analysis has not been done, it may be the case that a small rural community with a very small cash economy simply cannot support arctic-design piped water and sewer. If there is to be a long-term solution to the problems of O&M in communities like Nulato, it may have to come as a lower cost technology or as a subsidy from outside.

The irony of this is that the present financial dilemma comes as no surprise. The city treasurer, for one, clearly anticipated it. “A lower cost system flush/haul with the remainder of the money available for subsequent year [capital] O&M sounded better…but VSW, or IHS for that matter, or up until now EPA, don’t work that way. Dollars are for construction, not O&M” (Field notes of ANHB project director, April 30, 1996).

In a December, 1996 letter, the Nulato treasurer wrote:

Obviously villages must be able to afford to operate their water/sewer facilities, otherwise the capital investment can literally go down the drain. We do need help. The Alaska Native Health Board O&M Pilot Project is a very valuable source of such help. The pilot project helps us to get valuable training, to implement a preventive maintenance program, and to focus on ways to make our system more efficient and cost-effective. Programs such as [this], along with the Remote Maintenance Worker program, help make our system viable.

While there are plenty of people who still see money as the answer, there are growing numbers who see it as only a limited part of the solution. In his field notes, the ANHB project director discusses the difference in philosophy between two individuals in one community:

…A seems primarily interested in securing more funding for the construction of water and sewer systems... He believes what is really needed to solve Alaska’s rural water and sanitation problems is money and more money and the construction of systems. In A’s opinion, it is a matter of dollars. In addition [to his concern with grants for capital construction] he expressed... his concern about the power cost equalization program, [that it be] maintained and restored to its previous levels. He also was requesting the State revenue sharing not be decreased.

In discussions with B, my impression is that she believes the sanitation issues will be solved with education and community participation as well as dollars for the construction.
A... seems to think that [the problem of co-mingling solid waste and honey bucket waste] would be hard to resolve because people will always seek the simple solution to make as little effort as possible and continue to dump their garbage and dump their honey bucket waste at the same site. In discussing this with B, on the other hand, she believes that if people were taught why it is important to segregate the human waste from the honey buckets from the solid waste then most people would do that (Field notes of ANHB project director).

Learning

Learning is always a long-term investment in community capacity. Homeowner education and the development of an active utility board were important accomplishments of the project in Nulato that will yield long-term benefits. One thing the rest of us might learn from this project is that learning not only takes time, but also motivation and context. Community leaders had to see for themselves the critical need for utility management and user-friendly education materials before they were motivated to act. Outside resource people cannot teach these motivations and insights gained from experience, but they can facilitate wider experience for community leaders through more exchanges with other communities, as well as offer incentives and training opportunities when the motivation to learn is present.

Another dimension of learning concerns external political and fiscal changes. The small local governments have for years depended on state funds, including revenue sharing, power cost equalization, and various grants. But revenue sharing has declined 60 percent in the last decade, and PCE and other grant funds are politically endangered. This external change requires local adaptation and learning. When communities feel the pinch, they by custom look to the state for a solution. The concept of levying or increasing local fees and taxes to support local government services has not yet dawned in many communities; in others it is still new and unaccepted; and in yet others, fees and taxes are being instituted, but the complications of rate setting and effective billing, collections, and customer relations have not yet been ironed out. Each one of these stages of adaptation represents a different learning challenge.

Government fees and taxes are of course unpopular throughout the state. But new fees and taxes present a much more formidable financial burden in rural communities than in urban communities, because per capita income is much lower: the 1990 median household income in all Alaskan communities under 1,000 population was about $28,000, compared to $44,000 in Anchorage and $32,000 in Fairbanks.

Turnover

A dramatic example of administrative turmoil is the community where the same city manager was fired four times in one year (and rehired in between). Another person
hired in the interim left after one month because he was not getting paid. A third was “appointed” without his knowledge or consent. The fourth person lasted ten months. While this case is extreme, it is not isolated. Over the two-year period on record, three of the project communities experienced involuntary terminations of their city administrators or clerks or mayors, and two more communities experienced substantial voluntary turnover. There is also high turnover among water and sewer operators. A tally across 101 grant applications found that 50 percent of utility managers and 37 percent of operators had tenures of less than two years.

These findings are reinforced by two earlier studies. Logan (1995) surveyed 336 Alaskan city and village council clerks, asking for a five or more year history of turnover in the position, the reasons for turnover if known, and contact information for prior clerks, whom she then contacted by phone. Her preliminary results (25 percent response) identified 194 turnover events, of which 67 percent were employee initiated, 13 percent were employer initiated, 2 percent due to uncontrollable events, and 18 percent for unknown reasons. Among the employee-initiated departures, 27 percent took another job; 22 percent moved away; 21 percent quit for personal reasons or reasons of health, higher education or retirement; 15 percent left due to inadequate pay or benefits; 6 percent quit because of council or staff problems; and 10 percent for unknown reasons. Logan also discussed (but did not cite) a 1992 study by Ike Waits of the Alaska Department of Community and Regional Affairs, which found the average tenure of a city clerk in communities under 1,000 population to be 1.9 years, compared with 4.7 years for communities over 1,000 population.

There are many possible reasons: qualified employees may leave the community more frequently, seeking career advancement or other amenities in larger places; wages, hours, benefits and working conditions may not be good enough to attract and retain workers; the local culture may not make paid work and work commitments a priority; disruptions in the personal lives of employees—such as having to leave the village for medical care—may interrupt their work tenure; political conflicts interrupt work tenure; and weak organizational development, particularly weak supervision and support, make the job difficult and frustrating for the employees, engendering a high rate of burnout. Whatever the mix of reasons, turnover destroys continuity in procedures, record keeping, knowledge, relationships and leadership.

Lessons Learned and Shared

In their final interviews, some of our community contacts related lessons to share with other communities.

A lesson the Noorvik city administrator wanted to share with other communities constructing systems was that the project engineer and foreman should consult with the water operators in the planning, design, and construction phases to make sure that the design is appropriate for the community and the work is done well. This enables the operators to monitor the work and learn about the system from the ground up. In particular he emphasized that the heat tape must be properly installed.

Also the village needs to be very involved with the project because they will have to maintain and work with the system. It is not the granting agency’s responsibility to maintain the system; it is ours. Your operators also have to be committed to the system, and you need good support to the operators from the administration and the council. The villages themselves should not sign off on any project where they don’t feel comfortable. They shouldn’t be intimidated, and need to understand their responsibilities before signing off.

Another lesson Noorvik wanted to share was the need for close attention to the critical spare parts inventory provided with the original construction. Communities need to track inventory and make sure there is an adequate supply of parts of the appropriate types, because when the one-year warranty expires the communities are on their own for providing spare parts. The city can only afford to keep a certain amount of inventory on hand. When homeowners find out that a part will cost $50 or more, they sometimes don’t want to replace it until it completely fails. This is hard on the system, because a malfunctioning part can compromise the vacuum for the whole system.

A major problem in Noorvik, which has the oldest vacuum sewer system in the state, is that at least three different types of activators have been installed over the years. It is important to keep them all in good working order, because a malfunction in one compromises the vacuum pressure for the entire system. The oldest units are no longer manufactured, and until last year the operators had not been trained to repair and maintain the new units. It is a real burden to keep spare parts in stock for three or more different kinds of units: complete plumbing for one toilet involves 29 parts and costs over $1500; sinks and tubs add more. It would significantly enhance efficiency and economy if the technology were standardized. This is especially important within a community, but would be valuable across communities as well: it would be simpler for the RMWs and enable communities to help each other with parts, repairs and training.

The standard procedure at PHS is to award contracts to the lowest bidder; from one project to the next they end up with a mix of products. If communities want consistent parts, they need to specifically make that request to PHS prior to the bid. This is a valuable lesson to share with other communities. PHS and VSW might also modify their design and bid standards to favor standard products.

11 As of October, 1998, these functions have been compacted to the Alaska Native Tribal Health Consortium.
When asked what they had learned from the project, one community project
director answered: “I learned that there are a lot of people out there who are willing to
help you if you just ask them. Also it is always a good thing to have the community
involved as much as you can. You can’t accomplish anything without community
support.” And community support requires open communication:

In the beginning we weren’t really informing people about the “why” of
the system operation. It was basically one-on-one explanation. Now that
we developed a manual things are much better. Community education is
very important! People are willing to support a system of sanitation as
long as they understand and the system works adequately.

Communities had some advice for agencies as well. While communities
identified more financial support as the number one way that outside agencies can help,
number two was annual or biennial conferences. “We learned that we need to
communicate with other communities… [Conferences give] you current information
and help motivate you to go back to the village and work on the problem.”

When asked how outside agencies could improve their service to the community
one respondent said: “Some agencies don’t try to get community input. It is important
for all agencies to involve the community and not just work among each other.”

As for what outside agencies could do to improve their services to the
community, our community contacts cited:

• More site visits by their representatives so they understand the system

• More training opportunities for operators and utility managers—at
  least quarterly

• When a community loses key people, agencies should help provide training
  right away for the new people.