

HB

362

<TARGET><BILL>HB 362</BILL><SUBJECT>HB
362</SUBJECT><COMM>HCRA27</COMM></TARGET>

ALASKA STATE LEGISLATURE
HOUSE COMMUNITY & REGIONAL AFFAIRS



HB 362 Sponsor Statement

In a 1995 speech to the Alaska Federation of Natives, the State's top executive said, "By the year 2005, I want the honey bucket to be a thing of the past. Alaskans in our villages aren't second-class citizens . . . and they shouldn't live in Third World conditions." It is now 2012 and there are over six thousand homes without piped sewer and water systems. Village Safe Water estimates that it will cost \$650 Million to bring these homes on line and the cost keeps growing.

The state has consistently funded water and sewer but not at a level that adequately reduces the first-time installation backlog or keeps pace with increasing costs. This funding deficit is further impacted by the need to upgrade, repair, or replace aging or inadequate systems. Currently we use approximately 40% of the funds appropriated to address issues related to previously installed systems. Currently there is \$51.5 Million in the State's budget for Village Water & Sewer Projects which is less than 8% of the known need. Only \$9 Million of that \$51.5 Million comes from state sources. The remainder of the funding comes from other sources such as federal.

The state has decreased its contribution by more than 50% since 2004. It is critical that the State develop and implement a funding plan that addresses and reduces this growing deficit. With the prospect of decreases in future state revenue, we need to ensure that first-time service needs are addressed before State surpluses become State deficits. Just throwing money at the problem is not a solution. In the past systems were not always properly matched to their communities. This often left the local utility with a system they could not afford or a system where they did not have the necessary expertise needed to keep it operating.

There are emerging systems and new technologies that will need to be part of the answer. We need a comprehensive look at what solutions are available and which ones fit our conditions. We also need to ensure that we are not building ourselves a financial burden that cannot be sustained.

In short the goal of this Task Force is to find out how the State can solve the rural sanitation problem faster, better and cheaper. We've been doing the same thing for more than fifteen years. It's high time we took another look under the hood.

For Information: Paul Labolle 465 3789

FISCAL NOTE

STATE OF ALASKA
2012 LEGISLATIVE SESSION

Bill Version HB 362
Fiscal Note Number _____
() Publish Date _____

Identifier (file name) HB362-DEC-FC-03-09-12 Dept. Affected Environmental Conservation
Title Water and Sewer Task Force Appropriation Division of Water
Allocation Facility Construction
Sponsor House Community and Regional Affairs Committee
Requester House Community and Regional Affairs Committee OMB Component Number 637

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	FY13 Appropriation Requested	Included in Governor's FY13 Request	Out-Year Cost Estimates					
			FY13	FY14	FY15	FY16	FY17	FY18
OPERATING EXPENDITURES								
Personal Services	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Travel	6.3		0.0	0.0	0.0	0.0	0.0	0.0
Services	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Commodities	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Capital Outlay	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Grants, Benefits	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0		0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OPERATING	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0

FUND SOURCE		(Thousands of Dollars)						
1002	Federal Receipts	0.0		0.0	0.0	0.0	0.0	0.0
1003	GF Match	0.0		0.0	0.0	0.0	0.0	0.0
1004	GF	6.3		0.0	0.0	0.0	0.0	0.0
1005	GF/Prgm (DGF)	0.0		0.0	0.0	0.0	0.0	0.0
037	GF/MH (UGF)	0.0		0.0	0.0	0.0	0.0	0.0
1178	temp code (UGF)	0.0		0.0	0.0	0.0	0.0	0.0
TOTAL		6.3	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS							
Full-time	0	0	0	0	0	0	0
Part-time	0	0	0	0	0	0	0
Temporary	0	0	0	0	0	0	0

CHANGE IN REVENUES	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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Estimated SUPPLEMENTAL (FY12) operating costs 0.0 (separate supplemental appropriation required;
(discuss reasons and fund source(s) in analysis section)

Estimated CAPITAL (FY13) costs 0.0 (separate capital appropriation required)
(discuss reasons and fund source(s) in analysis section)

Why this fiscal note differs from previous version (if initial version, please note as such)

Not applicable, initial version.

Prepared by Michelle Bonnet, Director
Division Water
Approved by Lynn Kent
Deputy Commissioner

Phone 907-269-7599
Date/Time 3/9/12 9:00 AM
Date 3/9/2012

FISCAL NOTE

STATE OF ALASKA
2012 LEGISLATIVE SESSION

BILL NO. HB 362

Analysis

Analysis/Assumptions:

HB 362 would establish a Water and Sewer Task Force to address challenges in providing water and sewer improvements in rural Alaska villages. The Task Force would consist of nine members, including one state agency member. The bill currently calls for eight tasks, including significant research projects, to be completed during the first six months of FY2013.

Assumptions:

The bill, as written, does not specify how tasks would be completed or how extensive the effort should be. The Department assumes that it will be responsible for participating in the Task Force as the state agency member and will not be responsible for coordination, financial, or administrative support for the Task Force or its activities. A number of the tasks called for in the bill are presently being completed through collaborative efforts between the Department of Environmental Conservation, the Alaska Native Tribal Health Consortium, and federal agencies. It is assumed that a much more comprehensive effort is envisioned by the author of the bill and that tasks would not be carried out by the Department, other than to provide existing data and information to the Task Force.

Travel:

Travel funding will be used for Department employees who participate in the Task Force meetings. The estimated cost per trip is \$1,050 for six meetings.



**Rural Alaska Sanitation
Bush Caucus Briefing**

February 17, 2012

Presented by
The Alaska Department of Environmental
Conservation
&
The Alaska Native Tribal Health Consortium



Handouts for Reference:

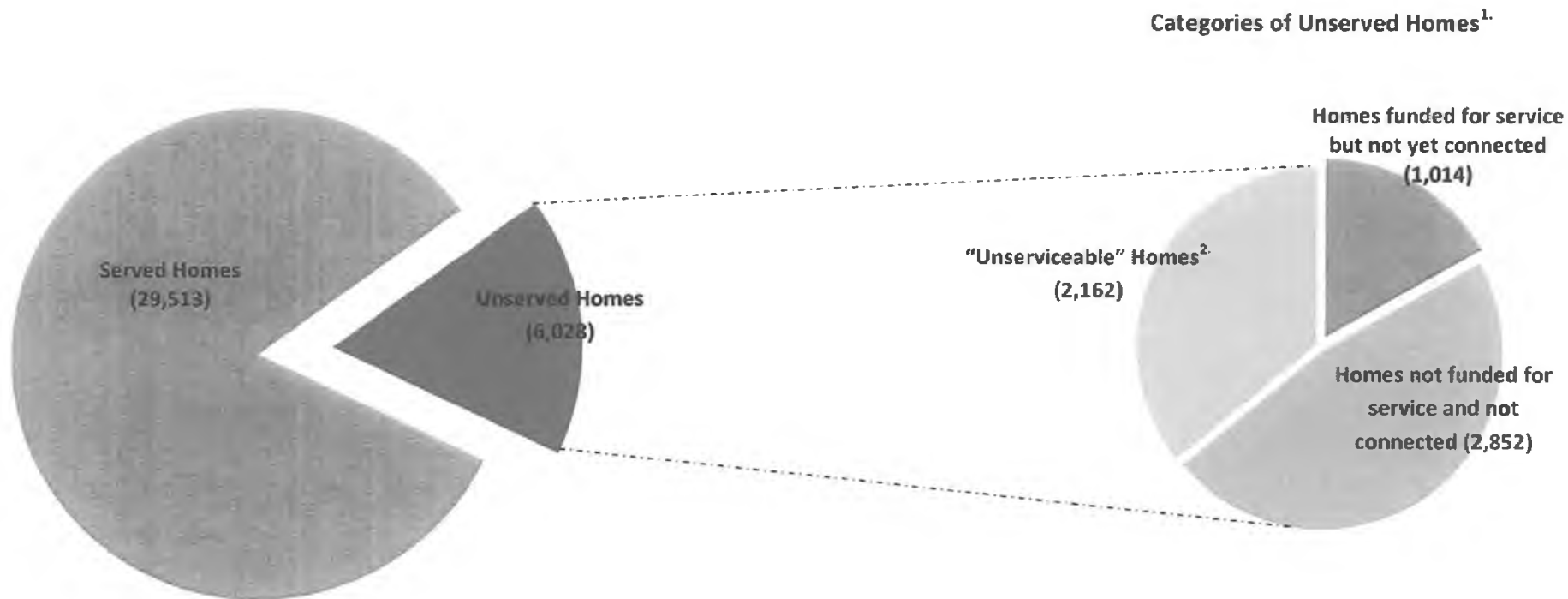
1. Status of Water and Sewer Service Delivery in Rural Alaska – Categories of Unserved Homes
2. Distribution of Unserved Homes by Region
3. Distribution of First Service Needs by Region
4. Distribution of Expansion, Upgrade, and Replacement Needs by Region

Status of Water and Sewer Service Delivery in Rural Alaska

Alaska Department of Environmental Conservation

February 2012

1.



Note: This data is comprised of housing information for all communities that meet federal funding agencies definition of "rural" and includes larger communities and regional hub communities. Only year round occupied homes are included in this data.

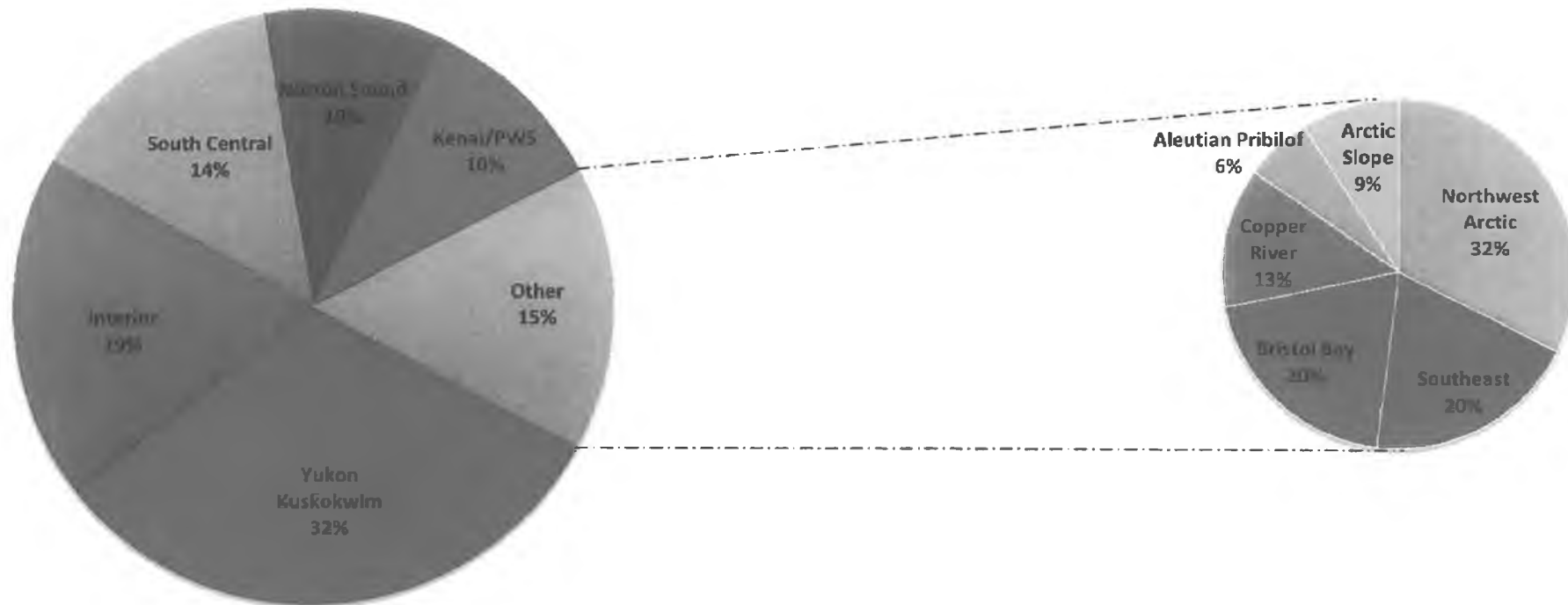
¹ An unserved home is one which is not connected to an onsite or community piped or closed haul system.

² An unserviceable home is one that is located in an area where septic tanks and wells are not feasible and is too far away from the "core" area of a community making extending piped service or providing vehicle access for flush/haul vehicles unreasonably expensive.

Distribution of Unserved* Homes By Region Based on Number of Homes

Alaska Department of Environmental Conservation
February 2012

2.



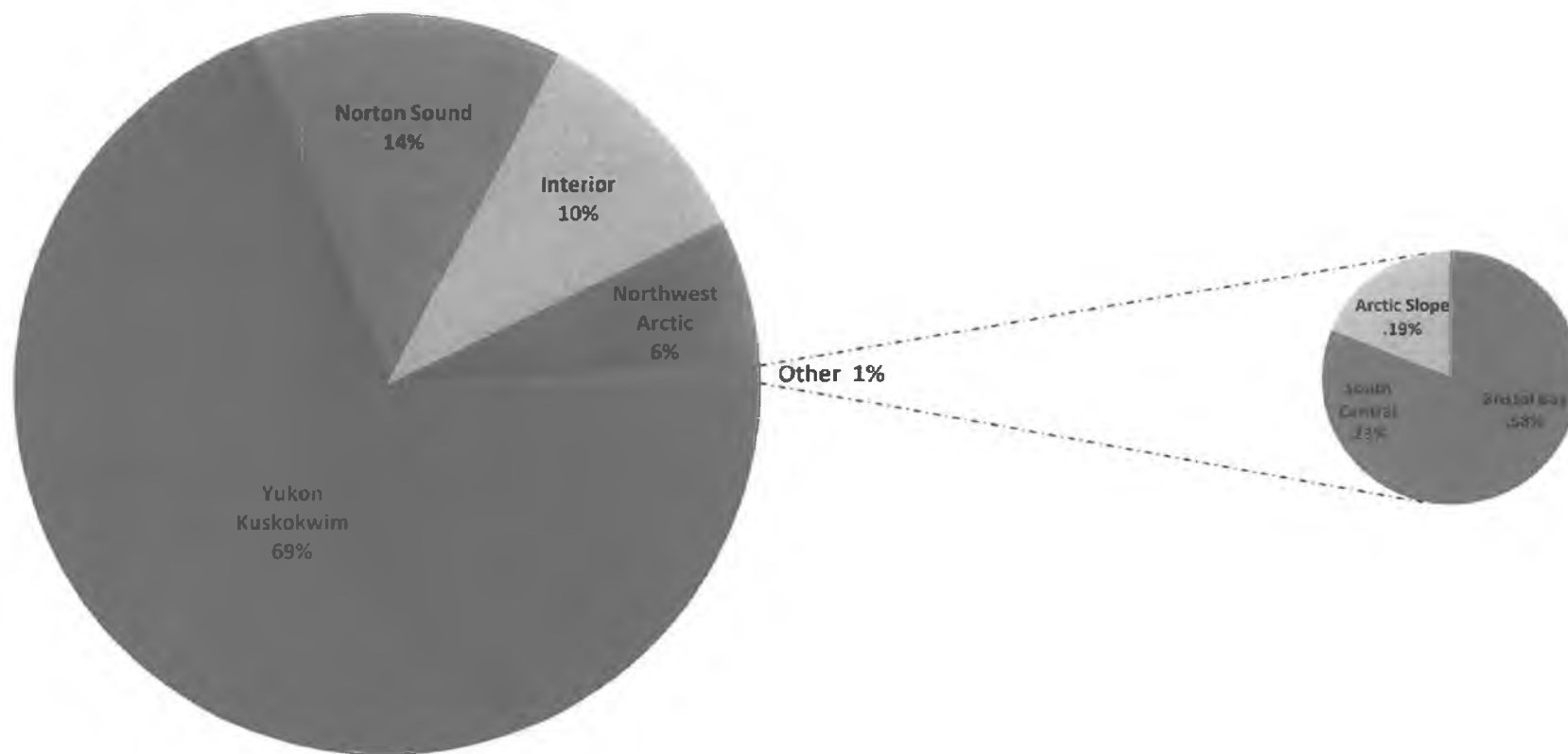
Total Number of Unserved Homes: 6,018

*An Unserved Home is defined as year round occupied house which does not have piped or covered haul water and sewer service.

(Percentages are based on estimated number of unserved homes in each region)

Distribution of First Service Needs by Region Based on Project Cost

Alaska Department of Environmental Conservation
February 2012



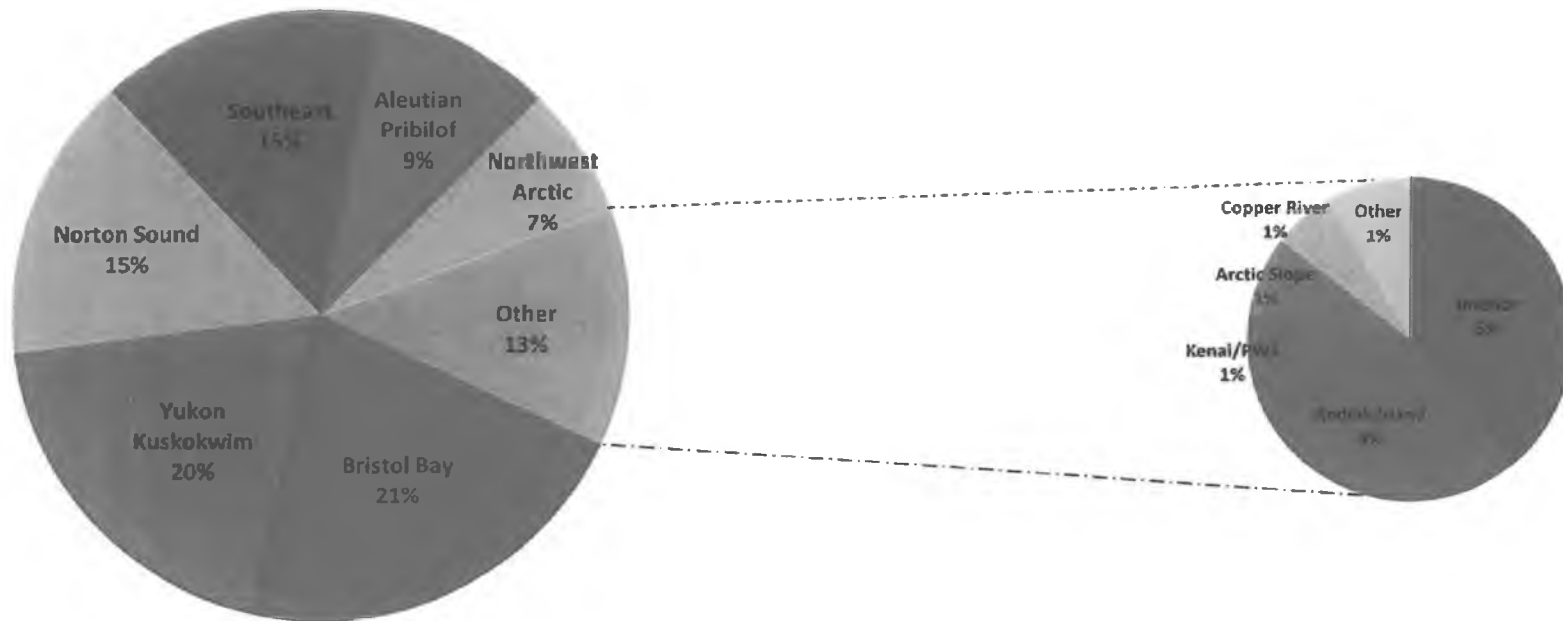
Total Cost to Address First Service Needs (in 2011 dollars): \$292,682,161

{Percentages are based on projected costs in each region}

Source: Sanitation Deficiency System, Alaska Area

Distribution of Expansion, Upgrade, and Replacement Needs by Region Based on Project Cost

Alaska Department of Environmental Conservation
February 2012



Total Cost to Address Expansion, Upgrade, and Replacement Needs (in 2011 dollars): \$410,015,442

(Percentages based on projected costs in each region)

Source: Sanitation Deficiency System, Alaska Area

A M E N D M E N T

OFFERED IN THE HOUSE
TO: HB 362

BY REPRESENTATIVE SADDLER

1 Page 3, following line 13:

2 Insert a new paragraph to read:

3 "(6) investigate and recommend strategies to protect public
4 investments in rural water and sewer systems and promote the long-term operational
5 life of rural water and sewer systems by ensuring, to the greatest extent possible, that
6 the systems can be maintained by local personnel and with local resources;"

7

8 Renumber the following paragraphs accordingly.

LEGISLATIVE RESEARCH REPORT

MARCH 25, 2009



REPORT NUMBER 09.201

PIPED WATER IN THE BUSH: BARRIERS TO COVERAGE

PREPARED FOR REPRESENTATIVE SHARON CISSNA

BY DANIEL LESH, LEGISLATIVE ANALYST

You asked about the availability of piped water in the bush. You were interested in which communities were covered by this service and the barriers to coverage of all communities.

According to statistics provided by the Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs, of the 173 rural communities for which the department has information on water and sewer infrastructure status, 39 have no centralized, piped water or sewer infrastructure; twelve have centralized, piped sewer but no piped water infrastructure; and eight have centralized, piped water but no piped sewer infrastructure. One hundred and fourteen rural communities have a centralized, piped water and sewer system. We include a list of the communities in each of these categories as Attachment A.¹

In the communities described above, piped water and sewer systems often do not extend to all of a community's residents. For this reason, most environmental health officials speak of piped water coverage in terms of percentage of *households* covered, rather than number of communities covered, according to Joe Sarcone, U.S. Environmental Protection Agency.² By this measure roughly 70-80% of households in rural Alaska are covered by piped water. A recent journal article on the public health impacts associated with piped water availability—an article that reaches the conclusion that lack of coverage is associated with higher respiratory and skin infection rates—estimates that 73% of households in rural Alaska are connected to piped water sources and 71% of households are connected to piped sewer systems.³ According to an estimate in a publication (Attachment C) by the state's Village Safe Water program, a program we

¹ Data obtained from Athena Logan, research analyst, Department of Commerce, Community, and Economic Development, (907) 269-4540.

² Mr. Sarcone, rural sanitation coordinator, Environmental Protection Agency, can be reached at (907) 271-1316.

³ See Attachment B for a copy of this journal article: Hennessy et al., 2008, "The Relationship Between In-Home Water Service and the Risk of Respiratory Tract, Skin, and Gastrointestinal Tract Infections Among Rural Alaska Natives," *American Journal of Public Health*, Volume 98, Number 11, pages 2072-2078.

describe in more detail below, 77% of rural households in Alaska currently have running water and flush toilets, a substantial increase from 37% of such households in 1994.

BARRIERS TO PIPED WATER COVERAGE

Numerous studies and commissions over the past decade have addressed rural sewer and water infrastructure deficiencies in rural Alaska.⁴ These reports emphasize that while capital investments are necessary, they are not sufficient to address these problems, and new state and federal approaches regarding operation and maintenance are needed. A 2001 inter-agency report titled "Sustainable Utilities in Rural Alaska" (Attachment D) summarizes some of the issues that have hampered efforts to build, maintain, and operate successful water utilities in small rural villages, as follows:

The Steering Committee, composed of federal, state, local, private, non-profit and tribal officials, recognizes that agencies collectively are part of the problem in rural utilities. Agency policies have not provided enough money to build community capacity to sustain utilities. Also, insufficient money is provided for planning successful utilities or managing and operating projects once completed.

The federal and state agencies that work on these issues do not coordinate their efforts well, and sometimes present conflicting incentives to the communities they serve. Simple standardization of application forms and requirements, for example, would ease the administrative burdens on small village utilities.

Funding agency budget processes can force action too quickly, with a focus on visible results (a project under construction) rather than a long-term planned result. Agency policies often create built-in inefficiencies, providing larger capital projects with lower operating costs, but higher life-cycle costs, rather than smaller capital projects with more reasonable and funded operating costs.

The legislative structure, at both the federal and state levels, often simply rewards the "squeaky wheel," while allowing operations and maintenance failures to occur without mandating changes in operating practice. There is a lack of acceptance of life-cycle costing principles at all levels. Projects idea are often brought to communities, designed and delivered from elsewhere, with little community buy-in or training for ongoing maintenance.

Achieving sustainability in rural sanitation utility systems brings particular challenges:

- ◆ Many sanitation systems are built where total costs exceed the amount of revenues that possibly can be generated by affordable user fees and local subsidies (a situation not unlike most urban systems).

⁴ These studies and commissions include the following: "Sustainable Utilities in Alaska," a 2003 report by the Institute for Social and Economic Research, University of Alaska Fairbanks; a 2001 inter-agency steering committee report entitled "Sustainable Utilities in Rural Alaska"; Governor Tony Knowles' 1998 "Rural Sanitation 2005 Action Plan"; and a 1992 report by the Alaska Sanitation Task Force entitled "A Commitment to Alaska." If you would like copies of any of these reports, please contact our office.

- ◆ The only source of non-local revenue is restricted to capital investments, which are viewed as one-time—not continuing—investments. There is no dedicated non-local operational subsidy for water and sewer utilities, such as PCE for electric utilities, even though this may be cheaper in the long run in terms of the total investment.
- ◆ The most sustainable systems are those with the least total cost, yet the incentive system does not drive the facility planning process towards systems with the least total costs. Instead, it drives the process towards systems with the lowest operating costs.
- ◆ The technologies are not developed. In sanitation, there are not technologies that are cheap, reliable, easy to operate, and yet capable of producing and delivering—in sufficient quantity—drinking water that will meet ever-more stringent quality standards.

Recent discussions with state and federal officials reiterate the points quoted above, suggesting that significant progress remains elusive on many of these issues. According to Mr. Sarcone, roughly \$70 million in state and federal monies were spent on sewer and water construction projects in rural Alaska last year, a relative decrease from previous years. However, many of these funds do not necessarily go toward the communities where need is greatest, due to certain eligibility requirements adopted by the Village Safe Water (VSW) program—a Department of Environmental Conservation program that administers state and federal rural sanitation monies.⁵

The eligibility rules adopted by the VSW program are the product of an assessment process conducted by the Rural Utilities Business Advisor (RUBA) program, which is housed in the Department of Commerce, Community and Economic Development (DCCED). The RUBA program provides assistance and training to communities to help them operate and maintain their water and sewer utilities. The programs' essential indicators—all of which generally must be met for a community to receive money through the VSW program—include requirements related to bookkeeping, utility fees and receipts, employee training, and payment of all outstanding IRS taxes, among other requirements.⁶

Another factor limiting the impact of federal and state capital funds is a lack of innovation in the arctic engineering community, according to Mr. Sarcone and Scott Rubee, deputy director, Division of Community and Regional Affairs, DCCED.⁷ According to these officials, state and federal monies for rural sanitation have created a constituency of planners, contractors, and agency officials that are somewhat resistant to change, despite the fact that innovation could lead to water and sewer facilities that are easier to maintain and operate over their engineering lifespan. Potential for innovation is especially great when rural sanitation issues are addressed comprehensively with energy issues, according to the officials we interviewed.

A final explanation for the lack of sustainable local water systems in all rural Alaska villages is that not all villages have an adequate water source that will meet strict federal water quality regulations—though this explanation only applies to a small number of communities. Mr.

⁵ We include a 2008 Legislative Audit (18-30042-08) of the VSW program as Attachment E.

⁶ For more information on the RUBA program's essential indicators, see Attachment F, a report describing the community of Angoon's progress toward meeting these indicators. We could find no other listing of RUBA's indicators than the program's reports on individual communities, and we chose Angoon at random.

⁷ Mr. Rubee can be reached at (907) 269-4569.

Sarcone provided the example of the community of Chefornak as one community with this problem.

We hope you find this useful. Please let us know if you have additional questions.

LIST OF ATTACHMENTS

Attachment A

List of rural communities with various types of water and sewer infrastructure

Data obtained from Athena Logan, research analyst, Department of Commerce, Community, and Economic Development, (907) 269-4540.

Attachment B

Hennessy et al., 2008, "The Relationship Between In-Home Water Service and the Risk of Respiratory Tract, Skin, and Gastrointestinal Tract Infections Among Rural Alaska Natives," *American Journal of Public Health*, Volume 98, Number 11, pages 2072-2078.

Attachment C

Fact Sheet: Alaska Department of Environmental Conservation's Village Safe Water Program

Attachment D

"Sustainable Utilities in Rural Alaska: Effective Management, Maintenance and Operation of Electric, Water, Sewer, Bulk Fuel, Solid Waste"

Inter-agency steering committee report compiled by Information Insights, Inc., November 2001

Attachment E

Legislative Audit #18-30042-08, "Department of Environmental Conservation, Division of Water, Village Safe Water Program," December 5, 2007

Attachment F

"RUBA Status Report: Angoon"
Rural Utility Business Advisor (RUBA) program, Division of Community and Regional Affairs, Department of Commerce, Community, and Economic Development

Attachment A

List of rural communities with various types of water and sewer infrastructure

Data obtained from Athena Logan, research analyst, Department of Commerce,
Community, and Economic Development, (907) 269-4540.

114 Communities with Both Piped Water and Sewer

- | | | | |
|----------------------|-----------------|----------------------|---------------------------------|
| 1. Adak | 30. False Pass | 59. Lower Kalskag | 88. Saint Paul |
| 2. Akhiok | 31. Fort Yukon | 60. Manokotak | 89. Sand Point |
| 3. Akutan | 32. Galena | 61. Marshall | 90. Savoonga |
| 4. Alakanuk | 33. Gambell | 62. McGrath | 91. Scammon Bay |
| 5. Ambler | 34. Grayling | 63. Metlakatla | 92. Selawik |
| 6. Andreaefsky | 35. Gulkana | 64. Meyers Chuck | 93. Seldovia |
| 7. Angoon | 36. Haines | 65. Minto | 94. Shaktoolik |
| 8. Atka | 37. Hobart Bay | 66. Mountain Village | 95. Shungnak |
| 9. Atkasuk | 38. Holy Cross | 67. Nanwalek | 96. Sitka |
| 10. Barrow | 39. Hoonah | 68. Naukati Bay | 97. Skagway |
| 11. Bethel | 40. Huslia | 69. New Stuyahok | 98. Sleetmute |
| 12. Brevig Mission | 41. Hydaburg | 70. Newhalen | 99. South Naknek |
| 13. Chenega Bay | 42. Igiugig | 71. Noatak | 100. Talkeetna |
| 14. Chevak | 43. Kake | 72. Nome | 101. Tanacross |
| 15. Chignik | 44. Kaktovik | 73. Nondalton | 102. Tanana |
| 16. Chignik Lagoon | 45. Kaltag | 74. Noorvik | 103. Tatitlek |
| 17. Chignik Lake | 46. Karluk | 75. Nuiqsut | 104. Thorne Bay |
| 18. Clark's Point | 47. Kiana | 76. Nulato | 105. Togiak |
| 19. Coffman Cove | 48. King Cove | 77. Old Harbor | 106. Toksook Bay |
| 20. Cold Bay | 49. King Salmon | 78. Ouzinkie | 107. Twin Hills |
| 21. Cordova | 50. Klawock | 79. Pelican | 108. Unalakleet |
| 22. Covenant Life | 51. Klukwan | 80. Petersburg | 109. Unalaska |
| 23. Craig | 52. Kobuk | 81. Pilot Station | 110. White Mountain |
| 24. Deering | 53. Kokhanok | 82. Port Clarence | 111. Whitestone Logging
Camp |
| 25. Dillingham | 54. Koliganek | 83. Port Graham | 112. Whittier |
| 26. Dot Lake Village | 55. Kotlik | 84. Port Lions | 113. Wrangell |
| 27. Egegik | 56. Kotzebue | 85. Russian Mission | 114. Yakutat |
| 28. Elim | 57. Koyuk | 86. Saint George | |
| 29. Emmonak | 58. Larsen Bay | 87. Saint Mary's | |

Eight Communities with Piped Water but not Piped Sewer

- | | | | |
|------------------|---------------|------------------|--------------------|
| 1. Covenant Life | 3. Ivanof Bay | 5. Nelson Lagoon | 7. Perryville |
| 2. Hughes | 4. Kasaan | 6. Nikolski | 8. Port Protection |

Twelve Communities with Piped Sewer but not Piped Water

- | | | | |
|-----------------|---------------|------------|-------------------|
| 1. Alcan Border | 4. Cube Cove | 7. Lutak | 10. Saint Michael |
| 2. Aniak | 5. Ekwok | 8. Naknek | 11. Tyonek |
| 3. Anvik | 6. Glennallen | 9. Nikolai | 12. Upper Kalskag |

Forty Communities with Only Individual Water Wells

- | | | | |
|-----------------|---------------------|-------------------|---------------------|
| 1. Alcan Border | 11. Evansville | 21. Mosquito Lake | 31. Slana |
| 2. Belkofski | 12. Eyak | 22. Naknek | 32. Stony River |
| 3. Betties | 13. Ferry | 23. Napaimute | 33. Sutton-Alpine |
| 4. Cantwell | 14. Gakona | 24. Nikolai | 34. Tenakee Springs |
| 5. Chase | 15. Georgetown | 25. Pedro Bay | 35. Tok |
| 6. Chickaloon | 16. Glacier View | 26. Pilot Point | 36. Tolsona |
| 7. Coldfoot | 17. Iliamna | 27. Port Alsworth | 37. Tyonek |
| 8. Dot Lake | 18. Lake Minchumina | 28. Port Heiden | 38. Ugashik |
| 9. Ekwok | 19. Levelock | 29. Red Devil | 39. Upper Kalskag |
| 10. Ekwok | 20. Lutak | 30. Skwentna | |

Attachment B

Hennessy et al., 2008, "The Relationship Between In-Home Water Service and the Risk of Respiratory Tract, Skin, and Gastrointestinal Tract Infections Among Rural Alaska Natives," *American Journal of Public Health*, Volume 98, Number 11, pages 2072-2078.

The Relationship Between In-Home Water Service and the Risk of Respiratory Tract, Skin, and Gastrointestinal Tract Infections Among Rural Alaska Natives

Thomas W. Hennessy, MD, MPH, Troy Ritter, REHS, MPH, Robert C. Holman, MS, Dana L. Bruden, MS, Krista L. Yorita, MPH, Lisa Bulkow, MS, James E. Cheek, MD, MPH, Rosalyn J. Singleton, MD, MPH, and Jeff Smith, MS, RS

Modern sanitation services (potable drinking water and safe wastewater disposal) are a cornerstone of public health progress and have contributed to decreased infectious disease morbidity and mortality. In 1950, 64.5% of US homes had complete sanitation services (a flush toilet, shower or bath, and kitchen sink).¹ This increased to 93.1% by 1970 and to 99.4% by 2000.^{2,3}

In 2000, 93.7% of Alaskan homes had complete sanitation, which ranked Alaska last among US states.³ In rural Alaska, where the vast majority of people are Alaska Natives, a much higher proportion lack basic sanitation facilities. Providing in-home sanitation services is difficult in remote villages where small, isolated populations live in a harsh, cold climate. Although many rural village homes lack in-home water service, nearly all villages have access to safe drinking water.⁴ Significant gains in health status indicators have occurred among rural Alaska Natives; however, the ongoing disparity in sanitation services remains unsolved in most of rural Alaska. Furthermore, there is a disparity in infectious disease hospitalizations among Alaska Natives compared with the general US population.⁵ To our knowledge, there are no evaluations of the health effects of a lack of modern sanitation services for rural Alaskans.

Alaska village residents who live without pressurized in-home water service typically obtain water from a community-based water point and bring it home in 5-gallon (19-L) plastic containers. As of 2000, one third of rural Alaska residents obtained water this way.⁴ Although water is available in centralized locations, some families must travel long distances or cross rivers to obtain safe water. This distribution method makes it difficult to obtain adequate amounts of water needed for basic consumption and hygiene practices.⁶ Alaska homes lacking pressurized in-home

Objectives. We investigated the relationship between the presence of in-home piped water and wastewater services and hospitalization rates for respiratory tract, skin, and gastrointestinal tract infections in rural Alaska.

Methods. We determined in-home water service and hospitalizations for selected infectious diseases among Alaska Natives by region during 2000 to 2004. Within 1 region, infant respiratory hospitalizations and skin infections for all ages were compared by village-level water services.

Results. Regions with a lower proportion of home water service had significantly higher hospitalization rates for pneumonia and influenza (rate ratio [RR]=2.5), skin or soft tissue infection (RR=1.9), and respiratory syncytial virus (RR=3.4 among those younger than 5 years) than did higher-service regions. Within 1 region, infants from villages with less than 10% of homes served had higher hospitalization rates for pneumonia (RR=1.3) and respiratory syncytial virus (RR=1.2) than did infants from villages with more than 80% served. Outpatient *Staphylococcus aureus* infections (RR=5.1, all ages) and skin infection hospitalizations (RR=2.7, all ages) were higher in low-service than in high-service villages.

Conclusions. Higher respiratory and skin infection rates were associated with a lack of in-home water service. This disparity should be addressed through sanitation infrastructure improvements. (*Am J Public Health*. 2008;98:2072–2078. doi:10.2105/AJPH.2007.115618)

water service also lack flush toilets. Residents use outhouses or in-home waste containers commonly known as “honeybuckets” that require manual removal to a centralized waste disposal site or lagoon. Sanitation infrastructure is provided to rural Alaskans by state- and federally funded programs that have provided service first where the greatest number of homes could be served at the lowest cost.

Although it has long been recognized that access to modern sanitation services can reduce morbidity and mortality from gastrointestinal illnesses, recent data have established the important role of adequate water supplies for preventing respiratory diseases.^{7–9} The value of adequate supplies of safe water has been attributed to the prevention of both waterborne diseases, in which the pathogen can be ingested from contaminated water, and water-washed disease, in which hygienic practices such as handwashing and bathing play a role.¹⁰ We sought to describe the relationship between in-home water and wastewater

service and the risks of waterborne and water-washed infectious diseases in rural Alaska. We used existing sanitation service data for rural Alaska along with hospital discharge records, a respiratory disease surveillance system, and a skin infection outbreak investigation to explore whether improved sanitation service was associated with improved health status among rural Alaska Native people.

METHODS

Population

The approximately 120 000 Alaska Natives are descendants of the indigenous population and represent 19% of Alaskans. Approximately 60% of Alaska Natives live in rural or remote villages. Of the approximately 170 rural villages, most have fewer than 300 residents, and the vast majority are Alaska Natives. Most villages are not accessible by road; travel between villages is mainly by airplane, snowmobile, or boat. Health care

services are administered by regional Alaska Native–managed tribal health organizations, with some statewide facilities and services shared and coadministered, such as the referral medical center in Anchorage.

Sanitation Services

The Rural Alaska Housing Sanitation Inventory documented water and wastewater service in rural villages from July 2001 through April 2004. Each home was evaluated, and a statewide database was created. We defined “served” homes as having pressurized, in-home water service including piped water service from a municipal system or on-site well and septic tank or drain field systems, or “closed haul” systems in which water is delivered to storage tanks and distributed throughout the home via internally pressurized plumbing. For the latter, wastewater from flush toilets is held in a storage tank and periodically evacuated by a pump truck. We used data from 6 predominantly rural regions that were defined according to the boundaries of the tribal health care organizations. We defined “high-service” regions as those in which 80% or more of homes had service and “low-service” as those in which less than 80% were served.

Water service data for 1 region (region A) were used in a village-level analysis. Because water improvements are ongoing, we excluded from analysis villages in which more than 50% of homes had new water service from 1999 through 2004 (5 villages with 2740 persons, or 11.6% of the region's population). We categorized the remaining 47 villages into tertiles according to the proportion of homes served. We analyzed region A's largest town separately because it has near-complete water service and a population approximately 5 times larger than that of the next-largest village. Household size and income data were obtained from the 2000 US Census.¹¹

Regional Disease Rates

Hospital discharge data for the fiscal years 2000 to 2004 for Alaska Natives in Alaska were obtained from the Indian Health Service's (IHS's) Direct and Contract Health Service inpatient data set.¹² These data include patient discharge records from IHS-operated, tribally operated, and community hospitals

that were contracted with IHS or with tribes to provide health care services to eligible persons.¹³ We selected hospitalizations for the 6 predominantly rural regions and urban Anchorage. Three regions were excluded because of small hospital discharge numbers.

Hospital discharges were selected for infectious gastroenteritis, pneumonia or influenza, skin or soft tissue infection, and methicillin-resistant *Staphylococcus aureus* (MRSA) infections for all ages, and respiratory syncytial virus (RSV) for children younger than 5 years. A record was selected if 1 of these diseases was listed among the first 6 discharge diagnoses according to the *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)*.¹⁴

The definitions of infectious gastroenteritis included diarrhea of determined etiology (bacterial: 001–005, 008.0–008.5, excluding 003.2; parasitic: 006–007, excluding 006.3–006.6; and viral: 008.6–008.8) and diarrhea of undetermined etiology (presumed infectious: 009.0–009.3). Pneumonia and influenza were identified with codes 480 to 487. Skin and soft tissue infections were identified with codes 680 to 682, 684, 686.8, and 686.9. Hospitalizations for MRSA were selected by code V09.0 (infection with microorganisms resistant to penicillins) among codes 038.11 (*S aureus* septicemia), 482.41 (other bacterial pneumonia caused by *S aureus*), and 041.11 (*S aureus* bacterial infection in conditions classified elsewhere and of unspecified site). Infection with RSV was defined as codes 480.1, 079.6, and 466.11. Because patient identifiers were not available, repeated hospitalizations could not be excluded.

Hospitalization rates were calculated per 10 000 persons per year for region of residence. The IHS fiscal year 2002 user population estimates (released March 2002) were used as the denominator. The user population included all Alaska Natives who had received IHS-funded health care at least once over the previous 3 years.¹² We calculated age group-specific rates, categorizing age as younger than 1 year, 1 to 4 years, 5 to 19 years, 20 to 44 years, 45 to 64 years, and 65 years or older. Rate ratios with 95% confidence intervals (CIs) were calculated with Poisson regression analysis.¹⁵ Age adjustment with the direct method for the user population of Alaska did

not substantially change the rates and is not reported.

Disease Rates Within Region A

We conducted ongoing surveillance of hospitalizations for acute lower respiratory tract infections (LRTIs) among children for region A and selected 1999 to 2004 to examine rates by village.^{16,17} We abstracted clinical and laboratory information from the computerized medical records for children younger than 1 year hospitalized at the regional hospital, or in Anchorage or who received contracted medical care at a nontribal hospital. We obtained for each hospitalization the birth dates, admission and discharge rates, ICD-9-CM diagnosis codes and narrative, and RSV test result. We merged duplicate hospitalization data on patients transferred to another hospital. A child was classified as having pneumonia if the discharge diagnoses included 1 of ICD-9-CM codes 480.1, 485, 486, or 507. Infection with RSV was defined as a hospitalized child younger than 1 year with acute LRTI and a nasopharyngeal aspirate positive for RSV by culture or a rapid identification method (enzyme immunoassay or direct fluorescent antibody). The majority of RSV testing was performed with Directogen (Bectin Dickenson, Cockeysville, MD). Comparable data for all Alaska Natives and for the US general population were obtained from published sources.^{17,18}

Skin infection hospitalization data were obtained from an outbreak investigation in region A.¹⁹ We included hospitalizations for skin infections from July 1, 1999, through June 30, 2000, and used ICD-9-CM codes (680.0–682.9) to include carbuncle, furuncle, and cellulitis. The regional hospital laboratory was used to identify all confirmed *S aureus* cultures from skin infections for the same period. The MRSA infections were defined by a minimum inhibitory concentration of oxacillin at 2 µg/mL or greater. Clinical samples obtained at village-based clinics must be transported to the regional hospital for culture and confirmation, introducing a potential diagnostic access bias. To avoid overestimating infection rates in the 10 villages closest to the regional hospital, whose residents might seek care directly at the hospital-based clinics and hence be diagnosed more often, we excluded

TABLE 1—In-Home Water and Wastewater Service to Homes, by Region: Alaska, 2000

Region	American Indian/Alaska Native Population, ^a No.	Communities Surveyed, No.	Homes Surveyed, No.	Homes With Water Service, No. (%)	Homes With Wastewater Service, No. (%)
High service					
F	5 409	25	1 555	1 387 (89)	1 349 (87)
E	12 370	26	2 834	2 499 (88)	2 403 (85)
D	4 518	4	368	368 (100)	368 (100)
Low service					
C	6 867	10	834	626 (75)	627 (75)
B	7 274	14	1 376	782 (57)	751 (55)
A	20 714	49	5 513	3 360 (61)	3 328 (60)
Total	57 152	128	12 480	9 022 (73)	8 826 (71)

^aData from the 2000 US Census.¹¹

from analysis persons from these villages. Population denominators were obtained from the 2000 Census.¹¹

The χ^2 test for trend was used to compare hospitalization rates for villages with differing levels of water service. We adjusted for a potential confounder (number of persons per household) with the Cochran–Mantel Haenszel test comparing high-service to low-service villages.

RESULTS

Rural In-Home Water Service

We obtained water service data from 128 villages and a total of 12 480 homes in the 6 regions. Overall, 73% of homes had in-home water service (range by region: 57% to 100%). Wastewater service was present in 71% of homes; the percentages by region were similar to the proportion of homes with water service by region (Table 1). The high-service regions had 91% of homes with in-home water service compared with 61% of homes in the low-service regions.

Regional Hospitalization Rates and Water Service

Hospitalization rates by region for the 5 infectious disease categories varied by water service level (Table 2). The RSV hospitalization rate for children younger than 5 years was higher in the low-service regions than in the high-service regions (rate ratio [RR]=3.4; 95% CI=3.0, 3.8). For all ages, rates for

pneumonia and influenza (RR=2.5; 95% CI=2.4, 2.7), skin or soft tissue infection (RR=1.9; 95% CI=1.8, 2.1), and MRSA infection (RR=4.5; 95% CI=3.6, 5.7) hospitalizations were also higher for low-service regions.

Hospitalization rates for infectious diarrhea did not differ between high- and low-service regions (RR=0.94; 95% CI=0.78, 1.2). Diarrhea of undetermined etiology as the only diarrhea-coded diagnosis was reported for only 4.2% of the diarrhea hospitalizations, and the removal of this diagnosis did not affect the overall rate comparison.

Higher pneumonia and influenza hospitalization rates seen among the low-service regions were seen in each age group; however, the overall excess rate was greatest among the very young and the elderly (Table 3). The hospitalization rate among children younger than 1 year was 5 times higher in low-service regions than in the high-service regions. For children aged 1 to 4 years and persons 65 years or older, the rates were at least 2 times higher in the low-service regions than in the high-service regions.

Water Service in Region A

In region A, 61% of homes had water service, but service was not uniformly distributed throughout the region (Table 4). Water service was available in less than 10% of homes for 20 villages (30% of population), in 10% to 79% for 13 villages (20% of population), and in 80% or more for 14 villages (27% of population).

The largest town, with 23% of the region's population, had 99.5% of homes with water service. With the exclusion of the largest town, the other groups of villages were similar in persons per household and mean household income. Villages with less than 10% of homes served had a slightly lower median population than those with a greater proportion of homes served. The population ranges overlapped for all 3 groups, and the largest difference in median village population between groups was 181 persons.

Hospitalization Rates and Water Service in Region A

Among the regions, the highest hospitalization rates for each of the diagnoses were among persons in region A (Table 2). In particular, pneumonia and influenza hospitalization rates among the region's infants (2550 per 10 000) were more than 2 times higher than the rates for any other region (Table 3). On average, more than 25% of the birth cohort was hospitalized with this diagnosis yearly.

Hospitalization rates for infants with LRTI, pneumonia, and RSV were highest among infants in villages with the lowest level of in-home water service compared with those in other villages (Table 4). Also, we noted a trend of lower hospitalization rates for infants from villages with increasing proportions of homes served by in-home water service (Figure 1). This trend was highly significant for hospitalizations because of LRTI ($P=.002$) and LRTI with pneumonia ($P=.007$) and was present, but not statistically significant, for RSV infections and RSV pneumonia.

Relative hospitalization rates of infants from the lowest-service compared with those from the highest-service villages were as follows: LRTI (RR=1.2; 95% CI=1.1, 1.4), pneumonia (RR=1.3; 95% CI=1.1, 1.5), and RSV (RR=1.2; 95% CI=1.0, 1.6). These rate ratios were similar after adjustment for the number of household members. Compared with the overall US infant population, infants in the lowest-service villages had a 5-times-higher rate of both LRTI and RSV hospitalizations and an 11-times-higher hospitalization rate for pneumonia.

Region A had the highest rate of hospitalization for skin and soft tissue infections and for MRSA infections (Table 2). Within this region, we observed a significant trend of

TABLE 2—Hospitalization Rates per 100 000 for Specific Infections and the Proportion With In-Home Water Service, by Region: Alaska, 2000–2004

Region	Water-Served Homes, %	Infectious Diarrhea, Hospitalization Rate (No.)	RSV, ^a Hospitalization Rate (No.)	Pneumonia or Influenza, ^{a,b} Hospitalization Rate (No.)	Skin or Soft Tissue Infection, ^b Hospitalization Rate (No.)	MRSA Infection, Hospitalization Rate (No.)
Urban Anchorage	100	7.14 (106)	78.5 (130)	63.24 (939)	50.71 (753)	5.25 (78)
High-service region						
F	89	5.80 (16)	148.29 (39)	85.93 (237)	47.86 (132)	2.90 (8)
E	88	9.73 (70)	29.76 (15)	42.12 (303)	26.0 (187)	1.25 (9)
D	100	6.43 (14)	214.69 (57)	98.26 (214)	41.32 (90)	1.38 (3)
Total high-service regions	91	7.64 (206)	90.1 (241)	62.8 (1693)	43.07 (1162)	3.63 (98)
Low-service region						
C	75	5.78 (20)	136.42 (59)	100.87 (349)	34.10 (118)	0.58 (2)
B	57	4.06 (16)	129.48 (56)	90.82 (358)	39.07 (154)	1.27 (5)
A	61	8.72 (96)	314.48 (481)	199.82 (2200)	113.62 (1251)	26.70 (294)
Total low-service regions	61	7.17 (132)	248.90 (596)	157.89 (2907)	82.72 (1523)	16.34 (301)
Rate ratio ^c (95% CI)		0.94 (0.78, 1.17)	2.81 (2.42, 3.26)	2.54 (2.39, 2.70)	1.93 (1.79, 2.08)	4.51 (3.59, 5.66)

Note. RSV = respiratory syncytial virus; MRSA = methicillin-resistant *Staphylococcus aureus*; CI = confidence interval. Number is the total number of hospitalizations for that disease.

^aRespiratory syncytial virus, for hospitalizations among children younger than 5 years.

^bThree pneumonia- or influenza-associated hospitalizations and 8 skin- or soft tissue-infection hospitalizations did not have community of residence available.

^cHigh- vs low-service regions.

TABLE 3—Age-Specific Hospitalization Rates for Pneumonia and Influenza and Proportion With In-Home Water Service, by Region and In-Home Water Service Level: Alaska, 2000–2004

Service Unit	Age <1 Year, Hospitalization Rate (No.)	Age 1–4 Years, Hospitalization Rate (No.)	Age 5–19 Years, Hospitalization Rate (No.)	Age 20–44 Years, Hospitalization Rate (No.)	Age 45–64 Years, Hospitalization Rate (No.)	Age ≥65 Years, Hospitalization Rate (No.)
Urban Anchorage	246.69 (81)	76.11 (100)	13.57 (60)	31.8 (179)	112.4 (286)	384.11 (233)
High-service region						
F	989.47 (47)	143.85 (31)	15.22 (14)	19.16 (17)	97.21 (47)	397.06 (81)
E	333.33 (20)	51.80 (23)	8.03 (18)	15.46 (40)	64.02 (83)	211.37 (119)
D	750.00 (42)	190.93 (40)	9.39 (7)	27.30 (19)	102.19 (35)	552.53 (71)
Total high-service regions	386.30 (190)	88.87 (194)	11.89 (99)	26.0 (255)	96.65 (451)	335.53 (504)
Low-service region						
C	988.64 (87)	194.48 (67)	17.88 (23)	32.32 (35)	73.83 (33)	492.89 (104)
B	1435.48 (89)	124.16 (46)	20.38 (26)	27.50 (37)	89.07 (55)	399.24 (105)
A	2549.75 (756)	317.11 (391)	22.83 (90)	34.4 (117)	139.88 (205)	954.58 (641)
Total low-service regions	2087.35 (932)	258.73 (504)	21.4 (139)	32.4 (189)	115.81 (293)	742.03 (850)
Rate ratio ^a (95% CI)	6.57 (5.58, 7.72)	2.96 (2.51, 3.50)	1.80 (1.39, 2.33)	1.25 (1.03, 1.51)	1.20 (1.04, 1.39)	2.31 (2.06, 2.59)

Note. CI = confidence interval. Number is the total number of hospitalizations for that disease.

^aHigh- vs low-service regions.

increased disease rates associated with lower levels of in-home water service for infections caused by *S aureus*, MRSA, and hospitalizations for skin infections ($P < .001$ for each; Table 4). The risk of skin infections was substantially higher among persons from villages with the least water service than for those villages with the highest water service for each of *S aureus* infections (RR = 5.1; 95%

CI = 3.0, 8.7), MRSA infections (RR = 7.1; 95% CI = 3.6, 14.0), and skin infection hospitalizations (RR = 2.7; 95% CI = 1.8, 4.1; $P < .001$ for each comparison).

DISCUSSION

This is the first study to associate the absence of in-home water service with an increased

risk of lower respiratory tract and skin infections among Alaska Natives. Using aggregated data from regions across Alaska, we found that hospitalization rates for pneumonia and influenza, skin and soft tissue infections, MRSA infections, and childhood RSV were 2 to 4 times higher in regions with a low proportion of homes with water service than in regions with a high proportion of homes with

TABLE 4—Village Demographic Characteristics and Annualized Rates of Respiratory Disease Hospitalizations (Children Younger Than 1 Year) and Soft Tissue Infections (All Ages), by Percentage With In-Home Water Service for Region A: Alaska, 1999–2004, and 1999–2000

Characteristic	Percentage of Community With In-Home Water Service				P	
	<10	10–79	≥80	100	For Trend ^a	≥80% vs 100%
Population (% of total)	6956 (30)	4743 (20)	6415 (27)	5459 (23)		
Number of villages	20	13	14	1 ^b		
Median village population (range)	312 (49–1042)	370 (96–651)	493 (202–832)	5459	.31	Not tested
Average no. persons per home ^c	4.7	4.2	4.2	4.2	.09	Not tested
Average household income, \$ per year	30 633	28 393	31 160	57 321	.87	Not tested
Infections, hospitalization rate (no. ^d)						
All LRTI	351 (338)	304 (121)	282 (218)	227 (141)	.002	.02
Pneumonia LRTI	238 (229)	201 (80)	185 (143)	130 (81)	.007	.006
RSV-positive	140 (135)	118 (47)	113 (87)	93 (58)	.08	.24
Pneumonia RSV	78 (75)	63 (25)	63 (49)	51 (32)	.23	.34
<i>Staphylococcus aureus</i> infection, any	13.8 (55)	10.8 (43)	2.7 (17)	8.4 (46)	<.001	<.002
MRSA infection, any	11.3 (45)	7.3 (29)	1.6 (10)	5.5 (30)	<.001	.01
Hospitalized for skin infection	12.8 (89)	9.6 (45)	4.8 (30)	5.5 (30)	<.001	.61

Notes. LRTI = lower respiratory tract infection; RSV = respiratory syncytial virus; MRSA = methicillin-resistant *Staphylococcus aureus*.

^aTrend among villages excluding largest town in region.

^bLargest town in region.

^cAverages are weighted by village population size.

^dNumber is the total number of hospitalizations for that disease.

water service. Although suggestive, this relation was not entirely consistent and was influenced greatly by high hospitalization rates within region A. However, within region A, we undertook a closer look at disease rates by village-level water service and found that villages with the lowest level of water service (less than 10% of homes served) had the highest hospitalization rates for respiratory infections among infants and for skin and soft tissue infections among persons of all ages. The hospitalization rates demonstrated a typical dose-response group relation in which lower rates were related to progressively higher levels of in-home water service.

Because of the study design, these data fall short of establishing a causal relation between water service and infectious disease risks. However, the strength of the association, the dose-response group relation within region A, and the biological plausibility all support the conclusion that pressurized, in-home water service is an important determinant of health status and contributes to reducing transmission of these communicable diseases.

The infectious diarrheal hospitalization rate among Alaska Natives was similar to that

among the general US population and did not differ significantly by water service.^{20,21} This may seem unexpected because high diarrheal disease rates are seen in other populations that lack in-home water and wastewater service. However, gastrointestinal disease morbidity and mortality among American Indian and Alaska Native populations has been declining since the 1950s.^{13,20} The current low rates are likely because of the availability of safe drinking water in nearly all villages (even those with no in-home water service); the relatively cold source water, which does not support propagation of waterborne bacterial pathogens; and the population's overall good nutritional status.

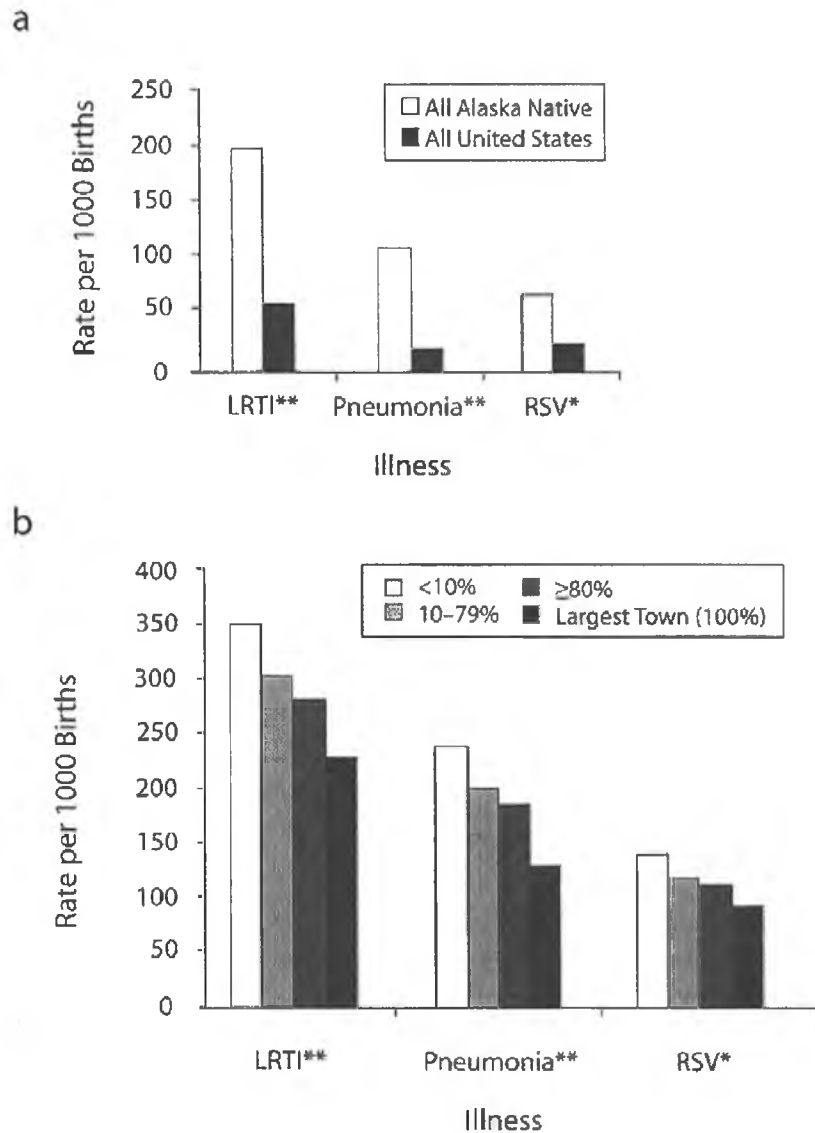
The diarrheal hospitalization rates were in stark contrast to the disparities noted for respiratory and skin infection rates in lower-water service villages. Particularly disturbing was the 5-times higher rate of LRTI hospitalizations and 11-times higher rate of pneumonia hospitalizations among infants in low-service villages in region A compared with the general US population.^{17,18} Because infant pneumonias in region A have been identified as a precursor to chronic respiratory diseases

such as bronchiectasis and chronic productive cough, many of these children will likely have ongoing health problems because of these infections.^{22,23}

Because respiratory and skin infections are not typically contracted through water, the higher rates in low-water-service villages may appear paradoxical. This is best explained by the important role water plays in preventing respiratory and skin infections through handwashing and other personal hygienic measures.²⁴ It is known that the availability of pressurized, in-home water service increases both water consumption and hygiene practices.^{6,25} Thus, the availability of potable water appears to have stabilized waterborne disease rates in Alaska, but it is the water-washed diseases that remain health threats for villages lacking in-home water service. Our findings are consistent with other studies that have shown an association between handwashing and respiratory infectious diseases.^{7–9}

Limitations

Some limitations should be considered when one interprets these data. Because of the study design, we cannot be certain that



Note. Comparison rates for all Alaska Natives and all United States from references 17 and 18.
 *Region A's largest town had water service in almost all homes and was analyzed separately.
 P = .08 for trend, region A; *P < .05 for trend, region A.

FIGURE 1—Hospitalization rate among infants for lower respiratory tract Infections (LRTI), pneumonia, and respiratory syncytial virus (RSV) in region A compared with all Alaska Native and US infants, by percentage of village homes with water service: Alaska, 1999–2004.

these associations arose from a cause-and-effect relationship. Water service may be a marker for other factors related to these health outcomes. When comparing regions, we could not control for factors such as income, village size, and crowding that might have confounded the associations. However, within region A, these characteristics were

either similar across villages or were accounted for. The sanitation survey preceded some of the illness data; thus, some relevant water service improvements may not have been included. This could have led to overestimation of water service differences. In the region A analysis we accounted for this by removing villages that had received water

service improvements over the study period. Finally, our study did not include data on outpatient respiratory or gastroenteric infections, personal hygiene practices, water quality, water quantity, or the different water delivery systems in use.

Conclusions and Recommendations

In 1954, Public Law 83-568 established the US Public Health Service Indian health program (later named the Indian Health Service) as responsible for improving the health of Alaska Native people. At that time, infectious diseases caused 46% of all Alaska Native deaths. Providing potable water and safe wastewater disposal services for Alaska Native communities was a primary objective.²⁶

The IHS, along with the State of Alaska, US Environmental Protection Agency (EPA), US Department of Agriculture Rural Development Program, and Alaska's Tribal Health Organizations, has worked to increase the proportion of rural Alaska homes with modern sanitation service from less than 10% in 1950 to 84% in 2006 (W. Griffith, Village Safe Water Program, written communication, April 2006).

Sanitation improvements have been credited with contributing to the dramatic improvements in Alaska Natives' health.⁴ However, substantial progress must be made to bring sanitation service in rural Alaska up to the modern standard enjoyed by 99.4% of the US population. The EPA has established the goal of providing modern sanitation services for 94% of rural Alaskan homes by 2011 (D. Wagner, Alaska EPA Drinking Water Program, written communication, April 2006). Even if this can be achieved, it will leave many rural Alaskans with substandard water and sanitation facilities.

Our study indicated that in-home water service is an important determinant of health in rural Alaska communities. Lower levels of water services were associated with a higher burden of hospitalizations for pneumonia and influenza, skin infections, and LRTIs. This finding was suggested by data in region-to-region analyses and is strongly supported by the village comparisons within region A.

These health disparities were borne disproportionately by Alaska Native infants, children, and elderly who resided in low-water-service villages. Of particular concern was that

up to one fourth of region A infants were hospitalized annually for respiratory infections.

Further prospective studies could assess the relative contributions of hygienic practices, the volume of water used, and the water distribution system while accounting for potential confounding factors and the economic benefits of in-home water service for prevention of infectious diseases. Although those data would be helpful, we believe that the long-recognized value of in-home service along with the data from our study are convincing enough that programs should proceed with adequate support toward a goal of providing modern water and sanitation service to each home in rural Alaska villages. ■

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Note. The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Contributors

T. W. Hennessy originated the study, supervised its conduct, conducted analyses, and was the principal writer. T. Ritter originated the study, analyzed water use data, and wrote sections of the article. R. C. Holman conducted analyses related to water use and regional hospitalization rates and assisted with writing. D. L. Bruden conducted analyses related to water use and disease rates within region A and assisted with writing. K. L. Yorita was involved in data preparation and analysis for water use and regional hospitalization rates and assisted with writing. L. Bulkow provided population data and oversaw the statistical analyses. J. E. Cheek originated the study. R. J. Singleton provided and analyzed data on respiratory hospitalization, assisted with writing, and participated in interpretation of the data. J. Smith was involved in the design and oversaw the water use data acquisition and analysis.

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Human Participant Protection

Institutional review board approval for this study was obtained from the Centers for Disease Control and Prevention and the Alaska Area institutional review board of the Indian Health Service for the respiratory hospitalization data in region A. The hospital discharge administrative and disease outbreak data were determined to be exempt from review because they lacked patient identifiers and were obtained in a public health response to a disease outbreak, respectively.

References

1. US Census Bureau. *Census of Housing, 1950*. Available at: <http://www.census.gov/hhes/www/housing/census/historic/plumbing.html>. Accessed January 27, 2008.
2. US Census Bureau. *Census of Housing, 1970*. Available at: <http://www.census.gov/hhes/www/housing/census/historic/plumbing.html>. Accessed January 27, 2008.
3. US Census Bureau. *US Summary, 2000*. Available at: <http://www.census.gov/prod/2002pubs/c2kprof00-us.pdf>. Accessed January 27, 2008.
4. *Sanitation 2000: Water and Wastewater in Rural Alaska*. Anchorage: Alaska Dept of Environmental Conservation, Village Safe Water Program; 2000.
5. Holman RC, Curns AT, Kaufman SF, Cheek JE, Pinner RW, Schonberger LB. Trends in infectious disease hospitalizations among American Indians and Alaska Natives. *Am J Public Health*. 2001;91:425-431.
6. Howard G, Bartram J. *Domestic Water Quantity, Service Level and Health*. Geneva, Switzerland: World Health Organization; 2003:17-19. Available at: http://www.who.int/water_sanitation_health/diseases/WSH03_02.pdf. Accessed January 28, 2008.
7. Luby SP, Agboatwalla M, Feikin DR, et al. Effect of handwashing on child health: a randomised controlled trial. *Lancet*. 2005;366:225-233.
8. Ryan MA, Christian RS, Wohlrahe J. Handwashing and respiratory illness among young adults in military training. *Am J Prev Med*. 2001;21:79-83.
9. Fung IC, Cairncross S. Effectiveness of handwashing in preventing SARS: a review. *Trop Med Int Health*. 2006;11:1749-1758.
10. White GF, Bradley DJ, White AU. *Drawers of Water: Domestic Water Use in East Africa*. Chicago, IL: University of Chicago Press; 1972.
11. Alaska Department of Labor and Workforce Development. *Census and Geographic Information Network, Research and Analysis Section*. Available at: <http://almis.labor.state.ak.us/?PAGEID=67&SUBID=114>. Accessed October 24, 2005.
12. *Inpatient/CHS Inpatient Data Fiscal Years 2000-2004. National Patient Information Reporting System*. Albuquerque, NM: Indian Health Service; 2005.
13. *Trends in Indian Health-2000-2001*. Rockville, MD: Indian Health Service; 2004.
14. *International Classification of Diseases, Ninth Revision, Clinical Modification*. 6th ed [CD-ROM]. Washington, DC: US Dept of Health and Human Services; 2005.
15. Kleinbaum DG, Kupper LL, Muller KE, Nizam A. *Applied Regression Analysis and Other Multivariable Methods*. Pacific Grove, CA: Duxbury Press; 1998.
16. Singleton RJ, Bruden D, Bulkow LR, Varney G, Butler JC. Decline in respiratory syncytial virus hospitalizations in a region with high hospitalization rates and prolonged season. *Pediatr Infect Dis J*. 2006;25:1116-1122.
17. Peck AJ, Holman RC, Curtis AT, et al. Lower respiratory tract infections among American Indian and Alaska Native children and the general population of U.S. children. *Pediatr Infect Dis J*. 2005;24:342-351.
18. Holman RC, Curns AT, Cheek JE, et al. Respiratory syncytial virus hospitalizations among American Indian and Alaska Native infants and the general United States infant population. *Pediatrics*. 2004;114:437-444.
19. Baggett HC, Hennessy TW, Leman R, et al. An outbreak of community-onset methicillin-resistant *Staphylococcus aureus* skin infections in southwestern Alaska. *Infect Control Hosp Epidemiol*. 2003;24:397-402.
20. Holman RC, Parashar UD, Clarke MJ, Kaufman SF, Glass RI. Trends in diarrhea-associated hospitalizations among American Indian and Alaska Native children, 1980-1995. *Pediatrics*. 1999;103:E11.
21. Mounts AW, Holman RC, Clarke MJ, Breesee JS, Glass RI. Trends in hospitalizations associated with gastroenteritis among adults in the United States, 1979-1995. *Epidemiol Infect*. 1999;123:1-8.
22. Redding G, Singleton R, Lewis T, et al. Early radiographic and clinical features associated with bronchiectasis in children. *Pediatr Pulmonol*. 2004;37:297-304.
23. Singleton RJ, Redding GJ, Lewis TC, et al. Sequelae of severe respiratory syncytial virus infection in infancy and early childhood among Alaska Native children. *Pediatrics*. 2003;112:285-290.
24. Cairncross S, Valdmanis V. Water supply, sanitation and hygiene promotion. In: Jamison DT, Breman JG, Measham AR, et al., eds. *Disease Control Priorities in Developing Countries*. 2nd ed. New York, NY: Oxford University Press; 2006:771-792.
25. Curtis V, Kanki B, Mertens T, et al. Potties, pits and pipes: explaining hygiene behavior in Burkina Faso. *Soc Sci Med*. 1995;41:383-393.
26. Alaska Dept of Health and Social Services. *Health Status in Alaska*. Available at: <http://www.hss.state.ak.us/dph/targets/PDFs/history2000.pdf>. Accessed December 26, 2006.

Attachment C

Fact Sheet: Alaska Department of Environmental Conservation's Village Safe Water Program



Alaska Department of Environmental Conservation Village Safe Water Program

The Alaskans We Serve

Rural Alaska is characterized by over 280 isolated villages scattered across an area more than twice the size of Texas. Populations in these communities are predominately Native and range between 25 and 6,000 residents, averaging about 300 residents per village. Nearly all villages are accessible by air and water only. Most residents practice a blended subsistence lifestyle and depend heavily on moose, caribou, walrus, whale, seal and fish for their food supply. Unemployment rates frequently exceed 50%. Many of these communities lack a safe source of drinking water or a safe means of sewage disposal – The Village Safe Water Program (VSW) is working to change this. As one of the three Facility Programs established within the Department of Environmental Conservation, Division of Water, the role of the VSW program is to work with rural communities to develop sustainable sanitation facilities.

How the Program Works

Communities apply each year to VSW for grants for sanitation projects. The applications are scored, based heavily on the proposed project's ability to address assessed critical public health needs, as well as the communities' demonstrated capacity to operate and maintain the facilities. Grants are awarded for the highest ranking projects. Federal and state funding for this program is administered and managed by the State of Alaska's Village Safe Water (VSW) program. VSW provides technical and financial support to Alaska's smallest communities to design and construct water and wastewater systems. VSW works directly with community officials to make sure that planning results in facilities that are appropriate for each community, that facilities are properly and efficiently constructed, and that state and federal grant funds are used effectively and efficiently. In some cases, funding is awarded by VSW through the Alaska Native Tribal Health Consortium, who in turn assist communities in design and construct of sanitation projects.

Focus on Local Capacity

Local capacity is a vital component of developing sustainable sanitation systems throughout rural Alaska. Construction is only approved once

The role of the Village Safe Water Program is to work with rural communities to develop sustainable sanitation facilities.

communities have met agreed upon performance criteria and have demonstrated the capacity to operate and manage sanitation facilities. Although local capacity requirements may occasionally delay construction, they are an essential element of a comprehensive statewide sanitation plan.

Progress to Date

Appropriations through EPA and USDA coupled with state funding have resulted in substantial improvements in the health, safety, and well-being of thousands of Alaskans. In 1994 only 37% of rural Alaska households had adequate sanitation facilities. Today, 77% of rural Alaskan homes have running water and flush toilets.

With federal and state support, the percentage of rural households with basic sanitation services has increased by over 30% over the past decade. Similarly, there has been a significant increase in the number of trained rural utility operators, clerks, and managers.

Types of Systems Used in Alaska

Climate, physical conditions, population density, community capacity, capital costs, operation/maintenance costs, and regulations are among the factors that must be considered in determining the type of system best suited to a particular community.

The types of systems built with assistance through the VSW program include:

- 'washeterias': centrally located community buildings with flush toilets, drinking water to haul home, and laundry and shower facilities
- septic tanks and wells, and
- piped systems (both above ground and underground)
- tank haul systems: separate holding tanks provide potable water and store wastewater for each home. Haul vehicles and equipment operated by the city fill the water tanks and remove the waste from sewage tanks.

Funding the Village Safe Water Program

Efforts to improve sanitation conditions in rural and Native Alaska began with a modest endeavor in the 1960's and 1970's by the Indian Health Service. The State of Alaska became involved in 1972 with the passage of the Village Safe Water Act. Between 1972 and 1994, the state contributed \$300 million to sanitation projects. The U.S. Department of Agriculture (USDA) and the Environmental Protection Agency (EPA) started providing funding in 1994 and 1995 respectively. Since 1994 when the federal/state Rural and Native Alaska Sanitation Development program began, the State has contributed an additional \$240 million to improve rural sanitation conditions and EPA/USDA together have contributed \$537 million. The funding level this year (federal fiscal year 2005) for the Village Safe Water program is \$45 million through EPA, \$26 million through

Post Construction

Once a project is complete, the community's local governing body takes ownership of the system and is responsible for its ongoing operation, maintenance and management. The Department of Environmental Conservation offers technical support and hands-on training in system operation and maintenance, and the Alaska Department of Commerce, Community and Economic Development offers utility management training and assistance. Together, these programs offer an insurance policy that safeguards sanitation systems by training local residents the necessary skills to properly operate, maintain, and manage their sanitation

Remaining Needs

Sanitation conditions in most Alaska villages have vastly improved. Yet one family in three still does not have access to a sanitary means of sewage disposal or an adequate supply of safe drinking water in their homes. For members of these families, buckets or pit privies are the only methods for disposing of human waste, and water must be hauled by individuals from community watering points or untreated sources such as creeks or rivers.

Every year, an assessment of the sanitation needs of Native Americans across the country is completed for the Indian Health Service. According to this assessment, the estimated total sanitation need of Alaska's 220 Native Villages is \$565 million. This assessment does not include the needs of 65 rural Alaska villages that are non-Native.

Contacts

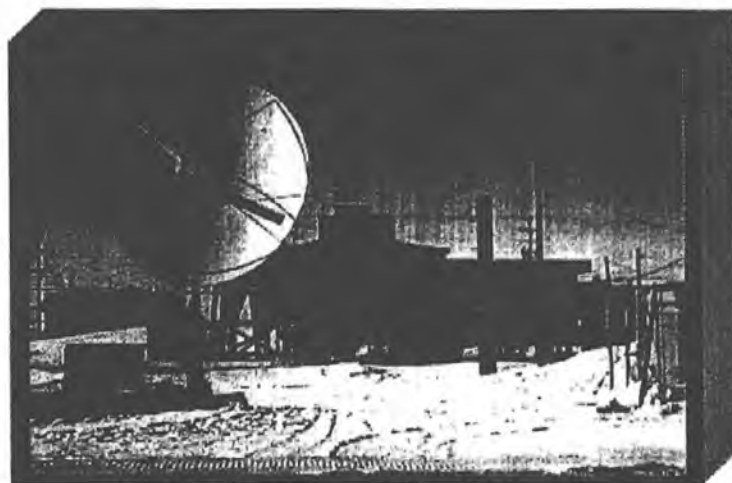
For more information visit our website at:
<http://www.dec.state.ak.us/water/vsw/index.htm>

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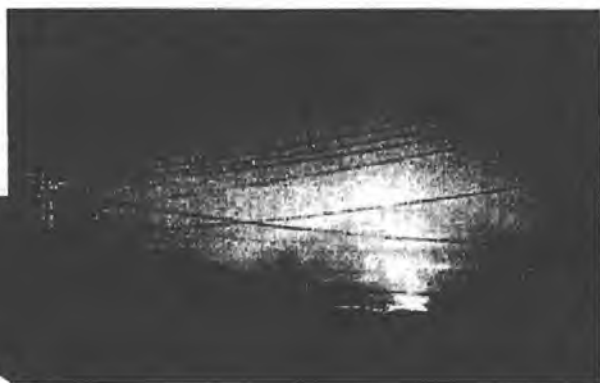
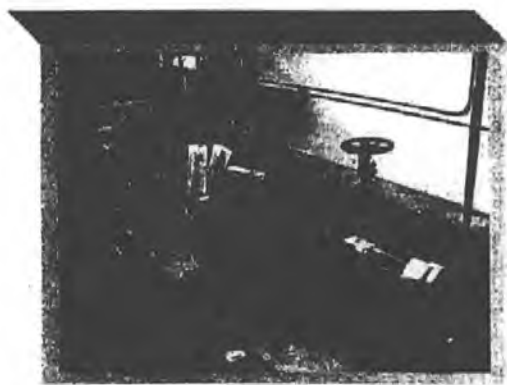
Attachment D

"Sustainable Utilities in Rural Alaska: Effective Management, Maintenance and Operation of Electric, Water, Sewer, Bulk Fuel, Solid Waste"

Inter-agency steering committee report compiled by Information Insights, Inc.,
November 2001



Sustainable Utilities in Rural Alaska
Effective Management, Maintenance and Operation of
Electric, Water, Sewer, Bulk Fuel, Solid Waste



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Brian Rogers of Information Insights, Inc. facilitated the Steering Committee meetings held in Talkeetna on August 29-30, 2001 and in Anchorage on October 4, 2001. He also compiled the findings and recommendations of the Committee into this report.

SUSTAINABLE UTILITIES IN RURAL ALASKA

Steering Committee Report

November, 2001



United States
Department of
Agriculture

**Rural
Development**

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Office of the State Director

Dear Alaskans:

The attached report incorporates the public comments, peer reviews and collaborative work of participants in our process over the past two years. Our goal was to assess impediments to, and to recommend actions to achieve, reliable and sustainable utilities for all Alaskans. The executive summary and action plan accompanying the main body of our work are intended to provide direction for continued progress toward that goal.

I wish to thank the many talented people involved with bringing this report to you, and express my appreciation of the ongoing teamwork. As with any complex task, the journey is a large part of the destination in this effort. Together we listened, learned and shared. This report is not the end of our journey, but it provides a workable starting point for continued progress.

As the major sponsor of this work, I hope you will contact me with any additional information or suggestions you may have after reading our report. The teamwork that has evolved will continue. Our collective hope is that all Alaskans will have access to safe, reliable and affordable utilities now and in the future. Failure is simply not an option.

Sincerely,

A handwritten signature in black ink, appearing to read "B. B. Allen", written over a vertical line that extends from the word "Sincerely," down to the typed name below.

B. B. ALLEN
State Director

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STEERING COMMITTEE REPORT

Introduction

USDA Rural Development sponsored the *Sustainable Utilities in Rural Alaska* study in cooperation with the Alaska Energy Authority, the Alaska Science and Technology Foundation, and the Denali Commission.

The University of Alaska's Institute of Social and Economic Research was the primary research partner in this project to explore, document, and evaluate the management, maintenance, and operation of rural utilities.

The study drew on research conducted by the Institute of Social and Economic Research and others. It also drew on the collaborative experience of a Steering Committee that included federal, state, local, private, non-profit and tribal officials and representatives. The full report is available as a separate document.

After completion of the study, the Steering Committee gathered in two facilitated workshops to determine and validate an appropriate action plan. This is the Steering Committee's collaborative report.

The Steering Committee intends and hopes that its recommendations will assist rural communities and their utilities in moving towards a higher level of sustainability and sense of ownership. The Committee recognizes that there are very few, if any, sustainable utilities operating in rural Alaska without subsidies today, just as most utilities in urban Alaska receive at least some of their revenues from sources other than ratepayers.

The Committee also intends that its recommendations will provide and increase economic opportunities in rural Alaska, protect cultural integrity and promote self-governance in Alaska's villages. The nine principles and 42 recommendations contained in this report provide a framework for achieving these goals. The recommendations are presented both by category and by implementing agency.

Sustainability

Achieving sustainable rural utilities is a goal shared by both federal and state agencies serving rural Alaska. These agencies – and the people they serve – want to avoid failures and long-run liabilities in rural communities.

In its simplest form, a sustainable utility is one where available financial resources, from all sources, are at least equal to the total cost of the utility. Total cost includes management, operation, maintenance, cost of capital renewal and replacement (after the

design life has been achieved), necessary to maintain an acceptable level of service now and for future generations.

Reliable utility services improve a community's health and economy, and increase its educational opportunities and overall quality of life. These benefits should be available to residents of all Alaska communities, which is why governments sponsor and support programs with the goal of making basic utility services available to all Alaskans.

But utilities must operate successfully and continuously to bring these benefits to a community. Our focus must be not just on building the physical utility infrastructure, but also on helping the communities support the utility's long-term successful operation.

While the concept of sustainability is not exclusively financial, economic sustainability is essential. Utility systems are financially sustainable when available revenue from ratepayers, local and other sources of funds equals the total costs of the utility, including operating and maintenance expenses, capital recovery, and a rate of return on invested capital.

Healthy and safe communities depend upon sustainable infrastructure. This statement sets out principles to guide us in our pursuit of sustainability. All government utility assistance programs should be tested and, where necessary, adjusted to conform to these principles.

1. All state and federal assistance to rural utilities should optimize the sustainability of the utility system and the long-term value of the state and federal investment.
2. The ultimate goal for each community should be to sustain the cumulative financial burden of all of its utilities. However, the total cost of all utility services must be affordable to each community. Sustainability cannot be achieved through rates or other forms of local contribution if they unreasonably burden local governments and utility customers.
3. We can best promote sustainability by recognizing that each community begins progress towards that goal at a different level, and moves toward that goal at a different pace. All training support should incorporate sustainability concepts and principles.
4. We should define achievable benchmark levels of sustainability for different utility services and communities. These benchmarks should guide state and federal investment in rural utility infrastructure.
5. In our pursuit of sustainability, we must always be mindful of, and provide appropriate deference and protection to, local people, governments, cultures and lifestyle choices. To be successful for the long term, proposed facilities must meet locally defined needs. All planning and projects must include a formal community input and feedback process.
6. Rural utility systems should be designed to strike an appropriate balance between level of service and life-cycle cost.
7. Achieving sustainability may require some continuing support from outside the community. The net result of state and federal investment in capital and operating

costs should be to increase the sustainability of that utility, and the overall ability of the village to support its utilities.

8. Recognizing that how well a utility is managed and operated impacts its sustainability, we need to identify and support utility management structures, operations systems, and capital and operating program incentives that best allow communities to move to the highest benchmark achievable on the sustainability scale.
9. All community and project planning processes must include the goal of sustainability. A viable community plan should consider all community service needs and all resources that may be available to support sustainable community services.

Measuring sustainability in rural Alaska is not, however, a well-defined process. The Steering Committee recommends the Regulatory Commission of Alaska develop sustainability metrics -- a clearly definable standard of measurement -- covering the financial, organizational, and management aspects of sustainable utilities, at the utility and community levels.

Financial sustainability can be roughly categorized in four stages or degrees of sustainability:

- 0 Utility revenues are not sufficient to pay its operating and maintenance costs.
- 1 Utility revenues (from all sources) are sufficient to pay for all operating and maintenance costs.
- 2 Utility revenues (from all sources) are sufficient to pay for all operating and maintenance costs, and to fund major repair and renovation costs.
- 3 Utility revenues (from all sources) are sufficient to pay for all operating and maintenance costs, and to fund major repair and renovation costs, and fully fund depreciation, insurance, and a return on investment.

Organizational and management capacity for utilities does not lend itself to simple measurement, but can be considered in a spectrum characterized as:

- 0 Utility (or community) organizational capacity is *broken*, unable to deal with utility management.
- 1 Utility (or community) organizational capacity is *reactive*, able only to manage problems as they arise.
- 2 Utility (or community) organizational capacity is *proactive*, able to manage problems as they arise and create solutions in advance of problems.
- 3 Utility (or community) organizational capacity is *planning* for the future, able to anticipate and manage all aspects of operations, maintenance and replacement of utility infrastructure.

The purpose of measuring sustainability at the utility or village level is not to create barriers to solving problems in rural Alaska. Instead, it is to evaluate progress and to recognize unmet needs that should be addressed by federal, state or local actions. In addition to financial, organizational and management capacity, assessment tools can measure plant condition, personnel qualifications, finance and accounting capability, and other management metrics.

The Steering Committee recommends the Regulatory Commission of Alaska be tasked to lead the development of the financial measures of sustainability, while the Rural Utility Business Advisor program develops the management measures of sustainability. The Regulatory Commission of Alaska measures will need to take into account maintenance and operations, plant repair and renovation, and the replacement of capital facilities, including facilities that were contributed to the utility through federal, state or other capital subsidies.

Recognizing Success

The significant challenges of achieving sustainability and accountability in rural utilities should not overshadow the significant successes that have occurred. The Denali Commission should evaluate causes of success and failure in rural utilities, and publicize the practices that have proved to be most successful.

The Steering Committee commends several projects, programs and processes that have improved the quality of rural utility planning, development, operations and maintenance, including:

- The master planning concept used by the Village Safe Water program in the Alaska Department of Environmental Conservation. The separation of planning and construction phases provides more opportunity for community involvement in the development of water and sewer projects. Chuathbaluk is a recent successful example of this process.
- The processes used by both Village Safe Water and the U.S. Indian Health Service in funding projects. Both processes give priority to villages with certified operators.
- The Denali Commission's requirement for business planning for bulk fuel and electric power system projects that it helps finance. This requirement makes communities and agencies to think through the whole project. Business plans must include ten-year forecasts to show a utility or community's ability to repay capital costs.
- USDA Rural Utilities Service-financed electric systems, such as the Alaska Village Electric Cooperative (AVEC), Kodiak Electric Association, and others. RUS assistance has built-in criteria for accountability and helps create a utility with financial discipline, a work plan, defined needs, and a forecast for the future, all criteria for success.

- The Remote Maintenance Worker program in the Alaska Department of Environmental Conservation, which provides technical assistance and training to rural water and sewer system operators, and responds to emergency situations to help protect state and federal investments in rural water and sewer systems.
- The Rural Utility Business Advisor program in the Alaska Department of Community and Economic Development which provides hands-on, water and sewer utility management training to rural communities.
- The Local Utilities Matching Program (LUMP), a pilot program funded by the Alaska Department of Environmental Conservation and administered by the Northwest Arctic Borough from November 1992 through October 1994. The program used State funds to match residential user fees collected. It was designed to promote the collection of user fees, to promote the employment and retention of trained operators, to facilitate successful preventive maintenance programs, and to reduce rehabilitation and replacement costs. It proved to be effective while the State funds were provided, but less so after State funding ceased.
- The Power Cost Equalization Program that, while not perfect in its incentive structure, has brought affordable power to stabilize community costs.

Criteria for community success include several factors, including active community leadership, cooperation in the community between city and tribal entities, business planning know-how, education and training, community buy-in, local utility expertise, a common vision and goal for the community, and a cash economy in the village.

Understanding Failure

The Steering Committee, composed of federal, state, local, private, non-profit and tribal officials, recognizes that agencies collectively are part of the problem in rural utilities. Agency policies have not provided enough money to build community capacity to sustain utilities. Also, insufficient money is provided for planning successful utilities or managing and operating projects once completed.

The federal and state agencies that work on these issues do not coordinate their efforts well, and sometimes present conflicting incentives to the communities they serve. Simple standardization of application forms and requirements, for example, would ease the administrative burdens on small village utilities.

Funding agency budget processes can force action too quickly, with a focus on visible results (a project under construction) rather than a long-term planned result. Agency policies often create built-in inefficiencies, providing larger capital projects with lower operating costs, but higher life-cycle costs, rather than smaller capital projects with more reasonable and funded operating costs.

The legislative structure, at both the federal and state levels, often simply rewards the "squeaky wheel," while allowing operations and maintenance failures to occur without mandating changes in operating practice. There is a lack of acceptance of life-cycle

costing principles at all levels. Project ideas are often brought to communities, designed and delivered from elsewhere, with little community buy-in or training for ongoing maintenance.

The state lacks a financial plan or energy plan that can guide utilities and program managers in their decisions. Consultant work is often not integrated into the community processes; project feasibility is often force-fitted into a community.

Achieving sustainability in rural sanitation utility systems brings particular challenges:

- Many sanitation systems are built where total costs exceed the amount of revenues that possibly can be generated by affordable user fees and local subsidies (a situation not unlike most urban systems).
- The only source of non-local revenue is restricted to capital investments, which are viewed as one-time – not continuing – investments. There is no dedicated non-local operational subsidy for water and sewer utilities, such as PCE for electric utilities, even though this may be cheaper in the long run in terms of the total investment.
- The most sustainable systems are those with the least total cost, yet the incentive system does not drive the facility planning process towards systems with the least total costs. Instead, it drives the process towards systems with the lowest operating costs.
- The technologies are not developed. In sanitation, there are not technologies that are cheap, reliable, easy to operate, and yet capable of producing and delivering – in sufficient quantity – drinking water that will meet ever-more stringent quality standards.

While agencies are frustrated by these challenges, the Steering Committee recognizes that some of these frustrations are created by understandable differences between national policies, Alaska needs, and community needs, and the federal challenge of creating programs that serve all areas of the nation.

Achieving Accountability

Critical to achieving sustainability in rural utilities is the requirement of accountability. Utility managers must use sound business principles, consistently applied, to manage utilities. There must be consequences for failure - an end to the bailing out of utilities that are unsuccessful - and means in place to ensure that management practices change when utilities need help.

The most challenging question is who should monitor utility performance. At its most basic form, accountability can be measured by the reliable provision of safe water, sewage disposal, electricity, and bulk fuel to Alaska villages.

The Steering Committee believes that the Regulatory Commission of Alaska's "fit, willing and able" standard should be revised and applied to all rural utilities, and that the

Regulatory Commission of Alaska should develop standard financial reporting for rural utilities. The Alaska State Legislature should create incentives for rural utilities to opt into economic regulation by the Regulatory Commission of Alaska. Granting agencies should review project proposals in light of the Regulatory Commission of Alaska criteria.

While the Steering Committee recognizes that subsidies may be necessary in many communities, utilities, and projects, the subsidies must be explicit, and should come with requirements that the receiving utility work toward greater sustainability and accountability. Funding agencies should establish benchmarks for utilities and villages, and make it clear that they will measure progress toward those benchmarks prior to funding any new community projects.

The Steering Committee recognizes the challenge that agencies will have tracking progress toward sustainability and accountability. The Denali Commission is in the best position to analyze current techniques for accountability and incentive structures, and to gather reports from the federal and state agencies involved.

Planning

The Steering Committee recognizes a general lack of planning as a significant barrier to achieving sustainable rural utilities. The Committee's recommendations constitute a series of steps intended to improve community and utility planning capacity. The agencies recognize that current programs favor construction over planning, and will seek ways to encourage community comprehensive planning and project-specific planning from construction and other funding sources.

At the project level, agencies are seeking to cooperate on the development of consistent factors for life-cycle cost analysis of potential projects, with project analysis including total costs of operations and maintenance, renewal and replacement, facility insurance, depreciation, and capital replacement.

Information about village infrastructure, capacity, and needs is now contained in numerous federal and state databases and files. All agencies involved in village utility systems should share their database tools, make information available online, and commit to use those tools.

The Steering Committee recognizes that staff resources in programs such as the Rural Utility Business Advisor program will need to be expanded to meet new requirements for utility project and community planning.

Improving the quality of community and utility planning will take time and effort. The Steering Committee recommends the Denali Commission and the U.S. Department of Housing and Urban Development host a periodic forum on community comprehensive planning.

Operating and Maintaining Utilities

Most grant programs provide funding for utility capital improvements, but not for operating and maintenance costs. The Steering Committee concludes that this grant methodology undermines sound community and utility decision-making. In some cases, significantly smaller capital projects could be built if a portion of the capital cost savings could be used to endow utility maintenance and operations.

The Steering Committee recommends the Legislature and Governor seek amendments to federal programs allowing state and private matching funds to be used for operating and maintenance endowment if the change increases sustainability of the project and the life-cycle cost of meeting village needs improves.

All grants should contain conditions to require improved management and operating performance, evaluation and examination of grant program results, and improving utility sustainability.

The Steering Committee believes that regional utilities are most likely to have the capacity over time to sustain operations and maintenance requirements. To test this belief, the committee will seek funding for a demonstration project to determine the true cost of a regional cooperative. The Yukon-Kuskokwim Health Corporation is developing a business plan to establish a sewer and water regional utility cooperative, recognizing that there will need to be a subsidy during the ramp-up period.

Each utility project should be assessed against the sustainability criteria established by the Regulatory Commission of Alaska and the Rural Utility Business Advisor program. Agencies involved in rural utilities will expect those utilities to continuously improve their level of sustainability.

Conclusion

The *Sustainable Utilities in Rural Alaska* Steering Committee believes that through collaborative efforts of federal and state agencies, local and tribal governments, cooperatives, and private utilities, we can improve the provision of utilities to rural Alaska residents.

The Committee looks to the Denali Commission as a key organization to bridge the differences between federal and state policies and programs serving rural Alaska. We encourage ongoing collaboration among the agencies and organizations represented on the Steering Committee to develop a coordinated action plan and schedule, identify resources, and carry out the recommendations contained on the following pages.

STEERING COMMITTEE RECOMMENDATIONS – BY CATEGORY

Definition and Principles	<p>In its simplest form, a sustainable utility is one where available financial resources, from all sources, are at least equal to the total cost of the utility. Total cost includes management, operation, maintenance, cost of capital renewal and replacement (after the design life has been achieved), necessary to maintain an acceptable level of service now and for future generations.</p> <p>All government utility assistance programs should be tested and, where necessary, adjusted to conform to these principles:</p> <ul style="list-style-type: none">• All state and federal assistance to rural utilities should optimize the sustainability of the utility system and the long-term value of the state and federal investment.• The ultimate goal for each community should be to sustain the cumulative financial burden of all of its utilities. However, the total cost of all utility services must be affordable to each community. Sustainability cannot be achieved through rates or other forms of local contribution that unreasonably burden local governments and utility customers.• We can best promote sustainability by recognizing that each community begins progress towards that goal at a different level and moves toward that goal at a different pace. All training support should incorporate sustainability concepts and principles.• We should define achievable benchmark levels of sustainability for different utility services and communities. These benchmarks should guide state and federal investment in rural utility infrastructure.• In our pursuit of sustainability, we must always be mindful of, and provide appropriate deference and protection to, local people, governments, cultures and lifestyle choices. To be successful for the long term, proposed facilities must meet locally defined needs. All planning and projects must include a formal community input and feedback process.• Rural utility systems should be designed to strike an appropriate balance between level of service and life-cycle cost.• Achieving sustainability may require some continuing support from outside the community. The net result of state and federal investment in capital and operating costs should be to increase the sustainability of that utility and the overall ability of the village to support its utilities.
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	<ul style="list-style-type: none"> • Recognizing that how well a utility is managed and operated impacts its sustainability, we need to identify and support utility management structures, operations systems, and capital and operating program incentives that best allow communities to move to the highest benchmark achievable on the sustainability scale. • All community and project planning processes must include the goal of sustainability. A viable community plan should consider all community service needs and all resources that may be available to support sustainable community services.
<p style="text-align: center;">Policy Actions</p>	<ol style="list-style-type: none"> 1. The rural utility agencies should standardize measures of utility sustainability. The purpose is to measure and assess gaps, not to erect a barrier to entry or funding. 2. The Regulatory Commission of Alaska should draft the financial measures of sustainability at the utility level and at the community level. 3. The Rural Utility Business Advisor program should draft the management measures of sustainability at the project/utility level and at the community level. 4. Granting agencies should require an assessment of a utility and village against the benchmarks prior to funding a new project. 5. Granting agencies should eliminate unnecessary duplication of state-subsidized utilities.
<p style="text-align: center;">Planning</p>	<ol style="list-style-type: none"> 6. The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. 7. The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them. 8. Granting agencies should understand that planning is an evolutionary process, and that planning for projects cannot be required without funding to accomplish the required planning.

9. The Alaska Science and Technology Foundation should develop a template for complete master plans for water and sewer projects, and a specific timeline and specification for how project engineers and funding agencies can work with villages to optimize their understanding, buy-in, and ownership of village utility projects.
10. The Alaska Science and Technology Foundation should work with other funding agencies and rural representatives to develop a simple model and spreadsheet for determining and predicting existing and future revenue – both government and market (non-government) based – that will support all local utilities and increase their overall sustainability.
11. Granting agencies should provide funding for business planning and comprehensive community planning for sustainability from a variety of funding sources.
12. Granting agencies should allow use of construction funding for planning and pre-construction feasibility specifications, including engineering, economic and management issues.
13. The Denali Commission and granting agencies should be asked to look at life-cycle costs of village utilities and to identify gaps. The Denali Commission should establish the factors used in life-cycle cost analysis, including discount rates, inflation assumptions and other criteria. The Alaska Energy Authority should establish and annually revise the rates used for these factors.
14. Before funding a project, granting agencies should require a business plan that shows all community financial resources and total costs of the project, including an analysis of the impact of the project on owner finances. The plan must be understood and adopted by the community.
15. Granting agencies should incorporate the Rural Utility Business Advisor business approach into utility planning projects.
16. USDA Rural Development should make funding available for project feasibility planning.
17. USDA Rural Development should report to the Alaska 20/20 Conference on sustainable utilities issues.
18. The Environmental Protection Agency should expand the planning capability within its funding programs.
19. The Village Safe Water program should seek authority to spend USDA Rural Development funds for planning.

	<p>20. The Denali Commission and the U.S. Department of Housing and Urban Development should host a forum on community comprehensive planning.</p> <p>21. USDA Rural Development should develop a plan for property insurance on facilities, through purchased insurance, a self-insurance program, insurance pool or other program.</p> <p>22. The Alaska Science and Technology Foundation should provide support for a component of community comprehensive planning that measures market sustainability.</p>
Accountability	<p>23. The Department of Community and Economic Development should provide a self-assessment tool and funding for villages to begin community comprehensive planning.</p> <p>24. The Denali Commission should analyze current techniques for accountability and incentive structures, and gather reports from agencies by January 2002.</p> <p>25. The Legislature should amend statutes governing the Regulatory Commission of Alaska to create incentives for utilities to opt into regulation, and to disallow subsidies without regulation.</p> <p>26. Granting agencies should give incentives for consolidation of utility systems.</p> <p>27. Granting agencies should contract for independent third-party evaluation of services that villages receive.</p> <p>28. The Alaska Energy Authority and the Denali Commission should solicit regional organizations to establish a demonstration regional sewer and water cooperative.</p> <p>29. The Alaska Native Tribal Health Consortium is developing a statewide utility association concept to promote economy of scale in procurement and administrative support activities. In conjunction with this activity, the Yukon-Kuskokwim Health Corporation is developing a business plan to establish a prototype sewer and water regional utility cooperative, recognizing there will be need for a subsidy during the ramp-up period.</p> <p>30. Granting agencies should require changes to utility practice or procedures when providing emergency assistance. The Legislature should not bail out failing utilities that do not change practices or procedures, and should consolidate such utilities under a back-up operator.</p>
Operations and Maintenance	<p>31. The Governor and Legislature should recommend approval of amendments that would allow a portion of capital funding to be used for an operating and maintenance endowment if the life-cycle cost of meeting the village needs improves and if the change would increase sustainability of the project. The amendments</p>

could allow pooling of the operating and maintenance endowment for a broader group of project support.

32. The Alaska Energy Authority should convene a group to look at alternative approaches to ensure long-term sources of funding for operations and maintenance.
33. The Denali Commission should conduct a financial analysis of selected successful and unsuccessful village utility systems. The Denali Commission should publicize success stories and best practices, as well as information on pitfalls that can be avoided.
34. The Regulatory Commission of Alaska should establish a simplified form for uniform accounting to gather consistent data from utilities.
35. Granting agencies should require grantees to use the standard financial reporting system.
36. The Governor and Legislature should recommend Congressional funding for a regional demonstration project to determine the true cost of a regional cooperative.
37. The Regulatory Commission of Alaska should review the "fit, willing and able" criteria for village utilities and utility projects. The agency should also identify community utilities that do not currently meet these criteria.
38. Granting agencies should review all projects in light of the Regulatory Commission of Alaska's revised "fit, willing and able" criteria.
39. The Governor and Legislature should strengthen the Rural Utility Business Advisor program in the Alaska Department of Community and Economic Development by increasing staff and resources.
40. Granting agencies should make grants with conditions of and consultation with the grantee on performance improvement standards, evaluation and examination of results. Future capital investment should be curtailed if the utility does not meet the performance improvement standards.
41. Organizations that provide training to utility managers, such as the U.S. Small Business Administration, the UAA Small Business Development Center, and the UAF College of Rural Alaska should reach out to train the next generation of utility managers on how to measure sustainability.
42. The Denali Commission should establish a forum for coordination among agencies on capital development and sustainable operations at the community level, consistent with the legislation creating the Commission.

STEERING COMMITTEE RECOMMENDATIONS – BY IMPLEMENTING AGENCY

<p style="text-align: center;">Denali Commission</p>	<ul style="list-style-type: none"> • The Denali Commission should establish a forum for coordination among agencies on capital development and sustainable operations at the community level, consistent with the legislation creating the Commission. • The Denali Commission should conduct a financial analysis of selected successful and unsuccessful village utility systems. The Denali Commission should publicize success stories and best practices, as well as information on pitfalls that can be avoided. • The Denali Commission and granting agencies should be asked to look at life-cycle costs of village utilities and to identify gaps. The Denali Commission should establish the factors used in life-cycle cost analysis, including discount rates, inflation assumptions and other criteria. The Alaska Energy Authority should establish and annually revise the rates used for these factors. • The Denali Commission should analyze current techniques for accountability and incentive structures, and gather reports from agencies by January 2002. • The Alaska Energy Authority and the Denali Commission should solicit regional organizations to establish a demonstration regional sewer and water cooperative. • The Denali Commission and the U.S. Department of Housing and Urban Development should host a forum on community comprehensive planning.
<p style="text-align: center;">All federal and state agencies generally</p>	<ul style="list-style-type: none"> • The rural utility agencies should standardize measures of utility sustainability. The purpose is to measure and assess gaps, not to erect a barrier to entry or funding. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them.

Granting Agencies generally

- Granting agencies should eliminate unnecessary duplication of state-subsidized utilities
- Granting agencies should understand that planning is an evolutionary process, and that planning for projects cannot be mandated without funding to accomplish the required planning.

Funding for Planning:

- Granting agencies should provide funding for business planning and comprehensive community planning for sustainability from a variety of funding sources. Granting agencies should incorporate the RUBA business approach into utility planning projects
- Granting agencies should allow use of construction funds for planning and pre-construction feasibility specifications, including engineering, economic and management issues.

Proposal Review:

- Granting agencies should review all projects in light of the Regulatory Commission of Alaska's revised "fit, willing and able" criteria.
- Granting agencies should require an assessment of a utility and village against the benchmarks prior to funding a new project.
- Before funding a project, granting agencies should require a business plan that shows all community financial resources and total costs of the project, including an analysis of the impact of the project on owner finances. The plan must be understood and adopted by the community.

Grant Conditions:

- Granting agencies should require changes to utility practice or procedures when providing emergency assistance. The Legislature should not bail out failing utilities that do not change practices or procedures, and should consolidate such utilities under a back-up operator.
- Granting agencies should make grants with conditions of and consultation with the grantee on performance improvement standards, evaluation and examination of results. Future capital investment should be curtailed if the utility does not meet the performance improvement standards.
- Granting agencies should require grantees to use the standard financial reporting system.
- Granting agencies should give incentives for consolidation of utility systems.

	<p>Grant Evaluation:</p> <ul style="list-style-type: none"> • Granting agencies should contract for independent third-party evaluation of services that villages receive.
<p>USDA Rural Development</p>	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them. • USDA Rural Development should develop a plan for property insurance on facilities, through purchased insurance, a self-insurance program, insurance pool or other program. • USDA Rural Development should make funding available for project feasibility planning. • USDA Rural Development should report to the Alaska 20/20 Conference on sustainable utilities issues. • The Village Safe Water program should seek authority to spend USDA Rural Development funding for planning.
<p>HUD</p>	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority, and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them.

	<ul style="list-style-type: none"> • The Denali Commission and the U.S. Department of Housing and Urban Development should host a forum on community comprehensive planning.
EPA	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority, and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their data tools, and commit to use them. • The Environmental Protection Agency should expand the planning capability within its funding programs.
SBA	<ul style="list-style-type: none"> • Organizations that provide training to utility managers, such as the U.S. Small Business Administration, the UAA Small Business Development Center, and the UAF College of Rural Alaska should reach out to train the next generation of utility managers on how to measure sustainability.
ANTHC and Yukon-Kuskokwim Health Corp.	<ul style="list-style-type: none"> • The Alaska Native Tribal Health Consortium is developing a statewide utility association concept to promote economy of scale in procurement and administrative support activities. In conjunction with this activity, the Yukon-Kuskokwim Health Corporation is developing a business plan to establish a prototype sewer and water regional utility cooperative, recognizing there will be need for a subsidy during the ramp-up period.
State of Alaska Governor	<ul style="list-style-type: none"> • The Governor and the Legislature should recommend approval of amendments that would allow a portion of capital funding to be used for an operating and maintenance endowment if the life-cycle cost of meeting the village needs improves and if the change would increase the sustainability of a project. The amendments could allow pooling of the operating and maintenance endowment for a broader group of project support. • The Governor and Legislature should strengthen the Rural Utility Business Advisor program in the Alaska Department of Community and Economic Development by increasing staff and resources.

	<ul style="list-style-type: none"> • The Governor and the Legislature should recommend Congressional funding for a regional demonstration project to determine the true cost of a regional cooperative.
<p>State of Alaska Legislature</p>	<ul style="list-style-type: none"> • The Governor and Legislature should recommend approval of amendments that would allow a portion of capital funding to be used for an operating and maintenance endowment if the life-cycle cost of meeting the village needs improves and if the change would increase sustainability of the project. The amendments could allow pooling of the operating and maintenance endowment for a broader group of project support. • The Legislature should amend statutes governing the Regulatory Commission of Alaska to create incentives for utilities to opt into regulation, and to disallow subsidies without regulation. • Granting agencies should require changes to utility practice or procedures when providing emergency assistance. The Legislature should not bail out failing utilities that do not change practices or procedures, and should consolidate such utilities under a back-up operator. • The Governor and Legislature should strengthen the Rural Utility Business Advisor program in the Alaska Department of Community and Economic Development by increasing staff and resources. • The Governor and the Legislature should recommend Congressional funding for a regional demonstration project to determine the true cost of a regional cooperative.
<p>Alaska Energy Authority</p>	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority, and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them.

	<ul style="list-style-type: none"> • The Alaska Energy Authority should convene a group to look at alternative approaches to ensure long-term sources of funding for operations and maintenance. • The Alaska Energy Authority and the Denali Commission should solicit regional organizations to establish a demonstration sewer and water regional utility cooperative. • The Denali Commission and granting agencies should be asked to look at life-cycle costs of village utilities and to identify gaps. The Denali Commission should establish the factors used in life-cycle cost analysis, including discount rates, inflation assumptions and other criteria. The Alaska Energy Authority should establish and annually revise the rates used for these factors.
<p>AK Science & Technology Foundation</p>	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority, and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them. • The Alaska Science and Technology Foundation should provide support for a component of community comprehensive planning that measures market sustainability. • The Alaska Science and Technology Foundation should develop a template for complete master plans for water and sewer projects, and a specific timeline and specification for how project engineers and funding agencies can work with villages to optimize their understanding, buy-in, and ownership of village utility projects. • The Alaska Science and Technology Foundation should work with other funding agencies and rural representatives to develop a simple model and spreadsheet for determining and predicting existing and future revenue – both government and market (non-government) based – that will support all local utilities and increase their overall sustainability.

<p>Regulatory Commission of Alaska</p>	<ul style="list-style-type: none"> • The Legislature should amend statutes governing the Regulatory Commission of Alaska to create incentives for utilities to opt into regulation, and to disallow subsidies without regulation. • The Regulatory Commission of Alaska should draft the financial measures of sustainability at the utility level and at the community level. • The Regulatory Commission of Alaska should establish a simplified form for uniform accounting to gather consistent data from utilities. • The Regulatory Commission of Alaska should review the “fit, willing and able” criteria for village utility projects. The agency should also identify community utilities that do not currently meet these criteria.
<p>State of Alaska DCED</p>	<ul style="list-style-type: none"> • The joint committee formed by the U.S. Department of Housing and Urban Development, the U.S. Environmental Protection Agency, USDA Rural Development, the Alaska Science and Technology Foundation, the Alaska Energy Authority, and the Alaska Department of Community and Economic Development, should inventory existing agency planning requirements, sources of funding, define issues, and work to establish common standards for community comprehensive planning and specific project planning, including community buy-in to the business plan. • The joint committee should undertake a pilot project to make information about community utility systems available online. All agencies involved in village utility systems should share their database tools, and commit to use them. • The Department of Community and Economic Development should provide a self-assessment tool and funding for villages to begin community comprehensive planning. • The Governor and Legislature should strengthen the Rural Utility Business Advisor program in the Alaska Department of Community and Economic Development by increasing staff and resources. • The Rural Utility Business Advisor program should draft the management measures of sustainability at the project/utility level and at the community level.
<p>State of Alaska DEC</p>	<ul style="list-style-type: none"> • The Village Safe Water program should seek authority to spend USDA Rural Development funds for planning.
<p>University of Alaska</p>	<ul style="list-style-type: none"> • Organizations that provide training to utility managers, such as the U.S. Small Business Administration, the UAA Small Business Development Center, and the UAF College of Rural Alaska should reach out to train the next generation of utility managers on how to measure sustainability.

**AMENDMENT NO. 1
TO THE
JOINT PROJECT AGREEMENT
BETWEEN THE
ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY
THE
RURAL DEVELOPMENT
AND THE
DENALI COMMISSION**

**FOR A TWO-PHASED STUDY -
STATEWIDE ENERGY PLAN &
EFFICIENT UTILITY OPERATION AND MAINTENANCE
PROJECT No. 0010-DC-2000-11**

DATE OF AMENDMENT:
March 2000

On December 11, 1999 the Alaska Industrial Development and Export Authority (a public corporation of the State of Alaska) hereinafter referred to as AIDEA, the Rural Development (an Agency of the U.S. Department of Agriculture) hereinafter referred to as RD and the Denali Commission, hereinafter referred to as the Commission, executed a Joint Project Agreement (Agreement) for the provision of a two-phased statewide energy plan.

Phase 1 of the energy plan was funded by the Commission and is now complete. Of the \$100,000 in Commission funds set aside for Phase 1 only \$76,549.92 was needed. The balance of \$23,450.08 will be applied to Phase 2.

In order to complete Phase 2 of this project, the following changes are necessary.

1. The parties will undertake an effort to quantify the need for further funding for rural energy projects (bulk fuel, rural power upgrades and alternative energy). This is in addition to the previously agreed to two-phase statewide energy plan. Elements of this capital projects selection process and list include the following.
 - a. Diesel power plants and distribution systems - expand the existing Alaska Energy Authority (AEA) database to include all PCE-eligible communities.
 - b. Bulk fuel storage - projects identified from the existing AEA deficiency needs database.

- c. Alternative energy (i.e. not based on traditional oil-fired systems) - AIDEA will prepare an initial list of alternative energy projects recommended for funding. AIDEA will select these projects from existing concepts and proposals based on considerations of technical and economic feasibility. The Phase 2(b) contractor referenced below will conduct an expanded review of alternative energy potential in rural Alaska and will develop a revised list of recommended projects based on this expanded review along with a methodology for future project selection. Considerations of technical and economic feasibility will form the basis for the contractor's recommendations as well.
2. RD will direct and manage the Phase 2a operations, maintenance, and management study. The Commission and AIDEA will participate in the completion of this study. It is the expectation of the parties that the Phase 2a and Phase 2b contractors will coordinate their efforts, where feasible, especially field work.
3. AIDEA will direct and manage the Phase 2b statewide energy plan for the rural regions including evaluating solutions to major energy problems. The report will include expanded consideration of alternative energy and may include a revised list of recommended alternative energy projects. The Commission and RD will participate in the completion of this study.
4. AIDEA will serve as the contract administrator for the following contracts:
 - a. The University of Alaska - Institute of Social and Economic Research (ISER) for the Phase 2a operations, maintenance, and management study (RD will serve as the project manager) through a State of Alaska Reimbursable Services Agreement (RSA). This RSA will be limited to a maximum of \$25,000 in overhead/administration/indirect costs by ISER. RD will provide funding to AIDEA on a schedule of payments agreeable to RD and AIDEA.
 - b. A competitively selected firm to perform the balance of the Phase 2b rural portion of the statewide energy plan. The contractor must have extensive experience with rural Alaska energy issues. The Commission will provide funding to AIDEA on a schedule of payments agreeable to AIDEA and the Commission. Following state procurement principles, AIDEA will allow RD and the Commission to participate in the selection of the engineering contractor for Phase 2b.
 - c. With AEA assessment contractors for the diesel power plant and distribution systems capital project selection process and list.
5. The parties will determine the process for completion of Phase 2c and 2d of the statewide energy plan at a later date.
6. The parties agree that distribution of any work products identified under this Agreement (including those found in Paragraph No. 8 below), will not be distributed until all the parties have had adequate time for review, and comment and have provided approval for distribution.
7. The estimated cost and timelines to complete Phase 2a and 2b and the capital project selection process and list are shown on the following table.

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Item/Description	Estimated Cost	Contributor	Proposed Start	Proposed Finish
Capital Project Selection Process and List	\$200,000	AIDEA	3/1/2000	8/1/2000
Phase 2a - Operations, Maintenance and Management Study	\$200,000	RD	3/1/2000	3/1/2001
Phase 2b - Rural Portion of the Statewide Energy Plan	\$300,000	Commission	3/1/2000	1/1/2001
Phase 2c - Southeast/4 Dam Pool Portion of the Statewide Energy Plan	To be determined	Unknown	Unknown	Unknown
Phase 2d - Railbelt	To be determined	Unknown	Unknown	Unknown

8. A peer review process of the Phase 2 Energy Plan shall be conducted by a consultant selected and funded by the Denali Commission. An amount not to exceed \$50,000 shall be allocated for peer review efforts on the energy plan. An additional amount not to exceed \$50,000 with the concurrence of RD and AIDEA may be allocated as well for peer review efforts on the energy plan. AIDEA and RD will have an opportunity to review and advise the Denali Commission on all tasks, associated with the energy plan, assigned to the peer review consultant. Apart from the energy plan efforts, the peer review contractor may be requested by the Denali Commission to carry out other Commission related tasks (funded independently from the energy plan).
9. All tasks and products from Paragraph Nos. 7 and 8 are intended to produce an integrated energy planning process and plan.

This document constitutes Amendment No. 1 to the Joint Project Agreement for a two-phased statewide energy plan.

All other sections of the original Agreement remain in effect as agreed upon and executed.

**AMENDMENT NO. 1 - JOINT PROJECT AGREEMENT
TWO-PHASED STUDY - ENERGY AND UTILITIES**

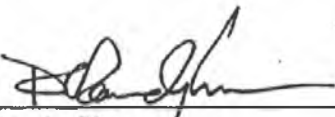
**PAGE 4
MARCH 2000**

10. Signatures:

NOW THEREFORE, in order to provide the two-phased energy plan as set forth in this Agreement, AIDEA, RD and the Commission mutually agree to the terms and conditions contained herein:

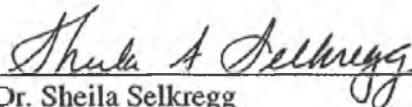
IN THE WITNESS WHEREOF, the parties have subscribed their names,

3-22-00
Date



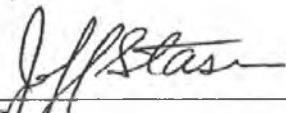
D. Randy Simmons
Director, Alaska Industrial Development and Export Authority

3-16-00
Date



Dr. Sheila Selkregg
Director, Rural Development
Alaska Office

3-16-00
Date



Jeff Staser
Federal Co-Chair, Denali Commission

Attachment E

Legislative Audit #18-30042-08, "Department of Environmental Conservation, Division of Water, Village Safe Water Program," December 5, 2007

ALASKA STATE LEGISLATURE

LEGISLATIVE BUDGET AND AUDIT COMMITTEE

Division of Legislative Audit



P.O. Box 113300
Juneau, AK 99811-3300
(907) 465-3830
FAX (907) 465-2347
legaudit@legis.state.ak.us

December 5, 2007

Members of the Legislative Budget
and Audit Committee:

In accordance with the provisions of Title 24 of the Alaska Statutes, the attached report is submitted for your review.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF WATER VILLAGE SAFE WATER PROGRAM

December 5, 2007

18-30042-08

We reviewed the Department of Environmental Conservation in the construction of water and sewer systems through the Village Safe Water program. The primary emphasis of our review was to assess the procedures followed by program managers in evaluating and ranking applications for construction grant funding. A second objective involved assessing the current status of findings and recommendations made in a prior audit of the program completed in November 2003 (audit control no. 18-30028-04).

The audit was conducted in accordance with generally accepted government audit standards. Fieldwork procedures utilized in the course of developing the findings and discussion presented in this report are discussed in the Objectives, Scope, and Methodology section.

A handwritten signature in black ink, appearing to read "Pat Davidson".

Pat Davidson, CPA
Legislative Auditor

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OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Title 24 of the Alaska Statutes and a special request by the Legislative Budget and Audit Committee, we conducted an audit of the Village Safe Water Program (VSW) administered by the Department of Environmental Conservation (DEC).

The objectives of the report fall into two categories. The first category involves how the VSW program distributes grant funding to various communities served by the program. Objectives include:

1. Assessing the reasonableness of the criteria used to identify and scale sanitation projects for various communities;
2. Reviewing how funding priorities are established for construction grant funding; and,
3. Assessing how well the program has done in communicating ranking and assessment criteria to communities seeking grant funding.

The second category of objectives involves reviewing and assessing the changes made by DEC in how the VSW program is administered. Changes have been made primarily in response to a November 2003 Legislative Audit report and concerns by federal funding agencies. Objectives include:

1. Assessing the effectiveness of newly established controls over project construction costs; and,
2. The impact over how administrative costs being charged to outstanding projects will have on the final cost and design.

Scope and Methodology

While VSW staff is ultimately responsible for the oversight of sanitary project appropriations, the day-to-day active oversight of many projects is carried out by the Alaska Native Tribal Health Consortium (ANTHC). The role and background of this organization is discussed further in the Organization and Function section.

When we assessed various controls related to construction oversight of VSW projects, we focused primarily on controls in place at DEC. For some controls, our analysis and evaluation included projects supervised by ANTHC. In other instances, our evaluation was limited to improvements made to systems related only to the projects supervised directly by VSW engineers.

In order to meet the various objectives of the audit, our fieldwork included:

- Analysis of departmental and division policies and procedures related to procurement of goods and services. This was done to evaluate if procurement deficiencies discussed in our prior audit report had been addressed through the adoption and implementation of improved procedures.
- Review of statutes related to the purpose of the program and the eligibility requirements. Since eligibility standards for VSW grants originate in state law, it was necessary to review and understand the program's statutes. This permitted us to evaluate if the criteria used by VSW managers was consistent with the precepts set out in statute.
- Review of the Memorandum of Understanding (MOU) between DEC and the two major federal funding agencies involved, the U.S. Department of Agriculture, and the Environmental Protection Agency. This document sets out measures of program performance, how funding is to be allocated, and what costs are allowable under the terms of the federal programs. This review provided a better understanding of basic program controls required by the federal agencies involved and allowed for consideration of these requirements when evaluating the basis and support for program expenditures.
- Interviews with personnel from the Division of Water; Division of Information and Administrative Services; Department of Community and Economic Development, Division of Community and Regional Affairs; Environmental Protection Agency; and U.S. Department of Agriculture-Rural Development. The interviews provided additional perspective on various aspects of how the VSW program is administered. Additionally, we better understood how the rural utility business assistance program functions and how various aspects of that program affects VSW decision making.
- Review of the MOU between DEC and ANTHC related to supervision of various VSW sanitation projects. We did this to better understand the role ANTHC plays in supervising more than 50 active projects in Alaska.
- Analysis of application files for both planning and construction grants. For the applications received for funding in FY 06 and FY 07, we selected a sample and compared the documentation submitted to the ranking criteria used to establish funding priorities and budget requests. Applications for projects that eventually were supervised either directly by VSW or indirectly through ANTHC were both included. This review allowed us to confirm that VSW program managers were consistently applying the ranking criteria established for assigning priority for inclusion in the department's budget request.
- Evaluation of documents used to support expenditures charged to various construction projects. For a sample of transactions charged to projects in either FY 06 or FY 07, we evaluated the underlying documentation to determine if expenditures were reasonable and allowable under federal funding guidelines. This review also allowed us to assess the

improvements made in how invoiced expenditures were reviewed and approved since DEC assumed responsibility for processing invoices. Expenditures related to projects supervised by ANTHC were included.

- Examination of personnel and payroll records for six projects active during the 2007 construction season. We evaluated these records to determine if payroll charges were reasonable and appropriately supported. Examination of the personnel and hiring records confirmed sufficient employment information had been obtained and kept on file. Another objective of this evaluation was to assess if the controls over payroll processing and labor costs charged to projects had improved since our prior audit in November 2003. We did not review personnel or payroll recordkeeping related to projects supervised by ANTHC.
- Examination of evidence to confirm the appropriateness of procurement procedures followed by construction management firms and project superintendents when obtaining project goods and services. We selected a sample of 25 procurements related to expenditure transactions charged to projects during FY 06 or FY 07. We also reviewed four procurement processes for professional services conducted by VSW in either FY 06 or FY 07. This review assessed the consistency to which preferred, competitive procurement practices were followed by both VSW and agency contractors. Procurement activity carried out by ANTHC for projects supervised by that organization was not reviewed.
- Conducting a survey of communities who submitted construction grant application(s) since FY 04 and consultant engineering firms who assisted communities in the completion of the applications. The survey results provided perspective on how well communities seeking grant funding for VSW projects understood the criteria used to evaluate and rank projects for funding. Communities that received appropriations, whether or not the community's project was supervised directly by VSW or through ANTHC, were included in the survey.

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ORGANIZATION AND FUNCTION

In 1970, the Village Safe Water Act established under Alaska Statute (AS) 46.07 created the Village Safe Water (VSW) program. The Act established "*a program designed to provide safe water and hygienic sewage disposal facilities in villages in the state.*" An eligible village is defined as "*an unincorporated community that has between 25 and 600 people residing within a two-mile radius, a second class city, or a first class city with no more than 600 residents.*"¹

The VSW program was originally administered by the State Department of Health and Welfare but was later transferred to the Department of Environmental Conservation (DEC). The program is currently administered under a separate section within the DEC's Division of Water.

VSW's field engineers, financial support staff, procurement specialist, and grants administrator are stationed in DEC's Anchorage office. The field engineering staff consists of eight engineers, two engineering associates, and one college intern. The VSW program manager, who is assisted by a lead engineer, also works out of DEC's Anchorage office. The oversight of the VSW program is the responsibility of the facilities program manager, located in Anchorage, with the assistance of a planner from DEC's Juneau office.

The majority of VSW's funding is through federal grants from the U.S. Environmental Protection Agency, U.S. Department of Agriculture, Alaska Native Tribal Health Consortium, and Denali Commission. Alaska legislative appropriations for capital budgets provide the remaining funding.

For most VSW construction projects, the workforce is drawn from residents of the community where the sanitation system is being built. This is termed a force account arrangement in the public construction field. A majority of the oversight of the projects is performed by construction management firms and only a couple of projects utilize a superintendent.

Once the legislature has appropriated funds for a specific project, those funds technically belong to the receiving community. However, DEC holds the grant funds "in trust" for each project community.

Alaska Native Tribal Health Consortium

A large segment of the VSW program is carried out through the auspices of the Alaska Native Tribal Health Consortium (ANTHC). The organization was formed in December 1997 to manage statewide health services for Alaska Natives. Alaska Natives, through their tribal governments and regional nonprofit organizations, own the Consortium. ANTHC is one of

¹ AS 46.07.080(2).

22 co-signers of the Alaska Tribal Health Compact, a self-governance agreement with the federal Indian Health Service.

ANTHC employs approximately 1,800 people and had an operating budget of \$322 million in FY 06. ANTHC offers statewide services in specialty medical care, water and sanitation, community health and research, information technology, and professional recruiting.

The Division of Environmental Health and Engineering, ANTHC's second-largest division, provides project management, engineering, construction, and operations support of public health infrastructure in Native communities throughout Alaska.

BACKGROUND INFORMATION

The Village Safe Water (VSW) enabling statute (AS 46.07) authorizes construction of water and sewer systems in the State's villages. The statute defines a village as "an *unincorporated community that has between 25 and 600 people residing within a two-mile radius, a second class city, or a first class city with not more than 600 residents.*"²

Though the Department of Environmental Conservation (DEC) has traditionally focused on sanitation projects in rural Alaskan communities off of the road system, the statute is silent as to any priority among eligible villages or communities. The primary vehicle for implementing the VSW program has been through use of grants to build appropriate, operationally sustainable, water and sewer projects. Grants have been funded by a combination of state and federal funds.

VSW operating procedures have often been driven by policy to promote sense of ownership

Historically, two central principles have had an ongoing impact on how the VSW program has been administered. The first principle involves the role which inadequate water and waste disposal systems, collectively referred to as sanitation systems, have on the public health of many of Alaska's remote, rural communities. These concerns have contributed to both federal and state governments making a substantial funding commitment to the VSW program.

The second principle involves building sanitation systems in such way as to promote a sense of ownership on the part of the communities. This central principle is repeatedly reflected in how VSW management has chosen to administer the program. In particular, this sense of ownership principle has an impact on:

1. How projects are prioritized and selected for funding;
2. What type of project is selected as appropriate for a given community. There is concern to match the cost and scale of the project to a community's capacity to fund and operationally maintain a selected project;
3. How appropriated funds are released for beginning construction;
4. How the funds are accounted for during the construction process; and,
5. How construction projects are managed on a day-to-day basis.

² AS 46.07.080(2).

As the VSW program matured, and increased funding became available from the federal government, many of the administrative choices made based on this core principle have been restructured. This has been done in order to strengthen fiscal oversight over grant funds, while limiting the impact they might have on the ownership principle.

The VSW program makes two types of grants – planning, and design and construction

The VSW program has two categories of grants. Eligible communities wanting to build a sanitation system can apply for a planning grant. Such funding is used to conduct a needs assessment and allow the communities to explore the possible options available to address those needs. Compared to grants for design and construction, these grants are relatively modest, ranging from \$25,000 to \$250,000 in recent years.

The second type of grant involves the funding for design and construction of a sanitation system best suited to meet the sanitation needs of the community. This phase involves the largest funding commitment. The average appropriation in FY 07 for VSW sanitation projects was over \$2.9 million.

Communities seeking first time funding for new systems given priority for planning grants

The criteria used to evaluate and rank applications for planning grants has remained relatively constant from year to year. As set out in Exhibit 1, on the following page, the evaluation criteria used in FY 07 compared to that applied in FY 05 was rescaled, while much of the emphasis remained the same. In both years, points were structured in such a way to give priority to:

1. Communities seeking first time planning funds,
2. New water and sewer systems, rather than upgrading existing facilities; and,
3. Communities who had not received previous federal or state funding for planning.

Key part of planning phase is to match local community capacity and project scope

Communities request funding from VSW in order to document their sanitation needs by completing a feasibility study/master plan. VSW assists the community with procuring and contracting a consulting firm to perform the project planning. During the planning effort, significant communication occurs between VSW, the consultant, and the community in identifying, evaluating, and selecting water and sewer improvement alternatives for the community.

Exhibit 1					
Two Examples of Planning Grant Application Scoring Criteria Used in Recent Years					
		FY 05 Criteria		FY 07 Criteria	
		Points	Pct.	Points	Pct.
Type of Study		100	15.4%	<i>This FY 05 factor was folded in the Planning Project Need factor below beginning in FY 06.</i>	
Feasibility study or facility plan	100				
Sanitation utility comprehensive study	50				
Planning Project Need				100	20%
Original Sanitation Facilities Plan	100				
Study for an "essential" improvement	75				
Rehabilitation Plan for aging system	50				
Update an obsolete plan	0				
Type of System		100	15.4%	100	20%
Water and/or Sewer Facility	100				
Other Sanitation Facility (FY 05 only)	25				
Solid Waste (FY 07 only)	0				
Purpose of Plan or Study		100	15.4%	<i>This concept of this factor was blended in the Community Development Status criterion beginning in FY 06.</i>	
New System	100				
New level of sanitation service	75				
Upgrade or replace existing system	50				
Community Development Status		100	15.4%	100	20%
25% or less in community presently served	100				
25-50% in community presently served	75				
50-75% in community presently served	50				
More than 75% in community served	25				
25-75% have existing service (FY 07)	75				
More than 75% existing service (FY 07)	50				
Past Federal or State Funding		100	15.4%	100	20%
No planning funding within last 7 years	100				
No planning funding within last 5 years	50				
Funding Received within last 5 years	0				
No planning funding within last 5 years (FY 07)	100				
Previous Planning Documentation		100	15.4%	<i>This factor was incorporated into the overall Past Federal or State Funding above beginning in FY 06</i>	
Never completed a study or plan	100				
No study/ plan of similar scope previously done	50				
Study or plan will update existing study/plan	25				
City Council Resolution		50	7.6%	<i>Factor made part of application quality factor in subsequent years</i>	
Application Quality		<i>Not a specific factor prior to FY 06</i>		100	20%
Total Maximum Points		650	100%	500	100%

Whether the community received planning funds from VSW or another source, the scope of any subsequent funding requests for design and construction must be included in an approved Sanitation Facilities Master Plan.³

For villages seeking first time construction funding, a significant part of the planning process is determining the financial capacity of the community to develop sufficient revenues to cover operation costs for the system selected. An important use of planning funding is to develop a cost estimate for the project selected. Typically, this process requires the community to work with its planning consultant and VSW to choose from four options. Stated in order of construction/operating cost, these options are:

1. Washeteria Model – a single, centralized building in the community, which houses showers, laundry facilities, and toilet facilities, is constructed;
2. Flush and Haul – a system involving a combination of water storage and sewage collection tanks at each residence combined with tank vehicles, either trailer or truck, for transport to/from a watering point or to a sewage disposal lagoon.
3. Septic Tanks and Wells – a system where stand-alone wells and septic tanks are put in place for a residence or group of residences.
4. Piped System – the standard water/sewer setup in the State's more developed urban areas where water is piped into the residence and sewage is piped out for central treatment.

As part of the village's master planning process, current conditions are assessed, alternatives are evaluated, and costs are identified. In addition to capital costs, a business plan is developed which details the projected operating revenues and expenses. The VSW project engineer and VSW planner work with the consultant and community during the development of the plan, and may recommend changes necessary for plan approval.

The planner compares the capital and operating costs of the selected system or phased improvements with historical data of similar type and location. The capital cost of \$200,000 per household and a user fee based on 5 percent of median household income are rules of thumb presently used for evaluating affordability and sustainability in determining approval.

To prioritized funding, grant applications are scored using criteria that reflect policy goals

Seventy-five percent of the funding provided for VSW construction grants comes from federal agencies, primarily the Environmental Protection Agency or the U.S. Department of Agriculture.

³ Starting in FY 07, a current and approved plan or study is needed if the amount of the request and all remaining needs was for \$3 million or more. In FY 08, the dollar threshold was reduced to \$2 million. Typically, communities requesting funds less than \$2 million are not for new systems, but components of a system already built. An example would be system upgrades made necessary due to regulatory changes.

Accordingly, VSW sets its overall budget request based on the amount of federal funding available. In recent years, the legislature has provided the 25 percent required matching appropriation from the State's general fund.

The projects included in the annual capital appropriation have been those included in DEC's proposed capital budget.

Demand for funding exceeds available funds, as illustrated in Exhibit 6 on page 28. Accordingly, VSW managers have developed criteria used to evaluate and rank applications for funding. Different sets of criteria are used for planning grants as compared to design and construction grant applications. DEC scoring criteria serve to reflect operational priorities and are designed to provide incentives for communities to conform to established policy.

The selection of factors and how they are weighted is developed through internal policy discussions. VSW consults with federal funding partner agencies in setting the criteria for evaluating applications. Many of the factors reflect the legislative intent that accompanied the FY 06 capital appropriation, as illustrated in Exhibit 2.

Public health factors and local capacity are key factors in evaluating grant applications

In past years, the two primary criteria used to evaluate applications reflected the two central principles that have historically guided VSW operations: addressing public health concerns, and fostering a sense of ownership.

Public health has been the central public policy concern behind the widespread support of the VSW program. In past years, proposed projects that address identified major threats to public health scored higher in the funding application process. In FY 06, this public health emphasis was slightly redirected in the ranking criteria. Rather than tying scoring to specific, documented health events, the department placed emphasis on projects having an overall positive health impact.

This shift in how public health factors were integrated into the application review process reflected studies that concluded a community's general, day-to-day health was consistently

Exhibit 2

Legislative Intent Reflects Central Tenets of the VSW Program

In a statement of legislative intent included with the FY 06 capital budget appropriation, the legislature ratified many of the policies that have historically guided VSW operations. Excerpts from the intent are as follows:

It is the intent of the Legislature that the Department of Environmental Conservation (DEC) will establish guidelines for deciding whether proposed project costs are reasonable and whether proposed projects are sustainable; ensure that projects are limited to systems that are reasonable and sustainable; and exercise final decision authority as to project costs and the types and extent of projects to be constructed.

It is the intent of the Legislature that DEC will encourage development of local ordinances that enhance the establishment and collection of user fees which are adequate to pay for the sustained operation of facilities constructed by the program.

better with reliable access to potable water. Accordingly, the emphasis on public health was reflected in the increased weighting assigned to first time service to homes.

As shown in Exhibit 3, on the following page, this criterion became 35 percent of the scoring. Under this rating system, applications involving first time service to homes were accorded higher priority than applications related to upgrading existing service or addressing regulatory compliance exceptions. Criteria that reflect a community's willingness and capability to operate and maintain a facility has remained critical to how a project is prioritized. Referred to as local capacity, evaluative criteria involves such things as the community being able to demonstrate it has the technical and administrative expertise in place to maintain the sanitation project after construction is complete.

For example, a community's application is scored higher if it can demonstrate it has residents that have received training sufficient to keep the system operating. Likewise, a community's application will score higher with demonstrated administrative expertise such as having a trained utility manager and being able to show it has or can develop a business model capable of collecting adequate revenues to maintain and operate the sanitation system. As shown in Exhibit 3, this factor remains at least 40 percent of an application's score, the largest single category for accumulating ranking points.

Construction logistics also play a factor in the score assigned to a project. If the project can be coordinated with other construction that might be going on in the community or if the project provides for consolidation of the sanitation system with other existing systems in the community, the project can receive up to 17.5 percent of the maximum total of available evaluation points.

Rural Utility Business Advisor (RUBA) assessment plays a critical role for communities

The RUBA program is administered by the Department of Commerce, Community, and Economic Development (DCCED). The program assists communities in developing the business skills necessary to run a successful, smaller scale local utility. The program provides training and technical assistance necessary to carry out such fundamentals as, setting rates for services, collecting billings, and making the necessary payroll tax payments. The program gives priority to communities currently having a sanitation system built or is in line to receive funding for new or expanded sanitation system.

Exhibit 3					
Two Examples of Construction Grant Application Scoring Criteria Used in Recent Years					
		FY 05 Criteria		FY 07 Criteria	
		Points	Pct.	Points	Pct.
Public Health up to a maximum of		300	14.1%	<i>Public health criteria was shifted from being related to specific disease or pollution event into overall health benefits provided by 1st time service to homes below...</i>	
Documented disease event	300				
Potential for disease event	200				
Potential for pollution event	100				
First time service to homes (overall health impact)		200	9.4%	350	35.0%
Project necessary is a subsequent phase to complete already started project	100				
Local capacity factors Points given for certified trained workers, capacity to handle administrative tasks necessary to generate funding to cover operational costs.		900	42.4%	400	40.0%
Project part of state master plan		50	2.4%	<i>Beginning in FY 06, this factor was made a mandatory requirement rather than just ranking item.</i>	
Other project funding is available for use		175	8.2%	<i>Phased out as a factor</i>	
Project can be coordinated with other construction		100	4.7%	75	7.5%
Project will consolidate system with other community systems such as school		200	9.4%	100	10.0%
Economic Feasibility factors		200	9.4%	<i>Phased out as factor, although some precepts incorporated into application quality criterion</i>	
Application Quality		<i>Not a specific factor prior to FY 06</i>		75	7.5%
Total Maximum Points		2,125	100%	1,000	100%

A key part of RUBA's assistance involves what is termed as an assessment. An assessment involves a documented and structured evaluation of the various operational indicators related to the business of operating a utility. RUBA's management assessment process identifies what the agency terms essential and sustainable capacity indicators to help identify the technical, managerial, and financial capacity of rural utilities. Essential indicators are defined as those items that are critical for continued operation of the utility. If not accomplished, RUBA projects the utility would fail within three years. Sustainable indicators include factors that are critical to the long-term survival of the local utility.

Under VSW's construction funding eligibility requirements, if a community has had an assessment performed, they must satisfactorily meet all essential indicators before being even submitting an application. If a community has never had a RUBA assessment performed, it is allowed to follow through with its application, but will have to successfully pass a RUBA assessment before any appropriated construction-related funding is released. Seven

construction projects, with a total of \$13.3 million in appropriations made between FY 01 and FY 03, have not yet been started because communities involved cannot meet RUBA assessment requirements.

In recent years, DEC has made three key changes in how it supervises construction projects

Alaska Statute 46.07.040 authorizes DEC "to provide for the construction by contract or through grants to public agencies or private nonprofit organizations, or otherwise." The statute further provides that "*workers from the village in which the facility is being constructed shall be utilized to the maximum extent feasible [emphasis added].*"

In 2003, VSW management was supervising construction for most of the sanitation projects under their oversight, using what is termed as the superintendent model. Under this approach, the community receiving the project was primarily responsible for contracting the day-to-day project construction oversight. VSW engineers played a limited role in how superintendents were selected, compensated, and in determining the contractual scope of their duties.

A major reason such an approach was used was to promote the sense of community ownership. Additionally, use of superintendents hired by the village was often seen as a way to maximize the use of "*workers from the village*" as required by state law. However, this approach contributed to weak oversight of projects by VSW engineers. Many of the deficiencies discussed in our agency's prior audit report⁴ stemmed from the control weaknesses inherent in the superintendent model as it had evolved in recent years.

DEC management made three major operational changes to improve controls over construction project administration. The changes involved:

1. Shifting away from the superintendent model to the construction management model.
The village driven superintendent model has been increasingly deemphasized and has been replaced with a more state-agency directed construction management firm model. Rather than allowing or encouraging local communities to select the superintendent to supervise construction, VSW engineers now play a larger role in the selection of construction management (CM) firms.

These CM firms, typically professional engineering firms, have often been involved with the local community during the planning phase of a sanitation project. During the 2006 construction season, there were seventeen independent superintendents working on projects involving VSW engineer oversight. For the 2007 construction season there were only two. VSW managers expect there will be no superintendent model projects for construction they oversee during the next construction season.
2. Development of a more comprehensive standard services contract. In conjunction with changing the model used to supervise project construction, VSW developed a better, more standardized professional services contract for use when dealing with CM firms.

⁴ Division of Legislative Audit report #18-30028-04 dated November 19, 2003.

VSW management cites the development of standard contract terms, detailed, consistent labor rates, and established billing provisions, all as benefits of the new and improved contract.

3. Invoice processing was brought within DEC. A third improvement in controls involved using departmental personnel to supervise and carry out the day-to-day accounting for various projects. This change placed invoice processing in the hands of administrative staff more familiar with cost restrictions attached to federal funding. While the primary oversight responsibility for approving the costs charged to various projects rest with the VSW engineer, state administrative staff better acquainted with federal funding rules provide improved fiscal support. This change helps avoid questioned costs, a significant concern for a program receiving 75 percent federal funding.

To a degree, these changes represent a subtle shift away from the fostering ownership principle. However, the changes were not substantially counterproductive to this core VSW operating principle.

The way administrative costs are budgeted and accounted for has changed in recent years

The budgeting and charging of administrative costs involved with administering VSW construction projects has changed in recent years. Prior to FY 06, DEC received a separate capital appropriation each year to fund the estimated costs of administering all the capital projects appropriated during the same budget year. DEC staff report the budget estimate was based on anticipated costs involved in administering the projects for one year. Since the funding provided was in a capital appropriation, if there was a balance in the administration cost appropriation, it could be carried over from one budget year to the next.

However, there still remains some construction activity related to project appropriations made in the prior years. Accordingly, DEC management has opted to place a retroactive 10 percent administrative allocation against projects appropriated prior to FY 06.

Beginning in FY 06, estimated administrative costs were included in each separate project's funding request, rather than being isolated in a single administrative budget component. This change in how administrative costs were budgeted and accounted for was done primarily at the request of federal funding agencies, who believed such an approach enhanced fiscal accountability over project costs.

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REPORT CONCLUSIONS

We reviewed various issues regarding administration of the Village Safe Water (VSW) program by the Department of Environmental Conservation (DEC). We were directed to assess specific issues related to the effectiveness of: construction administration and financial management controls and the process used to prioritize proposed sanitation systems for construction. We also evaluated the appropriateness of recent changes made in the scoring criteria used to evaluate construction grant applications and how effectively changes in the criteria were communicated to applicant communities.

From our review and analysis, we concluded the following:

- Systems selected in conjunction with communities are consistent with both DEC criteria and the legislative intent attached to the FY 06 capital appropriations for VSW projects.
- Construction and financial controls have improved in recent years, but minor exceptions persist.
- Ranking of applications for construction grant funding is consistent with established criteria. However, documentation in the historical application files is incomplete, making it difficult to confirm an application's ultimate score and rank.
- VSW program managers did a good job of communicating the changes made to construction grant criteria to affected communities.
- Use of the Rural Utility Business Advisor (RUBA) evaluation process has delayed starting projects already appropriated and is preventing some rural communities from submitting grant applications.
- VSW's retroactive assessment of administrative costs on past projects and, more significantly, construction material cost increases has an impact on the scope and nature of already appropriated projects.

Further discussion of these conclusions follows.

Systems chosen in conjunction with communities is consistent with VSW criteria and legislative intent

An important product of the project planning phase, whether funded by a VSW grant or from other sources, is to arrive at a sanitation system appropriate for the community. Factors involved in identifying an appropriate project reflect two major concerns:

1. Technological feasibility given the layout of the community; and,
2. The surrounding geographical area and economic feasibility given the capacity of the community to set up a business structure to charge and collect enough revenue to fund the operations of the selected system.

The trade-off between what is desired and what is affordable is consistent with both stated legislative intent and one of the central operating tenets of the VSW program, building projects scaled in such way so the local community has the capacity to operate the system on a continuing basis. As set out in Exhibit 2, a project is appropriate if the system and costs are consistent with legislative intent that VSW projects be "*reasonable and sustainable*" along with the requirement that adequate user fees be generated to pay for "*the sustained operation of facilities constructed by the program.*"

In our review of projects approved and included in VSW capital budget requests since FY 03, we saw no evidence where the engineers involved scoped projects in a manner inconsistent with cost guidelines. These guidelines were established to best match the cost of a given sanitation project to the operating capacity of the community. The guidelines, recognizing they are considered guidelines and not absolute standards, were consistently applied when evaluating the costs and the most appropriate system for a given community.

Improvement in controls have generally been effective, some minor exceptions persist

Many of the weaknesses identified in the prior audit stemmed from lack of effective oversight of construction management (CM) firms and the widespread use of on-site superintendents with contracts that put them beyond the effective authority and control of VSW engineers. These weaknesses fell into three categories: lack of procurement controls built into construction oversight contracts, deficiencies in invoice review and payment, and inadequate payroll controls.

These deficiencies were addressed in three ways:

1. Utilization of a state procurement specialist. In FY 05, a state position was established to handle various procurement issues rather than leaving such matters to individual VSW engineers.
2. Phasing out the use of working with on-site superintendents. VSW shifted away from relying on a superintendent model approach to supervise day-to-day construction and moved toward a construction management model. This restructuring placed more reliance and responsibility on professional engineering firms.
3. Improved and standardized contract developed to work with CM firms. In addition to shifting to more widespread use of CM firms, DEC management developed standard, more enforceable contracts to be used by VSW engineers.

Despite these improvements, we did identify the following exceptions:

1. Procurement of goods and materials by CM firms was not always done in accordance with contract requirements. Under the new standard VSW contract, CM firms are required to demonstrate they have bought material amounts of goods and services in a manner consistent with VSW procurement policy. We reviewed 25 procurements, all required to be done in accordance with such policy. Adherence to VSW procurement policy could not be determined in three of the procurements due to insufficient documentation. The use of competitive building to purchase items could not be determined.
2. Some personnel files were missing required documentation. Since the prior audit, DEC has issued a new contract to a different accounting firm for the processing of payroll related to various projects being built using the force account approach. In the audit of the payroll charges and related personnel records, isolated documentation errors were identified. More specifically, some required documentation in personnel files maintained by the accounting firm was missing. Payroll expenditures were reasonable and appropriately reviewed and authorized. DEC management was informed of these findings. Accordingly, DEC management intends to specify in a new payroll services contract, that the accounting firm responsible for processing payroll will be also be responsible for working with the communities involved, to be sure personnel files are complete

Projects included in construction grant appropriations consistent with established criteria

Scoring of applications is a collaborative process. In a joint session with representatives from the federal funding agencies, the Department of Commerce, Community, and Economic Development, and the Alaska Native Tribal Health Consortium, VSW management reviews the applications and assigns points based on the established criteria and quality of the application. Communities are then notified of their scores, and if they want to dispute the information in their application they may do so. The scores are adjusted based on any additional information received and the rankings are finalized.

Projects included in the VSW program's capital budget request do reflect the scores assigned during the application evaluation process. Criteria established to reflect various policy objectives of the VSW program were consistently used to identify which applications, and eventually which projects, merited funding. Most grant applicants, those not included in a given year's budget request due to lower scores, continue to work with VSW engineers to improve their scores and increase the probability of receiving funding in future years.

It was difficult to confirm the basis for how some scoring points were assigned. Evaluating and confirming many aspects of a typical application involve consulting data kept on informational databases. These statewide databases are dynamic in nature, constantly changing as they are updated on a regular basis. While information in the database may supply confirmation of an assertion made in an application, a documented record of the information used is not created at the time of access.

As information on the database subsequently changes, it is difficult to confirm what the status of the information was at the time the grant application was scored. With the assistance of VSW management we were able to recreate the information used at the time grant applications were originally evaluated. While documentation of the scoring process should be better maintained, we did confirm that grant applications were consistently funded in accordance with established criteria. Further discussion regarding how to address our concerns about documentation is addressed in Recommendation No. 2.

Ranking criteria generally communicated well to communities

We surveyed 77 of the communities who had submitted applications for VSW grant funding since FY 04. We received 46 responses. More than 80 percent of the responding communities reported they believed VSW officials did a good job of communicating to them the criteria to be used in evaluating their grant applications. These respondents indicated they were consistently made aware of changes made to the scoring criteria. Additionally, 75 percent of respondents reported they either completely understood or somewhat understood why VSW managers were adjusting the application evaluation criteria.

The survey results suggest that the criteria used in the grant application process has been accessible and available to interested communities. Based on survey responses it appears the information has consistently been made available through the VSW website.

Many survey respondents praised the work and communication provided by VSW engineers in keeping their community informed and providing assistance. However, several comments from the surveys indicated that communities are not provided sufficient information regarding their score in order to know where improvements in their applications are needed. One survey respondent stated that a total score amount is received, but includes no detail on the allocation of the points across the scoring criteria. Another respondent replied that due to scoring low in a particular area, additional documentation was provided for the review committee to consider. The respondent was not informed of the committee's decision or the final outcome of the committee's consideration of the additional documentation.

For many villages, the emphasis on management capability is limiting access to funding

In recent years, a community's ability or capacity to demonstrate it can effectively operate a local utility has had a growing impact on some villages' ability to apply for, qualify for, or begin construction of a VSW sanitation project. The State's RUBA assessment process is a key requirement that has substantial impact on both the applying for funds and the release of construction funding.

VSW management is advising communities currently undergoing a RUBA assessment to postpone their application until the village has successfully completed the process. If a community has not begun the RUBA assessment, they can apply for construction funding. However, after receiving an appropriation, the village is expected to successfully complete a RUBA assessment prior to beginning construction.

VSW is aware there are numerous communities that have not submitted an application because they have yet to successfully complete the RUBA assessment. RUBA management reports they are working with more 10 villages who are trying to work through the RUBA process so that they can develop a VSW grant application.

Currently 22 villages, with more than \$44 million in appropriations, have had construction held up due to RUBA assessment requirements. Of these, seven sanitation projects, with more than \$13 million in appropriations made between FY 01 and FY 03, have yet to be started. Construction, and most of the related appropriated funding, has been held up because the communities cannot successfully complete the RUBA essential indicator assessment. The primary reason the communities cannot meet the RUBA test is that they owe back taxes to the Internal Revenue Service.

Retroactive assessment of administrative costs only a portion of the cost factors impacting previously funded projects

DEC has started to assess all active construction projects for administrative costs related to the project oversight. For projects funded before FY 06, this is considered a retroactive assessment because administrative costs were not included in the project specific budgets, but were budgeted and appropriated separately.

The retroactive assessment of administrative costs against active projects is being done at the direction of the federal funding agencies. Even though projects are still active and not yet complete, the federal funding agencies have ended their commitment to fund those costs as non-project specific administrative costs. It appears their reasoning for making such a change is as follows:

1. Three-fourths of the funds in the administrative appropriations come from federal government agencies.
2. The funding agencies will reimburse for project specific cost. Therefore, DEC must develop allocation methodologies to directly associate administrative costs to the specific project driving those costs.

Such a retroactive cost assessment, coupled with the growth in other costs, increases the possibility that some projects, especially those that have yet to start, will have to be restructured, reduced in scope, or a supplemental funding requested in order to complete the project. However, the growth in these other major costs such as goods and materials, are likely to have a more significant impact on the project's budgets than the administrative cost assessment.

Based on information supplied by VSW managers, the cost of various types of pipe used in projects has increased between 40 and 73 percent since 2003. Lumber costs, in the same period, have increased an estimated nine to 18 percent, with fuel costs increasing between 45 and 66 percent. According to the VSW managers, the most likely scenario for completing projects will involve, if necessary, breaking the projects into stages. Staged construction is a

common approach used by VSW engineers for many of the program's larger projects. Projects will most likely remain as previously scoped, but the cost estimate will be revised and a second stage will be identified and cycled into future budgets and appropriations.

It is not a budgetary violation for DEC to charge administrative costs to the projects whether or not those specific types of costs were included in the development of the project estimate as long as those administrative costs are directly associated with that project. However, adding unexpected costs to any project reduces the likelihood the project can be fully completed as planned and for the amount budgeted.

FINDINGS AND RECOMMENDATIONS

Recommendation No. 1

The legislature should consider clarifying the eligibility requirements for the Village Safe Water (VSW) program in order to better target funding.

The VSW program has historically been used as the primary conduit for funding directed to improve the sanitation conditions in Alaska's remote rural, primarily Native communities. Federal funding support, which infused the program with substantial resources, was aimed at what were sometimes called third world sanitation conditions in many of Alaska's villages. Federal law accompanying funding has invariably specified funding is to be used for rural and Native villages in Alaska.

In recent years, the VSW program has provided construction grants for communities that do not fit this profile. Perhaps the most striking examples are two grants totaling more than \$1.7 million made in FY 03 and FY 05, for a sanitation system to be put into a neighborhood subdivision within the larger unincorporated community of Anchor Point. Anchor Point is located in the Kenai Peninsula Borough. It had a 2006 estimated certified population of just over 1,800, albeit spread over a larger expanse than a typical remote Alaskan village.

The grant applicant, which consisted primarily of a neighborhood within Anchor Point, was determined to be eligible to participate in the program. Exhibit 4, on the following page, provides a comparison between how Anchor Point's FY 05 construction funding application was scored compared to Pitkas Point's⁵ application, which did not score high enough to be included that year's budget request.

VSW managers typically deal with recognized governing bodies, such as village or tribal councils, when assisting a community through the grant application process for VSW funds. In recent years, the program began receiving interest and applications from neighborhood subdivision organizations or non-profit corporations representing a group of households rather than being affiliated with a local governing body. At least seven grant applications for five other such communities or housing subdivisions, totaling \$22.6 million, have been received by VSW.

VSW managers report they have dealt with organizations that have been specifically formed to apply for sanitation grants. Although managers are uneasy whether such communities meet the central intent of the VSW program, they have been advised by the Department of Law (DOL) that such organizations are eligible for grant funding.

⁵ See Exhibit 5 on page 26 for a demographic comparison of these two applicants.