The Alaska Rural Utility Collaborative

Achieving Sustainability Through Collaborative Support of Utility Management and Operations

In rural Alaska, harsh winters create challenges for water and wastewater services, including freezing pipes and water supply, resulting in water and sewer service interruptions. Isolated communities, lack of resources and staff, and harsh weather amplify environmental and public health challenges. Collaboration within and between communities have helped to alleviate the burden by creating economies of scale to address needs. The Alaska Rural Utility Collaborative (ARUC) is a program within the Alaska Native Tribal Health Consortium (ANTHC) that strengthens community collaboration and sustainability, and makes efforts to prevent major losses when problems arise.

Benefits of ARUC Membership

- Communities are equipped to protect health and improve quality of life
- Emergency response is enhanced by creating economies of scale
- Qualified staff operate and maintain community systems to provide high-quality drinking water and safe sewage disposal
- Community members receive job and training opportunities as water plant operators with good wages and benefits. The workforce is further developed through training of back-up staff in each community
- Prevention and maintenance extend the useful life of community systems, saving millions of federal and state dollars in replacement costs
- Water and sewer expenses are paid through ARUC with community funds
- User fees are set in agreement with community councils. Each community rate varies to meet the unique community context to be self-sustaining
- ARUC enforces shut-off policies for non-paying customers
- Communities have access to expertise and utility support from ANTHC engineers, operations and maintenance specialists, utility mangers and grant specialists at no additional cost to customers
- Membership automatically renews in most cases

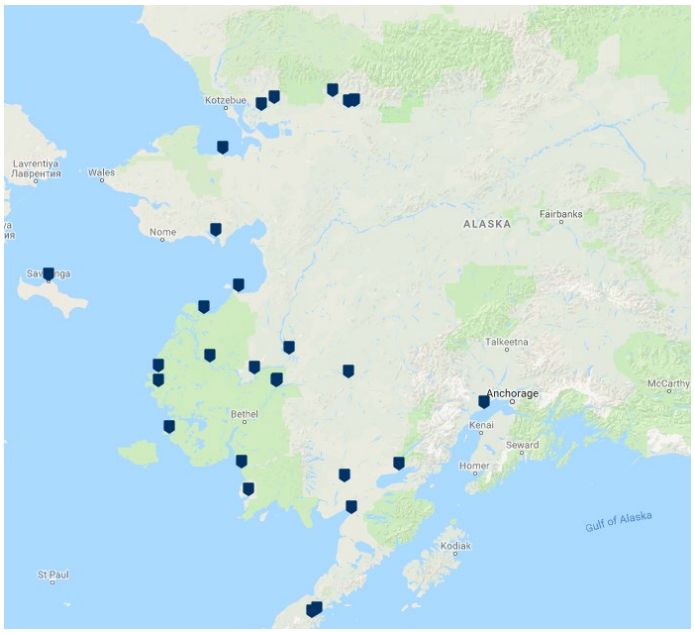

Figure 1. Map of ARUC Member Communities

Background

Figure 2. ARUC Advisory Committee in 2016

ARUC began as the Rural Utility Cooperative (RUC) in 2004 as a pilot program of the Yukon-Kuskokwim Health Corporation (YKHC), with funding from the EPA. In its first year, RUC served three communities: Holy Cross, Grayling and Upper Kalskag. YKHC transferred ownership of the RUC program to ANTHC in October 2007 and the program was renamed Alaska Rural Utility Collaborative in 2008. As of 2018, ARUC serves 26 full member communities and five Assisted Billing communities to provide training to increase community capacity and improve system operations and finances.

ARUC empowers its member communities to manage, operate and maintain water and wastewater systems through a strength-in-numbers approach. As a result of ARUC, community systems in rural Alaska build an emergency and parts reserve fund, technical and engineering support from ARUC engineers, and additional assistance to access project funding. ARUC helps water and sewer systems increase efficiency, reduce fuel usage, train and retain the workforce, increase sustainability and decrease reliance on state and federal agencies. The goal of ARUC is to build local capacity and for community members to benefit from reduced fees and less system downtime.

The ARUC Advisory Committee includes a representative from each member community. Representatives serve as liaisons between ARUC and participating communities. The committee meets four times a year to discuss issues related to community system operations, maintenance, ordinance revisions and utility budgets and fees. Representatives maintain the purpose and value of ARUC: to maximize public health benefits of sanitation facilities and build local community capabilities (ARUC, 2017).

ARUC Full-Membership Services

Communities can choose to participate solely in ARUC's Assisted Billing Program or become a full ARUC member. To become a full member, communities must participate in the Assisted Billing program for at least one year.

Training and Technical Assistance

ARUC engineers and operations staff work one-on-one with operators, provide routine training to ARUC communities, and provide off-site training in Anchorage, Bethel, Kotzebue, and Nome.

Assisted Billing Program

Through the Assisted Billing (AB) Program, ARUC provides billing and collection services which help communities increase revenue from user fees that cover direct expenses and enable utilities to build a reserve account. This program only requires a 30-day commitment between ANTHC and the participating communities.

The AB program enrolls communities with utility billings (electric, water, sewer) and assists communities with collecting monthly utility fees from customers. The money collected, minus a billing service fee, is then sent back to the community to operate their water/sewer system. The billing service fees range between $500-$800 per month, depending on the number of homes within the community, and covers labor, postage, envelopes, and any additional billing expenses.

Emergency Response

Utility emergencies, such as a freeze-up of a community water source, requires preparedness, communication, and quick response. The following case studies showcase how ARUC assisted communities during emergencies.

Ambler In 2017, the raw water line between the water intake well and the treatment plant froze in Ambler. Fortunately, the system had a heat trace and pipe connection to the well drop pipe installed in 2016 by ARUC. Local operators responded quickly and used the heat trace to thaw the well before more of the line froze and avoided a system-wide freeze.

Upper Kalskag A thawing facility for a sewer force main line was installed in Upper Kalskag. As thawing capabilities for sewer lines are only needed in rare freeze cases, a permanent facility was not needed and would require unaffordable electricity and fuel storage for heating. Instead, a mobile facility was installed in a remote location without a permanent heating source and electrical service but could thaw frozen lines when needed.

St. Michael The extremely cold winter of 2017 caused many pipes to freeze. At the same time, the remote monitoring alarm system broke down and operators did not receive a signal about the freezing temperature within the system. In January 2017, local operators contacted ARUC for assistance. Several organizations, community members, and local operators helped to restore service to the community. The Bering Straits Housing Authority provided 100 five-gallon buckets, hand sanitizer, and septic haul bins to provide temporary relief to those without water and sewer. St. Michael's emergency reserve funds provided immediate assistance and temporary repairs. The Native Village of St. Michael received grants totaling $750,000 from the Housing and Urban Development Indian Community Development Block Grant Imminent Threat program and the Norton Sound Economic Development Corporation Large Infrastructure Outside Entity Funding to assist with permanent infrastructure repairs.

ARUC Member Communities

- *Ambler*
- *Chevak*
- *Chignik Lake*
- *Deering*
- *Golovin*
- *Goodnews Bay*
- *Holy Cross*
- *Kiana*
- *Kobuk*
- *Kotlik*
- *Lower Kalskag*
- *New Stuyahok*
- *Newhalen*
- *Noorvik*
- *Pitkas Point*
- *Quinhagak*
- *Russian Mission*
- *St. Michael*
- *Savoonga*
- *Scammon Bay*
- *Shungnak*
- *Sleetmute*
- *South Naknek*
- *Toksook Bay*
- *Tyonek*
- *Upper Kalskag*

Assisted Billing Communities

- *Grayling*
- *St. Mary's*
- *Buckland*
- *Kivalina*
- *Selawik*

Engineering Projects

Communities have installed cost-efficient technologies to detect problems early and save on energy and repair costs. These projects include:

- Remote Monitoring
- Heat Recovery
- Energy Efficiency
- Service Line Projects

Figure 3. Toksook Bay, which is an ARUC member

Remote Monitoring

Remote monitoring provides essential information to operators and engineers when they are not physically present at the water plant. Remote monitoring systems alert operators via email or text of concerning issues, such as changes in temperature and flow rates. Remote monitoring has assisted many communities in detecting and responding to problems early.

In Shungnak, engineers and operators received a notification regarding low water tank levels and responded early to prevent the issue from getting worse, saving thousands of dollars in labor and repair costs.

In St. Michael, data from remote monitoring helped identify the cause of a system-wide freeze. Local operators used remote monitoring data as evidence of a system-wide problem and received grant funding to fix the issue.

Chevak used remote monitoring data to achieve solvency and develop reserve savings. Operators monitored fuel usage over time to determine a precise amount of fuel needed for each system. They lowered the amount of fuel used throughout the year and saved on fuel costs.

Newhalen improved their water monitoring systems to reduce energy costs. A controller was installed on the water storage tank to indicate how much water is remaining. These controllers help prevent problems from arising and assist local operators in maintaining adequate water levels.

Heat Recovery

Heat recovery, or transferring and using heat that would otherwise evaporate, helps to improve energy efficiency, lower fuel usage and costs, and decrease monthly water and sewer utility rates for customers. ANTHC's Energy Initiative Department installs a community heat recovery system by conducting a feasibility study and then securing funding for the project. Local operators and ARUC engineers completed a heat recovery project in Russian Mission in 2017, where they installed a pipeline to transfer excess heat generated by the power plant to the water treatment plant and reduced fuel usage by 2,200 gallons annually. In a recent example, Chevak is installing a heat recovery project. The community uses an average of 15,000 gallons of fuel per year, and expects to save an estimated 12,500 gallons annually, through the heat recovery installation project.

Energy Efficiency

Noorvik and **Kotlik** upgraded their systems to improve energy efficiency. In both communities, new vacuum pumps and control schemes were installed for the vacuum sewer system. In Noorvik, local operators repaired a vacuum leak which resulted in increased energy efficiency and improved productivity.

Service Line Projects

Permafrost shifts the ground and pipes as it freezes and thaws. Flexible service lines reduce the risk of connection breaks and pipes pulling away from homes. In Noorvik and Savoonga, flexible service connections, including helical piles, adjustable support and solid platforms were installed. This prevented potential leaks, freeze-ups, air gaps and structural damage.

In 2017, six service line projects were completed in the communities of Holy Cross, Chignik Lagoon and Scammon Bay. These lines expanded service, increased efficiency, and facilitated growth of these communities by increasing their capacity to provide service to more members.

Energy Efficiency in Chevak

Chevak has a been a member of ARUC since 2008. In 2013, Chevak's system was $200,000 in debt. Energy and repair costs increased customer fees to $165 per month.

The community gained assistance to:

- *Install a sewer energy efficiency project (2013)*
- *Install a wind-to-heat energy project*
- *Train operators*

As a result, customer fees decreased to $85 per month and Chevak's system has saved more than $500,000 in emergency reserves.

Accomplishments

ARUC received the impressive Harvard Project on American Indian Economic Development Honoring Nations High Honors award in 2016. The Honoring Nations program celebrates outstanding examples of tribal governance. ARUC was recognized for its approach of building on economies of scale to overcome the challenges in rural Alaska. ARUC built a collaborative to assist residents during emergencies, train and develop the workforce, and help communities to financially sustain their water and sewer systems. Rural communities across the US can use a similar approach by collaborating with nearby communities or neighboring counties to improve their water and wastewater systems and ultimately improve health outcomes.

Figure 4. ARUC Received High Honors from Harvard Honoring Nations in 2016

EPA United States Environmental Protection Agency

EPA 810-R-20-008

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