

ARUC: Water/sewer management

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ARUC Philosophy

- Building infrastructure is the first step
- Management of infrastructure is next
 - Protect investment (life of system)
 - Minimize ‘repair by replacement’
 - Maximize health impact of system
 - Reduce cost to operate
- Strength in numbers: 26 communities working together, instead of each struggling alone



YK Delta: Circulating systems, shifting soils

- Chevak
- Goodnews Bay
- Kotlik
- Holy Cross
- Lower Kalskag
- Pitkas Point
- Quinhagak
- Russian Mission
- Sleetmute
- Toksook Bay
- Upper Kalskag



Bristol Bay: Buried systems more traditional

- Chignik Lagoon
- Chignik Lake
- New Stuyahok
- Newhalen
- South Naknek
- Tyonek



Maniilaq: Circulating systems, shifting soils, extreme cold

- Ambler
- Deering
- Kiana
- Kobuk
- Noorvik
- Selawik



Nome: circulating, vacuum sewers

- Golovin
- Saint Michael
- Savoonga



Lessons learned

- Complicated systems require engineering to sustainably operate
 - Energy efficiency!
 - Data is critical
- Proper maintenance is costly
- Emergencies destroy budgets.

A tale of 5 cities.

■ Vacuum sewer system labor, 2012

– Chevak	\$166,000
– Savoonga	\$142,000
– St Michael	\$89,000
– Selawik	\$212,000
– Kotlik	\$ 94,000
– Noorvik	<u>\$114,000</u>
AVERAGE	\$136,000

ARUC initiatives

■ Energy Savings

1. O&M focus, small budget energy projects
 - Chevak, Saint Michael, South Naknek, etc
2. Recovered heat
 - all ARUC communities possible
 - Savoonga, Quinhagak, Noorvik apps pending
3. Alternative energy
 - Goodnews Bay windmills
 - Chevak wind boilers
 - Solar: Ambler now, all Maniilaq to follow
 - Kobuk Biomass: wood supply = JOBS

■ Decrease dependence on grants

■ Remote monitoring

ARUC Summary

ARUC's job is sustainability of member rural water systems & DEHE.

Tribal Utility Services (TUS)

- Community Assistance
- Review of Project Summary/Scope Documents
- Plan Review
- New system start-up
- Operator training new systems
- Transition to ownership
- O&M Manuals and operational aids

TUS

- Local response to emergencies
- Construction Skills Training
 - Apprenticeship Program
 - Skills Training
 - Internship Program
 - Certifications
 - Database Tracking
- Significant Non Compliance (SNC) assistance

TUS

- Operator Training on-site for new operators
- Water Plant Operator class instructors
- System Management Training
- Technical Assistance



What does ARUC and TUS Really Do?

- Excerpts from ARUC Energy Retrofitting reports:
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- Deering Waste heat
- System was installed years ago, but was not properly controlled resulting in back fed heat to the power plant radiators. There was probably a net gain in value, but the system was poorly understood and was shut down. We have installed a new pump and controls, and thus far the boilers only fire when dryers are active. We currently have meters in route that will allow us to begin to quantify the fuel use and interface with remote monitoring. Additionally we have provided much of the neglected operational maintenance and should start to see the resultant savings. More to come.
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- Kotlik Waste heat retro-commission
- This was a hot project... as the system was installed without appropriate controls. This project demonstrated our ability to roll all aspects of a complex small-scale project into a small team. Design, take-offs, electrical, plumbing, commissioning, etc. This is a great way to show the potential value-added of ARUC operations. Ironically this is also a great example of the disconnect from the operators and the bills. Although the boilers have virtually stopped firing, the operators are much more engaged with the other work, (stuff that makes their lives easier) pump controls, new vacuum valves, new impellers, etc... (these too have value, as operators either log less hours, or get more optimization while on shift).
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continued

- Kobuk Maintenance
- *Eric went out and began evaluating the system, and trying to attack some of the most critical failure potentials. While there he worked with the operator to conduct some very basic system maintenance. The highlight is that by cleaning the boiler, and adjusting a circuit setter we estimate the fuel savings to be 200 to 250 gal/mo. There is much more to be done there, and we are currently working to install more permanent fixes, and get the needed parts on-site. This is a prime example of why we need to develop the capacity to ensure this type of work isn't neglected.*
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- St. Michael, Boiler/HX rehab, retro-commission of HX add system
- This report is ironic, mostly because they froze-up shortly after our work out there. I have no doubts that the project was saving fuel, but the freeze negated that savings. One point to make is that while there we identified a potential problem with the automated controls at the lake house... I have the fix, but being tied to project funding hasn't allowed this to be implemented. This likely had an impact on the freeze up. We would need to discuss all this. Louis is currently implementing phase I of the Vacuum boiler project. I anticipate phase II in about a month.
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