

Delivery of Drinking Water and Sanitation Utilities in Alaskan Villages Using Collaborative Principles: Innovation Leading to More Sustainable Communities

140th Annual Meeting of the American Public Health Association
San Francisco, CA Moscone Convention Center, Oct. 27-31, 2012

Presented by

Dr. R. Steven Konkell, AICP, FRIPH
Associate Professor (Environmental Health Sciences)
University of Alaska, Anchorage

October 29, 2012

Part One



DR. KONKEL & CAPTN JOHN SPRIGGS

Prof. Steve Konkel, Ph.D., AICP, FRIPH
Dept. of Health Sciences, U. of Alaska Anchorage
(Environmental Health Sciences)
Diplomacy 405F
Anchorage, AK 99508

Prof. & Senior Research Fellow, Health & Environment
Dublin Institute of Technology, Dublin, Ireland (2008-10)
US Fulbright Scholar, 2007-08

Captain John W. Spriggs, R.E.H.S, MPH
Senior Utility Consultant, Founder and Developer
of the ARUC Concept
Alaska Native Tribal Health Consortium (ANTHC)
Anchorage, Alaska

Manillaq Service Region, Northwest Arctic Borough
Kotzebue, Alaska, ARUC and Environmental Health Mgr.

Table of Contents

- Acronyms
- Alaska Rural Utility Collaborative (ARUC)
Purpose, Infrastructure Planning, Funding,
Management, & “Operation & Maintenance” of
Sustainable Utilities
- Strategic Concept Development
 - Initial Village Selection, Yukon-Kuskokwim Pilot
 - Evaluations and Evolution of Statewide Program
- Key Performance Indicators
- Benefits of the Statewide Approach
- Challenges Ahead
- Concluding Remarks

Acronyms

- AI/AN - American Indian/Alaska Native
- Alaska DEC - Alaska Dept. of Environmental Conservation
(Administers the Alaska Village Safe Water [VSW] Program)
- ANTHC - Alaska Native Tribal Health Consortium
- ARUC - Alaska Rural Utility Collaborative
- BBAHC- Bristol Bay Area Health Corporation
- AVEC – Alaska Village Electrical Cooperative
- Denali – Denali Commission Alaska
- EPA - Environmental Protection Agency
- IHS - Indian Health Service, U.S. Public Health Service
- LRTI- Lower Respiratory Track Infection

Acronyms (Cont.)

- MOA - Memorandum of Agreement
- MRSA - Methicillin-Resistant Staphylococcus Aureus
- NCEH- National Center for Environmental Health, CDC
- O & M- Operation and maintenance costs
- RMW Program- Remote Maintenance Worker program
- RSV - Respiratory Syncytial Virus
- RUBA Program- Rural Utility Business Advisory program
- SDWA - Safe Drinking Water Act of 1974
- S. Aureus- Staphylococcus Aureus
- SNC list- Significant Non-Compliance list managed by the Alaska DEC
- USDA/RD - Rural Development, U.S. Dept. of Agriculture

ARUC's Purpose

- Provide good water every day to Alaska Tribes
- Provide utilities on a sustainable basis, allowing for full coverage of operation and maintenance costs



ARUC, a Comprehensive Approach to Providing Drinking Water & Preventing Sanitation-Related Disease

1. Infrastructure planning and acquisition of funding to deliver water and wastewater treatment services
2. Management systems
3. Proper and efficient operation & maintenance
4. Providing an enabling environment (e.g. qualified operators, regulatory compliance, plans to maintain infrastructure & improve efficiency)
5. Water quantity and quality issues affect economics; the water source and system type affect costs

ARUC Basics

- Management of village water/sewer systems
 - Standard ordinances, enforced policies for connections, payment of utility bills, termination of service, etc.
- Technical support
 - Hire & supervise operators
 - Summer projects, preventative maintenance
- Financial Procedures
 - Collect customer payments (centralized billing services)
 - Pay expenses
- Revenues must meet expenses!
 - Apportion fuel, personnel, and O&M expenses

Strategic Development

APPLYING COOPERATIVE PRINCIPLES

- **PILOT IN THE YUKON-KUSKOKWIM DELTA**
 - 58 villages in the Bethel Y-K region were contacted
 - 20 villages responded, and 10 villages were selected
 - Martin Report 35 variables to monitor and track, RUC, Non-RUC
 - Interim Evaluation, completed Sept. 2005
 - Developed **Key Performance Indicators (KPIs)**
 - **Analysis and Framework developed by Konkel, RS in conjunction with ANTHC**
 - Final evaluation, completed Oct. 2007
- **Denali Commission, Rasmussen Foundation, and USDA –RD provide funds for expanding to ARUC**

Kivalina, Northwest Arctic Borough



374 residents, 97% Inupiat, note physical location adjacent to the Chukchi Sea (Arctic Ocean) 83 miles above the Arctic Circle
Traditional lifestyle revolves around subsistence, year round

SELAWIK

Northwest Arctic Borough

- Selawik has 829 residents
- Photograph below shows the location of the river, with the boardwalk parallel to the river.
- Photograph on right shows subsidence, resulting in steep stairs
- Selawik had its water pipes freeze during the winter of 2011/12 [\$\$\$]



**Toksook Bay Alaska
Yukon-Kuskokwim Delta Region
One of the Y-K success stories...**



ARUC has expanded since 2008 to maritime climates.



RUC Pilot Village Members

■ Rural Utility Cooperative (RUC) Villages initially involved

■ SEE CHRONOLOGY ON RUC DEVELOPMENT IN FINAL REPORT
Beginning July 1, 2003

- Holy Cross
- Grayling
- Toksook Bay
- Russian Mission
- Upper Kalskag
- Lower Kalskag
- Alakanuk
- Chevak



Alaska Rural Utility Collaborative (ARUC) members

Fiscal Year 2008

8 Villages

FY2009:

17 Villages

FY 2011 & 12

23 - 27 Villages



ARUC members

24 Member Villages in 2011-12, now at 27 villages

- **YKHC Region** - Chevak, Goodnews Bay, Holy Cross, Lower Kalskag, Upper Kalskag, Russian Mission, Toksook Bay, Sleetmute, Kotlik
- **Norton Sound Region** – Savoonga, St. Michael, Golovin
- **Bristol Bay Area Health Consortium Region** – Chignik Lake, Chignik Lagoon, South Naknek, Newhalen, New Stuyahok
- **Maniilaq Region** – Ambler, Kiana, Kivalina, Kobuk, Noorvik, Selawik
- **Anchorage Service Region** – Tyonek

ARUC Key Performance Data

Indicators, Developed in the Pilot Evaluation

	<u>Non-ARUC</u>	<u>RUC</u>	<u>ARUC</u>
■ Operator turnover	75%	19%	5%
■ Significant Non-Compliance List (AK DEC VSW)	2X ARUC rate		
■ User Collections	40%	56%	80%
20 – 40 months		82%	88%
Over 40 months		93%	104%

ARUC Premises

- Utility management tools are essential in today's environment
 - increased regulations & complexity of systems
 - Funding reductions and budget cuts
 - Extending plant life improves economics
 - Proper operation and maintenance helps to maximize public health benefits

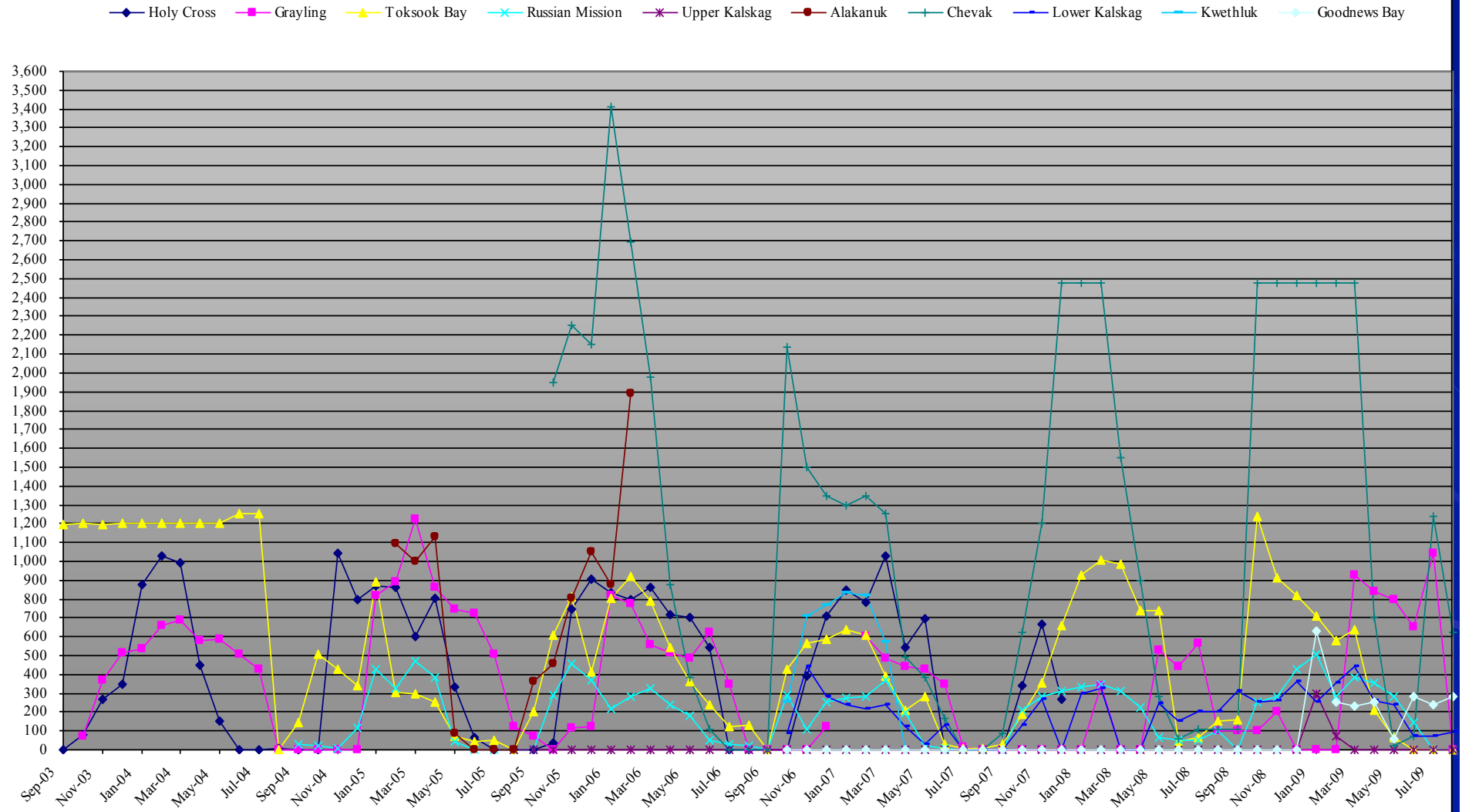
“Whiteboard” Categories

Measured Monthly

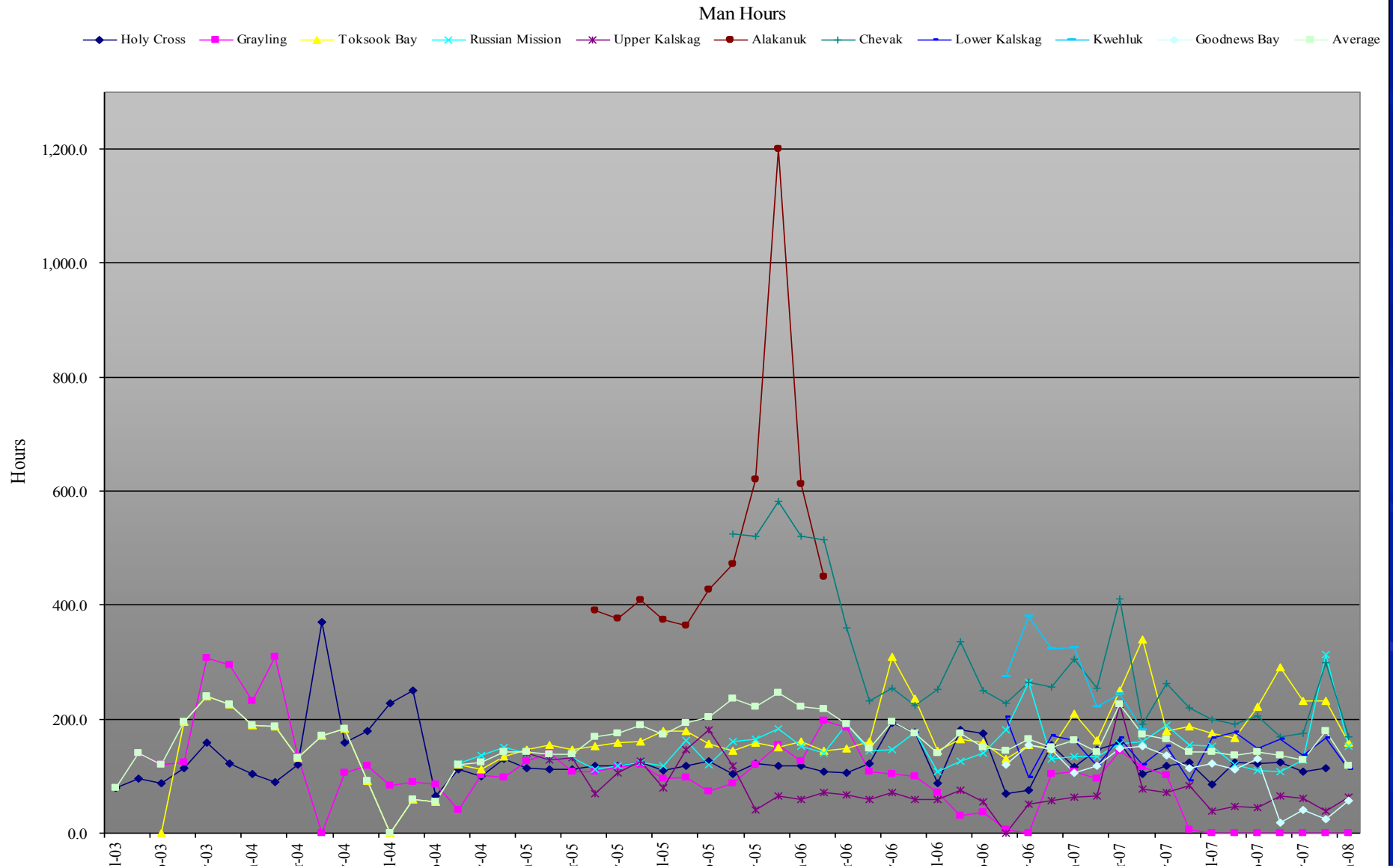
- Certification of Highest Operator
- % of Operable Connections
- Labor Cost per Hour of Highest Paid Operator (\$)
- H2O Production
- H2O Production per Capita
- Monthly Water/Sewer Billing (\$)
- Population
- Fuel Cost per Gallon (\$)
- Fuel Consumption (gal)
- Fuel Consumption per Connection
- Cost per kWh (\$)
- Electric Consumption (kWh)
- Electric Consumption per Connection
- Water/Sewer Reserve Account
- Total Hours Worked (All Operators)
- Collection % (\$ Collected / \$ Billed)
- Age of Water Plant
- # of Connections

ARUC Fuel Consumption

Fuel Consumption



ARUC Man Hours



ARUC Electrical Consumption

Electrical Consumption

- ◆ Toksook Bay
- ◆ Russian Mission
- ▲ Upper Kalskag
- ✕ Chevak
- ✱ Lower Kalskag
- Goodnews Bay
- + Sleetmute
- South Naknek
- Chignik Lake
- Savoonga
- St. Michael
- Golovin
- ✱ Selawik
- ✱ Chignik Lagoon
- ◆ Tyonek
- Newhalen

