City of Shaktoolik
Phone # (907) 955-3441
Fax # (907) 955-3221

P. O. Box 10
Shaktoolik,
Alaska 99771

June 8, 2012

Paul Ivanoff III
Community Benefits Director
Norton Sound Economic Development Corporation
420 L Street, Suite 310
Anchorage, AK 99501

RE: Letter of Request - City of Shaktoolik (City) Water Storage Tank Insulation System Replacement Project – Shaktoolik, Alaska

Dear Mr. Ivanoff:

The City is pleased to provide this letter and associated enclosures requesting Norton Sound Economic Development Corporation (NSEDC) funding in the amount of $50,000 to assist with the completion of the water storage tank insulation system replacement project. This letter has been prepared utilizing the guidance contained within the NSEDC Community Energy Fund Application package requirements. Within the body of this letter, requirements contained within the application are discussed and presented. This letter and its associated enclosures can be considered a complete application. The NSEDC application is enclosed with this letter.

Scope of Work

At this time, the City's water storage tank has no insulation on the roof of it and a large portion of the sidewall insulation has been compromised due to storm damage over its 40 year service life. Due to the lack of an adequate insulation system for the water storage tank, it has been estimated that the City is paying in excess of approximately $20,000 per year in unnecessary heating costs, based on an energy audit completed by the Alaska Native Tribal Health Consortium in 2011 (the complete energy audit of the water treatment plant is enclosed with this application packet). This unnecessary heating cost is ultimately paid by the local rate payers in the form of increased electrical and water and sewer user fees. Because of the priority that has been placed on the completion of the project, the City has been working with the Denali Commission (Commission), Federal Emergency Management Association (FEMA), State of Alaska Division of Homeland Security and Emergency Management (DHS&EM) and the State of Alaska's Village Safe Water Program (VSW) to acquire the needed funds to repair the entire water storage tank insulation system. This project will remove the remaining insulation system on the tank and replace it with a completely new package. There are no permits that are required as part of this project as this is considered a maintenance activity to an existing water storage tank and no functional changes are being made to the water system. The City is expediting the project and attempting to complete it prior to the on-set of winter this year to have local residents realize the savings that this project will yield, as soon as possible. The applicable statement of work, technical specifications, and drawings prepared by the City for this project, are enclosed with this letter.

Budget

It is anticipated that this project will cost approximately $258,880 (in 2012 dollars) to complete. The line item budget for this project is enclosed with this application packet. Additionally, a vendor quote for the water storage tank insulation system labor and materials has been enclosed with this letter. It should be noted that this quote only includes materials and freight to Seattle and does not include engineering management and construction oversight of the project. Please see the line item budget for complete and detailed cost information related to the project.

Timeline

The anticipated timeline for this project is as follows:

- Contractor Award – July 2012;
- Construction Commencement – August 2012;
- Construction Completion – September 2012; and,
- Project Close-Out – December 2012.

The above is based on the following assumptions: a two (2) week request for quote period being completed in early July 2012; three (3) to four (4) week shipping period for materials; and, a 2 to 3 week period for construction.

Operation and Maintenance

The new insulation system will be virtually operation and maintenance (O&M) free. Additionally, extra materials will be provided as part of the materials contract in addition to a one (1) year warranty on all the newly installed items. The new insulation system will be inspected on a regular basis as a part of the City's on-going O&M program. Future financial needs for O&M activities are anticipated to be minimal and any cost associated with this will be paid for with the City's personnel budget.

Approximately 44% ($114,331) of the estimated $258,880 budget for this project will be for labor and personnel related expenses. The remaining 56% ($144,549) of the estimated budget for this project will be utilized for construction materials.

Matching Funds or Contribution

At this time, the City has secured funding for the project from the 3 following sources: (1) FEMA/DHS&EM; (2) VSW; and, (3) Commission. The matching funding and contribution amounts from each agency are identified within the following table:

Source	Item	Amount Secured ($)
FEMA/DHS&EM	This funding is to replace 25% of the water storage tank sidewall insulation package that was damaged during a November 2011 storm event.	33,307
VSW	This funding will replace the water storage tank roof insulation package that has been missing since a 2003 repair project.	136,031
Commission	Portion of funding to complete the insulation for the tank sidewall insulation.	44,580

The FEMA/DHS&EM project worksheet and VSW supplemental funding request for the funding levels referenced within the table above are enclosed with this letter.

Community Support

Enclosed with this letter are resolutions of support from the following local entities:

- City of Shaktoolik;
- Native Village of Shaktoolik; and,
- Shaktoolik Native Corporation.

Organization Financial Status

The organization financial status for the City is enclosed with the application packet.

Additionally, the City has a sanitation facilities master plan that is in the final draft stages. This project will be completed by VSW when a final site visit and community meeting is organized by them to review the final draft with City residents and personnel. The current State of Alaska, Rural Utility Business Advisor quarterly report for the City of Shaktoolik, is enclosed with this letter.

Checklist

The signed checklist for the application is enclosed with this letter.

Closing

This project represents an opportunity for federal, State and local entities to leverage available resources and work together to assist a rural Alaskan municipality with the improvement of its physical infrastructure and sustain it for the long-term. It should also be noted that the Commission has been and will continue to provide technical assistance to the City for the duration of this project. Please do not hesitate to contact me via phone at: 907-955-3441; or, via email at: easicksik@yahoo.com, if you have any questions or need any assistance.

Sincerely,

Eugene Asicksik

Eugene Asicksik
Mayor, City of Shaktoolik

Cc:
Mark Spafford, Senior Program Manager, Denali Commission

Enclosure(s)

2012 NSEDC Community Energy Fund Application
Statement of Work
Technical Specifications
Engineering Drawings
2011 ANTHC Energy Audit
Water Storage Tank Insulation System Replacement Line Item Budget
Vendor Quote
FEMA/DHS&EM Project Worksheet
VSW Supplemental Funding Request
Community Support Resolutions
Current City of Shaktoolik RUBA Report

Norton Sound Economic Development Corporation

Community Energy Fund Application

For funding consideration, applications must be received by the NSEDC Anchorage office on or before March 15, June 15, October 15, or December 15 of each calendar year for consideration at the subsequent quarterly meeting.
Faxed or e-mailed applications will not be accepted.
Early submissions are encouraged.

Mail or deliver original applications to:
Norton Sound Economic Development Corporation
420 L Street, Suite 310
Anchorage, AK 99501

Additional Contact Information:

Paul Ivanoff III, Community Benefits Director
Phone (800) 385-3190
pivanoff@nsedc.com

Galsy Ashenfelter, Community Benefits Specialist
Phone (800) 650-2248
galsy@nsedc.com

Roy Ashenfelter, Community Development Coordinator
Phone (888) 650-2274
roy@nsedc.com

IMPORTANT INFORMATION

Applicant Eligibility
To be eligible, an applicant must be a local utility, municipal government, ANCSA Village Corporation or federally recognized tribal government, and must be located in one of NSEDC's member communities.

Review of Application(s)
The NSEDC Board of Directors will review and approve completed applications that meet the Community Energy Fund (CEF) guidelines during any of its regularly scheduled quarterly meetings.

Submission Deadline
For timely review and consideration by the NSEDC Board of Directors, original applications and all supporting documentation must be submitted to the NSEDC Anchorage office by March 15, June 15, October 15, or December 15 to be reviewed by the Board at the subsequent quarterly meeting. Please contact NSEDC for quarterly board meeting dates.

Fax and Email
Faxed or emailed applications will not be accepted. It is the responsibility of the applicant to ensure that NSEDC receives a signed, original application with all supporting attachments on or before each submission deadline.

Preparation Costs
All costs incurred by applicants over the course of the application preparation process shall be the sole responsibility of the applicant.

Application Clarification, Modification, and Rejection
NSEDC reserves the right to modify the requirements for completing this application. In the case of modification, all applicants will be given an opportunity to revise and re-submit their application(s) in the specific areas affected. Submission of an application does not obligate NSEDC to fund the proposed project. All funding decisions shall be made at the sole discretion of NSEDC.

NSEDC Guidelines and Policies

Program Guidelines

Each NSEDC member community is eligible for a maximum program allocation of one million dollars ($1,000,000).

CEF Program goals include:

- Reduction and stabilization of community-wide energy (power & heating) costs;
- Reduction of the region's exposure to fossil fuel-related market fluctuations and environmental risks;
- Improvement of region-wide energy infrastructure while maintaining safety and reliability.

Projects funded through the Community Energy Fund must meet the following conditions:

- Reduce costs or improve energy efficiency for all community households;
- Provide an on-going energy-related benefit for the entire community.

Program funding may be used to assist with, but is not limited to, the installation and construction of:

- Community-wide alternative/renewable energy systems (i.e. wind turbines to connect to existing power generation systems);
- Efficiency upgrades or adjustments to existing power generation and distribution systems.

General Requirements

- The program will not fund feasibility studies for energy upgrades or construction projects.
- Program funds are meant to facilitate the actual implementation of projects that are past the conceptual phase ("shovel-ready").
- Program funds cannot be applied to costs or expenditures incurred three or more months prior to application approval.
- NSEDC requires funding to be utilized for large-scale projects that address one or more of a community's long-term strategic goals pertaining to energy.
- The program funds must be used to leverage state, federal or other funding sources. NSEDC strongly encourages partnerships with energy related entities that have had successful projects such as the Denali Commission, Alaska Energy Authority (AEA), and Alaska Village Electric Cooperative (AVEC). Other potential partners will be considered on a case-by-case basis.
- Due to the community-based nature of the program, resolutions of support from all other eligible entities (local utility, municipal government, ANCSA Village Native Corporation and federally recognized tribal government) in the applicant's community are required to demonstrate full support for the project.

Project Administration

Applications for funding and any resulting grants are subject, in all respects, to the NSEDC Board of Directors Funding Policies, as updated in October 2009, and as amended hereafter. Applicants should carefully review the funding policies to ensure the proposed project and any resulting operations conducted with grant funds are consistent with current policies throughout the term of the grant. NSEDC staff shall have full discretion when interpreting board policies in the administration of grant funds. NSEDC will attempt to provide applicants with any future amendments to the CEF grant policy; however, it is the applicants' responsibility to ensure they are abiding by the Board's current funding policies.

Payment and Reimbursements

Upon funding approval, grant recipients must report expenditures to NSEDC on a quarterly basis using NSEDC's Financial Statement Report template. Quarterly reports should include requests for payment or reimbursements for costs incurred by the grant recipient during the respective quarter. Reimbursable expenditures must be pre-approved by NSEDC. Requests for payment or reimbursement must be accompanied by a purpose and explanation of the expenditures including invoices, receipts and corresponding check stubs establishing the recipient's prior payment for items for which reimbursement is sought. Back-up documentation for payment requests must be in a form satisfactory to NSEDC, which reserves the right to require additional information. A minimum of four weeks is required before payment for any invoice over $50,000.

Date: JUNE 6, 2012

Project Title: WATER STORAGE TANK INSULATION SYSTEM REPLACEMENT

Organization Name: CITY OF SHAKTOOLIK

Authorized Representative: EUGENE ASICKSIK, MAYOR

Project Contact Person: MARK SPAFFORD

Total Project Cost: $ 234,286

Total NSEDC Funds Requested: $ 50,000

Current Costs of Energy in Community:

Electricity cost per khw - $0.30

Gasoline cost per gallon - $5.85

Heating oil cost per gallon - $6.30

APPLICATION REQUIREMENTS

The Community Energy Fund Application must include the following:

Letter of Request
Provide a cover letter summarizing the proposed project and clearly specify the amount of funding requested for a specific Community Energy Fund (CEF) project, activity, or service. Provide a brief overview stating how the project will benefit community members and meet the intent of the Community Energy Fund. For major structural projects, you must include a copy of a completed plan submitted by a certified engineer. Contact information must be included in the cover letter.

Scope of Work
As an attachment, provide a description and/or feasibility study of the overall plan for the specified project, activity, or service and include copies of architectural & engineering drawings/plans. Clearly outline the project goals and priorities.

Budget
Significant matching funds are an important component of the NSEDC CEF grant. Attach a spreadsheet detailing how the requested NSEDC funds will be spent and the source(s) of the required matching funds. List additional grants or other funds from other source(s) and provide a breakdown in the spreadsheet of how funds from each source will be used. Submit quotes or invoices from vendors for supplies, equipment, shipping or services as back-up documentation for the budget. *The budget must be presented in NSEDC format, no exceptions (see attached format).* Please note that NSEDC will not pay for costs not directly associated with the project. This includes "State" approved indirect costs or any other indirect costs associated with the project.

Timeline
If approved, the CEF grant will be made available for the project or program for two (2) calendar years from the time the initial disbursement is remitted by NSEDC to the grant recipient. Please provide a detailed description of the project timeline, including purchase, shipment, production, completion, and maintenance, if applicable.

Operation & Maintenance
If the project will require ongoing operation and/or maintenance beyond the NSEDC grant year(s), please provide a summary describing the future financial and personnel needs for the project and how those needs will be met.

What percentage of the requested NSEDC funds is budgeted for the payment of wages or for other personnel/labor expenses? What percentage of the requested budget is for construction materials?

What percentage of the total requested funding is budgeted for such personnel/labor expenses that will last for more than one (1) year for this specific project?

Matching Funds or Contributions
Please identify other funding sources as it pertains to your funding request:

Source	Item	Amount Secured	Pending*

**Note – Your project must be fully funded for the CEF grant to take effect.*

Community Support
Include a **resolution** of support **from each** of the following:

City	Tribe	ANCSA Village Corp.	Utility

Organization Financial Status

Federal Tax Identification Number (Employer Identification Number-EIN)		
92-0071623	**YES**	**NO**
Are all federal and state taxes current? If not, provide a list of all unpaid taxes and organization's plan for bringing the taxes current.	X	
Are there outstanding liens or garnishments against the organization? If so, identify the lien, the basis for the lien, the amount of debt, and the applicant's plan for paying off the debt.		X
Has the organization conducted financial audits for the last three years? (NSEDC reserves the right to request copies of those audits.)		X
Does the organization have short term and long range plans? If so, provide a summary of the plans.	X	
Is the organization new? If yes, please provide proof of incorporation or organization as a limited liability company.		X

Checklist

- o Letter of Request
- o Feasibility Study
- o Architectural and Engineering Drawings and Schematics
- o Permits
- o Scope of Work
- o Budget
- o Timeline
- o Operation & Maintenance
- o Matching Funds
- o Organizational Financial Status
- o Resolutions of Support

CITY OF SHAKTOOLIK
Name of Group or Organization

EUGENE ASICKSIK, MAYOR
Printed Name of Representative

Eugene Asicksik 6/8/12
Signature Date

MAYOR
Title

The applicant must adequately address all requirements of this application for the application to be considered complete. The NSEDC Board of Directors will make final funding approvals. Completing this application does not obligate NSEDC to fund the proposed project or program. If you have questions, please contact Paul Ivanoff III, *NSEDC Community Benefits Director*, at (800) 385-3190 or pivanoff@nsedc.com.

NSEDC Internal Use Only — DO NOT COMPLETE

Date Received: _____

Reviewed by: _____

Checklist of attachments. Each attachment must adequately address the requirements and include supporting documentation:

- o Letter of Request
- o Feasibility Study
- o A&E Drawings & Schematics
- o Land Use Permits
- o Scope of Work
- o Budget
- o Timeline
- o Operation & Maintenance
- o Matching Funds
- o Financial Status
- o Resolutions of Support

	Yes	No
Application is complete and all questions are adequately addressed.		
Does the budget comply with NSEDC's format?		
Are quotes, invoices, etc. provided to support the budget?		
Does the project or program list matching funds requested from other organizations?		
Are copies of matching funds requests and/or award letters provided?		
Does this project directly benefit the community members as intended?		
Are the questions on the organizations financial status answered?		

NSEDC Internal Use Only — DO NOT COMPLETE

Applicant's past performance in administering NSEDC grants:

Additional information to request from applicant:

NSEDC Notes:

NSEDC Community Energy Fund Application
Sample Budget

Budget Line Item	Applying Entity Contribution	NSEDC	Other (Please Identify)		TOTAL
Payroll					
Foreman (pay x hours x days)					
Carpenter (pay x hours x days)					
Labor (pay x hours x days)					
Stipends					
Fringe Benefits					
Materials					
Plywood					
Paint					
Electrical Supplies					
Insulation					
Plumbing Supplies					
Freight					
Northland					
ATS Nome to Village					
Equipment					
Generator					
Loader Rental					
Honda Rental					
Services					
Plumber					
Electrician					
Inspector					
Fuel					
Other					
Permits					
Airfare					
TOTAL					

STATEMENT OF WORK

PREFABRICATED WATER STORAGE TANK INSULATION SYSTEM

1.0 Introduction

1.1 This Statement of Work (SOW) covers the procurement of labor, equipment, and materials for a prefabricated water storage tank (WST) insulation system for the City of Shaktoolik, Alaska.

1.2 Applicable Documents: The following documents will apply to this contract.

1.2.1 Shaktoolik Water Storage Tank Drawing and Typical Insulation System Details

1.2.2 Specification: 13208 Technical Specifications Prefabricated Tank Shell Insulation System

1.2.3 Select Pages from the Shaktoolik Water Storage Tank Repair or Replacement Evaluation

1.2.4 City of Shaktoolik Water Storage Tank Site Assessment Memorandum

2.0 Key Assumptions

2.1 The Contractor will provide one prefabricated insulation package and associated appurtenances as described in the documents referenced in section 1.2 above.

2.2 Since the existing WST is a welded steel tank, no bolts exist on the roof of the tank (except for the vent location at the top center) to attach the roof insulation system as is typical of bolted steel tanks. Contractor will propose methodology of connecting and securing roof insulation system to tank to ensure that the requirements included within the technical specifications are met or exceeded.

2.3 The Contractor will provide the labor to complete the removal and disposal of the existing insulation system and installation of the new prefabricated insulation system. The Contractor will coordinate with the City of Shaktoolik for the disposal of the existing insulation system.

2.4 The Contractor will provide a warranty for the product as outlined in the technical specifications.

3.0 Contractor Responsibilities

3.1 Submittals: All required submittals shall be made to the following City of Shaktoolik representative. Electronic submittals shall be transmitted via email, if possible, and in PDF format unless otherwise indicated.

Mark Spafford, P.E.
Denali Commission
Sr. Program Manager
510 L Street, Suite 410
Anchorage, AK 99501
Phone: 907-271-1197
Email: mspafford@denali.gov

3.2 Inspection:

Inspection of materials prior to delivery to the F.O.B. location is not required as part of this request.

3.3 Delivery, Storage, and Handling

3.3.1 Shipment: The prefabricated WST insulation package system shall be delivered to Shaktoolik, AK.

3.3.2 Packaging: Packaging shall be as described in the technical specifications.

3.3.3 Packing Lists: Provide two (2) packing lists securely attached to each container (one inside and one outside), in water-tight re-sealable plastic bags for each individual crate or individually palletized deliverable item. The packing list is a detailed sheet describing the crate's contents.

3.3.4 Delivery and Labeling: Furnish materials, packaged as described in the specifications. Take extreme care in having this procurement complete, bundled for shipment, and labeled correctly in 2" high waterproof lettering. Label all individual boxes, pallets, crates or bundles with the following information:

Project Name:	*Shaktoolik Water Storage Tank Insulation System Replacement Project*
ATTN:	City of Shaktoolik
Destination:	Shaktoolik, Alaska
Phone:	907-955-3441 or 907-271-1197
Piece Weight:	{Piece weight in lbs}
Piece Cube:	{Piece cubic volume}

3.3.5 Installation: The contractor shall mobilize technicians to the project site who will complete the removal of the existing insulation system and installation of the new prefabricated insulation system. The contractor will be responsible for all food, lodging, and travel for the technician.

4.0 Buyer's Responsibilities

4.1 Any variations from the attached drawings and specifications must be approved by the City of Shaktoolik.

4.2 The City of Shaktoolik will not provide any materials to the Contractor for the completion of the prefabricated insulation system.

4.3 Landfill access is available locally for disposal of the existing insulation system as well as damaged new insulation system components.

4.4 Local transportation is available in the form of either four-wheelers or passenger truck vehicles.

5.0 Project Completion Criteria

5.1 The work will be considered complete when the prefabricated insulation system has been installed by the Contractor and approved by the City of Shaktoolik.

SECTION 13208

PREFABRICATED TANK SHELL INSULATION SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This section includes the manufacture and supply of a prefabricated tank insulation system applied over a potable welded steel water storage tank (WST). The materials covered in this specification include a composite insulation system for the WST side walls and roof, complete with a banding and securing system for it.

B. The prefabricated tank insulation system shall be complete with all assembly hardware, gaskets, sealants, bands, spring tensioner and all requisite accessories as shown on the Plans and/or described in this specification. If provided, any attached drawings and/or appendix(s) shall illustrate pertinent information with regard to tank dimensions, installation location, pipe species, type of piping and appurtenances.

C. The insulation manufacturer shall verify the welded WST design depicted on the contract drawings prior to commencement of fabrication and installation of the WST insulation system.

1.2 RELATED SECTIONS:

N/A

1.3 REFERENCES

The latest edition of the following specifications that are reference in this document shall be considered integral to this specification.

A. International Building Code (IBC) - 2006 Edition

B. American Architectural Manufacturers Association:
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

3. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. ASTM International:
1. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
4. ASTM C1289-08 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

D. Federal Specification Unit:
1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.

E. ANSI
1. ANSI 4880 – Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings and Exterior Wall Systems.

F. Underwriters Laboratory
1. UL 723 – Test for Surface Burning Characteristics of Building Materials

G. AWWA
1. AWWA D-103-09

1.4 DESIGN REQUIREMENTS

A. Roof Snow Loads: The design snow load shall be as follows:
1. Terrain Category – C;
2. Exposure Factor (Ce) – 0.9;
3. Importance Factor (I) – 1.1;
4. Thermal Factor (Ct) – 1.2; and,
5. Flat Roof Load (Pf) – 49.0 pounds per square foot (psf).

B. Wind Loads: Design and size components to withstand positive and negative wind loads, including increased loads at building corners per the following requirements:
1. Basic Wind Speed – 130 miles per hour (mph), 3 second gust;
2. Importance Factor (I) – 1.15;

3. Exposure Category – C; and,
4. Exposure Factor at 20 ft. – 1.1.

C. Wind Uplift Resistance: UL 580; Class 90.

D. Seismic Loads: Design and size components to withstand seismic loads and sway displacement per the following requirements:
1. Seismic Use Group (Category) – III;
2. Site Classification – C;
3. Design Category – C; and,
4. Analysis Procedure – Equivalent Lateral Force.

E. Air Infiltration: Limit air leakage through wall assembly to 0.03 cfm/sq ft of wall area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E283.

F. Water Leakage: None, when measured in accordance with ASTM E331 with test pressure of 6.24 psf.

G. Exterior Components: Accommodate the following without damage to system, components or deterioration of seals.
1. Movement within system.
2. Movement between system and perimeter framing components.
3. Dynamic loading and release of loads.
4. Deflection of structural support framing.
5. Expansion and contraction for temperature extremes of -60°F to +100°F.

1.5 SUBMITTALS

A. Shop Drawings: Indicate details of construction including attachments, joint patterns, penetrations, interface with flashings, ladders, manways and adjacent materials.

B. Product Data:
1. Submit data on system materials, product characteristics, performance criteria and limitations.
2. Submit data on metal types, finishes, and characteristics.
3. Submit two (2) color charts for finish selection. The color of the exterior sheathing will be selected by the Owner.

C. Samples: Submit one (1) each 8 x 12 inch size samples of the composite insulation system illustrating a composite section of exterior sheathing with protective coating, insulation, panel connection clips, vertical weather seal with band location slots.

D. Submit one (1) each band spring tensioner assembly for selection.

E. Manufacturer's Installation Instructions: Submit four (4) copies of written instructions covering storage, handling, inspection of materials, preparation required, installation techniques, jointing requirements and maintenance information. These instructions shall include a detailed erection drawing(s) of sufficient clarity to allow erection by others.

F. The drawing(s), manufactures submittal data, installation instructions shall be emailed in Adobe© .pdf format to the City of Shaktoolik.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing prefabricated tank insulation products specified in this section with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect adhesives and finish materials from freezing by storing in environment recommended by manufacturer.

B. All insulation panels, and miscellaneous parts shall be packaged for shipment in such a manner as to prevent abrasion or scratches due to direct contact between factory-coated surfaces of any and all individual insulation components and appurtenances, or packaging/crating material.

1. Insulation components of similar function, i.e., will be crated with like components.
2. Insulation panels shall be stacked together but separated from each other with a non-abrasive material, which is intended to protect the sheets from each other during rough-ocean shipping conditions.
3. Roof sheets may be stacked together but separated from each other with a non-abrasive material, which is intended to protect the sheets from each other during rough-ocean shipping conditions.
4. All spring tensioner, nuts, bolts and miscellaneous small parts and hardware shall be boxed, crated, and labeled appropriately.
5. Prior to shipment, all insulation components and materials shall be palletized to facilitate easy transfer between modes of transportation.

D. All insulation component items and appurtenances shall be full-box export crated for open-deck ocean-barge shipment.

1. Prior to enclosure in solid plywood export-type wooden crates, each palletized unit shall be tightly wrapped with plastic-film to prohibit exposure of the deliverable materials to saltwater spray during open-ocean barge transport of the appurtenances.
2. Pallet weights shall not exceed 3,000 pounds.

3. Pad eyes or hooks will be left exposed and easily accessible when installed as lifting devices and are an integral part of the crate. The sheathed crate shall consist of frame members which are covered with solid sheathing material such as lumber or plywood fastened to the interior frame.

E. For containerized shipments, the following shall apply:

1. Insulation panels shall be full box crated and blocked and braced.
2. Miscellaneous small parts and hardware shall be full box crated, blocked and braced.
3. Odd shaped parts not conducive to packing shall be tightly wrapped with plastic-film and shall be individually blocked and braced.

1.8 EXTRA MATERIALS

A. Furnish the following materials to Owner, with repair procedures:

1. One gallon of finish coat paint.
2. Two (2) additional insulation panels
3. Four (4) additional spring tension clamps

1.9 WARRANTY

A. The manufacturer shall warrant the insulation system against any and all defects in workmanship and materials for a period of one year from the date of delivery to the F.O.B. point. In the event any such defect should appear, it shall be reported in writing to the manufacturer during the warranty period.

PART 2 PRODUCTS

2.1 MANUFACTURES OF PREFABRICATED TANK INSULATION SYSTEM

A. Iso Panels, Inc. – Horizontal Insulation System

B. Thermacon – Horizontal Insulation System

C. Or approved equal

2.2 COMPONENTS

A. The insulation panels shall be precurved to fit the tank shell curvature. The panels shall be 4-feet by 8-feet and composed of a 5-inch foil faced (both sides) isocyanurate foam core laminated to 0.032-inch, 3105H14 alloy aluminum sheathing. The thermal conductivity (k) of the isocyanurate foam insulation shall be a maximum of 0.140 BTU in/Ft^{2o}FHr, at 75°F mean temperature. The exposed

side of the aluminum sheathing on the panels shall have a silicone polyester finish covered by a standard commercial warranty.

B. Fastening system and weather sealing: An effective weather tight system shall be provided. The weather tight system shall have a 2-inch wide aluminum vertical weather seal, and neoprene gasket insert on the end of each panel. Each panel shall have two (2) belt loops that will secure, provide location and prevent vertical movement of the horizontal banding system. Each panel shall have two (2) top clips to secure adjacent panels.

C. Aluminum bands shall be provided for sealing the top edge of all panels. The bands shall be of sufficient width to insure a 1-1/2inch minimum lap over the external sheathing.

D. Preloaded Spring Tension Clamping System shall be provided for attaching the insulation panels to the tank. The banding and clamping system shall be designed to withstand the wind pressure specified Section 1.4 Part B and shall allow for extremes of thermal expansion and contraction of the banding. A minimum of three (3) clamps per band shall be provided.

E. Flashing System: The contractor shall supply a roof flashing similar to the one shown in the drawing(s) to cover the roof-wall intersection.

F. Shell Manhole Cover: The contractor shall supply the quantity of shell manhole covers and manhole flanges specified in the drawing(s). The covers and flanges shall be precurved to fit the tank shell curvature. The covers shall be composed of a 5-inch foil faced (both sides) isocyanurate foam core which is laminated to an aluminum sheathing. The aluminum sheathing color shall be identical to the insulation panel color. The design of the shell manhole cover and flange shall be as shown in the drawing(s).

G. ACCESSORIES

1. Insulation Adhesive (As recommended by manufacturer)

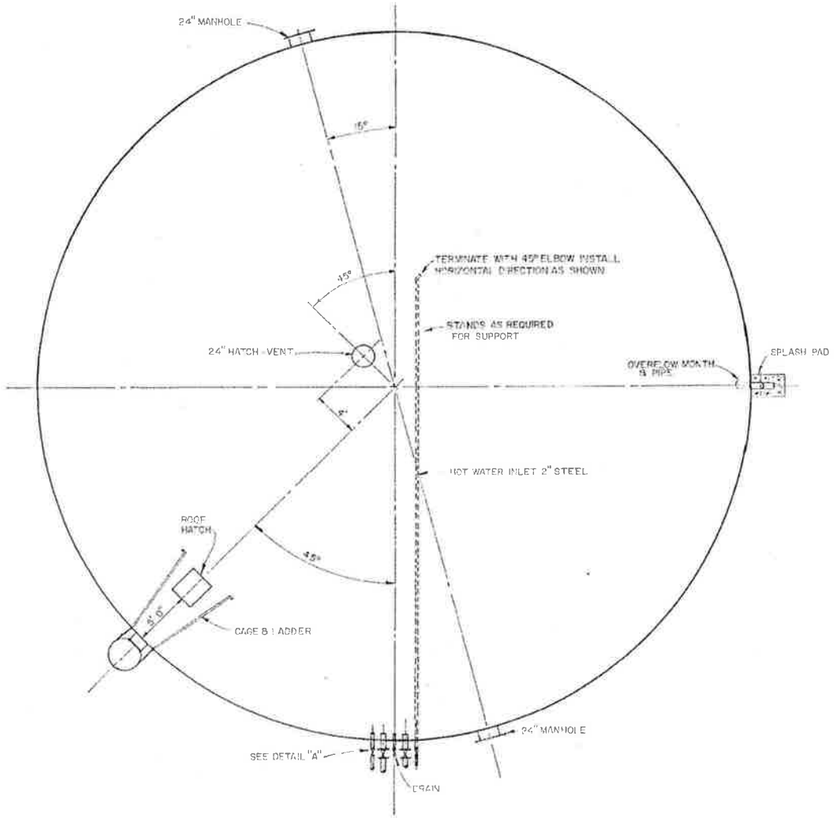
2. Sealant Materials: (As recommended by coating manufacturer)

PART 3. EXECUTION

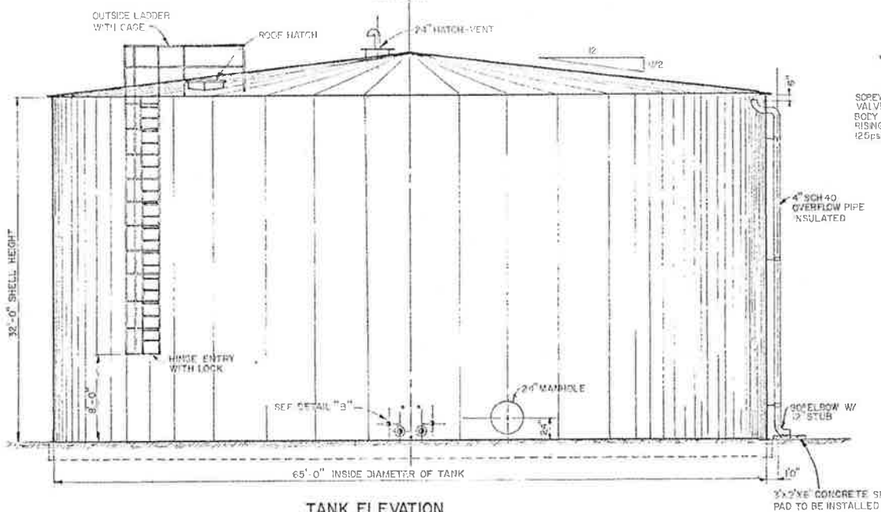
3.1 EXAMINATION

1. Verify materials are dry and have not been damaged.

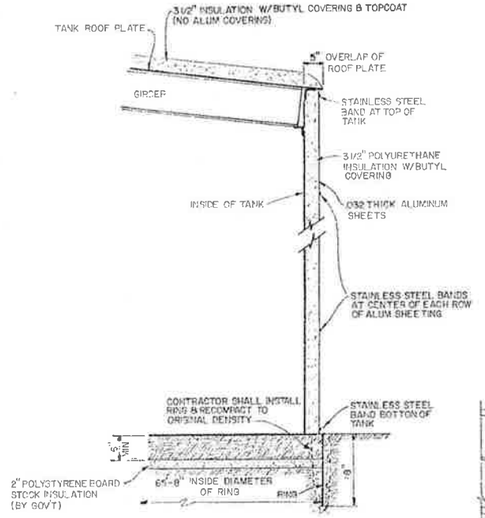
END OF SECTION



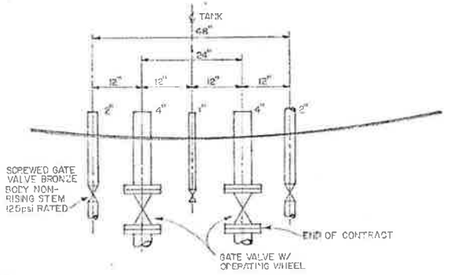
PLAN



TANK ELEVATION
NTS



RING INSTALL & INSULATION DETAIL
NTS



DETAIL "A"
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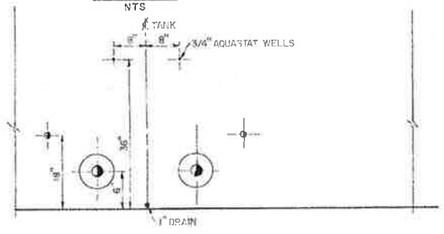

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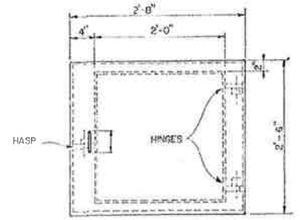
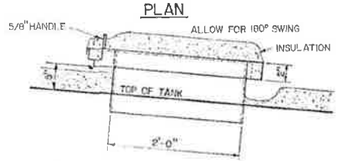
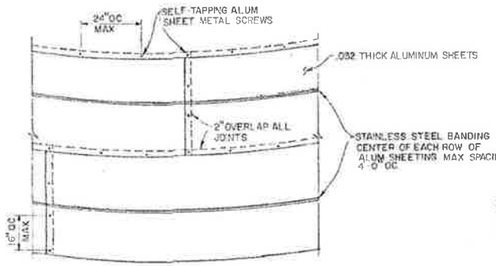


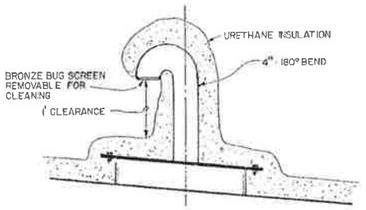
PLAN



ROOF HATCH DETAIL
NTS



ALUMINUM COVERING DETAIL
NTS



COMBINATION ROOF HATCH & VENT DETAIL
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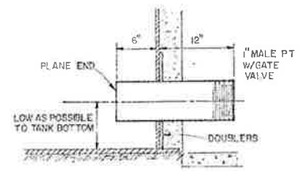
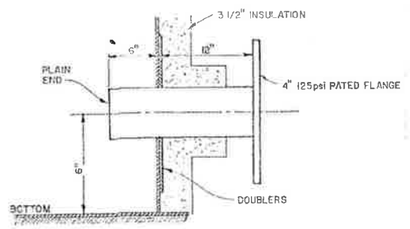


DRAIN DETAIL
NTS



INLET & OUTLET DETAIL
NTS

NOTES

1. ROOF, SHELL, & BOTTOM PLATES A-36 STEEL.
2. ALL 4" PIPING TO BE SCHEDULE 40 STEEL PIPE
3. ALL 2" PIPING TO BE SCHEDULE 40 STEEL PIPE
4. ALL BOLTS & NUTS TO BE A-307
5. SHELL DOUBLERS A-36 STEEL.
6. ENTIRE TANK (ROOF & SHELL) SHALL BE INSULATED WITH 3 1/2" POLYURETHANE SPRAY FOAM.
7. MANHOLE BOLTS & NUTS, LADDER AND CAGE NOT INSULATED.
8. MANHOLE SURFACE, HATCHES, VENT, OVERFLOW PIPE INSULATED WITH 3 1/2" POLYURETHANE.
9. CONTRACTOR TO PROVIDE ALL VALVES
10. TANK CONSTRUCTION TO LATEST AWWA STANDARDS OR AS SPECIFIED
11. DRAIN PIPE SHALL BE GALVANIZED STEEL PIPE
12. RING SHALL BE ROUND WITHIN 1" AND SHALL BE PLACED SO THAT TOP IS AT SAME ELEVATION ALONG RING PERIMETER
13. TANK SHELL ONLY SHALL BE COVERED W/ .032 THICK ALUMINUM COVERING OVER THE 3 1/2" INSULATION WITH 2" OVERLAP AT EACH JOINT AS SHOWN IN DETAILS.

DATE	REVISIONS	INITIALS

U. S. Department of Health, Education & Welfare
Public Health Service
Indian Health Service

SHAKTOOLIK, ALASKA
794,000 GALLON AWWA WATER TANK
& DETAILS
PUBLIC LAW 86-121 PROJECT
PROJECT NO. AN-77-104

SHEET NO. 17 OF 22 TOTAL SHEETS

Art Rennius
Design Engineer

Maintenance Review

Material Take-off

STATE OF ALASKA — Arthur D. Powell — REGISTERED PROFESSIONAL ENGINEER

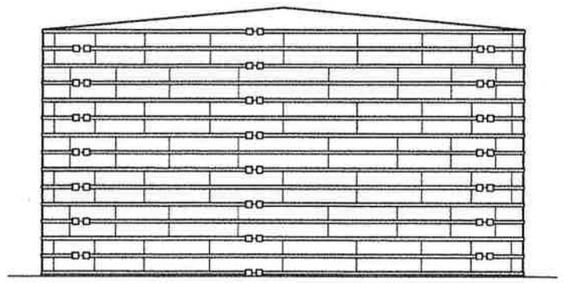
DRAWN BY: JAQ DATE: Nov 77
CHECKED BY: DATE:

SANITATION FACILITIES CONSTRUCTION BRANCH
OFFICE OF ENVIRONMENTAL HEALTH
ALASKA AREA NATIVE HEALTH SERVICE
ANCHORAGE, ALASKA

U.S. GOVERNMENT PRINTING OFFICE 1977-760-286

NOTE. TANK IS WELDED STEEL CONSTRUCTION, SEE TANK RECORD DWG.

PANEL, BAND AND BANDSION ARRANGEMENT

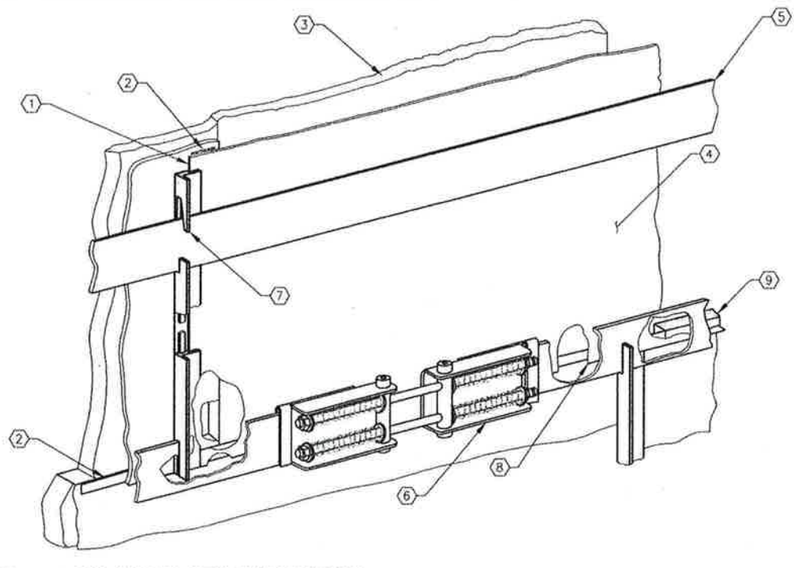


C1 TYPICAL TANK ELEVATION
NTS

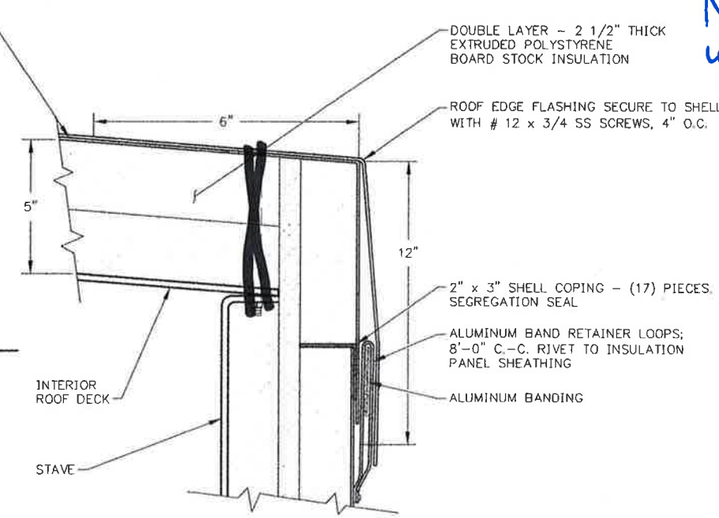
NOTES:

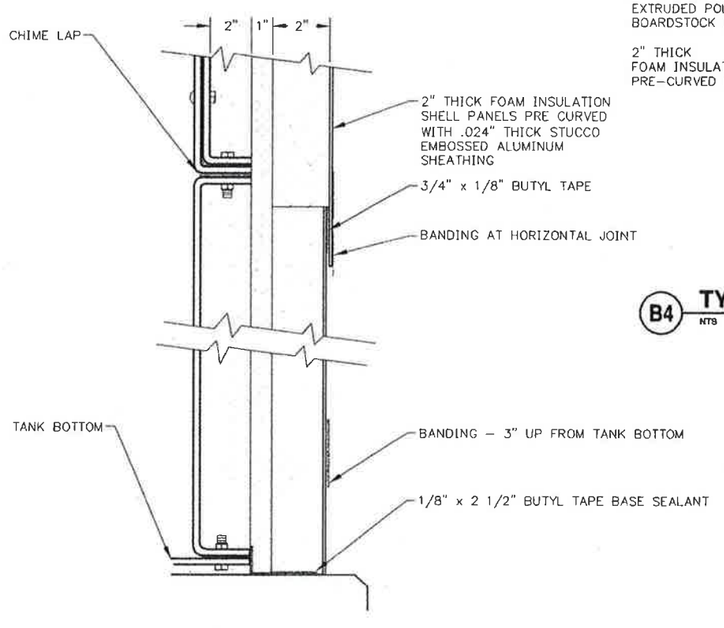
TANK INSULATION SYSTEM

1. VERTICAL JOINT WITH 2" OVERLAP – EXTRUDED ALUMINUM WEATHERSEAL.
2. 3/4" x 1/8" BUTYL TAPE UNDER ALL PANEL OVERLAPS.
3. 2" THICK ISOCYANURATE FOAM INSULATION WITH AN ALUMINUM FOIL FACING SHEET.
4. EXTERIOR SHEATHING – .024" THICK STUCCO EMBOSSED ALUMINUM – COLOR "TBD" STANDARD – WHITE, FAWN, SILVER, OR CLEAR
5. .050" x 3" ALUMINUM BAND HELD IN PLACE WITH "BANDSION" CLAMPS BANDS NORMALLY ON 2'-0" CENTERS.
6. "BANDSION" CLAMPS ALLOW FOR EXTREMES OF THERMAL EXPANSION AND CONTRACTION OF THE TANK AS OPPOSED TO EXTREMES OF AMBIENT EXPANSION AND CONTRACTION OF THE BANDING
7. CENTER BANDS ARE TO BE HELD IN PLACE BY A PUNCH OUT SECTION OF THE WEATHERSEAL EXTRUSION.
8. HORIZONTAL JOINTS WITH 1 1/2" OVERLAPS, DOWN WEATHER, COMPRESSED BY BANDING.
9. TOP EDGE OF EACH PANEL SEALED WITH ALUMINUM TAPE.

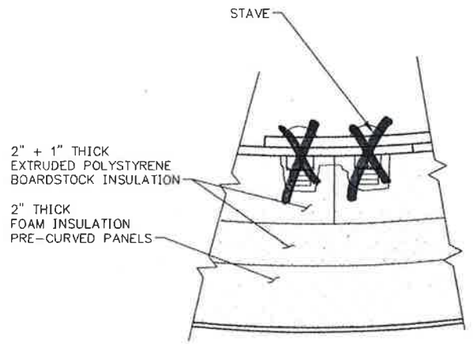


A1 TANK INSULATION SYSTEM
NTS





A2 TYPICAL SECTION OF TANK SHELL
NTS



B4 TYPICAL SHELL INSULATION PLAN
NTS

ALASKA
WATER STORAGE TANK
CONSTRUCTION PLANS

MRK	DATE	DESCRIPTION

SHEET TITLE

WST - INSULATION DETAILS

C-503

Alaska Native Tribal Health Consortium

Division of Environmental Health and Engineering
1901 Bragaw Street • Suite 200 • Anchorage, AK 99508-3440 • Phone: (907) 729-3600 • Fax: (907) 729-4090 • www.anthc.org

August 2nd, 2011

Ms. Rita Auliye
City Clerk
City of Shaktoolik
P O Box 10
Shaktoolik, AK 99771

Dear Ms. Auliye,

Re: Shaktoolik Water Treatment Plant Energy Audit Report

I have enclosed a copy of the report prepared as part of the energy audit of the Shaktoolik Water Treatment Plant. The audit was prepared by the Energy Projects Group of the Department of Environmental Health and Engineering (DEHE) at the Alaska Native Tribal Health Consortium (ANTHC). Please feel free to contact me if you have any questions.

Once the energy efficiency measures are implemented, the fuel and electricity costs to operate the Tribal Office building will be reduced by approximately $37,607 or 75% of the $50,050 2010 annual energy cost.

The energy audit was performed with EECBG funds provided by Department of Energy grant DE-EE0001883. We encourage the Native Village of Shaktoolik to implement our recommendations. If funding the implementation is a concern, you might want to apply for the next round of EECBG funding.

Sincerely,

Carl H. Remley
Energy Projects Manager

Enclosure
Shaktoolik Water Treatment Plant Energy Audit Report

Cc: Edwin Jackson, Shaktoolik Water Treatment Plant Operator w/ enclosure
Phillip Gagnon, Engineer I, Village Safewater w/ enclosure
Carleen Sagoonick, Tribal Administrator, Native Village of Shaktoolik w/ enclosure

Comprehensive Energy Audit
For
Shaktoolik Water Treatment Plant

Prepared For

City of Shaktoolik

July 22, 2011

Prepared By:

ANTHC-DEHE
Energy Projects Group
1901 Bragaw, Suite 200
Anchorage, AK 99508

Table of Contents

PREFACE

The Energy Projects Group at the Alaska Native Tribal Health Consortium (ANTHC) prepared this document for the City of Shaktoolik. The authors of this report are Carl H. Remley, Certified Energy Auditor (CEA), and Certified Energy Manager (CEM), and Gavin Dixon.

The purpose of this report is to provide a comprehensive document that summarizes the findings and analysis that resulted from an energy audit conducted over the past couple months by the Energy Projects Group of ANTHC. This report analyzes historical energy use and identifies costs and savings of recommended energy efficiency measures. Discussions of site specific concerns and an Energy Efficiency Action Plan are also included in this report.

ACKNOWLEDGMENTS

The ANTHC Energy Projects Group gratefully acknowledges the assistance of Ms. Carleen Sagoonik of the Native Village of Shaktoolik, Mr. Edward Jackson the Water Treatment Plant Operator, and Mr. Phillip Gagnon of Village Safe Water.

1. EXECUTIVE SUMMARY

This report was prepared for the City of Shaktoolik. The scope of the audit focused on Shaktoolik Water Treatment Plant. The scope of this report is a comprehensive energy study, which included an analysis of building shell, interior and exterior lighting systems, HVAC systems, process loads, and plug loads.

Based on electricity and fuel oil prices in effect at the time of the audit, the annual energy costs for the buildings analyzed were $6,462 for electricity and $43,588 for #1 fuel oil. This results in a total energy cost of $50,050 per year. A small amount of recovered heat was also used but it was at no cost.

It should be noted that this facility received a power cost equalization (PCE) subsidy last year. If it did not receive the PCE, the annual electricity cost would have been $22,452 and the total annual energy cost would have been $66,040. The building also contains a washeteria but it is rarely used.

Table 1.1 below summarizes the energy efficiency measures analyzed for the Shaktoolik Water Treatment Plant. Listed are the estimates of the annual savings, installed costs, and two different financial measures of investment return.

Table 1.1
PRIORITY LIST – ENERGY EFFICIENCY MEASURES

Rank	Feature	Improvement Description	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR[1]	Simple Payback (Years)[2]
1	Other Electrical: Circulation Pumps	Improve Manual Switching	$157	$0	>100	0.0
2	Setback Thermostat: Water Treatment Plant	Implement a Heating Temperature Unoccupied Setback to 50.0 deg F for the Water Treatment Plant space.	$956	$1,000	14.33	1.0
3	HVAC And DHW	Hydronic heating improvements	$5,242	$20,000	5.06	3.8
4	Electric Boiler	Repair insulation on Water Storage Tank roof and add electric boiler to heat tank that operates when excess wind is available from AVEC	$21,564	$200,000	1.64	9.3
5	Heat Recovery System on Circulation loop	This retrofit would replace the 30 year old heat recovery system that is not presently operational.	$9,109	$100,000	1.40	11.0
6	Lighting: WTP Entrance and Office	Replace with 6 LED replacement lamps	$225	$1,440	1.37	6.4
7	Main Entrance	Remove existing door and install standard pre-hung U-0.16 insulated door, including hardware.	$34	$682	1.35	20.0
8	Other Electrical: Appliances	Improve Manual Switching	$19	$100	1.16	5.4

Table 1.1 PRIORITY LIST – ENERGY EFFICIENCY MEASURES						
Rank	**Feature**	**Improvement Description**	**Annual Energy Savings**	**Installed Cost**	**Savings to Investment Ratio, SIR[1]**	**Simple Payback (Years)[2]**
9	Air Tightening: Main entrance and generator room	Perform air sealing to reduce air leakage by 865 cfm at 50 Pascals.	$302	$3,000	1.03	9.9
	TOTAL, all measures		**$37,607**	**$326,222**	**1.81**	**8.7**

Table Notes:

[1] Savings to Investment Ratio (SIR) is a life-cycle cost measure calculated by dividing the total savings over the life of a project (expressed in today's dollars) by its investment costs. The SIR is an indication of the profitability of a measure; the higher the SIR, the more profitable the project. An SIR greater than 1.0 indicates a cost-effective project (i.e. more savings than cost). Remember that this profitability is based on the position of that Energy Efficiency Measure (EEM) in the overall list and assumes that the measures above it are implemented first.

[2] Simple Payback (SP) is a measure of the length of time required for the savings from an EEM to payback the investment cost, not counting interest on the investment and any future changes in energy prices. It is calculated by dividing the investment cost by the expected first-year savings of the EEM.

With all of these energy efficiency measures in place, the annual utility cost can be reduced by $37,607 per year, or 75.1% of the buildings' total energy costs. These measures are estimated to cost $326,222, for an overall simple payback period of 8.7 years.

Table 1.2 below is a breakdown of the annual energy cost across various energy end use types, such as Space Heating and Water Heating. The first row in the table shows the breakdown for the building as it is now. The second row shows the expected breakdown of energy cost for the building assuming all of the retrofits in this report are implemented. Finally, the last row shows the annual energy savings that will be achieved from the retrofits.

Table 1.2 Annual Energy Cost Estimate										
Description	**Space Heating**	**Space Cooling**	**Water Heating**	**Lighting**	**Other Electrical**	**Circulation Loop Heat**	**Water Tank Heat**	**Ventilation Fans**	**Service Fees**	**Total Cost**
Existing Building	$4,517	$0	$4,132	$1,724	$3,874	$11,530	$24,273	$0	$0	**$50,050**
With All Proposed Retrofits	$1,591	$0	$663	$1,499	$3,559	$2,421	$2,709	$0	$0	**$12,442**
SAVINGS	$2,926	$0	$3,469	$225	$314	$9,109	$21,564	$0	$0	**$37,607**

2. AUDIT AND ANALYSIS BACKGROUND

2.1 Program Description

This audit included services to identify, develop, and evaluate energy efficiency measures at the Shaktoolik Water Treatment Plant. The scope of this project included evaluating building shell, lighting and other electrical systems, and HVAC equipment, process loads, motors and pumps. Measures were analyzed based on life-cycle-cost techniques, which include the initial cost of the equipment, life of the equipment, annual energy cost, annual maintenance cost, and a discount rate of 3.0%/year in excess of general inflation.

2.2 Audit Description

Preliminary audit information was gathered in preparation for the site survey. The site survey provides critical information in deciphering where energy is used and what opportunities exist within a building. The entire site was surveyed to inventory the following to gain an understanding of how each building operates:

- Building envelope (roof, windows, etc.)
- Heating, ventilation, and air conditioning equipment (HVAC)
- Lighting systems and controls
- Building-specific equipment
- Water consumption, treatment (optional) & disposal

The building site visit was performed to survey all major building components and systems. The site visit included detailed inspection of energy consuming components. Summary of building occupancy schedules, operating and maintenance practices, and energy management programs provided by the building manager were collected along with the system and components to determine a more accurate impact on energy consumption.

Details collected from Shaktoolik Water Treatment Plant enable a model of the building's energy usage to be developed, highlighting the building's total energy consumption, energy consumption by specific building component, and equivalent energy cost. The analysis involves distinguishing the different fuels used on site, and analyzing their consumption in different activity areas of the building.

In addition, the methodology involves taking into account a wide range of factors specific to the building. These factors are used in the construction of the model of energy used. The factors include:

- Occupancy hours
- Local climate conditions
- Prices paid for energy

2.3. Method of Analysis

Data collected was processed using AkWarm© Energy Use Software to estimate energy savings for each of the proposed energy efficiency measures (EEMs). The recommendations focus on the building envelope; HVAC; lighting, plug load, and other electrical improvements; and motor and pump systems that will reduce annual energy consumption.

EEMs are evaluated based on building use and processes, local climate conditions, building construction type, function, operational schedule, existing conditions, and foreseen future plans. Energy savings are calculated based on industry standard methods and engineering estimations.

Our analysis provides a number of tools for assessing the cost effectiveness of various improvement options. These tools utilize **Life-Cycle Costing**, which is defined in this context as a method of cost analysis that estimates the total cost of a project over the period of time that includes both the construction cost and ongoing maintenance and operating costs.

Savings to Investment Ratio (SIR) = **Savings** divided by **Investment**

Savings includes the total discounted dollar savings considered over the life of the improvement. When these savings are added up, changes in future fuel prices as projected by the Department of Energy are included. Future savings are discounted to the present to account for the time-value of money (i.e. money's ability to earn interest over time). The **Investment** in the SIR calculation includes the labor and materials required to install the measure. An SIR value of at least 1.0 indicates that the project is cost-effective—total savings exceed the investment costs.

Simple payback is a cost analysis method whereby the investment cost of a project is divided by the first year's savings of the project to give the number of years required to recover the cost of the investment. This may be compared to the expected time before replacement of the system or component will be required. For example, if a boiler costs $12,000 and results in a savings of $1,000 in the first year, the payback time is 12 years. If the boiler has an expected life to replacement of 10 years, it would not be financially viable to make the investment since the payback period of 12 years is greater than the project life.

The Simple Payback calculation does not consider likely increases in future annual savings due to energy price increases. As an offsetting simplification, simple payback does not consider the need to earn interest on the investment (i.e. it does not consider the time-value of money). Because of these simplifications, the SIR figure is considered to be a better financial investment indicator than the Simple Payback measure.

Measures are implemented in order of cost-effectiveness. The program first calculates individual SIRs, and ranks all measures by SIR, higher SIRs at the top of the list. An individual measure must have an individual SIR>=1 to make the cut. Next the building is modified and re-simulated with the highest ranked measure included. Now all remaining measures are re-evaluated and ranked, and the next most cost-effective measure is implemented. AkWarm goes through this iterative process until all appropriate measures have been evaluated and installed.

It is important to note that the savings for each recommendation is calculated based on implementing the most cost effective measure first, and then cycling through the list to find the next most cost effective measure. Implementation of more than one EEM often affects the savings of other EEMs. The savings may in some cases be relatively higher if an individual EEM is implemented in lieu of multiple recommended EEMs. For example implementing a reduced operating schedule for inefficient lighting will result in relatively high savings. Implementing a reduced operating schedule for newly installed efficient lighting will result in lower relative savings, because the efficient lighting system uses less energy during each hour of operation. If multiple EEM's are recommended to be implemented, AkWarm calculates the combined savings appropriately.

Cost savings are calculated based on estimated initial costs for each measure. Installation costs include labor and equipment to estimate the full up-front investment required to implement a change. Costs are derived from Means Cost Data, industry publications, and local contractors and equipment suppliers.

2.4 Limitations of Study

All results are dependent on the quality of input data provided, and can only act as an approximation. In some instances, several methods may achieve the identified savings. This report is not intended as a final design document. The design professional or other persons following the recommendations shall accept responsibility and liability for the results.

3. Shaktoolik Water Treatment Plant

3.1. Building Description

The 2,112 square foot water treatment plant was constructed in 1977 and had a significant upgrade in 1991. It has a normal occupancy of one person during occupied hours. The number of hours of operation for this building average 2.6 hours per day, considering all seven days of the week.

The building is mounted on pads, has a 2 X 12 floor joist, six inch panel walls, and a six inch panel sloped roof with a cathedral ceiling. The floor has twelve inches of fiberglass insulation. Overall, the building is in fair condition.

The main entrance to the water treatment plant is a double door that is heavily damaged. The other two doors are in fair condition. The building has a total of six windows that show their age but are in fair condition.

A heated water storage tank is located next to the water treatment plant. The storage tank has a capacity of 794,000 gallons of water. The steel tank is 65 feet in diameter and 32 feet high. The side walls of the tank are covered with 3 ½ inches of polyurethane insulation, with a butyl covering and an outer aluminum sheeting. The roof of the tank was covered with the same insulation and butyl covering with no protective aluminum sheeting. Over the years, structural failures of the roof supports have destroyed the insulation on the roof.

Description of Heating Plant

The Heating Plants used in the building are:

Weil McLain Boiler

Nameplate Information:	Weil McLain Model BL-676WS
Fuel Type:	#1 Oil
Input Rating:	278,000 BTU/hr
Steady State Efficiency:	80 %
Idle Loss:	5 %
Heat Distribution Type:	Water
Boiler Operation:	All Year
Notes:	Nozzle 2.25 GPH

Weil McLean Boiler

Nameplate Information:	Weil McLain BL-676WS
Fuel Type:	#1 Oil
Input Rating:	278,000 BTU/hr
Steady State Efficiency:	80 %
Idle Loss:	5 %
Heat Distribution Type:	Water
Boiler Operation:	All Year
Notes:	Nozzle 2.25 GPH

Heat Recovery System

Nameplate Information:	Heat Recovery from AVEC
Fuel Type:	Hot Wtr District Ht
Input Rating:	210,000 BTU/hr
Steady State Efficiency:	80 %
Idle Loss:	0 %
Heat Distribution Type:	Water
Boiler Operation:	All Year
Notes:	Feeds into water circulation loop only

The vast majority of the 12,750 gallons of #1 fuel oil used this past year was used to heat the water storage tank. Most of this heavy usage was due to the missing insulation on the 65 foot diameter roof of the water storage tank.

The second heaviest load on the boilers was the water circulation loop. A heat recovery system located at the Alaska Village Electric Cooperative (AVEC) power plant was designed to heat both the water circulation loop and the water storage tank. However, this system is no longer functional at all for the water storage tank and only marginally functional for the circulation loop. The majority of the heat for the circulation loop is from the boilers.

The space heating for the water treatment plant is totally dependent on the two boilers. Space heat was never provided by the heat recovery system. The building is kept at 65 degrees year round.

Heating Distribution Systems

At present, the boilers have three heat distribution loops. The largest loop provides heat to the water treatment plant unit heaters, the water storage tank, and the water circulation loop. The hot water heater for the washeteria is on a separate circulation pump. Both of these loops are operated 24 hours per day. The third loop is for the hydronic dryers. This loop is operated on a as needed basis only.

Domestic Hot Water System

As mentioned above, the domestic hot water system is heated by the two boilers but with a separate pumped loop. The loop constantly circulates glycol from the boilers to the 200 gallon hot water storage tank.

Waste Heat Recovery Information

As mentioned earlier, the heat recovery system has largely been abandoned and needs to be replaced.

Lighting

The lighting in the water treatment plant is provided by 36 four lamp four foot fluorescent fixtures. Six of those fixtures are used often and should up-graded. The remaining thirty are not used often enough to justify replacing.

Plug Loads

Plug loads in the water treatment plant are a very small percentage of the overall load.

Major Equipment

The major equipment is associated with the process loads at the water treatment plant. This includes but is not limited to the back wash pumps, the small chemical pumps, the glycol circulation pumps, the potable water circulation pumps, and a compressor. As mentioned earlier, there are also washers and dryers in the washeteria but they are rarely used.

3.2 Predicted Energy Use

3.2.1 Energy Usage / Tariffs

The electric usage profile charts (below) represents the predicted electrical usage for the building. If actual electricity usage records were available, the model used to predict usage was calibrated to approximately match actual usage. The electric utility measures consumption in

kilowatt-hours (kWh). One kWh usage is equivalent to 1,000 watts running for one hour. The basic usage charges are shown as generation service and delivery charges along with several non-utility generation charges.

The fuel oil usage profile shows the fuel oil usage for the building. Fuel oil consumption is measured in gallons. One gallon of #1 Fuel Oil provides approximately 132,000 BTUs of energy.

The following is a list of the utility companies providing energy to the building and the class of service provided:

Electricity: AVEC-Shaktoolik - Commercial - Sm

The average cost for each type of fuel used in this building is shown below in Table 3.1. This figure includes all surcharges, subsidies, and utility customer charges:

Table 3.1 – Average Energy Cost

Description	Average Energy Cost
Electricity	$ 0.1580/kWh
#1 Oil	$ 3.42/gallons
Hot Wtr District Ht	$ 0.00/million Btu

3.2.1.1 Total Energy Use and Cost Breakdown

At current rates, City of Shaktoolik pays approximately $50,050 annually for electricity and #1 fuel costs for the Shaktoolik Water Treatment Plant.

Figure 3.1 below reflects the estimated distribution of costs across the primary end uses of energy based on the AkWarm© computer simulation. Comparing the "Retrofit" bar in the figure to the "Existing" bar shows the potential savings from implementing all of the energy efficiency measures shown in this report.

Figure 3.1
Annual Energy Costs by End Use

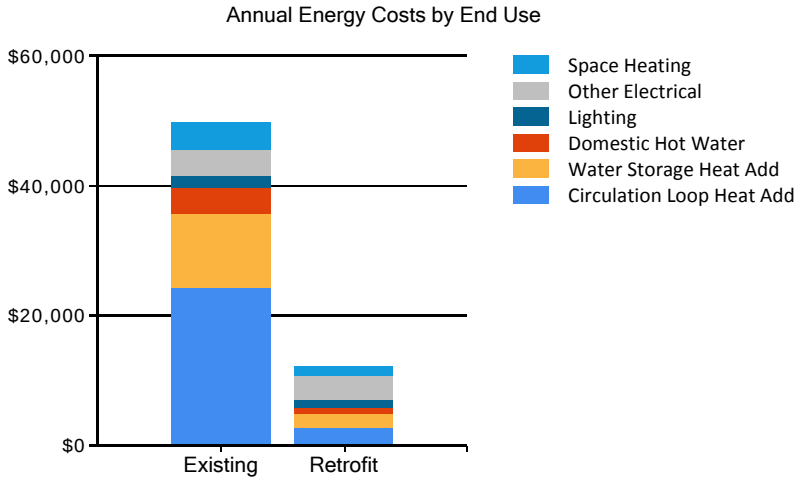


Figure 3.2 below shows how the annual energy cost of the building splits between the different fuels used by the building. The "Existing" bar shows the breakdown for the building as it is now; the "Retrofit" bar shows the predicted costs if all of the energy efficiency measures in this report are implemented.

Figure 3.2
Annual Energy Costs by Fuel Type

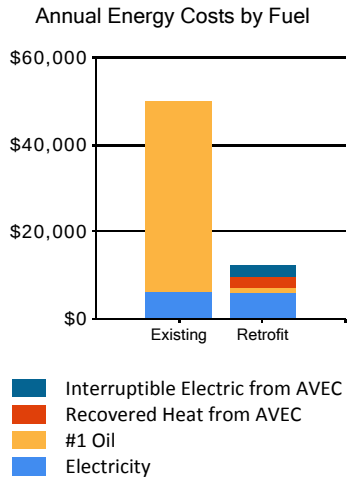
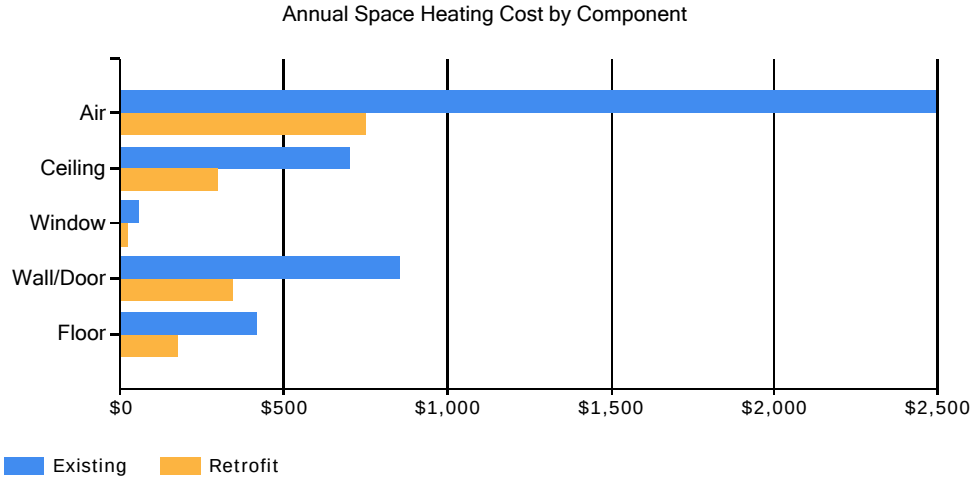


Figure 3.3 below addresses only Space Heating costs. The figure shows how each heat loss component contributes to those costs; for example, the figure shows how much annual space heating cost is caused by the heat loss through the Walls/Doors. For each component, the space heating cost for the Existing building is shown (blue bar) and the space heating cost assuming all retrofits are implemented (yellow bar) are shown.

Figure 3.3
Annual Space Heating Cost by Component



The tables below show AkWarm's estimate of the monthly fuel use for each of the fuels used in the building. For each fuel, the fuel use is broken down across the energy end uses. Note, in the tables below "DHW" refers to Domestic Hot Water heating.

Electrical Consumption (kWh)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lighting	926	844	926	896	926	896	926	926	896	926	896	926
Other_Electrical	2619	2387	2619	2535	2619	467	483	483	2535	2619	2535	2619
Cooking	0	0	0	0	0	0	0	0	0	0	0	0
Clothes_Drying	0	0	0	0	0	0	0	0	0	0	0	0
Ventilation_Fans	0	0	0	0	0	0	0	0	0	0	0	0
DHW	130	118	130	127	137	132	137	137	132	137	126	130
Space_Heating	338	308	336	321	325	315	325	325	315	325	323	338
Space_Cooling	0	0	0	0	0	0	0	0	0	0	0	0

Fuel Oil #1 Consumption (Gallons)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Cooking	382	349	382	370	382	0	0	0	370	382	370	382
Clothes_Drying	805	734	805	779	805	0	0	0	779	805	779	805
DHW	19	17	22	56	164	158	164	164	158	164	32	19
Space_Heating	223	210	205	116	0	0	0	0	0	0	160	225

Hot Water District Ht Consumption (Million Btu)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
DHW	0	0	0	0	0	0	0	0	0	0	0	0
Space_Heating	0	0	0	0	0	0	0	0	0	0	0	0

3.2.2 Energy Use Index (EUI)

Energy Use Index (EUI) is a measure of a building's annual energy utilization per square foot of building. This calculation is completed by converting all utility usage consumed by a building for one year, to British Thermal Units (Btu) or kBtu, and dividing this number by the building square footage. EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types. The Oak Ridge National Laboratory (ORNL) Buildings Technology Center under a contract with the U.S. Department of Energy maintains a Benchmarking Building Energy Performance Program. The ORNL website determines how a building's energy use compares with similar facilities throughout the U.S. and in a specific region or state.

Source use differs from site usage when comparing a building's energy consumption with the national average. Site energy use is the energy consumed by the building at the building site only. Source energy use includes the site energy use as well as all of the losses to create and distribute the energy to the building. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, which allows for a complete assessment of energy efficiency in a building. The type of utility purchased has a substantial impact on the source energy use of a building. The EPA has determined that source energy is the most comparable unit for evaluation purposes and overall global impact. Both the site and source EUI ratings for the building are provided to understand and compare the differences in energy use.
The site and source EUIs for this building are calculated as follows. (See Table 3.4 for details):

Building Site EUI = (*Electric Usage in kBtu + Fuel Usage in kBtu + similar for other fuels*) / *Building Square Footage*

Building Source EUI = (*Electric Usage in kBtu X SS Ratio + Fuel Usage in kBtu X SS Ratio + similar for other fuels*) / *Building Square Footage*

where "SS Ratio" is the Source Energy to Site Energy ratio for the particular fuel.

Table 3.4
Shaktoolik Water Treatment Plant EUI Calculations

Energy Type	Building Fuel Use per Year	Site Energy Use per Year, kBTU	Source/Site Ratio	Source Energy Use per Year, kBTU
Electricity	40,896 kWh	139,579	3.340	466,194
#1 Oil	12,745 gallons	1,682,340	1.010	1,699,163
Hot Wtr District Ht	0.00 million Btu	0	1.280	0
Total		**1,821,918**		**2,165,357**
BUILDING AREA		2,112	Square Feet	
BUILDING SITE EUI		863	kBTU/Ft^2/Yr	
BUILDING SOURCE EUI		1,025	**kBTU/Ft^2/Yr**	
* Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued March 2011.				

3.3 AkWarm© Building Simulation

An accurate model of the building performance can be created by simulating the thermal performance of the walls, roof, windows and floors of the building. The HVAC system and central plant are modeled as well, accounting for the outside air ventilation required by the building and the heat recovery equipment in place.

The model uses local weather data and is trued up to historical energy use to ensure its accuracy. The model can be used now and in the future to measure the utility bill impact of all types of energy projects, including improving building insulation, modifying glazing, changing air handler schedules, increasing heat recovery, installing high efficiency boilers, using variable air volume air handlers, adjusting outside air ventilation and adding cogeneration systems.

For the purposes of this study, the Shaktoolik Water Treatment Plant was modeled using AkWarm© energy use software to establish a baseline space heating and cooling energy usage. Climate data from Shaktoolik was used for analysis. From this, the model was be calibrated to predict the impact of theoretical energy savings measures. Once annual energy savings from a particular measure were predicted and the initial capital cost was estimated, payback scenarios were approximated.

Limitations of AkWarm© Models

• The model is based on typical mean year weather data for Shaktoolik. This data represents the average ambient weather profile as observed over approximately 30 years. As such, the gas and electric profiles generated will not likely compare perfectly with actual energy billing information from any single year. This is especially true for years with extreme warm or cold periods, or even years with unexpectedly moderate weather.

• The heating and cooling load model is a simple two-zone model consisting of the building's core interior spaces and the building's perimeter spaces. This simplified approach loses accuracy for buildings that have large variations in cooling/heating loads across different parts of the building.
• The model does not model HVAC systems that simultaneously provide both heating and cooling to the same building space (typically done as a means of providing temperature control in the space).

The energy balances shown in Section 3.1 were derived from the output generated by the AkWarm© simulations.

4. ENERGY COST SAVING MEASURES

4.1 Summary of Results

The energy saving measures are summarized in Table 4.1. Please refer to the individual measure descriptions later in this report for more detail. Calculations and cost estimates for analyzed measures are provided in Appendix C.

Table 4.1
Shaktoolik Water Treatment Plant, Shaktoolik, Alaska
PRIORITY LIST – ENERGY EFFICIENCY MEASURES

Rank	Feature	Improvement Description	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR	Simple Payback (Years)
1	Other Electrical: Circulation Pumps	Improve Manual Switching	$157	$0	>100	0.0
2	Setback Thermostat: Water Treatment Plant	Implement a Heating Temperature Unoccupied Setback to 50.0 deg F for the Water Treatment Plant space.	$956	$1,000	14.33	1.0
3	HVAC And DHW	Hydronic heating improvements	$5,242	$20,000	5.06	3.8
4	Electric Boiler	Repair insulation of Water Storage Tank and add electric boiler to heat tank that operates when excess wind is available from AVEC	$21,564	$200,000	1.64	9.3
5	Heat Recovery System on Circulation Loop	This retrofit would repace the 30 year old heat recovery system that is not presently operational.	$9,109	$100,000	1.40	11.0
6	Lighting: WTP Entrance and Office	Replace with 6 LED replacement lamps	$225	$1,440	1.37	6.4
7	Main Entrance	Remove existing door and install standard pre-hung U-0.16 insulated door, including hardware.	$34	$682	1.35	20.0
8	Other Electrical: Appliances	Improve Manual Switching	$19	$100	1.16	5.4
9	Air Tightening: Main entrance and generator room	Perform air sealing to reduce air leakage by 865 cfm at 50 Pascals.	$302	$3,000	1.03	9.9

Table 4.1 Shaktoolik Water Treatment Plant, Shaktoolik, Alaska PRIORITY LIST – ENERGY EFFICIENCY MEASURES						
Rank	Feature	Improvement Description	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR	Simple Payback (Years)
	TOTAL, all measures		$37,607	$326,222	1.81	8.7

4.2 Interactive Effects of Projects

The savings for a particular measure are calculated assuming all recommended EEMs coming before that measure in the list are implemented. If some EEMs are not implemented, savings for the remaining EEMs will be affected. For example, if ceiling insulation is not added, then savings from a project to replace the heating system will be increased, because the heating system for the building supplies a larger load.

In general, all projects are evaluated sequentially so energy savings associated with one EEM would not also be attributed to another EEM. By modeling the recommended project sequentially, the analysis accounts for interactive affects among the EEMs and does not "double count" savings.

Interior lighting, plug loads, facility equipment, and occupants generate heat within the building. When the building is in cooling mode, these items contribute to the overall cooling demands of the building; therefore, lighting efficiency improvements will reduce cooling requirements in air-conditioned buildings. Conversely, lighting-efficiency improvements are anticipated to slightly increase heating requirements. Heating penalties and cooling benefits were included in the lighting project analysis.

4.3 Building Shell Measures

4.3.1. Energy Efficiency Measure: Replace Exterior Door

Rank	Size, Type, & Condition	Recommendation	Energy Auditor Comments	Cost	Savings
7	Door Type: Metal - urethane, no therm. break Modeled R-Value: 2.5	Remove existing door and install standard pre-hung U-0.16 insulated door, including hardware.	The main entrance double door is worn out and should be replaced. It does not close or seal properly.	$682	$34

The double doors at the main entrance to the water treatment plant are old, bent, do not close tightly, and as a result are responsible for a significant amount of heat loss from the building. It is recommended that they be replaced.

4.3.2. Energy Efficiency Measure: Seal Air Leaks

Rank	Estimated Air Leakage	Recommended Air Leakage Target	Energy Auditor Comments	Cost	Savings
9	Air Tightness from Blower Door Test: 3600 cfm at 50 Pascals	Perform air sealing to reduce air leakage by 865 cfm at 50 Pascals.	Seal old boiler stack opening near main entrance and re-commission generator dampers so they seal properly.	$3,000	$302

Many buildings, especially older ones, have air leaks allowing heated and cooled air to escape when the air pressure differs between the inside and outside of the building. Because these leaks allow unconditioned air to enter as conditioned air is lost, air leaks can be a significant waste of energy and money. They also make the building drafty. A blower door test was performed as part of our energy audit. We found major leakage in two areas. The first was the open old boiler stack near the front entrance to the building. The second was the deteriorated generator dampers. The old boiler stack should be sealed off and the generator dampers repaired by an experienced HVAC person. Buildings with indoor air pollution caused by combustion heating, tobacco smoking, or moisture problems, may require more ventilation than average buildings.

4.4 Heating Measures

4.4.1. EEM Heating Plants, Cooling Plants, and Distribution Systems

A heating system is expected to last approximately 20-25 years, depending on the system. If the system is nearing the end of its life, it is better to replace it sooner rather than later to avoid being without heat for several days when it fails. This way, you will have time to compare bids, check references and ensure the contractors are bonded and insured.

Recommendation: Hydronic heating improvements

Estimated Cost: $20,000
Estimate Savings per Year: $5,242

Energy Auditor Comments: None

4.4.1.1. EXISTING SYSTEMS

4.4.1.1.1 Weil McLain Boiler
Description: Weil McLain Model BL-676WS heating plant fueled by #1 Fuel Oil, with a Natural draft.
Size : 278,000 BTU/h
Efficiency (Steady State & Idle): 80%

Portion of heat supplied by this unit: 50%
Notes: Nozzle 2.25 GPH

4.4.1.1.2 Weil McLean Boiler
Description: Weil McLain BL-676WS heating plant fueled by #1 Fuel Oil, with a Natural draft.
Size : 278,000 BTU/h
Efficiency (Steady State & Idle): 80%
Portion of heat supplied by this unit: 50%
Notes: Nozzle 2.25 GPH

4.4.1.1.3 Heat Recovery System
Description: Heat Recovery from AVEC heating plant fueled by Hot Wtr District Ht, with a Natural draft.
Size : 210,000 BTU/h
Efficiency (Steady State & Idle): 80%
Portion of heat supplied by this unit: 0%
Notes: Feeds into water circulation loop only

4.4.1.1.4 Distribution System

Notes: At present, space heating loop, tank heat, and circulation loop heat is all on one pump that runs 24/7. Should consider separating them. Hot water is on separate loop and runs 24/7. Circulation pump for dryers has been shut off.

4.4.1.1.4.1 Building Heat Circulation Pump

Nameplate: Grundfos model UNC 50-80
Notes:

4.4.2.2. PROPOSED SYSTEMS

4.4.2.1.1 Weil McClain Boiler
Description: heating plant fueled by #1 Fuel Oil, with a Natural draft.
Size : 278,000 BTU/h
Efficiency (Steady State & Idle): 80%
Portion of heat supplied by this unit: 50%
Notes:

4.4.2.1.2 Weil McLain Boiler
Description: heating plant fueled by #1 Fuel Oil, with a Natural draft.
Size : 278,000 BTU/h
Efficiency (Steady State & Idle): 85%
Portion of heat supplied by this unit: 50%
Notes:

4.4.2.1.3 AVEC Heat Recovery
Description: heating plant fueled by Hot Wtr District Ht,
Size : 210,000 BTU/h
Efficiency (Steady State & Idle): 75%
Portion of heat supplied by this unit: 0%
Notes: Heat is transferred through circulation water loop.

4.4.2.1.4 Electric Boiler
Description: 50 Kilowatt Electric Boiler heating plant fueled by Steam District Ht, with a Natural draft.
Size : 170,700 BTU/h
Efficiency (Steady State & Idle): 99%
Portion of heat supplied by this unit: 0%
Notes: Uses a special electric rate of $0.05 per KWH for excess wind. The rate is interruptible

4.4.2.1.5 Hydronic Heating Systems

Notes: This EEM would involve shutting off the hot water circulator pump, separating the space heat loop from the process heat loop, and re-insulating the heating lines as necessary. It would also involve installing a hydronic heat controller that controlled all the hydronic heating sources and a space heating loop mixing valve controlled by an outdoor reset controller.

The hot water circulation pump should be shut off since the washeteria is almost never used.

4.4.2 Programmable Thermostat

Location	Existing Situation	Recommended Improvement	Install Cost	Annual Savings	Notes
Water Treatment Plant	Existing Unoccupied Heating Set point: 65.0 deg F	Implement a Heating Temperature Unoccupied Setback to 50.0 deg F for the Water Treatment Plant space.	$1,000	$956	

4.5 LIGHTING UPGRADES

The goal of this section is to present any lighting energy conservation measures that may also be cost beneficial. It should be noted that replacing current bulbs with more energy-efficient equivalents will have a small effect on the building heating and cooling loads. The building cooling load will see a small decrease from an upgrade to more efficient bulbs and the heating load will see a small increase, as the more energy efficient bulbs give off less heat.

4.5.1 Lighting Upgrade – Replace Existing Fixtures and Bulbs

Location	Existing Lighting	Recommended Improvement	Install Cost	Annual Savings	Notes
WTP Entrance and Office	6 FLUOR (4) T12 4' F40T12 34W Energy-Saver Magnetic with Manual Switching	Replace with 18 LED replacement lamps	$1,440	$225	

Description:
This EEM includes replacement of the existing 24 T12 lamps and magnetic ballasts with 18 LED lamps. The new energy efficient, LED lamps will provide adequate lighting and will save the owner on electrical costs due to the better performance of the lamp and elimination of the ballasts. This EEM will also provide maintenance savings through the reduced number of lamps replaced per year. The expected lamp life of a LED lamp is approximately 50,000 burn-hours, in

comparison to the existing T12 lamps which is approximately 20,000 burn hours. The six fixtures listed above are the six normally used.

4.7 Process Loads

4.7.1 Circulation Loop Heat Recovery

Location	Life in Years	Description	Recommendation	Cost	Savings	Notes
Circulation Loop	15	Heat Recovery	This retrofit would replace the 30 year old heat recovery system that is not presently operational.	$100,000	$9,109	

As mentioned earlier, the heat recovery system was installed in 1977 and after 34 years is no longer functional. The majority of the heat from the new system will be used to heat the potable water circulation loop. Some of the heat will also be used to heat the water storage tank. This heat source will be the first to be used of all the sources as it is the most economical.

The savings of approximately $9,109 per year is based on cost of #1 oil in 2010 and has not been adjusted for anticipated increases. The savings are based on the AKWarm analysis of the existing heat loads and the calculated heat load of the water storage tank.

The cost of installing the new system includes all design, purchased materials, shipping, and installation and commissioning costs. These costs are based on recent projects completed by ANTHC throughout Alaska

4.7.2 Electric Boiler

Location	Life in Years	Energy Source	Description	Recommendation	Cost	Savings	Notes
In Series with oil boilers	15	Excess Wind Energy	Electric Boiler	Repair insulation of Water Storage Tank and add electric boiler to heat tank that operates when excess wind is available from AVEC	$200,000	$21,564	

AVEC has excess wind energy and is willing to sell that excess electricity to the water treatment plant at a significant discount. The cost would be $0.05 per kilowatt-hour. It would be supplied at this low interruptible rate whenever it is available.

This energy efficiency measure would install a separate interruptible electric service at the water treatment plant, install a 50 kilowatt electric boiler in series with the existing oil fired boilers, add the necessary controls at both the AVEC power plant and at the water treatment plant and re-insulate the roof of the water storage tank to reduce the heat load of the tank.

The savings estimate is based on the difference in cost of the oil now used for this heating and the $0.05 per kilowatt-hour for the electricity and the reduction in usage that will be utilized by insulating the roof of the water storage tank. Extensive calculations were done in estimating the savings.

The cost of this retrofit includes the necessary design activity, the materials, shipping, installation and commissioning and is based on similar installations performed by AVEC in the past and budgetary quotations obtained as part of this audit.

4.7.4 Other Electrical

Location	Life in Years	Description	Recommendation	Cost	Savings	Notes
Circulation Pumps	7	Grundfos 36E854-378, 3 HP with Manual Switching	Improve Manual Switching	$0	$157	Shut off circulation pumps one month earlier
Appliances	7	3 appliances with Manual Switching	Improve Manual Switching	$100	$19	

The potable water circulation pumps are presently shut off during the summer months. Based on discussions with the water plant operator and our experience throughout this part of Alaska, these pumps can be shut off for additional month each year.

5. ENERGY EFFICIENCY ACTION PLAN

Through inspection of the energy-using equipment on-site and discussions with site facilities personnel, this energy audit has identified several energy-saving measures. The measures will reduce the amount of fuel burned and electricity used at the site. The projects will not degrade the performance of the building and, in some cases, will improve it.

Several types of EEMs can be implemented immediately by building staff, and others will require various amounts of lead time for engineering and equipment acquisition. In some cases, there are logical advantages to implementing EEMs concurrently. For example, if the same electrical contractor is used to install both lighting equipment and heating system controls, implementation of these measures should be scheduled to occur simultaneously.

Attached to this report is Appendix A. The objective of the appendix is to provide the City of Shatoolik and the water plant operator with a wide range of websites to further their knowledge of both energy conservation and renewable energy.

Appendix A – Listing of Energy Conservation and Renewable Energy Websites

Lighting

Illumination Engineering Society - http://www.iesna.org/

Energy Star Compact Fluorescent Lighting Program - www.energystar.gov/index.cfm?c=cfls.pr_cfls

DOE Solid State Lighting Program - http://www1.eere.energy.gov/buildings/ssl/

Caliper Program – http://www1.eeere.energy.gov/buildings/ssl/caliper.html

Solid State Lighting Gateway Demonstrations – http://www1/eere/energy.gov/buildings/ssl/gatewaydemos.html

DOE office of Energy Efficiency and Renewable Energy - http://apps1.eere.energy.gov/consumer/your_workplace/

Energy Star – http://www.energystar.gov/index.cfm?c=lighting.pr_lighting

Hot Water Heaters

Tank less DHW Heaters -
http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12820

Heat Pump Water Heaters -
http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=12840

AHRI –Residential Water Heaters - http://ari.org/Content/ResidentialWaterHeaters_594.aspx

American Council for Energy-Efficient Economy -
http://www.aceee.org/consumerguide/waterheating.htm#heatpump

Solar Water Heating

DOE Energy and Efficiency and Renewable Energy Solar Energy Technologies Program –
http://www1.eere.energy.gov/solar/solar_heating.html

FEMP Federal Technology Alerts – http://www.eere.energy.gov/femp/pdfs/FTA_solwat_heat.pdf
www.eere.energy.gov.femp/pdfs/FTA_para_trough.pdf

FEMP Case Studies – www.eere.energy.gov/femp/technologies/renewable_casestudies.html

Solar Radiation Data Manual – http://rredc.nrel.gov/solar/pubs/redbook

Plug Loads

DOE office of Energy Efficiency and Renewable Energy – http:apps1.eere.energy.gov/consumer/your_workplace/

Energy Star – http://www.energystar.gov/index.cfm?fuseaction=find_a_product

Top 10 energy efficient desktop PCs –
http://crave.cnet.co.uk/cnetuk/crave/greentech/0,250000598,10001753,00.htmThe Greenest Desktop Computers of 2008 - http://www.metaefficient.com/computers/the-greenest-pcs-of-2008.html

Wind

AWEA Web Site – http://www.awea.org

- AWEA Small wind toolbox: www.awea.org/smallwind/

NWTC Web Site – http:www.nreal.gov/wind

National Wind Coordinating Collaborative – http:www.nationalwind.org

Utility Wind Interest Group site: http://www.uwig.org

WPA Web Site – http://www.windpoweringamerica.gov

Homepower Web Site: http://homepower.com

Windustry Project: http://www.windustry.com

Best Links: www.freash-energy.org

Solar

NREL – http://www.nrel.gov/rredc/

Firstlook – http://firstlook.3tiergroup.com

TMY or Weather Data – http://rredc.nrel.gov/solar/old_data/nsrdb/1991-2005/tmy3/

State and Utility Incentives and Utility Policies - http://www.dsireusa.org

NSEDC Community Energy Fund Application - City of Shaktoolik - Water Storage Tank Insulation Replacement Project

Budget Line Item	Applying Entity Contribution	NSEDC	FEMA/DHS&EM	VSW	Commission	Total
Payroll						
Roof Technician	$0	$0	$0	$24,050	$0	$24,050
Sidewall Technician	$0	$12,521	$10,314	$0	$28,440	$51,275
City Administrative	$0	$3,000	$0	$0	$0	$3,000
Construction Management	$0	$0	$0	$20,000	$0	$20,000
Engineering	$0	$0	$0	$10,000	$0	$10,000
Materials						
Roof Insulation	$0	$0	$0	$42,830	$0	$42,830
Sidewall Insulation	$0	$28,479	$22,986	$0	$16,140	$67,605
Frieght						
Barge to SKK	$0	$0	$0	$30,000	$0	$30,000
Equipment						
City Loader	$0	$5,000	$0	$0	$0	
Telehandler	$0	$0	$0	$3,114	$0	$3,114
Other						
Airfare	$0	$0	$0	$4,326	$0	$4,326
Per Diem	$0	$0	$0	$1,680	$0	$1,680
RFQ Advertising	$0	$1,000	$0	$0	$0	$1,000
Total	$0	$50,000	$33,300	$136,000	$44,580	$258,880

Thermacon **Tank Insulation Systems**
by Vertarib Inc.
471 N. Broadway, Suite 196
Jericho, NY 11753

March 5, 2012

Philip Gagnon, P.E.
DEC-Village Safe Water
555 Cordova Street
Anchorage, AK 99501-2617
907-269-7681
907-269-7509 fax
Philip.gagnon@alaska.gov

Phil:

Thank you for the opportunity to work with you on the tank in Shaktoolik, AK. I have put together pricing for material and installation – with multiple options to handle various possibilities as follows:

Scope of Work

1 Tank – 66' diameter x 32' height

Option A - Provide "Thermacon" horizontal Aluminum Outer Panel (1" panel) to be placed over existing panel system – Shell and/or Roof; Existing insulation will be repaired by reinsulating areas with holes and/or damage, tightening bands and then reinstalling outer Thermacon panel over existing metal skin.

Option B – Replacement of Current System with new panel system with total 5" insulation.

We propose the Thermacon Tank Insulation System that will consist of:

Tank Sidewall

- **Option A** -The insulation system shall be comprised of an outer panel, precurved to fit the tank shell curvature, composed of 48" x 96" x .032" aluminum sheathing laminated to one (1") inch thick foil faced (both sides) isocyanurate foam.
- **Option B –** In addition to the 1" laminated outer panel in Option A – Existing system will be stripped and two inner layers consisting of a total of four (4") inch 25psi density polystyrene foam.

- Fastening System and Weather Sealing: An effective weather tight system shall be provided. The weather tight system shall have a shop-installed, extruded aluminum vertical weather seal, and neoprene gasket insert on the end of each panel. The extrusion shall function as a weather sealed overlap; the slotted ends and factory punched slots will provide location and prevent vertical movement of the horizontal banding system.
- An aluminum band shall be provided for sealing the top edge of all panels. The band shall be of sufficient width to insure a 1-inch minimum lap over the external sheathing.
- Bandsion Clamping System consisting of external Bands and clamps shall be provided for attaching the panels to the tank. The banding and clamping system shall be designed to withstand wind pressures per the International Building Code (latest MOA adopted and amended edition) requirement and shall allow for extremes of thermal expansion and contraction of the banding.
- All manways, nozzles, brackets, vents, and stairways will have the panels cut tight against them and will be sealed with polyurethane caulk or equal.

Tank Roof

- The tank roof insulation shall be of similar construction to sidewall panels composed of:
    - **Option A** - one (1") inch thick foil-faced (both sides) isocyanurate foam insulation laminated to .032" thick 3105H25 alloy aluminum sheathing.
    - **Option B** - In addition to the 1" laminated outer panel in Option A – Existing system will be stripped and two inner layers consisting of a total of four (4") inches 40 psi density polystyrene foam.
- The panels shall be secured to the internal cables with stainless steel clips incorporated into the panel seam and tied to each crossing cable.
- Joints between panels short edge shall be filled with foam filler pieces and coped with riveted z-coping and .032" aluminum flashing.
- All penetrations to the metal sheathing will have turned up edges to prevent water entry and to provide for thermal expansion. These edges will be caulk sealed and counter flashed.

Price	**Shell**	**Roof**	**Total**
Option A			
Insulation Materials	$ 46,100	$ 25,745	$ 71,845
Installation	$ 42,450	$ 17,200	$ 59,650
	$ 88,550	$ 42,945	$ 131,495
Option B			
Insulation Materials	$ 67,605	$ 42,830	$ 110,435
Installation, includes stripping	$ 51,275	$ 24,050	$ 75,325
Total	$118,880	$ 66,880	$ 185,760

Terms

- Allow for 2-3 weeks for submittal drawings (if required).
- Production will commence 3 weeks after receipt of drawing approval, purchase order and initial payment (35% of total price).
- Product shipment within 3-4 weeks.
- Freight to deliver to Seattle, WA. Is included (Crated).
    - 1" Panels – 6 crates – approx. size 50"w x 100"l x 84"h – 1,000 lbs each.
    - Inner Layers – 12 crates - approx. size – 8'w x 8'l x 8'h – 500 lbs per skid. (can be shipped from Anchorage at no extra charge)

  Freight to site can be arranged by Vertarib at actual freight cost plus 15%.
- Price does not include any duties, permits or sales and use taxes.
- Installation is included, VSW to provide lift and subsistence for two men. The cost of stripping existing insulation off tank is included in installation price (cost of disposal of existing insulation not included).

Thank you for giving Vertarib the opportunity to participate in solving your insulation needs. If you have any questions feel free to contact me at your convenience.

Regards,

Thermacon Insulation Systems
by **Vertarib**

Alan Dinow

Alan Dinow
Vice President

FEMA Form 90-91, DEC 08

S/A

U.S. DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

PROJECT WORKSHEET

PW #31

DECLARATION NO.	PW REF NO.	DATE	FIPS NO.	CATEGORY	EMMIE NO.
FEMA 4050 DR AK	SHC-F01	01/26/12	180-68890-00	F	

APPLICANT	WORK COMPLETED AS OF: DATE:	PERCENT:
City of Shaktoolik	01/23/12	0%

DAMAGED FACILITY	COUNTY
Water tank shell	Nome

LOCATION	LATITUDE	LONGITUDE
West of main street near city hall	64.354230	-161.195470

Was this site previously damaged? (•) Yes ( ) No ( ) Unsure

DAMAGE DESCRIPTION AND DIMENSIONS:

During the event period of November 8-13, 2011 a powerful and extremely dangerous storm of near record or record magnitude impacted the west coast of Alaska. As a result of the storm, two horizontal rows of 157' long by 4' wide aluminum sheeting panels and stainless steel bands on the community water tank were blown off. A total of 1,256 SF of sheet aluminum and 10 stainless steel bands were damaged. Exposure to moisture has compromised the tank's polyurethane insulation layer under the aluminum sheeting .

GPS taken at the facility

(continued on DDSW continuation page)

SCOPE OF WORK:

Fund at 75%

WORK TO BE COMPLETED:

In order to restore the structure to its pre-disaster design, function, and capacity in accordance with applicable codes or standards the Applicant will use a contractor to remove and replace two horizontal rows of damaged 157' long by 4' wide water tank exterior aluminum sheeting (1,256 SF) and replace damaged stainless steel bands (10) and the underlying polyurethane insulation layer . The above described damages and repair are directly attributed to the DR 4050 event and exclude any pre existing damages.

(continued on DDSW continuation page)

PROJECT COST

ITEM	CODE	NARRATIVE	QUANTITY	UNIT	UNIT PRICE	COST
1	9999	WORK TO BE COMPLETED:				$ -
2	9999	Water Tank Contract (ESTIMATE)	1.00	LS	$ 33,307.50	$ 33,307.50
3	~~9902~~	~~NO DIRECT ADMINISTRATIVE COST~~	~~1.00~~	~~LS~~	$ -	$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
						$ -
		SUBTOTAL FROM COST CONTINUATION PAGE(S)				$ -
		TOTAL PROJECT COST				$ 33,307.50

PREPARED BY:	John Chandler [signature]	TITLE:	Public Assistance Project Specialist
FEMA PAC CREW LEADER:	Ron Hormann [signature]	STATE PAC CREW LEADER:	Don Orgill
APPLICANT:	Eugene Asicksik [signature]	DATE:	PHONE: 907-955-3441

National PW Template V2.2 February 2011 Excel 2007

REPLACES ALL PREVIOUS VERSIONS

ent 3/22/12 lh

FEDERAL EMERGENCY MANAGEMENT AGENCY

DAMAGE DESCRIPTION & SCOPE OF WORK

DECLARATION NO.				PW REF NO.	DATE	FIPS NO.	CATEGORY	EMMIE NO.
FEMA	4050	DR	AK	SHC-F01	01/26/12	180-68890-00	F	

APPLICANT	COUNTY
City of Shaktoolik	Nome

DAMAGE DESCRIPTION & SCOPE OF WORK (CONTINUED):

DAMAGE DESCRIPTION CONTINUED:

A summary of issues related to the water tank are noted below:

1. Project worksheet (PW) #24 was written on 01/14/2005 for similar water tank sheeting damage from a storm event occurring 10/18-20/2004.
5. There is no evidence the city replaced damaged water tank sheeting from the 2004 storm.
2. Version 1 of PW #24 was written on 02/07/2008 to deobligate $8,550.00 in project costs at the request of the State of Alaska due to lack of applicant documentation.(attached)
3. PW #24 is conditioned to obtain and maintain appropriate wind insurance for the water tank.
4. Shaktoolik Mayor Asicksik indicated at the 01/23/2012 kick off meeting the city has no insurance on the water tank.
7. Mayor Asicksik indicated the current storm resulted in the loss of two rows of water tank sheeting(an estimated 25% of sheeting).
8. In addition to the two rows of damaged water tank sheeting related to this storm event, additional water tank sheeting is missing or in disrepair (refer to photographs).
6. There is no indication the city regularly maintains the exterior water tank sheeting. The city has no onsite equipment to reach upper damaged areas of the water tank.

SCOPE OF WORK CONTINUED:

1. A quote from VERTARIB Tank Insulation Systems was obtained through Philip Gagnon, P.E. Village Safe Water Engineer with DEC - Village Safe Water. Quote is for complete restoration of the water tank including previous damage. This Project Worksheet will use 25% of the materials and installation cost plus applicable freight (for materials), airfare and per diem (for contractor crew) (documents attached).
2. Contracts must be of reasonable cost, generally must be competitively bid, and must comply with Federal, State, and local procurement standards. (FEMA regulations at 44 CFR Part 13). Quote is from sole source and other bids may be required.
3. City of Shaktoolik is working with Village Safe Water to obtain additional funding to completely restore the facility to original design, function and capacity.

PREPARED BY: John Chandler	TITLE: Public Assistance Project Specialist

FEDERAL EMERGENCY MANAGEMENT AGENCY

SCOPE NOTES

APPLICANT	PW REF NO.	CATEGORY	FIPS NO.	DISASTER	
City of Shaktoolik	**SHC-F01**	**F**	**180-68890-00**	**4050**	**AK**

Check next to appropriate comment for Data Specialist to add to the Scope of Work

Topic	Comment
Record Retention	Complete records and cost documents for all approved work must be maintained for at least 3 years from the date the last project was completed or from the date final payment was received, whichever is later.
Direct Administrative Costs	☐ The subgrantee is requesting direct administrative costs that are directly chargeable to this specific project. Associated eligible work is related to administration of the PA project only and in accordance with 44 CFR 13.22. These costs are treated consistently and uniformly as direct costs in all federal awards and other subgrantee activities and are not included in any approved indirect cost rates.
Mitigation	No Mitigation Opportunities Identified because: ☐ PW is for Emergency Work - Mitigation not eligible. ☐ Work already completed and no add-on mitigation is feasible. ☑ Mitigation not technically feasible. ☐ Applicant has decided not to incorporate mitigation.
CEF	☐ This project was estimated using the Cost Estimated Format (CEF).
CEF - Not Used	This project was not estimated using the CEF because: ☑ The PW is a small project. ☐ The PW is for Emergency Work. ☐ The work is greater than 90% complete at the time of inspection.
Permits	☑ Applicant is required to comply with all applicable regulations and to obtain all required permits.
	☐
	☐
	☐
	☐
	☐
	☐
	☐

PREPARED BY: John Chandler | TITLE: Public Assistance Project Specialist

FEMA Form 90-120

FEDERAL EMERGENCY MANAGEMENT AGENCY

SPECIAL CONSIDERATIONS

DISASTER		APPLICANT NAME	PW REF NO.	FIPS NO.	DATE
4050	AK	City of Shaktoolik	SHC-F01	180-68890-00	01/26/12

1. Does the damaged facility or item of work have insurance and/or is it an insurable risk? *(e.g., buildings, equipment, vehicles, etc.)*

only 5X

○ Yes ● No ○ Unsure

Applicant sates they do not have insurance on the water tank.

2. Is the damaged facility located within a floodplain or coastal high hazard area, or does it have an impact on a floodplain or wetland?

○ Yes ○ No ● Unsure

Area is in an unmapped area (refer Community ID #025070).

3. Is the damaged facility or item of work located within or adjacent to a Coastal Barrier Resource System Unit or an Otherwise Protected Area?

○ Yes ● No ○ Unsure

4. Will the proposed facility repairs/reconstruction change the pre-disaster condition? *(e.g., footprint, material, location, capacity, use or function)*

○ Yes ● No ○ Unsure

5. Does the applicant have a hazard mitigation proposal or would the applicant like technical assistance for a hazard proposal?

○ Yes ● No ○ Unsure

6. Is the damaged facility on the National Register of Historic Places or the state historic listing? Is it older than 50 years? Are there more, similar buildings near the site?

○ Yes ● No ○ Unsure Facility Constructed In: 1980

7. Are there any pristine or undisturbed areas on, or near, the project site? Are there large tracts of forestland?

○ Yes ● No ○ Unsure

8. Are there any hazardous materials at or adjacent to the damaged facility and/or item of work?

○ Yes ● No ○ Unsure

9. Are there any other environmentally or controversial issues associated with the damaged facility and/or item of work?

○ Yes ● No ○ Unsure

10. Is the damaged facility or item of work located within two-hundred feet of a body of water?

● Yes ○ No ○ Unsure

Norton Bay

PREPARED BY:	John Chandler

FEDERAL EMERGENCY MANAGEMENT AGENCY

REPETITIVE LOSS STATEMENT

APPLICANT	PW REF NO.	FIPS NO.	CATEGORY	DISASTER	
City of Shaktoolik	SHC-F01	180-68890-00	F	4050	AK

1. **Has this project / site had previous damage?**
   (If the answer is NO, It is not necessary to address the remaining questions)
   (•) Yes ( ) No ( ) Unsure

2. **Did FEMA provide funding for the repair of this previous damage?**
   (If the answer is NO, It is not necessary to address the remaining questions)
   (•) Yes ( ) No ( ) Unsure

3. **What is the date and cause of the previous damage?**

   Date (MM/DD/YY): 10/18/04

   - [ ] Fire
   - [ ] Flood
   - [ ] Earthquake
   - [x] Tornado / Wind
   - [ ] Hail / Rain

4. **Was mitigation approved in the previous disaster?**
   ( ) Yes (•) No ( ) Unsure

5. **Was the mitigation work completed prior to this disaster?**
   ( ) Yes (•) No ( ) Unsure

6. **If known, provide the following information on the previous disaster:**

Disaster No:	PW No:	Version No:
1571	24	1

7. **Comments:**

Version 1 of PW #24 was written 02/07/2008 to deobligate $8,550 at the request of the State of Alaska Department of Homeland Security and Emergency Management. The State had numerous failed requests to receive documentation from the applicant.

VERTARIB

Thermacon Tank Insulation Systems
by Vertarib Inc.
471 N. Broadway, Suite 196
Jericho, NY 11753

March 5, 2012

Philip Gagnon, P.E.
DEC-Village Safe Water
555 Cordova Street
Anchorage, AK 99501-2617
907-269-7681
907-269-7509 fax
Philip.gagnon@alaska.gov

Phil:

Thank you for the opportunity to work with you on the tank in Shaktoolik, AK. I have put together pricing for material and installation – with multiple options to handle various possibilities as follows:

Scope of Work

1 Tank – 66' diameter x 32' height

Option A - Provide "Thermacon" horizontal Aluminum Outer Panel (1" panel) to be placed over existing panel system – Shell and/or Roof; Existing insulation will be repaired by reinsulating areas with holes and/or damage, tightening bands and then reinstalling outer Thermacon panel over existing metal skin.

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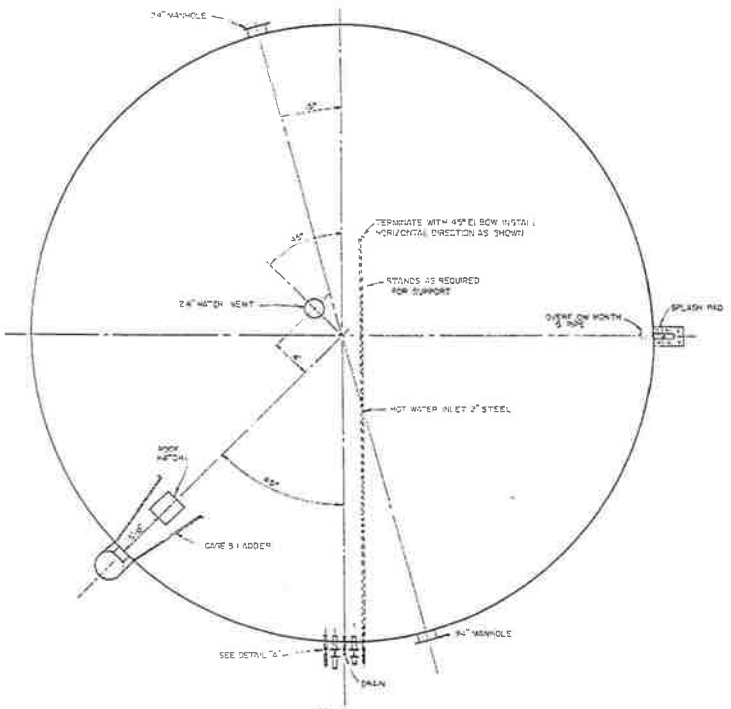
Regards,

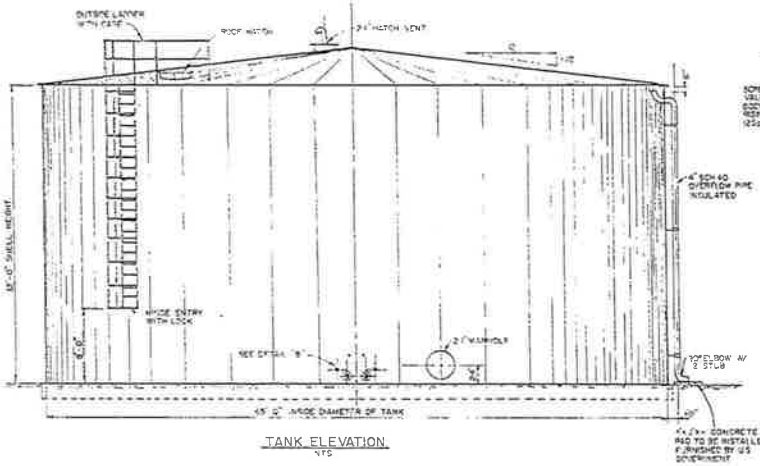
Thermacon Insulation Systems
by **Vertarib**

Alan Dinow

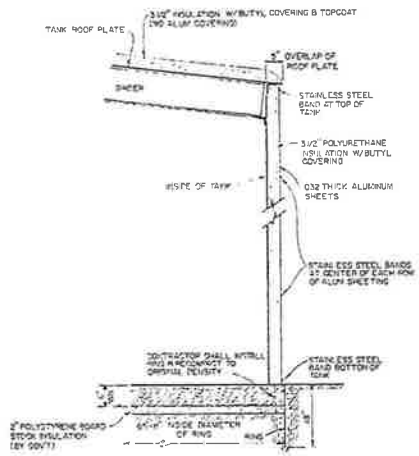
Alan Dinow
Vice President



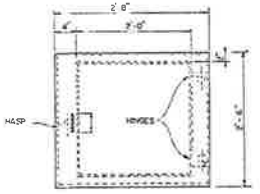
PLAN



TANK ELEVATION

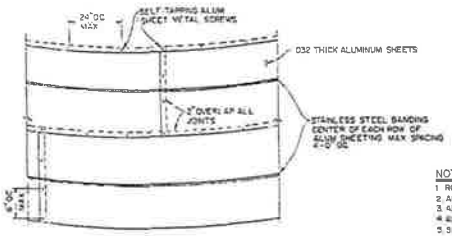


RING INSTALL & INSULATION DETAIL

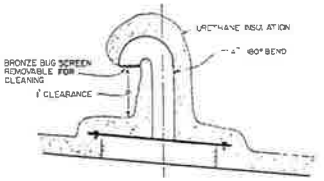


PLAN

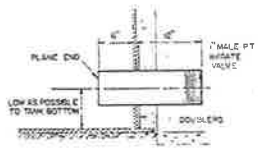
ROOF HATCH DETAIL



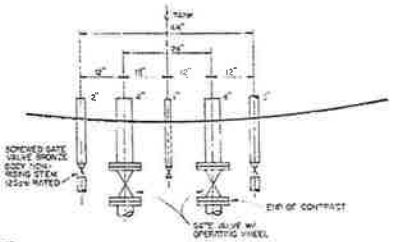
ALUMINUM COVERING DETAIL



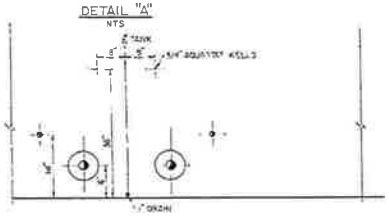
COMBINATION ROOF HATCH & VENT DETAIL



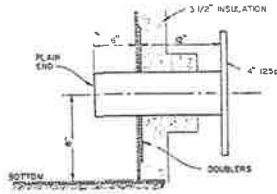
DRAIN DETAIL



DETAIL "A"



DETAIL "B"



INLET & OUTLET DETAIL

NOTES

1. ROOF, SHELL, & BOTTOM PLATES A-36 STEEL
2. ALL 4" PIPING TO BE SCHEDULE 40 STEEL PIPE
3. ALL 2" PIPING TO BE SCHEDULE 40 STEEL PIPE
4. ALL BOLTS & NUTS TO BE A-307
5. SHELL DOUBLERS A-36 STEEL
6. ENTIRE TANK (ROOF & SHELL) SHALL BE INSULATED WITH 3 1/2" POLYURETHANE SPRAY FOAM.
7. MANHOLE BOLTS & NUTS, LADDER AND CAGE NOT INSULATED.
8. MANHOLE SURFACE, HATCHES, VENT, OVERFLOW PIPE INSULATED WITH 3 1/2" POLYURETHANE
9. CONTRACTOR TO PROVIDE ALL VALVES
10. TANK CONSTRUCTION TO LATEST AWWA STANDARDS OR AS SPECIFIED
11. DRAIN PIPE SHALL BE GALVANIZED STEEL PIPE
12. RING SHALL BE ROUND WITHIN 1" AND SHALL BE PLACED SO THAT TOP IS AT SAME ELEVATION ALONG RING PERIMETER
13. TANK SHELL ONLY SHALL BE COVERED W/ .032 THICK ALUMINUM COVERING OVER THE 3 1/2" INSULATION WITH 2" OVERLAP AT EACH JOINT AS SHOWN IN DETAILS

DATE	REVISIONS	INITIALS

U. S. Department of Health, Education & Welfare
Public Health Service
Indian Health Service

SHAKTOOLIK, ALASKA
794,000 GALLON AWWA WATER TANK
& DETAILS
PUBLIC LAW 86-121 PROJECT
PROJECT NO. AK-FT-104

SHEET NO. 17 OF 22 TOTAL SHEETS

DRAWN BY JAO DATE Nov 77
CHECKED BY DATE

SANITATION FACILITIES CONSTRUCTION BRANCH
OFFICE OF ENVIRONMENTAL HEALTH
ALASKA AREA NATIVE HEALTH SERVICE
ANCHORAGE, ALASKA

Design Engineer
Maintenance Review
Material Take-off

STATE OF ALASKA

Chandler, Johnny

From: Don Orgill [dorgill@aidrc.com]
Sent: Wednesday, March 14, 2012 10:32 AM
To: Gagnon, Philip F (DEC) (philip.gagnon@alaska.gov)
Cc: Chandler, Johnny; jolly.tangog@alaska.gov
Subject: RE: Contact Information for Shaktoolik Tank Quote

Mr. Phil Gagnon,

Just checking to see if this afternoon (Wed.) is a good time to discuss the Shaktoolik repairs, or if you would prefer another day? Please let us know what time is best for you.

Thank you,

Don Orgill
Division of Homeland Security
and Emergency Management
Alaska State Public Assistance Specialist
JFO Phone: 907-271-4300
JFO Fax: 907-271-4315
Cell Phone: 315-723-6782

From: Don Orgill [mailto:dorgill@aidrc.com]
Sent: Thursday, March 08, 2012 10:44 AM
To: johnny.chandler@fema.dhs.gov
Cc: jolly.tangog@alaska.gov
Subject: FW: Contact Information for Shaktoolik Tank Quote

From: Gagnon, Philip F (DEC) [mailto:philip.gagnon@alaska.gov]
Sent: Wednesday, March 07, 2012 10:24 PM
To: Don Orgill
Cc: Gregory.Fewins@fema.dhs.gov; Mark Spafford; Eugene Asicksik
Subject: FW: Contact Information for Shaktoolik Tank Quote

Don,

Attached please find a quote I received for the repair of the Shatoolik water storage tank skin. The option we discussed is, "Option A" under "Shell." It should be noted that when the quote was provided it was stated that they will not place the shell directly over the existing insulation. The existing insulation will have moisture and other damage that must be repaired prior to installation of a new skin. If the damage and moisture are not removed first the skin will trap the moisture and cause additional damage.

My calculations are that two panels – damaged under the FEMA storm – equate to approximately one quarter of the tank shell area. Therefore materials and installation cost equal: $88,550 * 0.25 = $22,137.50.

In addition to this freight must be added. From past experience freight from Anchorage to Shaktoolik is approximately $1.50/lb and freight from Seattle to Anchorage is about the same. Therefore 12,000lb * $1.50/lb = $18,000 (ANC – SKK)

and 6,000lb * $1.50/lb = $9,000 (SEA – ANC) Note no freight costs from Seattle to Anchorage on the inner layers. Therefore total freight costs ($18,000 + $9,000) * 0.25 = $6,750

Airfare and subsistence for two men were not included in the estimate. For two weeks of work and possible weather hold on airplane to Shaktoolik, $60/day per diem and round trip airfare for two men (~$2,000/person, $1,300 SEA-OME, $700 OME-SKK), total subsistence and airfare, ($2,000 * 2) + [($60 * 2 * 14)*0.25] = $5,680. Airfare will not change regardless of the portion of the tank skin that is repaired all other costs have been multiplied by one quarter.

Total cost for repair of the tank skin is, $33,307.50. The below table summarizes the costs.

Materials	$11,525.00
Installation	$10,612.50
Freight	$6,750.00
Airfare	$4,000.00
Per Diem	$420.00
Total	**$33,307.50**

I will work on completing leach field repair estimates in the near future, hopefully I can get those to you at the beginning of next week. I had a conversation with the individual who did the most recent repairs and he provided me with a much better understanding of what occurred and what the current systems consist of.

I've been coordinating with Mark Spafford of the Denali Commission on some of the Shaktoolik repairs. In our discussions we concluded there may be repairs that could be completed as part of the FEMA project that would reasonably prevent this type of damage from occurring again – my understanding is this is the second storm, requiring FEMA aid, which has caused damage to the water storage tank. Is there a time next Wednesday or Thursday afternoon that we could meet to discuss other options for the Shaktoolik repairs? I would hope to have materials to discuss the leach field repairs at the same time.

Best regards,

Philip Gagnon, P.E.
Village Safe Water Engineer

DEC - Village Safe Water
555 Cordova Street
Anchorage, AK 99501-2617
Phone: (907) 269-7681
Fax: (907) 269-7509
philip.gagnon@alaska.gov

From: adinow@thermacon.com [mailto:adinow@thermacon.com]
Sent: Monday, March 05, 2012 10:42 AM
To: Gagnon, Philip F (DEC)
Subject: Re: Contact Information for Shaktoolik Tank Quote

Phil

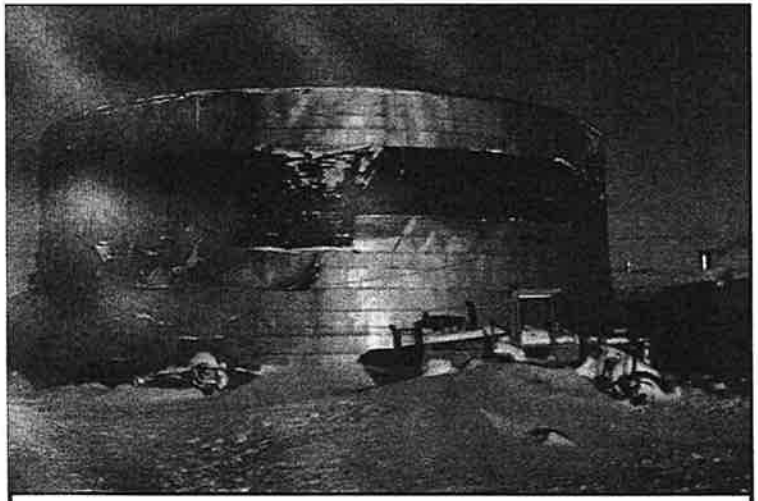
I tried to include various options in the proposal. It should meet most of the variables we discussed.

If you have any questions or want to review please feel free to contact me.

FEDERAL EMERGENCY MANAGEMENT AGENCY

PHOTO SHEET

APPLICANT:	City of Shaktoolik	CATEGORY:	F
FIPS NO.	180-68890-00	PW REF NO.	SHC-F01



Water tank shell damage.

TO INSERT PICTURE, SELECT THIS BOX AND CLICK "INSERT PICTURE" BUTTON.

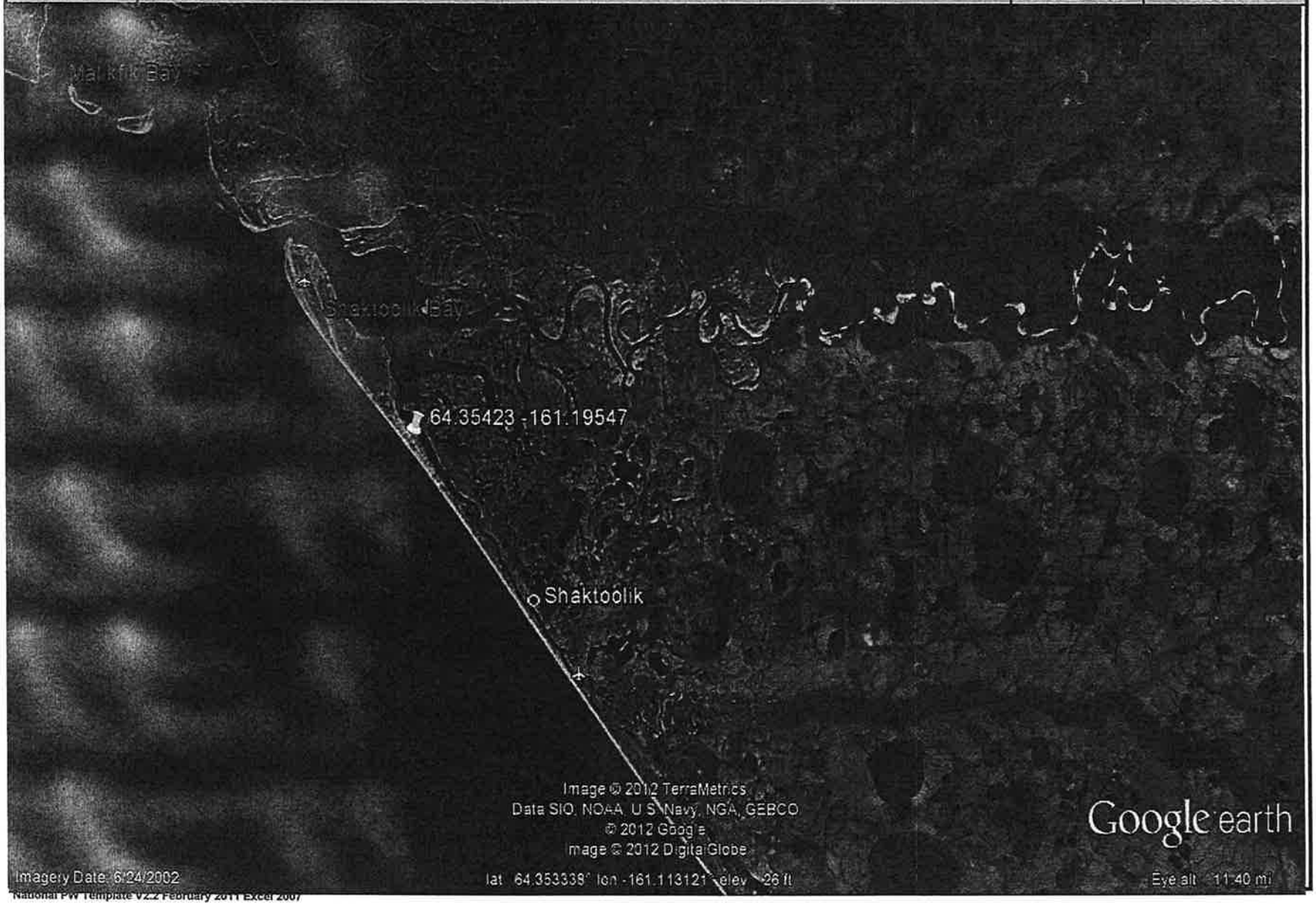
Water tank shell damage.

TO INSERT PICTURE, SELECT THIS BOX AND CLICK "INSERT PICTURE" BUTTON.

FEDERAL EMERGENCY MANAGEMENT AGENCY

LOCATION MAP

APPLICANT:	City of Shaktoolik	CATEGORY:	F
FIPS NO.	180-68890-00	PW REF NO.	SHC-F01

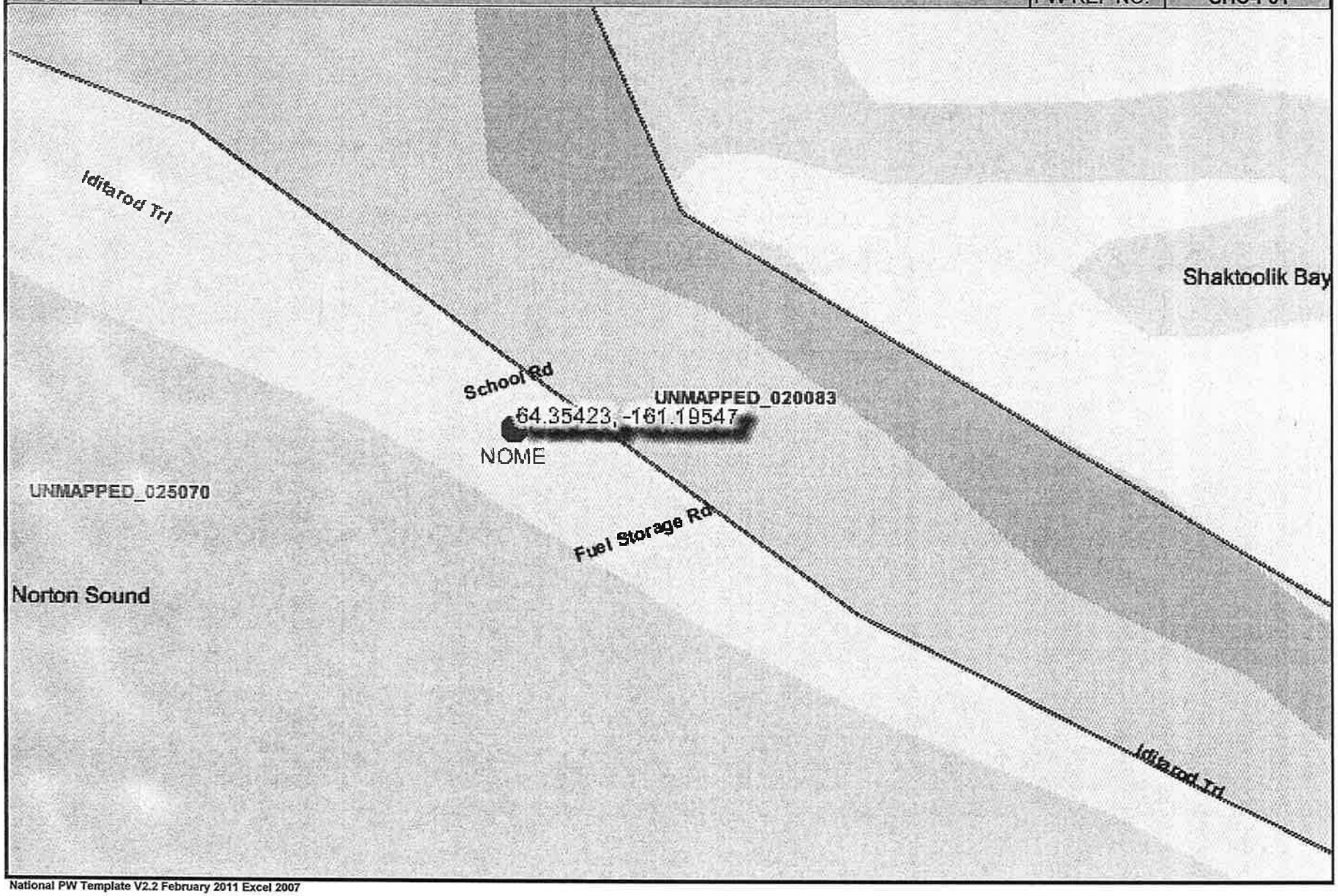


National PW Template v2.2 February 2011 Excel 2007

FEDERAL EMERGENCY MANAGEMENT AGENCY

FIRMETTE

APPLICANT:	City of Shaktoolik	CATEGORY:	F
FIPS NO.	180-68890-00	PW REF NO.	SHC-F01



National PW Template V2.2 February 2011 Excel 2007

Village Safe Water Program
Supplemental Funding Information Form

Community: City of Shaktoolik Date: 04/10/2012

Project Number (ANTHC and/or VSW): 49115

Original scope of work and a description of any reductions in scope to date:

Finance repairs to the water storage tank . The tank has two failed columns and is in imminent danger of collapse . The first part of this project is to repair the structural damage in the tank. The second phase will re-coat the interior of the tank with an NSF 61 approved coating system. The scope has been reduced and no longer includes re-coating the interior of the tank.

Original total funding amount: $350,000

Amount of funding expended to date: $350,000

Percent of project completed to date: 75%

Amount of funding needed to complete project: $136,020 31

Amount of Supplemental Funding requested: $136,020 31

Is this project part of a larger overall scope of work? (Explain)

No, this project replaces the insulation package that was removed to perform the column repairs.

If so, is there sufficient funding available to complete other, related projects?

N/A

Reasons for cost overrun (categories and amounts)

It was not foreseen at the time of the original cost estimate that the roof insulation package would need to be removed and replaced. The supplemental funding requested is to return the water storage tank insulation package to its original condition (its condition prior to removal). Removal was necessary to perform interior tank column repairs. According the July 22, 2011 Comprehensive Energy Audit for Shaktoolik Water Treatment Plant performed by ANTHC-DEHE Energy Projects Group, this missing insulation package is contributing to an additional $21,560/year in costs to the City of Shaktoolik.

Steps taken to address causes of cost overrun:

The current cost estimate returns the tank to the condition it was in prior to the repairs and includes data received directly from venders. Weather and unforeseen cost increases, including freight and materials, could adversely effect the accurateness of the estimate.

Funding Requested by: Philip Gagnon, P.E. 04/10/2012

Funding Request Approved by: Greg Magee, P.E. 4/16/12

Required Attachments:

- ✓ Detailed cost estimate table including all scope items, original budget, expenditures to date, and revised budget (including supplemental funding).
- N/A Issued for Construction (stamped) Engineering plan set
- ✓ Detailed project construction schedule (projected)

Data as of 04-06-2012

Community Name	Airport Code	ANIPA	PROJECT	PROJECT NAME	SCOPE NAME	CC	BUDGET	EXPENSES	KNOWN OBLIGATIONS	UNOBLIGATED Balance
SHAKTOOLIK										
	SKK									
		05EH02								
			71065							
				SHAKTOOLIK WATER STO						
					SKK EMT ENG,MGMT,TVL					
						18901449	0.00	20,950.77	0	(20,950.77)
					SHAKTOOLIK WATER STO					
						18888065	297,066.13	276,115.36	0	20,950.77
				SHAKTOOLIK WATER STO Tot			297,066.13	297,066.13	0	(0.00)
			49115							
				SKK WST REPAIR 5EH02						
					SKK EMT ENG,MNG,TRVL					
						18903126	9,026.06	13,920.40	0	(4,894.34)
					SKK W-WT WATER TANK					
						18903127	37,816.40	31,478.12	0	6,338.28
				SKK WST REPAIR 5EH02 Total			46,842.46	45,398.52	0	1,443.94
		05EH02 Total					343,908.59	342,464.65	0	1,443.94
SHAKTOOLIK Total							527,620.19	525,229.66	494.13	1,896.40
Grand Total							527,620.19	525,229.66	494.13	1,896.40

Date: 4/1

Calculated by:

Philip Gagnon

Shaktoolik Water Storage Tank Roof Insulation Supplimental Funding Cost Estimate - If Constructed Independently

Reference:

Vertarib Cost Estimate
Alaska Air Flight Itinerary (2X)
Bering Air Alaska Flight Itinerary
Vertarip email dated 04/10/2012

Materials	$42,830.00	
Installation	$24,050.00	
[1]Freight	$27,000.00	$1.50/lb SEA-ANC & $1.50/lb ANC-SKK 6,000lb SEA-ANC & 12,000lb ANC-SKK
[1]*Airfare	$4,325.70	SEA-OME $982.90 & OME-SKK $459.00
[1]Per Diem	$1,680.00	$60/day per standard State of Alaska rate - Anticipate 14 days (2 people)
Subtotal	$99,885.70	
Construction Management (CM)	$14,982.86	15% of project costs
Subtotal	$114,868.56	
Engineering Management and Travel (EMT)	$9,189.48	8% of project costs including CM
Subtotal	$124,058.04	
Contingency 10% of project costs including CM and EMT	$11,973.23	10% contingency was not added to airfare as 50% contingency has already been included
Total	$136,031.27	
EMT	$9,189.48	
W-WT	$126,841.79	

[1]These costs are as though the roof insulation package will be purchased and installed independently of the wall insulation package.

*A 50% contingency was used for airfair because the cost estimate used was based on buying tickets months in advance of departure dates. In reality if tickets are not bought far enough in advance prices may be much higher. Additionally, advanced purchase of tickets is less likely given the criticalness that this project be completed prior to next winter and grant funding must first be recieved and materials procured, shipped and recieved on site prior to flying out

PROJECT COST ESTIMATE

Community: City of Shaktoolik

Project Title: Supplimental Funding Water Storage Tank Repairs

Scope Item	Quantity	Units	Unit Cost	Total Estimate/Funding	Percent of Total	Houses Served
M-DS Design & Studies (LS)	1.00	LS	$0.00	$0.00	0%	73
EMT Engineering, Management, & Travel	1.00	LS	$9,189.48	$9,189.48	7%	73
W-WT Water Tank (Gal)	1.00	EA	$126,841.79	$126,841.79	93%	73
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
				$0.00	0%	
			Total Estimate:	$136,031.27		

Design Start Date: _____ **Design Completion Date:** _____

Construction Start Date: 9/1/2004 **Construction Completion Date:** 12/31/2012

Scope of Project:

Finance repairs to the water storage tank. The tank has two failed columns and is in imminent danger of collapse. The first part of this project is to repair the structural damage in the tank. The second phase will re-coat the interior of the tank with an NSF 61 approved coating system. The scope has been reduced and no longer includes re-coating the interior of the tank. These supplemental funds will cover the costs to replace the roof insulation and shell package that was removed when the columns were replaced.

VSW Manager, Approval Signature: _____ **Date:** _____

IRA Council
P.O. Box 100
Shaktoolik, Alaska 99771-0100
Phone (907) 955-3701
Fax (907) 955-3757

The Native Village of Shaktoolik is in support of the City of Shaktoolik Water Storage Tank Renovation Project

12-15

WHEREAS, the Native Village of Shaktoolik is an Alaskan Native Village organized as an Alaskan Native/American Indian Organization Act of 1934 as amended in 1936 for Alaska, and;

WHEREAS, the Native Village of Shaktoolik IRA Council is the elected governing body of the Alaska Native/American Indian People of the Native Village of Shaktoolik, and;

WHEREAS, the City of Shaktoolik seeks additional funding to supplement funding from FEMA, Village Safe Water, and the Denali Commission to repair damages done to the community water storage tank and;

WHEREAS, repair of the water storage tank will ensure the community has readily available potable water for the benefit of our residents, businesses, and schools and help to minimize energy consumption of keeping the water above freezing temperatures;

Now therefore be it resolved that the Native Village of Shaktoolik IRA Council supports the City of Shaktoolik efforts to secure funding for the Water Storage Tank Renovation Project.

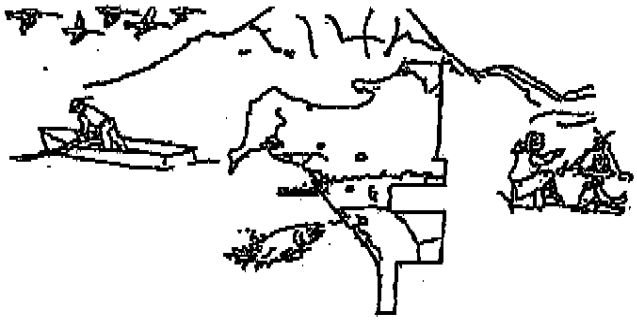
Certification
12-15

We, the undersigned members of the Native Village of Shaktoolik IRA Council do hereby certify that the Native Village of Shaktoolik IRA Council is composed of 7 members, of whom 05 voted on this 12th day of June, 2012, and the foregoing resolution was adopted by a vote of 05 members.

YES 5 NO 0 ABSTAIN 0 ABSENT 2

Agnes R. Takak
Harvey Sooklayak Sr.
President

ATTEST:
Edna Savetilik
Edna Savetilik
Secretary



Shaktoolik Native Corporation
P.O. Box 46
Shaktoolik AK 99771
Phone (907) 955-3241 office 955-3242 store
Fax (907) 955-3243

June 11, 2012

Re: Letter of support

To Whom It May Concern:

Shaktoolik Native Corporation fully supports the City of Shaktoolik's efforts to secure funding from the NSEDC energy fund to supplement funding from FEMA, Village Safe Water, and the Denali Commission. This is to ensure that the storm damaged insulation surrounding the community's water storage tank is repaired in a manner that is both effective and strengthened to resist damage from future storms.
The city's water storage tank not only serves the residents of the community but is also essential to the successful functioning of all governing, educational, and business entities here in Shaktoolik. We all rely on the city for readily available water for the health, safety and well being of our residents, students and customers.
We, at the village corporation level, strongly encourage NSEDC to grant funding to the City of Shaktoolik to help ensure our water supply is well protected and insulated from our winters' bitter cold weather and help minimize energy consumption in keeping the water from freezing. Our schools, governments and businesses cannot function effectively without readily available potable water.

Sincerely,

Teresa B. Perry
Vice President SNC

Fred N. Sagoonick
CEO SNC

Cc: files

City of Shaktoolik
Phone # (907) 955-5441
Fax # (907) 955-5221

P. O. Box 10
Shaktoolik
Alaska 99771

CITY OF SHAKTOOLIK
RESOLUTION NO. 05-08-12

A RESOLUTION OF THE CITY OF SHAKTOOLIK SUPPORTING THE CITY OF SHAKTOOLIK APPLICATION FOR FUNDING THROUGH NSEDC'S COMMUNITY ENERGY FUND.

WHEREAS, NSEDC's Community Energy Fund presents the City of Shaktoolik with a unique opportunity to improve the Energy Efficiency of the Community's Water Storage Tank; and

WHEREAS, the City of Shaktoolik is striving to reduce its Energy Costs and provide affordable, dependable Water & Sewer to its customers by improving the insulation on its Water Storage Tank; and

WHEREAS, NSEDC'S Community Funding, along with funds from FEMA, VSW and Denali Commission, will provide the resources to the City of Shaktoolik to purchase and install new insulation on the Water Storage Tank and improve its efficiency.

NOW THEREFORE BE IT RESOLVED that the City Council of Shaktoolik supports The City of Shaktoolik's Application for funding from NSEDC's Community Energy Fund Grant Program.

PASSED and APPROVED by a duly constituted quorum of the SHAKTOOLIK CITY COUNCIL this 8th day of June, 2012.

SIGNED: _____ ATTEST: _____
Eugene Asicksik, Mayor
Kristal Sagoonick
Acting City Clerk

Ruba Status Report

RUBA Status Report

Community:	Shaktoolik	RUBA:	No
Staff:	Leroy Seppilu	Agreement:	No
DCA Region:	Nome	Agreement Date:	
Region:	Bering Straits	Exp Date:	
Govt Type(s):	2nd Class City		
Borough:	Unorganized	Assessment Date:	1/21/2010
Population:	214		
Active Community:	Yes	Date Updated:	4/6/2012

Community Sanitation Overview: Water is pumped three miles from the Togoomenik River to the pumphouse, where it is treated and stored in a 848,000-gallon insulated tank adjacent to the washeteria. A piped water and sewage collection system services most homes. 75% of households have complete plumbing and kitchen facilities. The school is connected to City water, and has received funding to develop a sewage treatment system to serve the entire community. The City burns refuse in an incinerator. The landfill needs to be relocated; the current site is not permitted.

RUBA Status and Activities This Quarter: RUBA staff has kept in contact with acting city clerk to have the city implement Quickbooks for the city's finances. She had gotten authorization from the mayor to puchase the QBP, an accounting software program. She said she has enough experience with it to implement most of the software's features, including payroll and taxes, billing and bank accounting, etc. RUBA staff encouraged her to implement it as soon as she can and that she should include subscribing to Intuit' monthly payroll upgrade.

Capacity Indicator: Finances

Essential Indicators

Yes	All revenues and expenses for the utility are listed in the utility budget.
No	The utility has adopted a balanced realistic budget.
No	Monthly financial reports are prepared and submitted to the policy making board.
Yes	The utility is current in paying all water/wastewater electric bills.
Yes	The utility has on hand a year's adequate fuel supply or it has a financial plan to purchase an adequate supply.
No	The utility is receiving revenues (user fees or other sources) sufficient to cover operating expenses.

Sustainable Indicators

No	The utility is receiving revenues (user fees or other sources sufficient to cover operating expenses and Repair & Replacement (R) costs.
No	YTD revenues are at a level equal to or above those budgeted.
No	YTD expenditures are at a level equal to or below those budgeted.
Yes	A monthly manager's report is prepared.
Yes	Budget amendments are completed and adopted as necessary.

Finances Comment: The city still does not make monthly financial reports, although the acting city clerk Betsy Bekoalok has just purchased QBP accounting software program to manage the city's finances. She has experience using it, but would like to do a refresher course on it. RUBA staff provided QBP hotline names and phone number for her to use. RUBA staff also discussed creating a monthly financial report using Excel (a RUBA approved format). The city usually submits a late completed budget each fiscal year.

Capacity Indicator: Accounting Systems

Essential Indicators

Yes	The utility has adopted a collection policy and actively follows it.
Yes	The utility bills customers on a regular basis.
Yes	An accounts receivable system is in place which tracks customers and reports past due accounts and amounts.
Yes	An accounts payable system is in place.
Yes	The payroll system correctly calculates payroll and keeps records.
Yes	A cash receipt system is in place that records incoming money and how it was spent.
Yes	The utility has a cash disbursement system that records how money was spent.

Sustainable Indicators

Yes	A chart of accounts is used that identifies categories in a reasonable, usable manner.
No	Monthly bank reconciliations have been completed for all utility accounts.
No	The utility has a purchasing system that requires approval prior to purchase, and the approval process compares proposed purchases to budgeted amounts.
Accounting Systems Comment:	The City has a fairly comprehensive water and sewer ordinance. All records, including tracking of customer billing, payments and past dues are kept manually. The acting city clerk purchased Quickbooks Pro accounting software program and will start implementing it soon.

Capacity Indicator: Tax Problems

Essential Indicators

Yes	The utility has a system to accurately calculate, track, and report payroll tax liabilities.
Yes	The utility is current on filing tax reports.
Yes	The utility is current on making tax deposits.
N/A	If there are any past due tax liabilities or recorded tax liens, a lien release has been issued or a repayment agreement has been signed and repayments are current.
Tax Problems Comment:	The city is up to date with payroll tax liabilities, filing reports and tax deposits. All record-keeping is done manually.

Capacity Indicator: Personnel System

Essential Indicators

Yes	The utility has a posted workers compensation insurance policy in effect.

Sustainable Indicators

Yes	The utility has adopted and uses a Personnel Policy, which has been reviewed by an attorney, AML or Commerce for topics and language.
Yes	The utility has adequate written job descriptions for all positions.
Yes	The utility has adopted and follows a written personnel evaluation process that ties the job description to the evaluation.
Yes	The utility has an adequate written hiring process.
Yes	The utility has personnel folders on every employee that contain at least: I-9, Job Application and Letter of Acceptance.
Yes	The utility has a probationary period for new hires that includes orientation, job training/oversight, and evaluations.
Yes	The utility provides training opportunities to staff as needed and available.
Personnel System Comment:	The city has workers' compensation coverage through Alaska Municipal League-Joint Insurance Asso. (AML-JIA). The city has an older personnel policies ordinance, but is complete and comprehensive.

Capacity Indicator: Organizational Management

Essential Indicators

Yes	The entity that owns the utility is known; the entity that will operate the utility is set.
Yes	The policy making body is active in policy making of the utility.
Yes	The policy making body enforces utility policy.
Yes	The utility has an adequately trained manager.
Yes	The utility has an adequately trained bookkeeper.
Yes	The utility has an adequately trained operator or operators.
Yes	The utility has adopted the necessary ordinances (or rules and regulations) necessary to give it the authority to operate.

Sustainable Indicators

Yes	The utility has adopted an organizational chart that reflects the current structure.
Yes	The policy making body meets as required.
Yes	The utility complies with the open meeting act for all meetings.
Organizational Management Comment:	The city council acts as a utility board. The council places water and sewer issues in its agenda in the monthly city council meetings and takes action on utility issues as needed. The mayor hires a temporary bookkeeper to work on and complete the budget each year. She has experience with use of QBP and plans to start using it for completion of budget and monthly financial reports.

Capacity Indicator: Operation of Utility

Essential Indicators

Yes	The utility operator(s) are actively working towards necessary certification.
Yes	The utility has a preventative maintenance plan developed for the existing sanitation facilities.

Sustainable Indicators

Yes	The manager receives a monthly O&M report from the utility operator and routinely "spot checks" the facilities to see that the maintenance items are being completed.
No	The utility has a safety manual and holds safety meetings.
Yes	Utility facilities have not suffered any major problems/outages due to management issues that are unresolved.
Yes	The utility is operating at the level of service that was proposed.

Yes	The operator provides status reports to the manager on a routine basis.
Yes	The utility has completed and distributed its "Consumer Confidence Report".
No	The utility is not on the "Significant Non-Complier" (SNC) list.
Yes	The utility maintains an inventory control list.
Yes	The utility maintains a critical spare parts list.
Operation of Utility Comment:	According to the latest Significant Non-Compliant list, the city is still on the Significant Non-Complier list for Stage 1 and SWTR violations. The city utility operator is working with Analytical and Remote Maintenance Worker to get off of the SNC list. The utility operator is certified as Provisional 1.
RUBA Activities for the Coming Quarter:	*RUBA staff will travel to community to review training needs for implementation of QBP. *RUBA staff will work and monitor timely completion of FY '13 budget.

Webmaster