Energy Efficiency Upgrades for Sanitation Facilities in Selawik, Alaska

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ANTHC, DEHE Overview

Services Provided:
- Design/Build
- Project Management
- Environmental Health
- Tribal Utility Support
- Regional Health Facilities
- National Tribal Water Center
- Alaska Rural Utility Collaborative
Selawik Overview
Selawik Sanitation Facilities

Above ground circulating water & vacuum sewer
Selawik Sanitation Facilities

System Development Timeline

1970s Original Facility
1984 Renovations
1997 Improvements
2000-2002 Upgrades
2005-2008 WTP Rehab
2011 Current Energy Upgrades
2014 What’s Next?
Selawik Energy Use & Costs

- Electricity:
  - $38,902 (10,514 gal)
  - $91,559 (337,829 kWh)

- Fuel:
  - $7,688 (5,125 gal)

- Recovered Heat:
  - Small portion

Image: Power plant and power lines in a rural setting.
Challenges in Selawik

- Annual freeze-ups to mains and services
- Vacuum sewer system is expensive to operate
- Damage due to freeze/thaw cycle of permafrost
## Project Objectives

<table>
<thead>
<tr>
<th>Utility</th>
<th>Scope of Work</th>
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</thead>
</table>
| Water Treatment/Vacuum Sewer Plant (Interior) | 1. Modify heat recovery system  
2. Upgrade glycol heat-add system (sewer)  
3. Upgrade hydronic heat-add system (water)  
4. Replace interior lighting with LED lamps  
5. Re-commission vacuum sewer pumps          |
| Vacuum Sewer Collection System (Exterior)    | 1. Repair leaks in vacuum sewer mains & service lines  
2. Repair and re-insulate junction & arctic boxes  
3. Label heat trace breaker boxes             |
# Additional Funding for Additional Scope of Work

<table>
<thead>
<tr>
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</table>
| Water Treatment Plant         | 1. Replace circulation pumps  
                                | 2. Replace single wall with double wall heat exchangers                         |
| Sewer & Water System          | 1. Replace glycol heat-add lines in utilidors  
                                | 2. Re-level vacuum sewer utilidors  
                                | 3. Replace vertical bends & elbows in water loops                               |
| Individual Services           | 1. Repair up to 100 damaged arctic boxes  
                                | 2. Replace up to 100 non-functioning water service circulation pumps            |
# Phased Approach

## Scope of Work

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
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<tbody>
<tr>
<td>1. Upgrade glycol heat-add system in vacuum sewer plant</td>
<td>2012</td>
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<tr>
<td>2. Upgrade hydronic heat-add system in water treatment plant</td>
<td>2012</td>
</tr>
<tr>
<td>3. Re-commission vacuum sewer pumps</td>
<td>2012</td>
</tr>
<tr>
<td>4. Repair and re-insulate junction &amp; arctic boxes</td>
<td>2012</td>
</tr>
<tr>
<td>5. Label heat trace breaker boxes</td>
<td>2012</td>
</tr>
<tr>
<td>6. Replace circulation pumps</td>
<td>2012</td>
</tr>
<tr>
<td>7. Replace glycol heat-add lines in utilidors (about 35% complete)</td>
<td>2012</td>
</tr>
<tr>
<td>8. Repair up to 100 damaged arctic boxes (30 completed)</td>
<td>2012</td>
</tr>
<tr>
<td>9. Replace up to 100 non-functioning water service circulation pumps</td>
<td>2012</td>
</tr>
</tbody>
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<table>
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Progress to Date

- Project is complete
- In closeout phase
- Focusing on the future
New Circulating Pumps
Recovered Heat Module
Hydronic Piping
Challenges

- Freight
Technical Issues Are Addressed, Now What?

- Technical issues only part of the problem
- Change user behavior and perception
- Climate change ongoing impact
- Utility ordinance driving behavior
- ARUC looking to the future
A Healthy Future for Rural Alaska