Key Activities Completed:

1. Completed installation of piping insulation.
2. The five electronic flow meters were replaced with mechanical paddle wheel meters and all loops are showing readings correlating with the design flows and pump pressure curves.
3. The paddle flow switches supplied by Trane with the heat pumps have been replaced with differential switches.
4. Requested and receive from AEA and ACEP 6-month no cost extension until June 30, 2012 to complete the project.
5. ASLC has received a grant from the M.J. Murdock Foundation to fund connecting the Center’s pavement heating to the heat pumps and to recover waste heat from various sources in the building to add to the evaporator loop to keep the glycol temperature entering the heat pump evaporators as high as possible to improve system performance. This work is in design and will be installed in 2012.

Existing or Potential Problems Addressed:

1. As reported in last quarterly report the instrumentation integration and operator screen programming has been delayed by a very challenging detail of getting ModBus power meter data into a LonTalk server. With the power data not coming through the LonTalk server, we have not been able to monitor COP continuously on line. We have not been pleased with rate of progress on resolving this problem by Echelon and Trane; however, they appear close to resolution and Trane should be able to complete the Tracer SC controller programming by January 16, 2012.
2. We have been able to sample one hour time intervals that are fairly typical and the readings we are obtaining are close to those predicted in the modeling. From the time the heat pumps were placed into operation by Trane in July 2011, we operated them with our 500KW electric boiler as the Center’s source of building heating. Effective December 21, 2011, we discontinued the electric boiler operation and went on oil boiler. This was predicated by the high demand placed on the electric boiler to supply building and pavement heating during very cold weather, resulting in high KWH demand. As reported in the attached Seawater Heat Pump Performance Report, for the 19-day period from December 21, 2011 through January 8, 2012, we have achieved a COP of 3.14 with 4,020 gallons of fuel oil saved. Factoring in the cost of the total kWh consumed by the heat pump system, this has meant a cost savings of $11,117 and a reduction of 89,000 pounds of CO2.

3. We have verbally proposed to ACEP that the exhibit match requirement be waived given the significant contributed labor provided to systems installation. We are proposing to develop an a video to exhibit the system to the Center’s visitors rather than a static floor display.

4. We have been invited by the House Resources Committee to make a 10-minute presentation on the project January 27, 2012 in Juneau.

Activities Targeted for Completion:

1. Complete full system commissioning and training. Training is scheduled for January 17-18, 2012 subject to Trane’s completion of the instrumentation integration and operator screen programming.

2. Obtain formal modification of the ACEP agreement regarding the Exhibit requirement.

3. Finalize project reporting and monitoring requirements with ACEP/AEA following commissioning and training.

**ASLC HEAT PUMP PROJECT TIMELINE**

**Updated January 1, 2012**

June 6, 2010 – July 7, 2010: Procure and contract mechanical/electrical engineering services

July 8 – November 30, 2010: Complete design (Drawings, Specifications, Final Cost Estimate)


December 1, 2010 – November 15, 2011: Equipment procurement (including instrumentation), installation and commissioning, and final reporting:

a. Shop drawing/manufacture submittals and review – 3 weeks
b. Manufacture and ship heat pumps, heat exchangers and instrumentation to Seward – 12 weeks

c. Ship heat exchangers, heat pumps, instrumentation from Seattle to Anchorage to Seward – 2 weeks

d. Installation of all mechanical, electrical and instrumentation components – 6 weeks, including piping and seawater supply pump

e. Start-up, commissioning, and training

November 15, 2011 – June 30, 2012: Project monitoring and reporting to ACEP/AEA

EXHIBIT TIMELINE

January 1, 2012– March 1, 2012: Exhibit (video) development

March 1, 2012 - June 1, 2011: Exhibit (video) production and evaluation

June 1-30, 2012: Exhibit (video) launch

Project personnel assigned to the project are as follows:

Darryl Schaefermeyer, ASLC Operations Manager Project Executive
Randy Stauffer, ASLC Project Engineer Project Manager
John Underwood, ASLC Facilities and Life Support Supervisor Project Superintendent
Douglas (Ricky) Deel, ASLC Exhibits Manager Exhibit Development
Andy Baker, P.E., (www.yourcleanenergy.us) Consulting Engineer
Lee Bolling, EIT, (www.yourcleanenergy.us) Engineering Technician
John Faschan, P.E. (www.edc-alaska.com) Electrical Engineer
Kevin Hansen, P.E. (www.edc-alaska.com) Mechanical Engineer

The project is on schedule and budget to meet the revised Contract completion date of June 30, 2012.

Attachments: (1) Schedule & Milestone Overview as of 1/1/12
(2) Seawater Heat Pump Performance Report, 12-21-2011 – 01-09-2012
(3) Financial Report
(4) Photos
## Sea Water Heat Pump Project
### Schedule & Milestone Overview
#### As of 1/1/12

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Description</th>
<th>Dates</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>Heat Pumps Ordered</td>
<td>Nov. 12, 2010</td>
</tr>
<tr>
<td>2.</td>
<td>Complete System Engineering</td>
<td>Nov 30, 2010</td>
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<tr>
<td>5.</td>
<td>Receive System Components</td>
<td>Mar. 7 – May 6, 2011</td>
</tr>
<tr>
<td>7.</td>
<td>Install Piping in 2nd Floor Gallery</td>
<td>April 4 - 7, 2011</td>
</tr>
<tr>
<td>8.</td>
<td>Install Components &amp; Piping in Basement</td>
<td>April 11 – June 6, 2011</td>
</tr>
</tbody>
</table>
Figure 1 Pump 100 - Salt Water Supply
Figure 5: Evaporator and Condenser Loop Pumps

Figure 6: AHU Pre-Heat Loop HX and Pumps
Figure 7 DHW Pre-Heat HX
Figure 8 Tracer SC - Overall Screen View