



## **Alaska SeaLife Center<sup>®</sup>**

*w i n d o w s   t o   t h e   s e a*

**Alaska SeaLife Center Seawater Heat Pump Project  
Denali Commission Emerging Energy Technology Grant  
UAF 10-0069**

**Alaska Energy Authority Renewable Energy Grant  
AEA Grant Agreement No. 7030017  
Quarterly & Monthly Report ending March 31, 2011**

### Key Activities Completed:

1. Issued Purchase Orders for heat exchangers, closed loop circulation pumps, air separators, expansion tanks, control valves, non-motorized valves, motor control center, and PVC and steel piping/fittings.
2. Received proposals from three control contractors for furnishing, installation and commissioning of heat pump system controls and instrumentation.
3. Received quotations from two electrical contractors for installing line voltage power to motor control center, heat pumps, and circulation pumps.
4. Issued Purchase Order for circulation pumps.
5. Issued Purchase Order for heat exchangers.
6. Selected Trane as the most responsive, responsible controls supplier and contractor from the three proposals received. Proceeded to finalize scope of work and draft contract which will be signed in March 2011.
7. Issued contract and purchase order to Service Electric on February 2, 2011 for electrical power installation.
8. Issued contract and purchase order to Jaffa Construction on March 3, 2011 for rigging and installation of Trane heat pumps.
9. Received delivery of Trane heat pumps on March 14, 2011.
10. Received delivery of steel and copper pipe and related materials on March 14, 2011.
11. Poured housekeeping pad for MCC.
12. Received delivery of loaned steel pipe grooving machine and training by Victaulic representative.
13. Received delivery of expansion tanks, air separators, and HX-5.
14. Trane heat pumps installed in boiler room by Jaffa Construction on March 18, 2011.
15. Issued contract and purchase order to Trane for controls and Instrumentation.

16. Issued purchase order to EPSCO on March 16, 2011 for 20-inch wye saddle for salt water discharge piping.
17. Issued purchase order to Fluidtrol on March 22, 2001 for flushable salt water supply strainer.
18. Issued revised invitation to Johnson Control on March 30, 2011 to quote Metasys control modifications.
19. Issued purchase order to VAF Filtration Systems on April 4, 2011 for salt water supply strainer control and valve.
20. ASLC Life Support and Facilities staff commenced Victaulic pipe installation in public gallery area on April 4, 2011 for HP system heating loop.

#### Existing or Potential Problems Addressed:

1. Addressed with design engineers the manufactured specifications and performance of the various quoted heat exchangers. ASLC has ordered Bell & Gossett heat exchangers; however, have not yet released to manufacture pending additional review of the heat exchangers' heat transfer rates. ASLC has requested Bell & Gossett to verify and certify the heat transfer rates of the units proposed or to alternatively provide units that will meet the design specification heat transfer rates. Order of Bell and Gossett heat exchangers cancelled due to heat transfer rates not meeting design requirement. Ordered Alfa Laval heat exchangers.
2. ASLC informed AEA Grant Manager that it was withdrawing its request for a an amendment to the budget milestones following a review by ASLC and City of Seward accounting personnel that the existing budget appropriately met and could be managed within the ASLC accounting program. Resolved concerns regarding heat exchanger transfer rates by procuring Alfa Laval heat exchangers.
3. Resolved concerns regarding circulation pump curves by procuring Paco pumps.
4. With Steve Carrick's departure on February 18, 2011 to take the Superintendent of Engineering position at the Philadelphia Zoo, the project exhibit schedule has had to be modified to allow his replacement to become oriented to the project. See revised exhibit schedule below.
5. Resolved design questions regarding salt water supply flushable strainer.

#### Activities Targeted for Next Quarter

1. Receive remaining equipment (heat exchangers (2), motorized valves, circulation pumps (6), motor control center, flushable strainer, 20-inch PVC wye saddle, and control instruments.
2. Complete installation of steel, PVC and copper pipe for seawater loop, evaporation loop, condenser loop and heating supply loop; heat exchangers; air separators; expansion tanks; circulation pumps; motorized and non-motorized control and check valves; motor control center; electrical power supply; HP controls and instrumentation; and commissioning/startup.

## ASLC HEAT PUMP PROJECT TIMELINE

Updated February 28, 2011

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 – January 31, 2011: Procure and control and electrical contractors.

December 1, 2010 – June 8, 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 – 2 weeks

June 8, 2011 – June 30, 2012: Project monitoring and reporting to ACEP

### EXHIBIT TIMELINE

April 1, 2011– August 30, 2011: Exhibit design and procurement

September 1- October 30, 2011: Exhibit fabrication

November 1 – 30, 2011: Exhibit installation and evaluation

Project personnel assigned to the project are as follows:

Darryl Schaefermeyer, ASLC Operations Manager

Randy Stauffer, ASLC Project Engineer

John Underwood, ASLC Facilities and Life Support Supervisor

Project Executive

Project Manager

Project

Superintendent

Douglas (Ricky) Deel, ASLC Exhibits Manager

Andy Baker, P.E., ([www.yourcleanenergy.us](http://www.yourcleanenergy.us))

Lee Bolling, EIT, ([www.yourcleanenergy.us](http://www.yourcleanenergy.us))

John Faschan, P.E. ([www.edc-alaska.com](http://www.edc-alaska.com))

Kevin Hansen, P.E. ([www.edc-alaska.com](http://www.edc-alaska.com))

Exhibit  
Development  
Consulting Engineer  
Engineering  
Technician  
Electrical Engineer  
Mechanical  
Engineer

The project is on schedule and budget to meet the Contract completion date of January 15, 2012.

Financial report will be submitted separately on January 6, 2011.

Attachments: (1) Schedule & Milestone Overview as of 3/10/11  
(2) Summary of Material, Equipment & Contract Purchase Orders as of 4/5/2011  
(4) Financial Reports  
(3) Photos

**Sea Water Heat Pump Project  
Schedule & Milestone Overview  
As of 4/1/11**

- |   |                         |
|---|-------------------------|
| 1. Heat Pumps Ordered <sup>(1)</sup>                        | Nov. 12, 2010           |
| 2. Complete System Engineering                              | Nov 30, 2010            |
| 3. Release System Component RFQs                            | Dec. 1 – Dec. 31, 2010  |
| 4. Place System Component Orders                            | Jan. 25 – Mar. 25, 2011 |
| 5. Receive System Components                                | Mar. 7 – May 6, 2011    |
| 6. Install Heat Pumps in Basement                           | Mar. 17 – 18, 2011      |
| 7. Install Piping in 2 <sup>nd</sup> Floor Gallery          | April 4 - 7, 2011       |
| 8. Install Components & Piping in Basement                  | April 11 – May 13, 2011 |
| 9. Install Electrical Power & Control Wiring <sup>(2)</sup> | May 2 – 27, 2011        |

10. Commission Heat Pump System <sup>(3)</sup>

May 30 – Jun.3, 2011

11. Complete System Training

Jun. 6 - 8, 2011

Notes:

- (1) Heat Pumps pre-ordered due to long lead time & to obtain price discount.
- (2) Power wiring & control wiring to be completed concurrently.
- (3) Due to warming sea water temperatures, complete system verification may not be possible at this time of year.

Sea Water Heat Pump Project (Project No. V0201 & V0202) Material, Equipment & Contract Purchase Orders 4/6/2011											
Item	Manufacturer	Supplier	P/O #	P/O \$	P/O Date	Tech Submittal	App'd to Man	Ship Date	Freight Co.	Est'd Del'y	Actual Del'y
Design & Engineering	N/A	YourCleanEnergy	8443	\$91,665	7/14/10			Contract Signed 7/12/2010			11/30/10
Heat Pumps (x2)	Trane	Trane	8492	\$181,100	11/12/10	12/8/10	12/16/10	2/14/11	Systems Transport	3/7/11	3/14/11
Refrigerant Monitor	Trane	Trane	8492	*****	11/12/10	*****	*****	1/27/11	UPS	*****	1/31/11
24v red Signal Tower	Federal Signal Corp	Trane via MSA	8492	*****	11/12/10	*****	*****	11/17/10	UPS	*****	11/24/10
Metal Pipe & Fittings	Various	Ferguson Enterprises	8527	\$50,206	1/25/11	2/8/11 (revised)	2/15/11	3/10/11	Carlisle	3/11/11	3/14/11
PVC Pipe & Fittings	Various	Ferguson Enterprises	8527	*****	1/25/11	2/8/11 (revised)	2/15/11	3/15/11	Carlisle	3/11/11	3/16/11
Check Valves (x6)	Various	Ferguson Enterprises	8526	\$1,565	1/25/11	2/8/11 (revised)	2/15/11	3/15/11	Carlisle	3/11/11	3/16/11
Ball Valves (x5)	Various	Ferguson Enterprises	8525	\$574	1/25/11	2/8/11 (revised)	2/15/11	3/15/11	Carlisle	3/11/11	3/16/11
Butterfly Valves (x30)	Various	Ferguson Enterprises	8524	\$9,977	1/25/11	2/8/11 (revised)	2/15/11	3/15/11	Carlisle	3/11/11	3/16/11
Balancing Valves (x12)	Various	Ferguson Enterprises	8523	\$6,982	1/25/11	2/8/11 (revised)	2/15/11	3/15/11	Carlisle	3/11/11	3/16/11
CVR Pipe Joiner	Various	Ferguson Enterprises	8563	\$1,776	3/16/11	N/A	N/A	?	?	3/21/11	3/26/11
Wye Saddle	Custom	EPSCO Int.	8562	\$1,125	3/16/11	N/A	N/A	?	UPS Next Day Air	3/25/11	3/28/11
Expansion Tanks (x3)	Wessels	Paramount Supply	8522	\$4,763	1/25/11	1/31/11	2/3/11	?	City Express	3/15/11	3/7/11
PCV Valve (x1)	Cal-Val	Paramount Supply	8521	\$7,358	1/25/11	2/2/11	2/3/11	3/15/11	City Express	3/15/11	3/16/11
Flushable Strainer	Fluidtrol	Fluidtrol	8565	\$3,788	3/22/11	3/16/11	3/22/11				4/29/11
Strainer Control & Valve	Valve & Filter Corp.	VAF Filtration Systems	8570	\$4,343	4/4/11	3/16/11	4/4/11	4/27/11	UPS	5/4/11	
Air Separators (x3)	Bell & Gossett	Paramount Supply	8528	\$4,469	1/25/11	1/31/11	2/3/11	?	City Express	3/29/11	3/24/11
Motorized Valves (x9)	Belimo	Keller Supply	8520	\$5,510	1/25/11	2/4/11	2/17/11			4/1/11	
Circ Pumps (x6)	Bell & Gossett	Keller Supply	8519	*****	1/25/11			***** ORDER CANCELLED 3/9/11*****			
Circ Pumps (x6)	Paco	Alaska Roteq	8555	\$14,516	3/9/11	3/2/11	3/9/11			4/22/11	
HX-5	Doucette	Keller Supply	8518	\$5,695	1/25/11	2/4/11	2/12/11	?	Carlisle	4/1/11	4/1/11
HX-4	Bell & Gossett	Keller Supply	8517	*****	1/25/11			***** ORDER CANCELLED 2/18/11*****			
HX-3	Bell & Gossett	Keller Supply	8517	*****	1/25/11			***** ORDER CANCELLED 2/18/11*****			
HX-4	Alfa Laval	Stinebaugh & Co.	8546	\$30,468	2/25/11	2/18/11	2/25/11	3/25/11	AFF	4/15/11	
HX-3	Alfa Laval	Stinebaugh & Co.	8546	*****	2/25/11	2/18/11	2/25/11	3/25/11	AFF	4/15/11	
MCC	Eaton	WESCO Distribution	8532	\$36,340	2/8/11	2/25/11	3/2/11			5/6/11	
Controls & Instruments	Various	Trane	8564	\$65,832	3/1/11						
Electrical Power Install	N/A	Service Electric	8538	\$39,200	2/17/11			T&M Not To Exceed (NTE) Contract Signed 2/18/2011			
Mechanical Installation	N/A	Jaffa Construction	8557	\$13,000	3/11/11			T&M Not To Exceed (NTE) Contract Signed 3/11/2011			
Mechanical Installation	N/A	Samson Tug & Barge	*****	\$213	3/11/11	*****	*****	*****	*****	*****	3/11/2011
Mechanical Installation	N/A	Carlisle	*****	\$250	3/17/11	*****	*****	*****	*****	*****	3/17/2011
Tools	Various	Resurrection Rentals				N/A	N/A	N/A	N/A		
Glycol						N/A	N/A				
JCI System Changes	N/A	JCI									
Water Treatment	N/A	H2O									
Pipe Insulation Install	N/A										
Commissioning	N/A	YourCleanEnergy									
				<b>Total Project P/O Value =</b>	<b>\$580,714</b>						
				<b>Total Project Budget =</b>	<b>\$713,300</b>						
				<b>Remaining Budget =</b>	<b>\$132,586</b>						

Instrumentation Devices Trane ACEP \$7,500



Figure 1 Installing first Trane heat pump into ASLC boiler room – March 17, 2011



Figure 2 Installing first Trane heat pump in ASLC boiler room - March 17, 2011



Figure 3 Installing second Trane heat pump in ASLC boiler room - March 17, 2011





Figure 4 Installing second Trane heat pump in ASLC boiler room - March 17, 2011



Figure 5 Trane heat pumps installed in ASLC boiler plant room - March 18, 2011



Figure 6 ASLC Facilities Technician Dan Rice installing Victaulic heating loop piping - April 4, 2011



Figure 7 ASLC Building Maintenance staff installing Victaulic heat loop piping - April 4, 2011



Figure 8 ASLC LSS Group Manager John Underwood and LSS Technician Isaac London installing Victaulic heating loop piping - April 5, 2011



Figure 9 ASLC LSS Technician Isaac London preparing Victaulic couplers for installation - April 5, 2011