



• August 15-18, 2010 • Dallas, Texas •
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Elmendorf Air Force Base – Boiler Decentralization

Elizabeth L. Brown
Ameresco, Inc.

Elmendorf Air Force Base

- Anchorage, AK
- Home of 3rd Wing (F-15, F-22, C-12, C-17, and E-3 aircraft)
- Headquarters of 11th Air Force, the Alaskan Command, and Alaska NORAD Region
- 9.3 Million Square Feet



Existing Central Plant

- Six (6) 150,000 lb/hr natural gas/jet fuel boilers
- Two (2) 9.3 MW steam extraction turbines
- One (1) 7.5 MW steam extraction turbine



Existing Central Plant

- Supplied 99% of Base's electric load and 75% of the Base's heating load
- 50 miles of steam and condensate distribution piping
- O&M Contract



Existing Central Plant



Task Order – Development

- Summer 2001 – Preliminary Site Survey
- Options Considered
 - Upgrade Central Plant
 - Cost prohibitive to repair and upgrade steam/condensate distribution piping (~15% condensate return)
 - Considered a threat to Base security
 - Install decentralized boilers

Task Order – Development

- August 2002 – Approval to proceed with Feasibility Study/ECSM Proposal under DOD 46-State ESPC
- September 2002 - 94% of the square footage affected was surveyed
- Extensive efforts and contributions
 - Elmendorf CE and Maintenance Shop Staff
 - Huntsville COE
 - PACAF
 - AFCESA
 - Texas A&M
 - Ameresco

Ameresco Task Order

- September 2003 – Task Order Award
 - \$48.8 Million including financing
 - 24 year term (2 years construction + 22 year performance period)
 - At that time, largest ESPC ever awarded

Task Order – Construction

- October 2003 – Construction kickoff



Task Order – Construction

- Critical and complicated project scheduling
 - Two 5-month construction windows (Summer 2004 and Summer 2005)
 - Mission critical to convert from central steam to decentralized heating systems by 2005 heating season
 - Coordination with gas and electric utilities
 - Air permitting, environmental baseline studies, and ordering long lead-time equipment started immediately upon NTP

Task Order – Construction

- Equipment Installed

- 230 cast iron boilers in 120 buildings
 - Administration, dormitories, dining halls, hangars, gymnasium, shops, warehouses...even a Burger King
- 29 gas-fired forced air heating units
- 35 DHW heaters



- Mechanical rooms

- Mechanical room renovations
- 4 stand-alone facilities



Task Order - Construction

Transportation Building Boilers



Task Order – Construction

Gymnasium Boilers



Task Order – Construction

- Upgraded 2 substations
- Local Gas Utility
 - 7 miles of gas piping
 - Individual meters at point of use
- Demolition of CHP and 125 steam pits
 - Demo of 75 steam pits in original scope of work
 - Demo of all steam pits at no cost to Government

Task Order – Construction

- Competitively sourced to local businesses
 - Small, disadvantaged company used a major subcontractor
- Subcontractor selection basis
 - Relevant experience and past performance (on Base and with local regulations)
 - Financial strength
 - Recommendations from Base
- Switchover in October 2005

Task Order – Operations

- Year 1 Actual Savings
 - 3,583,855 mmbtu
 - 34 million gallons water
 - \$9,139,697 (net of electricity purchase)
 - Actual savings significantly greater than proposed savings
- Projected Savings over Term
 - \$123 Million

Task Order – Operations

“This past year, PACAF surpassed the goal with an FY06 reduction of 17%; tops among the MAJCOMs. On the surface, we look healthy; however, our command energy savings was “carried” by superb efforts from a few bases; and particularly one high impact project – Elmendorf’s shutdown of their Combined Heat and Power Plant.” *Paul V. Hester, General USAF, Commander Pacific Air Forces (PACAF), Memorandum to PACAF Wing Commanders dated 8 Jan 07*

Task Order – Operations

- M&V
 - Developed jointly with AFCESA and Texas A&M
 - Year 1
 - Compare actual natural gas metered data with baseline
 - Measure 100% of boilers combustion efficiency
 - Year 2+
 - Measure combustion efficiency on statistically significant sample set of boilers
 - Rotating sample selected by Elmendorf AFB

Task Order – Operations

- Ameresco Responsibilities
 - Operations
 - Preventative Maintenance
 - Water Treatment
 - Repair/Replacement
- Permanent office in Anchorage
 - 4 service technicians
 - 1 administrative assistant

Task Order – Operations

- Provide mission critical support on a constant basis
- Coordinate with Base's service call center and CE maintenance shops
- Excellent relationship with customer
- Have never lost a building

Summary/Benefits

- Demolition of aging central plant
 - Older, inefficient equipment
 - Security threat
- Elimination of use of aging steam and condensate distribution
- Demolition of steam pits
- Elimination of expensive O&M contract
- New infrastructure
- Long-term, much less expensive O&M service contract with Ameresco



Thank You

Beth L. Brown
ebrown@ameresco.com