UAF Heat and Power Plant Major Upgrade Project

History
The University of Alaska Fairbanks’ heat and power plant provides electricity and steam heat to more than 3.1 million square feet of public facilities on the Fairbanks main campus. The plant’s main coal boilers were put in service in 1964. As these boilers began nearing the end of their 50-year lifespan, UAF leaders began exploring ways to provide heat and power for the next 50 years.

Research
The university has examined a broad range of boiler replacement options, with an eye on both fiscal stewardship and environmental responsibility. A key requirement of any plant upgrade is that it provides both heat and power to campus. This cogeneration approach makes the most efficient use of the fuel.

- Separate generation is about 52 percent efficient.
- Cogeneration is at least 65 percent efficient.

The solution
After extensive study, including advice from engineers and economists, and meetings with industry and environmental groups, UAF determined that a new solid fuel option made the most sense in terms of long-term operating cost and viability and reduced pollution.

The proposal is to construct a major upgrade to the plant. The project would replace the existing coal boilers with two circulating fluidized bed boilers, which would burn coal and up to 15 percent biomass to generate up to 17 megawatts of power and enough steam to heat the campus. The university would retain its two existing backup diesel and gas boilers and will continue with campus energy conservation measures and exploration of renewable options. This plan will allow the university to meet its energy needs for the next 50 years and nearly eliminate the need to purchase higher cost electricity from Golden Valley Electric Association.

Project cost
The total project cost for the upgraded plant is $245 million. Because fuel costs are lower with the new boilers and plant upgrade, UAF could afford to finance up to $50 million of the project and make that payment with the money saved in fuel costs.

UAF and State of Alaska risk
The UAF main campus is home to billions of dollars in state infrastructure. It all rests on the foundation of an ever-aging heat and power plant. Failure to invest now invites a catastrophic failure in the future. The consequences, should all or parts of the plant fail, would be financially devastating to the university and state:
• UAF could be forced to switch to oil-fired heat and electricity, increasing annual fuel costs from approximately $9.8 million per year to in excess of $33 million per year.

• If the plant were to fail during the winter, there is danger of freeze-up and significant damage to every facility on the Fairbanks campus. Purchasing electricity from GVEA does not provide heat to rapidly cooling buildings. It could cost up to $1 billion to repair and the effects to the educational and research mission of UAF would be devastating.

• Without a major upgrade to the plant, both the educational and workforce development opportunities that support the state’s economic health are at risk.

Environmental benefits
UAF has applied for an air quality permit for the upgraded plant. The new, more efficient boilers would result in a marked decrease in regulated emissions:
- NOx (oxides of nitrogen) - 64 percent decrease
- CO (carbon monoxide) - 41 percent decrease
- PM (total particulates) - 65 percent decrease
- PM10 (course particulates, 2.5 to 10 micrometers) - 73 percent decrease
- PM2.5 (fine particulates, less than 2.5 micrometers) - 45 percent decrease
- SO2 (sulfur dioxide) - 60 percent decrease
- VOC (volatile organic compounds) – 9 percent decrease
- CO2 (carbon dioxide) – 3 percent decrease

The particulates are especially notable for the Fairbanks area, as the borough has been designated a nonattainment area by the EPA. The state DEC is currently taking comments on air quality regulations for the area.

Additional benefits
The project will create a significant increase in construction jobs and economic activity within the state of Alaska during the 2015-2018 time period. In addition, UAF has historically served as a place of shelter for Alaska residents during disasters. The upgraded plant would heat and power campus independent of the larger electrical grid, which would allow campus to continue to serve that public safety role in the Interior.

Timeline
November-December 2013 – Air quality permit finalized
Nov. 2013 – Board of Regents approval of UA budget
Dec. 2013 – Board of Regents considers formal project approval
January-April 2014 – Legislative session
Summer 2014 – Site preparation and contracting for full design. Procurement begins.
Spring 2015 – Construction begins.
First quarter 2018 – Construction complete and testing begins
Last quarter 2018 – New plant in operation