

**BOILER CONTROL UPGRADES AND
ENERGY CONSERVATION MEASURES
SOUTH DAKOTA STATE UNIVERSITY**

July 9, 2010

The project is currently at the 95% review stage. SDSU requests approval of the bid documents so the project can be bid and contract awarded in time to meet the ARRA requirements. The project is expected to bid August 5, 2010, with project completion November of 2011. The estimated construction cost at this time is \$1,825,966. The total project cost is estimated at \$2,339,676 with a budget of \$2,425,000. The estimated simple payback on the entire project is 8.4 years. There will be no change to the floor plan of the building.

Combustion Air Preheater

The combustion air preheater portion of the project will move hot air near the ceiling of the heating plant to the basement where it will be drawn in to the boiler. In addition to moving the warm air to the basement we will also use economizers on boilers 5, 6 and 8 to recover heat from the flue gas into the boiler feed water. The original energy conservation measure included flue gas economizers to pre-heat combustion air. We are now pre-heating boiler feed water. Using the flue gas to heat boiler feed water is a different approach for reusing the waste heat than we initially planned but was a simpler more cost effective way to recover the heat and get it back into the boiler.

Boiler Blowdown Heat Recovery

The boiler blowdown recovery will take blowdown water from all boilers and run it through a heat exchanger transferring the heat to incoming boiler make up water.

Elimination of Vacuum Return System

This project will remove three large vacuum return pumps that need to run constantly and replace them with smaller pumps that run only as needed. In addition to the annual energy savings this project will replace pumps that had become high maintenance equipment and are near the end of their useful life. This will eliminate the operational problems associated with combined vacuum and pumped return system.

Installation of Variable Frequency Drives on Boiler Fans

This project will add VFD's (variable frequency drives) on the forced draft, induced draft and the over fire fans on boilers 5 and 6. Air flow is currently controlled by moving dampers while the fans run at full speed the VFD's will modulate fans speed saving electricity.

Digital Controls on Boilers

This will include the installation of combustion controls on boilers 5 and 6 and master plant controls on 5, 6, 7 and 8. It is estimated this increase efficiency by 2%.