A CUSTOM MASTER CONTROL PANEL OPERATES EQUIPMENT AT MULTIPLE LOCATIONS

BOILER CASE STUDY

University of Nevada, Reno
Reno, Nevada
Boiler Controls

CUSTOMER APPLICATION AND KEY CHALLENGES

The University of Nevada, Reno (UNR) is a teaching and research university established in 1874. The campus is situated in the heart of Reno, Nevada on over 255 acres and enrolls over 14,000-17,000 students annually. The University operations support campus residence halls, education buildings, a number of theaters and auditoriums, a planetarium, a stadium and one of the largest earthquake simulation labs in the country.

UNR approached R.F. MacDonald Co. in 2004 about acquiring a new boiler for their Central Heat Plant that provides heating to a majority of the buildings on campus. R.F. MacDonald Co. installed a new Cleaver-Brooks Nebraska boiler as one of four boilers on site. The second boiler needed to be replaced in 2011, and UNR decided it was time to centralize and automate the outdated controls on all four boilers and network their system with the other facilities on campus.

The University of Nevada, Reno campus is located within the heart of the city

THE R.F. MACDONALD CO. ANALYSIS & SOLUTION

The UNR Central Heat Plant wanted to upgrade their existing controls to achieve automatic sequencing and lead/lag on their equipment, which would substantially reduce the dependency on human operators to start and stop the boilers manually. R.F. MacDonald Co. surveyed the Central Heat Plant layout, then designed and built a customized Master Panel capable of sequencing, lead/lag, and outdoor reset on the 4 boilers, 5 secondary VFD system pumps, and 5 combustion air supply fans. The Master Panel also included a Red Lion Protocol Translator to communicate with systems campus-wide, such as the facility at the Center for Molecular Medicine.

The Master Panel was built using standard Cleaver-Brooks products on an Allen-Bradley PLC platform; a true open programmable logic controller. The Allen-Bradley platform is based on a simple Human Machine Interface (HMI) computer touch screen that is both easy to understand and intuitive to navigate. From the HMI, operators can monitor, manage, and automate utility usage based on various load conditions. The system automatically handles the sequencing to ensure equal runtime on each boiler, and the lead/lag to control boiler firing. Each terminal is also equipped with local controls that can be operated manually if necessary.

Four CB Hawk 4000 conversions are controlled manually or by the master panel through Ethernet and ModBus communications

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The E-Tech Economizer (left) and Nebraska Boiler (right) installed as part of this project

PROJECT RESULTS

As a sole-source supplier, R.F. MacDonald Co. provided all of the necessary equipment, controls retrofit, and expertise to design and successfully implement the Master Panel into the existing equipment at the UNR Central Heat Plant.

The automated sequencing and lead/lag has not only cut costs by optimizing utility usage, but the intuitive HMI touch screen graphics interface has improved efficiency for the equipment operators, as well. Now, because remote facilities can be controlled from the Master Panel at the Central Heat Plant, the requirement for operators at the Center for Molecular Medicine has been eliminated altogether.

"The new Master Panel at the UNR Central Heat Plant has not only increased boiler efficiency, but has decreased the workload on the human operators by automating system controls using simple HMI touch screen management.

The Master Panel offers a computer touch screen for controling equipment in several buildings