

# A CUSTOM CONTROL PANEL RESTORES SAFETY TO A HISTORIC BOILER AT NASA

## BOILER CASE STUDY

### NASA Ames Research Center

Moffett Federal Airfield, California  
Boiler Controls

## CUSTOMER APPLICATION AND KEY CHALLENGES

In 1945, the Bethlehem Steel Co. mounted a Babcock & Wilcox boiler on a Naval cruiser named the USS Helena. Although commissioned too late for World War II, the USS Helena saw action in the Korean War. During three trips to Korean waters, the USS Helena fired more than 35,000 rounds of ammunition and was awarded the Korean Presidential Unit Citation. In 1963, the USS Helena was decommissioned from service and eleven years later, the ship was sold for scrap.

The Babcock & Wilcox boiler from the USS Helena emerged in the NASA Ames Research Center to supply steam for their testing facility. Operators were using the boiler in a manual operation mode, bringing the boiler from no pressure to 400-500 lbs. of pressure. Since this situation proved highly inadequate and posed dangerous risks, the boiler controls needed upgrading.



The Arc Jet Complex at NASA houses the three story boiler and new controls

## THE R.F. MACDONALD CO. ANALYSIS & SOLUTION

The steam created from the Babcock & Wilcox boiler is transferred to the Arc Jet Complex where NASA conducts thermal materials testing. The steam is ported through a series of ejectors to create an extremely high vacuum. This simulates a space-like testing environment to see how heat shield materials used on space vehicles withstand extremely high temperatures, such as when a spacecraft returns to earth or enters another planetary atmosphere.

To improve reliability, safety and performance, R.F. MacDonald Co. was asked to design and install a new control system for the boiler. Throughout this highly sophisticated project, R.F. MacDonald Co. carefully selected the proper replacement equipment. The unique 206 KPPH "M" type boiler has 6 burners with 3 fuel trains, which required staging burners on or off to maintain steam pressure. R.F. MacDonald Co. decided that the best solution was to upgrade the existing combustion control and burner management systems with Allen Bradley controls logix.



The fully completed operator control panel

BOILERS

PUMPS

SYSTEMS

SERVICE

PARTS

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The final installation of the Controls Combustion System Panel (CCS) that controls the multiple burners of the boiler and steam generation functions

**"Since the installation of the new control system, the Ames Research Center has attained a more efficient pump down of the vacuum chamber, saving both time and gas usage. We thank R.F. MacDonald Co. for providing a more dependable and safer system."**



The Burner Management System Panel (BMS) - Before on Left and After on the Right