Project Case Study ESS.CS.817.MC01

Medical Center Fuel System Design
California Central Plant UCSD

earthsafe
Fuel Systems for Critical Power

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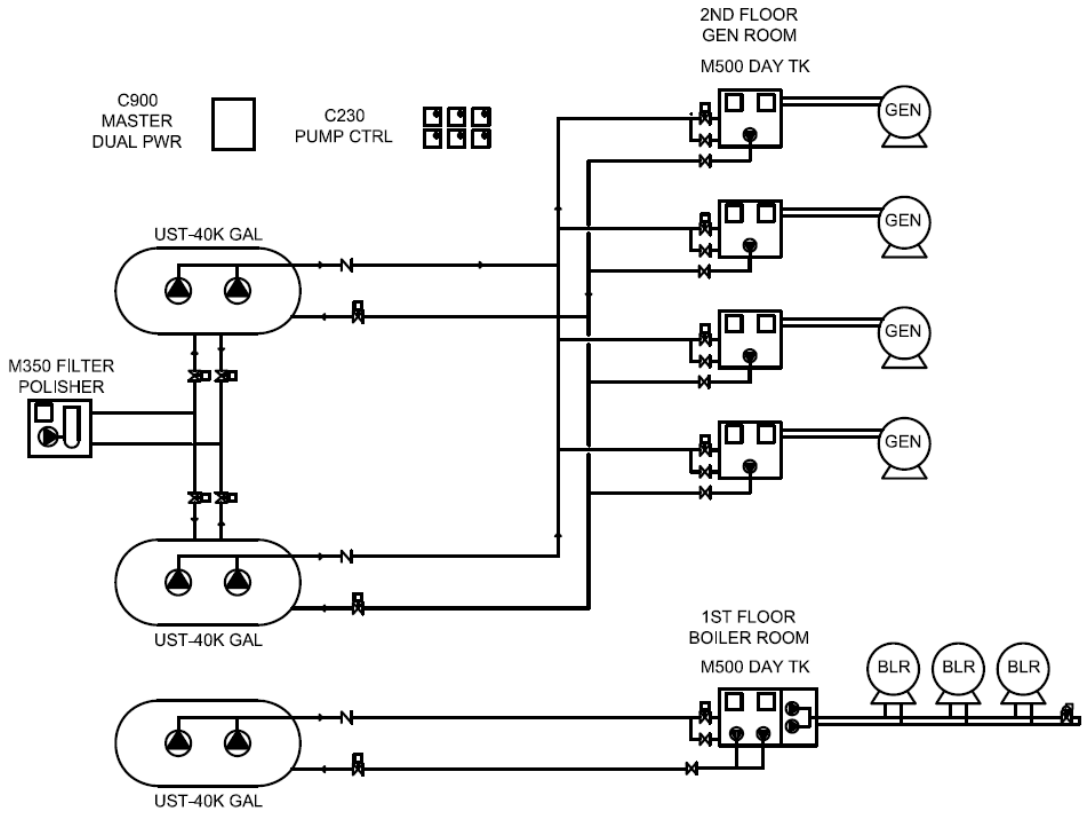
General Description:

The UCSD Medical Center required a new Central Energy Plant to support the new 10 story 500,000 SF Jacobs Medical Center. The central plant included 4 generators of 2 MW capacity located on an upper floor, and a set of boilers located on the lower floor. Fuel is stored in 2 underground storage tanks of 40,000 gallon capacity.



Challenges:

OSHPD Seismic Compliance: California has a requirement for hospital design and construction that requires products associated with emergency systems to be seismic tested and certified. Earthsafe controllers have been tested per the OSHPD requirements

CAL-EPA Environmental Compliance: California environmental regulations must also be considered in the system design. The Earthsafe C900 Master Controller interfaces with a Veeder Root tank management panel to perform the required testing protocols without compromising

the critical nature of the fuel system. This involves the operation of submersible pumps and valves for underground pipe PLLD pressure testing, and for vacuum generation as required for the positive interstitial monitoring of underground tanks, piping, and sumps.

Integration: The secondary challenge was the testing and integration of all status points into the facility wide BMS system using Ethernet connectivity and BACnet. The Earthsafe standard integration protocol includes sets of standard monitoring points for each system element, allowing for quick building and testing of points lists.

Operating Sequence Summary:
The system consists of 4 generator day tanks, serviced by 2 underground bulk storage tanks with FOS-FOR actuated valves, and 2 sets of submersible fuel pumps. Each of the day tanks has a C800 controller with level switches, level transmitters for gallon display, and temperature sensors. The day tanks have return flow pumps for overfill protection and periodic testing of the day tank refill function.

The boiler fuel system consists of an independent underground tank, pair of submersible pumps, and day tank. The C890 controller on the day tank provides refill control and interfaces with the C900 Master Panel for pump operation. The day tank has 2 sets of duplex pumps. The first set of pumps is designed to draw fuel from that day tank and feed the pressurized loop supplying diesel fuel to the boilers. The second set of duplex pumps is for overfill protection and periodic testing of the day tank refill function.

Special Operating Features:

1. Day Tank Analog Redundancy: The day tanks are equipped with Earthsafe level transmitters to provide an analog signal to the day tank controller for tank level and volume information. The system displays level, volume, and % full on the day tank controller, master controller, and the BMS. The analog signal provides high and low alarm points that serve as redundant signals to the float level sensors.
2. Veeder Root Level – Leak Integration: The C900 Master Controller integrates tank level and leak detection information from the Veeder Root TLS-350 tank monitor. The level and leak information is displayed on the C900 touch screen, and is also communicated to the facility BMS system.
3. Generator Switchgear Integration: The day tank C800 controllers have output relays to provide signals for day tank high, low, and leak status to the Russelectric Switchgear.