Medical Center Fuel System Design
Urban Hi-Rise Lurie Children's Hospital

earthsafe
Fuel Systems for Critical Power

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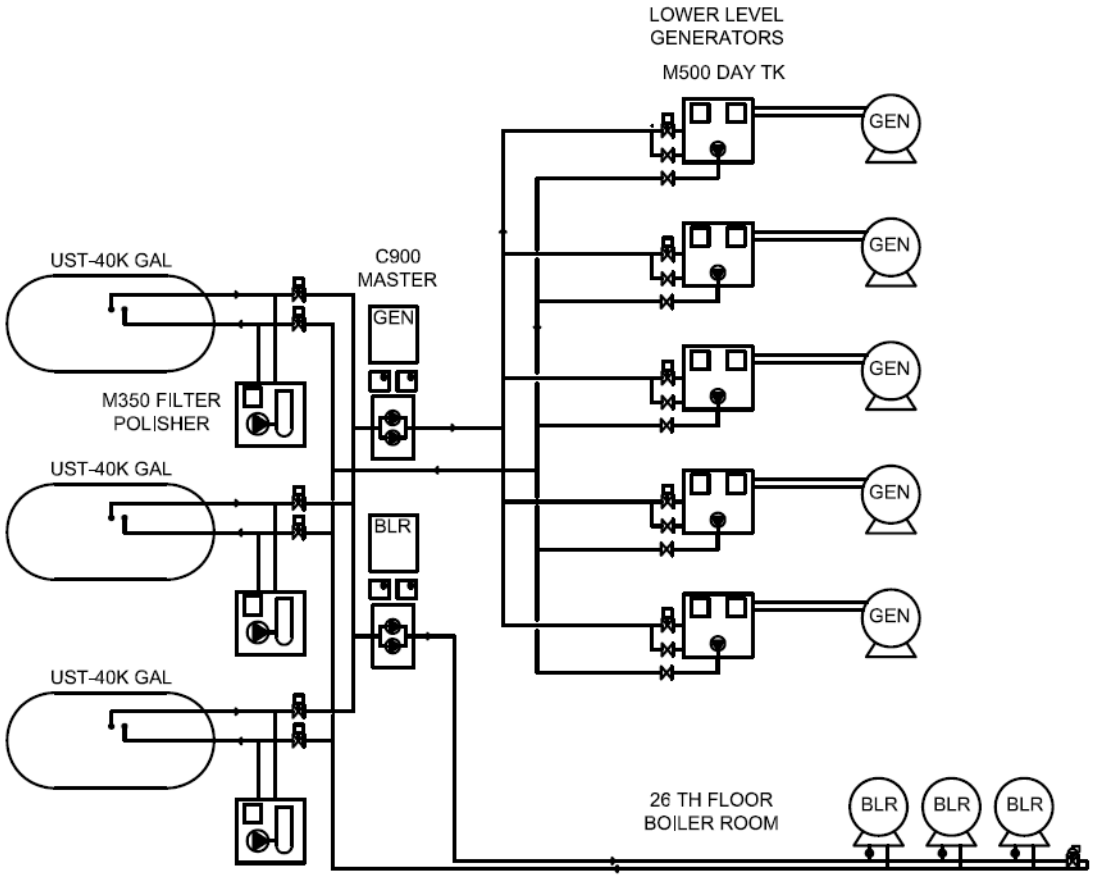
General Description:

The Lurie Childrens Hospital is the tallest childrens hospital in the world. The building is 23 stories high and in total 1,255,000 SF. The small footprint and high energy needs of the facility required a special fuel system design. The central plant included 5 generators of 2 MW capacity located at the lower level, and a set of boilers located on the 23rd level upper floor. Fuel is stored in 3 underground storage tanks of 40,000 gallon capacity.



Challenges:

Generator Fuel System: The generator plant at lower level with boiler plant at the 23rd upper level required independent pumping and control systems, with the sharing of the 3 underground storage tanks. The generator duplex pump system has an independent controls

design to receive status information from the day tanks and upon request, operate the tank selection valves and transfer pumps.

Boiler Fuel System: The boilers were located on the 23rd level of the building requiring high pressure pumps to deliver the fuel to the room. In addition the system provided a 100 PSI minimum supply pressure to the boilers, so the pressure at that level required precise and reliable control.

Integration: An additional 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 5 generator day tanks, serviced by 3 underground bulk storage tanks, and 2 sets of duplex fuel pumps. Each of the day tanks has a C800 controller with level switches. 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 a pair of high pressure positive displacement pumps. The C900 controller on the pump sets respond to a boiler call for fuel. The lead tank actuated valves are opened and the duplex pump sends fuel to the 23rd floor boiler feed loop.

Special Operating Features:

1. Pneumercator Level – Leak Integration: The C900 Master Controller integrates tank level and leak detection information from the Pneumercator tank monitor. The level and leak information is displayed on the C900 touch screen, and is also communicated to the facility BMS system.
2. Duplex Pump Weekly Flow Check: The duplex pumps include a feature to operate and check flow on a weekly basis. The operator selects the day and test start time. Each pump is started in succession to confirm flow.