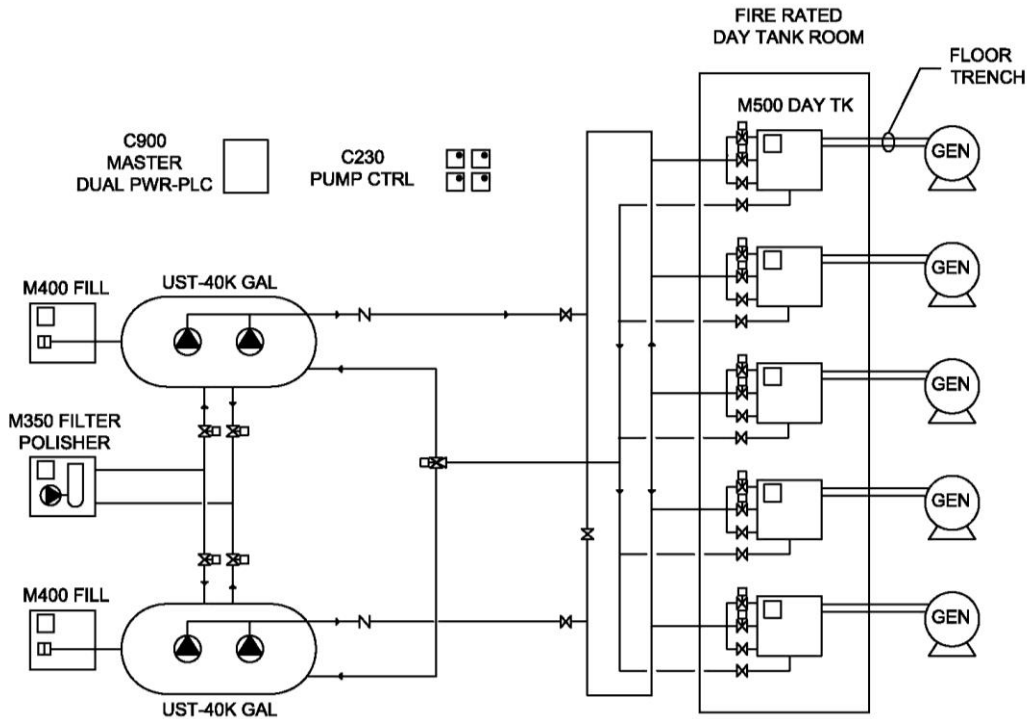


Data Center Fuel System Design

Type 4: Special Day Tank Room

General Description:

The data center operator required fast construction of a fuel system to support 24 generators of 2MW capacity each. The facility was organized to allow for 4 sets of generators each serviced by a stand-alone fuel system. The generators were located inside the building. Each group of 6 generators has a dedicated fire rated room with containment pit. Within the room are 5 day tanks – one for each generator. Bulk storage tanks are located outside underground and adjacent to the building, allowing gravity overflow from generators.



Challenges:

Speed: The primary challenge is the speed at which the system was required to be delivered, installed, tested, and ready for use. Access to the tank area was restricted while the building was constructed to allow craned access adjacent to the building. Earthsafe C900 Master Controllers, C800 Day Tank Controllers, and C230 Pump controllers are standard build units that are flexible and adaptable for the specific operating sequences required by the engineering consultant.

Integration: The secondary challenge was the testing and integration of all status points into the facility wide PMS system using Ethernet connectivity. 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 sets of 6 generator day tanks, each serviced by 2 bulk storage tanks with a 3-Way FOR actuated valve, 2 sets of submersible fuel pumps, 2 independent gravity fill stations, and 1 dual tank filter - polisher. Each of the day tank, fill station, and overflow modules have a C800 controller programmed for the specific application. There is 1 master with dual power inputs and dual PLC control. The system is designed to allow full manual control for day tank refill as a contingency.

Special Operating Features:

1. **Day Tank Dual Inlet Valves with Fail Safe Close.** Each day tank has dual actuated inlet valves with a manual bypass valve. The inlet actuated valves are fail safe close either with spring return or battery backup.
2. **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 PMS. The analog signal provides high and low alarm points that serve as redundant signals to the float level sensors.
3. **Veeder Root Level – Leak Integration:** The C900 Master Controllers integrate 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.
4. **Day Tank Remote from Engine:** The day tanks are located in a special day tank room at the end of the generator room. This is done to allow for isolation of the day tank hazard. It is important to properly size the engine FOS and FOR piping to avoid excessive flow loss in the relatively long run.