

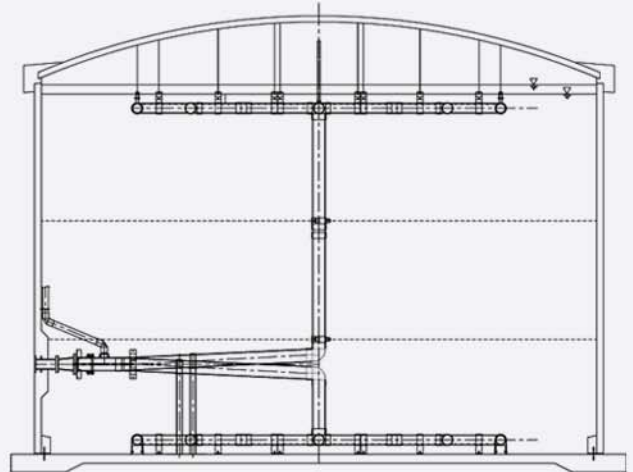
PROJECT PROFILE

QUANTICO, VA

FEDERAL GOVERNMENT FACILITY

0.111 MG THERMAL ENERGY STORAGE TANK

Noresco, a leading Energy Services Company (ESCO), selected Natgun to build an energy cost saving Thermal Energy Storage (TES) tank at a Federal Government facility in Quantico, VA. Noresco added the TES tank to an existing closed-loop, chilled water cooling system that serves several multi-story buildings at this campus. The TES tank gives the Federal Government facility the flexibility to operate their chilled water cooling system more efficiently.



The refrigeration equipment that provides the cooling of the chilled water is most efficient during periods when there is a high internal and external heat load in the buildings. However, under low load conditions when the buildings have only a small internal or external heat load, the chiller equipment is much less efficient in operation. By incorporating a TES tank into the existing chilled water system, Noresco improved the overall operating efficiency of the chilled water system. Noresco has set up the controls to charge the TES tank with chilled water during night-time operation. During low-load daytime periods, the TES tank automatically discharges the chilled water into the closed loop system, providing all the necessary cooling for the buildings, and thereby allowing the chiller equipment to de-energize at a time when it is operating least efficiently.

During the charge mode of the TES tank, it is observed that the water inside the tank naturally stratifies cold water at the bottom of the tank, and warm water at the top of the tank. The cold water enters the bottom of the TES tank during the charge mode through a specially designed octagonal piping array. This specially designed octagonal diffuser piping ensures that there is minimal mixing of the cold water (at the bottom of the tank) and the warm water (at the top of the tank).

Figure 1 Water Temperature During Charging Mode



Figure 1 illustrates the stratification of the water inside the TES tank during the charging process. Over a period of 2 hours as the tank is being charged, the sensors (mounted vertically every 12 inches) gradually change temperature. Each colored line represents a different temperature sensor. At any moment during the charging process, it is observed that the thermocline (the layer of water between the cold reservoir at the bottom and warm water at the top) is a very narrow band and only approximately 2 feet deep. This is confirmed by the temperature sensor readings.

Natgun TES tanks are built watertight and maintenance-free ensuring owners decades of continuous service.

THERMAL ENERGY STORAGE AND BIOFUEL TANKS

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