

PROJECT PROFILE

DANVILLE, PA

GEISINGER HEALTH

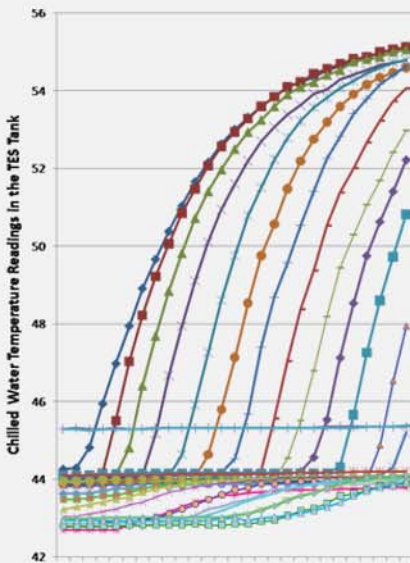
1.07 MG THERMAL ENERGY STORAGE TANK

As a part of a major expansion at their hospital campus in Danville, PA, Geisinger Health System built a new central chilled water plant to serve the district cooling requirements for their campus. Al Neuner, Associate Vice President of Facilities Operations for Geisinger Health System, directed Ewing-Cole to design an 8,000 ton-hr Thermal Energy Storage (TES) tank into the plans for the new central plant. This TES tank was designed to be the supplemental source of cooling for the chilled water system each day throughout the year, even in the winter time. During the winter operation, the TES tank would be charged with chilled water using a “free-cooling” heat exchanger and the cooling towers, and not require the use of mechanical refrigeration.



Torcon, the construction manager for the new central plant project, selected Natgun to build the TES tank for this project. Because this TES tank is built with precast prestressed concrete, the tank could be differentially buried into the hillside without requiring expensive retaining walls. This TES tank provides the facilities management staff at Geisinger with the ability to operate their district cooling system more efficiently by allowing the chillers to operate during night-time and off-peak hours instead of during the peak electric period during the daytime.

Figure 1 Temperature Readings



During these off-peak night time hours, the chillers operate at full load to “charge” the TES tank with cold water. Then during the hot daytime hours, the chillers and cooling towers are reduced, and cold water is “discharged” from the TES tank and circulated through a district cooling network of piping to the buildings. By operating in this way, Geisinger Health System reduces their electric energy consumption and energy costs. Al Neuner estimates that the TES tank will save the medical center over \$85,000 annually.

Figure 1 is a chart of these temperature readings that were recorded (by temperature sensors mounted vertically every 18”) during the actual discharge operation of the TES tank. This chart illustrates the stratification of the water inside the TES during a typical discharge cycle. At any moment during the discharge cycle, it was observed that each sensor recorded a predictable rise in temperature as the warm water at the top of the tank gradually displaced the cold water at the bottom of the tank. In a properly functioning stratified TES tank, a narrow and highly defined “thermocline” (boundary layer of water separating the cold water at the bottom with the warm water at the top) will form near the top of the tank and will remain consistent in thickness throughout the discharge cycle.

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

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