

Burnham MPC™ Moves into the Historic Breakers in Newport, RI

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The historic mansions of Newport, RI are known for their elegance and remind its visitors of a bygone era of social and financial preeminence during the turn of the twentieth century in America. Cornelius Vanderbilt II, grandson of railroad industrialist Cornelius Vanderbilt (1794-1877) had the 70 room Italian-renaissance inspired mansion built on the site of a wood-framed house which was destroyed by fire in 1892. A year later, Architect Richard Morris Hunt, deployed an international team of craftsmen and artisans to create the mansion, which is considered to be the most elegant of the Newport summer cottages.



The Breakers is now owned and operated by the Preservation Society of Newport County. The preservation society recently replaced an old inefficient boiler with two high-

efficiency model MPC9 boilers (up to **88.6% efficiency**). The old boiler operated at minimal efficiency, especially during the spring and fall when the building demand only required partial load. The mansion, built during the dawn of electricity, used a gravity feed system with large 18-inch supply and return mains. These large supply and return mains divide up into a network of several



smaller mains that feed scores of cast iron radiators hidden away in the walls of the structure. The radiation that heats The Breakers is built into the walls of the building and is for the most part out of sight. The heat distribution system consists of radiators lying horizontally in vertical structural chase ways throughout the building. Air convects upwards through these chase way-mounted radiators and is distributed into the rooms via ornately cut grilles in the marble walls allowing the system to exist without being seen. The task facing Donovan & Son's, Inc., Plumbing/HVAC in Middletown, RI was to propose and install heating system boilers that allow the Preservation Society of Newport County to conserve on fuel costs, more closely match varying building heat loads, and coexist with the tremendously large water content of a gravity system.

The boilers had to be installed as part of a century old high-mass gravity feed system. To do this, Donovan and Sons converted the near-boiler piping to a primary/secondary configuration consisting of a boiler room loop with boiler and system injection piping. The purpose of the boiler room loop was to create a buffer area where heated water from the boilers is no longer in direct contact with the cooler system return water as each boiler injects its heated water into the boiler room loop and in turn heated water from the boiler room loop is transferred into 18-inch supply and return mains, utilizing several small pumped connections. This configuration assists the flow of the gravity system to operate as it always has, by simply keeping the large system supply main hot and the boiler loop well above a desired minimum temperature.

Such a large water volume in the system loop required that added consideration be given to boiler protection. MPC boilers have built-in return water temperature protection in the form of a return water mixing tube (RWMT). The RWMT protects the boiler from low return temperatures by distributing cool return water evenly throughout the length of the boiler, virtually eliminating concerns of thermal shock and providing balanced flow through each casting. Operating parameters for the MPC, with the RWMT, require a minimum 130°F supply temperature, minimum 80°F return temperature and a maximum of 80°F ΔT.

System operation is controlled by a Tekmar 264 boiler staging control allowing for two individual sets of high-low firing, or four stages of firing. The control also modulates supply water temperature based on outdoor air temperature fluctuations. Domestic hot water is generated using a Burnham Alliance™ indirect water heater which replaced a separate oil-fired water heater. Staging the boilers, modulating the system set-point based on outdoor air temperature and installing the indirect water heater, all combined with the MPC's high-efficient three-pass sectional design are key factors in reducing energy costs. A recent jobsite visit showed the outdoor temperature to be 38°F and the system water temperature at 155°F with one boiler sustaining the load on low fire.



The ultimate benefits of The Breakers' new boiler system will be greatly reduced fuel costs and greater building comfort, by more closely matching the building heat load. Additionally, modular boiler systems provide redundancy if a mechanical device fails to operate during the winter months. The building can now be heated with as low as 25% of the total boiler capacity on the plentiful amount of moderate days that we encounter during the heating season. This will be a boiler system that will offer considerable payback for many years to come.

To find out more about the Burnham Commercial MPC boiler and how you can put the MPC to work for you, visit our all new website at: www.burnhamcommercialcastiron.com/products/high-efficiency/mpc.