Top Priority: Although largely "invisible", the water chemistry and cleanliness within hydronic and steam systems is critical to the life and proper operation of these systems. Therefore the proper design and installation of chemical treatment / water conditioning systems shall be viewed as top priority when undertaking projects that address these systems. It is imperative that these systems not be installed as an afterthought or overlooked altogether.

Cooling Towers / Condenser Water Systems: Each open condenser water system shall be equipped with an automated chemical treatment system, including an automated blow-down feature, to limit hardness, inhibit scaling and corrosion, and control microbiological growth within the system. Installation of a side-stream centrifugal separator to serve each condenser water system for the purpose of removing sediment/debris is also desirable. It shall be sized for approximately 10% of the total system flow.

Building Hydronic Systems: Each closed-loop hydronic heating/cooling system that serves an individual building (or portion thereof), whether filled with water or antifreeze solution, shall be manually treated with corrosion inhibitors that are appropriate to protect the materials of construction of that specific system. Since a direct connection between the domestic water system and a closed-loop hydronic system is not permitted, a valve and cap shall be provided at the system air separator that will allow chemicals in liquid form to be manually pumped into the system. See *Drawing #23 21 00-1, Flow Diagram - Hot Water Heating System*). The installation of a pot type chemical feeder is not required to serve a hydronic system. Upon direction from F&S Engineering Services, provide a bypass bag filter for the purpose of removing sediment.

Steam Boiler Systems: Each steam boiler shall be equipped with a softener (for all boilers) and a dealkalyzer (for water tube boilers) in the make-up water system as well as an automated chemical treatment system, including an automated blow-down feature (that removes water at the skimming level of the boiler), to reduce/limit hardness, and inhibit scaling and corrosion.

Humidifiers: At a minimum, each steam-to-steam humidifier shall be supplied with soft water. The use of RO water or DI water will be evaluated on a project-by-project basis.

Access: Adequate access shall be provided to operate and clean chemical treatment equipment as well as to transport and handle chemicals. A platform with stairs and safety railing as required by OSHA shall be provided as required to conveniently access the top of each chemical storage tank.

Safety: An approved eye wash, safety shower and associated floor drain shall be installed at each location where hazardous chemicals are stored or handled.

Additional Information: Additional information and project-specific direction regarding chemical treatment and water conditioning systems is available from the U of I.