What Your Engineer or Designer Should Understand About Specified Boilers

1) Basic information about boiler manufacturer's individual boiler and boiler staging controls
   a) What are boiler/plant controls designed to accomplish?
      i) Maintenance of steady temperature setpoint of:
         (1) Boiler supply? Buffer tank top temperature? Buffer tank sensor average?
      ii) Heating up tank to a certain temperature then shutting off?
      iii) Maintaining tank in a certain temperature range, but the precise temperature doesn't matter since the distribution temperature is much lower than tank temperature?
      iv) If cascade/staging controls exist, describe the logic used to add/remove boilers
         (1) Can all boilers run at full output at high tank-top (or tank-average) temperature?
         (2) When less heat is needed, is boiler output modulated down, or is a boiler dropped?
   b) Does the boiler require a buffer tank?
      i) Is a certain ΔT required top to bottom in the tank, or will controls perform properly if the tank is fully mixed (say, less than 3-4°F top to bottom)?
   c) Is any assumption made about distribution temperatures?
      i) Will boiler satisfy distribution temperatures of 180°F or more? What is the maximum temperature that can be maintained?
   d) What is maximum boiler supply temperature before it shuts down to prevent overheating? At what temperature will the manual high limit trip?
   e) Is any assumption made about distribution flow through the tank (or boiler)?
   f) Is any assumption made about relative flows into the tank from the boiler and the distribution system?

2) Maximum amount of heat that must be removed from each boiler upon shutdown.
3) Time response curves for the boiler going from steady state operation at 30% of full output to 100% output, and vice versa.
4) Time required for the boiler to go from a full stop (such as overnight, but not completely cold from being off all summer) to 100% output.
5) Frequency of heat output interruptions due to fueling and/or cleaning, and the total amount of time expected for each interruption (including full shutdown and resumption to 100% output).
6) What is an acceptable minimum runtime for the boiler?
7) What is the maximum allowable runtime for the boiler before cleaning/refueling?
8) What is the minimum output level of the boiler? Can it run at this level indefinitely without compromising operation of ash collection, subsequent startup, etc.?
9) Emissions data for intermittent boiler operation.
10) What is maximum ΔT rise across the boiler? (What's minimum flow rate allowed?)
11) What is minimum ΔT rise across the boiler? (What's maximum flow rate allowed?)