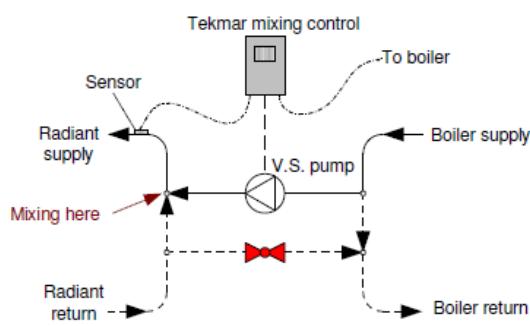


*Answer to question from JB Tech Talk No. 8 – in older systems boilers were high mass, in the basement, had millivolt gas valves and would fire without power. If the power was off and the zone valves were open, there would be some gravity heating flow even with no pumps on.*

The problem in this case was short cycling of the boiler. None of the safety devices, e.g. high limit was at fault so something else was telling the boiler to behave as if it was possessed.

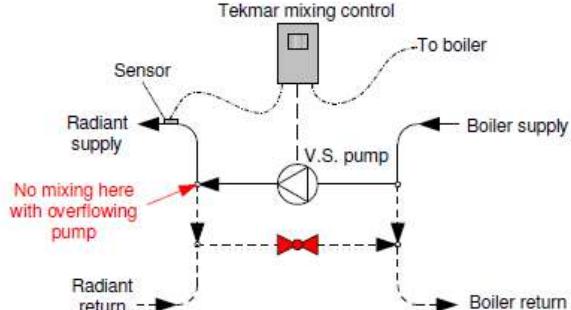
There are two radiant floor zones being supplied through a primary/secondary (P-S) connection using a variable speed injection pump controlled by a Tekmar variable speed mixing controller. After tracing a few wires, I found that the Tekmar was also enabling the boiler.

Below left is a simple schematic of the layout with the *right flow directions for mixing*.



Notice the red valve in the injection return line. This must be a manual balance valve to set the injection flow. Even though the pumps used are small, head loss in the tiny circuit they are pumping is low, and they will overflow even at low speed if they are not throttled. *No ball valves allowed here.*

The valve installed was a globe valve, so one bonus point for the installer, but it was *wide open\**. When the pump came on, the radiant supply would be at the same temperature as the boiler supply. The radiant zone setpoint would be exceeded, the Tekmar would disable the boiler, the temperature at the sensor would quickly drop and the Tekmar would enable the boiler; **short-cycling**.



I throttled the globe valve until the radiant supply temperature stabilized and the boiler, which is modulating, ran continuously. The final valve position was about a  $\frac{1}{2}$  turn open. I told the owner to open it just a wee bit if the system wouldn't keep up when it got bitterly cold.

After it ran through a winter with no issues, I stopped by and wrote on the wall behind the valve: "This valve to be set at  $\frac{1}{2}$  turn open". I know from experience that if anyone else was called in for future problems and found that valve barely cracked, they would open it to see if that was the problem and it would be like deja vu all over again; **another form of short-cycling**.

\* In fairness to the installer, it may not have been him who left it wide open.