

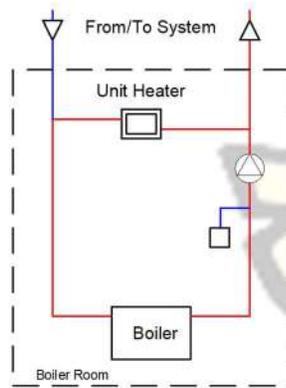
## JB Tech Talk No. 4: Where is the Water Going? A Common Balance Problem

On a *very* cold day I got a call to go to an apartment building with serious heating problems. The contractor was in trouble; he had recently installed some new pumps and was in the crosshairs for being ‘the last guy who did work there’.

The building has 15 floors, some commercial space on the main floor, the rest apartments, all with wall fin. The boiler was a cast-iron sectional with 8 modules that could be independently fired. When I walked into the mechanical room, I noticed that there was a large unit heater almost directly over the boiler; my first clue.

The contractor and building manager told me that despite the lack of heat in many of the apartments only a few sections of the boiler would run. Why would that be happening? I had seen the problem before, and I knew why.

Water, electricity, and a lot of humans always take the path of least resistance. In this case, one of those paths was through that big unit heater.



Piped direct from the pump discharge to the boiler return with oversized pipe, no balance valve, and low head loss, it was like a dead short without a circuit breaker. And, it was controlled by turning on the fan with a line voltage thermostat, so even though it never ran in a hot boiler room, it was always flowing.

The flow through the unit heater was going back to the boiler at the same temperature it left. The boiler control was not seeing the real load in the building and saw no need to fire up any more modules. This was verified by looking at the thermometer in the boiler return. It was hot.

I then asked the contractor to watch that thermometer as I closed the isolation valve on the unit heater. It was a ball valve and as it got near shut-off it sounded like a DC-9 taking off. Within seconds the contractor said, ‘Temperature’s dropping here!’ and more boiler sections lit up. I love it when there’s an *immediate* improvement.

More investigation revealed that on the same level there were some other unit heaters and a ventilation coil with a 3-way valve; another likely culprit for overflow. A very large fraction of the water being pumped was never leaving the penthouse.

There’s an epilogue here. We went down to one of the problem apartments to see if things were improving and to talk to the tenants about the problem because I felt that it wasn’t ‘new’. The first tenant we visited was a lady who had turned on her oven to try and stay warm. I asked her how long she had lived there, and she replied ‘22 years’. I said, ‘It must be disappointing to be having this kind of problem now.’ She glared at me and said, ‘It’s always been like this when it’s really cold!’ Bingo. You’ve just got to ask the right questions.