

When to Call the Plumber: Addressing a Deficiency in Hot Water Temperature to Mitigate Risk for Legionella in Ambulatory Care

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Background

- Legionella bacteria can grow and live in healthcare facility water systems and can cause Legionnaire's disease when the bacteria are introduced into the lungs of susceptible patients
- Legionella grows well in water at temperatures between 77F – 113F (25 – 45C) and optimally between 85F – 108F. Where plumbing codes do not restrict domestic water temperature, the hot and cold water systems should aim to avoid these ranges.
- Preventing and controlling legionella bacteria in potable water systems in most cases can be achieved through maintaining appropriate water temperature and residual chemical disinfectant levels
- Routine monitoring of these parameters of the potable water system at our ambulatory facilities occurs at least once annually as part of our water management program

Water Parameter Testing

- Water temperature is measured using a digital probe thermometer; hot water temperatures are measured after one minute of flushing; measurements at longer flushing intervals may be necessary when temperature values are within the Legionella growth range.
- Residual chemical disinfectant levels are measured using a digital colorimeter for both cold and hot water systems.

Timeline of Events

Routine testing at an outpatient health center identified a single clinic with hot water temperatures within legionella growth range (85F – 108F)

Repeat water parameter testing showed that hot water temperatures had improved, but were still not above Legionella growth temperatures at many sinks

Building maintenance was engaged to ensure laminar flow devices were cleaned or replaced; building water heaters were also checked and at appropriate temperatures

IPE and building maintenance reviewed as-built drawings to find a balancing valve on the hot water return line exists just downstream from the affected clinic

Repeat water parameter testing showed that hot water temperatures had improved to meet expectations (above 113F)



Weekly flushing was recommended and implemented for the clinic to reduce stagnancy

Laminar flow devices installed on faucets were identified as potentially being clogged, limiting flow

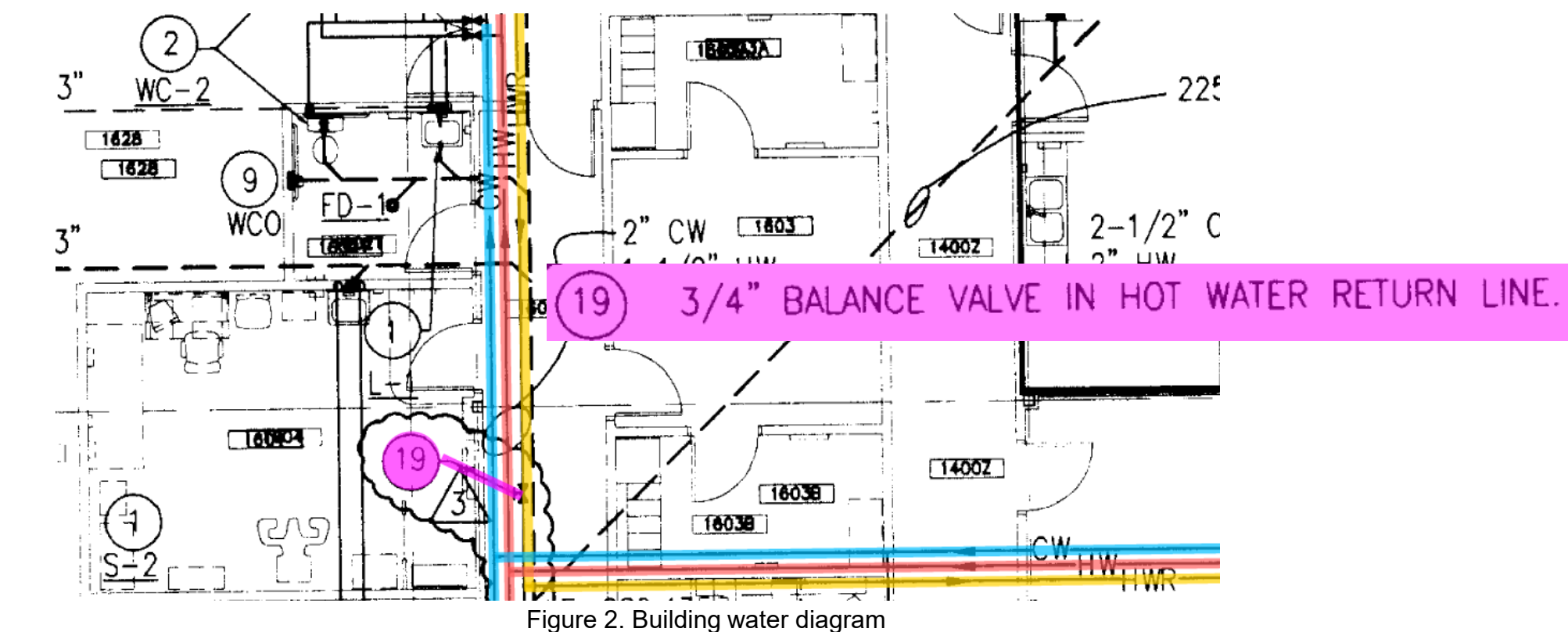
Building maintenance reviewed hot water return piping for the clinic to identify reasons for stagnancy, but no issues identified

A professional plumber was hired to assess the system and they found the balancing valve on the hot water return line; the valve was adjusted to increase circulation of hot water in the affected clinic

| Date | # of Samples | Avg. Temp @ 1 min. | Avg. Time to Reach >113°F |
|------------|----------------------------------|--------------------|---------------------------|
| 6/29/2022 | 4 | 75°F | 4 min. |
| 6/30/2022 | Weekly flushing scheduled | | |
| 7/11/2022 | 7 | 95°F | 3.5 min. |
| 7/21/2022 | 6 | 111°F | 2 min. |
| 10/14/2022 | Plumber adjusted balancing valve | | |
| 10/21/2022 | 5 | 114°F | 36 sec. |
| 10/28/2022 | 5 | 116°F | 35 sec. |
| 11/7/2022 | 7 | 116°F | 33 sec. |

Figure 1. Water parameter testing results

Building As-Built Drawing



Conclusion

- Routine water testing identified an issue with the potable hot water temperature, and corrective action occurred to reduce risk for Legionella growth
- Hot water failing to turn hot or taking a long time to reach appropriate temperature, could be an indication to staff that there may be a problem requiring investigation
- Involving a professional plumber can be beneficial in identifying the root cause when other interventions are unsuccessful

Acknowledgments

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References

- <https://www.cdc.gov/legionella/wmp/index.html>