Nitrate Soda Case Brief

🚰 Technical Case Brief

Contamination Without Backflow — A Hidden Risk in Apparently Compliant Systems

A real -world contamination event demonstrating how hidden system conditions can bypass expected safeguards —without any backflow event.

Executive Summary

This case documents a contamination incident that occurred under normal operating conditions in a system that appeared fully compliant. No backflow condition was present. The cause was a hidden, unidentified piping connection concealed within a wall and later assumed to be potable during a remodel —without verification. This condition created a direct contamination pathway from a non -potable source into beverage dispensing equipment.

What Happened

A previously installed but never commissioned set of in-wall piping connections remained unidentified. During a later public cafeteria remodel, a newly installed equipment bank—including soda dispensing equipment, a soft-serve machine, coffee and cappuccino service equipment, and an ice-making machine—was connected to these existing lines under the assumption they were potable.

A particularly misleading aspect of the incident was that the adjacent customer drinking-water tap, located immediately next to one of the soda dispensing levers, was actually correctly connected to the potable water system and functioned normally. This initially created substantial confusion during the investigation because the plain drinking water appeared unaffected while the beverage dispensing and food-service equipment water supply was contaminated.

In reality, the concealed piping serving the equipment bank was connected to a non-potable cooling tower system, allowing treated cooling water to be delivered directly into beverage and food-service equipment, while the nearby drinking-water tap remained on a separate potable connection.

Although the systems appeared compliant during standard review processes, the combined operational behavior of interconnected beverage dispensing, food-service,

drainage, and potable water systems created a hidden contamination pathway that was not identified under actual operating conditions.

The incident demonstrated how a concealed split-supply condition can exist within an apparently compliant installation, creating a direct contamination pathway without any actual backflow event.

Incident Conditions

The day prior to the incident, corrosion control chemicals (nitrate/nitrite -based) were introduced to the cooling tower, significantly increasing contaminant concentrations.

While the hidden connection had likely existed for some time, this condition amplified the impact and made the contamination event immediately apparent.

Root Cause

• Installed connections were never commissioned and remained undocumented

• Piping was concealed within a wall and not identified or labeled

• Remodel work relied on assumptions rather than system verification

• Required piping identification (CPC 603) was not implemented or verified

Consequences

• 12 individuals required emergency evaluation

• 40 patients were precautionarily evacuated from an adjacent wing

The affected cafeteria was publicly accessible and operated under County Environmental Health permit, with entry from both the hospital interior and the street —extending potential exposure beyond staff.

Why This Matters

This was not a failure of backflow prevention.

The system appeared compliant. The risk existed because the actual system configuration was not fully known.

Hidden or unidentified piping connections can create direct contamination pathways — without any backflow condition.

Key Lesson

Compliance does not ensure safe configuration.

System knowledge —not assumptions —is critical to risk prevention.

This incident resulted from a hidden system condition —not a failure of backflow

prevention.

What This Means for Your System

Hidden system conditions can exist even when a system appears compliant and has passed

inspection.

This case demonstrates that risk is not always visible through standard verification

methods.

• Unidentified or unverified piping connections can create direct contamination pathways

• Compliance alone does not confirm actual system configuration

• Remodels and system modifications introduce risk when existing conditions are assumed rather than verified

These risks are preventable —but only when they are del iberately identified.

Next Step

If your system has not been fully verified beyond standard compliance review, similar

conditions may exist without being visible.

A focused evaluation can confirm actual system configuration and identify potential

contamination pathways before they result in an incident.

Request a confidential system review:

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FloSafe Consulting LLC

Drinking Water System Risk Analysis

Independent evaluation of system configuration and contamination risk