

WHAT PROPERTY OWNERS SHOULD KNOW ABOUT BACKFLOW PREVENTION.

The Clean Drinking Water Act, Department of Health, and the Uniform Plumbing Code, have set standards for drinking water quality. Water suppliers such as the City of Ellensburg are responsible to ensure clean, safe drinking water is furnished to our customers. (WAC-246-290-490) The City does this by treating and testing the water in the system. Once the water goes through the meter the property owner is responsible to maintain the water quality. Because potable water is used for so many purposes other than drinking, contaminants can enter the water supply through your home or business. This is called backflow through a cross connection. A cross connection is a direct link between domestic water lines and a contaminated source.

There are two causes of backflow, backsiphonage and backpressure.

Backsiphonage is the reversal of normal flow caused by negative pressure that creates a vacuum effect in the water line. This condition occurs when there is a decrease of pressure in the city's water supply, for instance during a water main repair or nearby firefighting. Contaminates can be drawn back through garden hoses, toilet tanks, or hot tubs that have a direct connection to the water system. (See Figure 1) When normal water pressure is restored contaminants can be present in your water lines.

1. The water main is shut off for repair.
2. The water in the household drains into the water main, which is at a lower elevation, and flows out the break or crack into the soil.
3. A siphon is created by water draining out of the household lines.
4. Contaminants are siphoned through across connection into household water lines and the water main, and can re-enter the water system once repairs are completed.

FIGURE 1

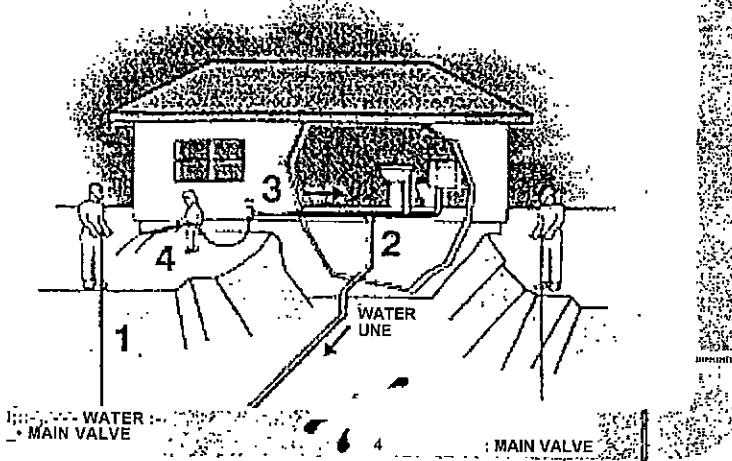


FIGURE 2

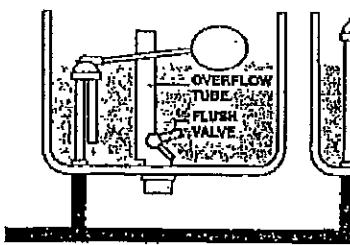
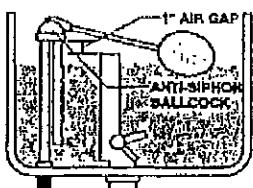


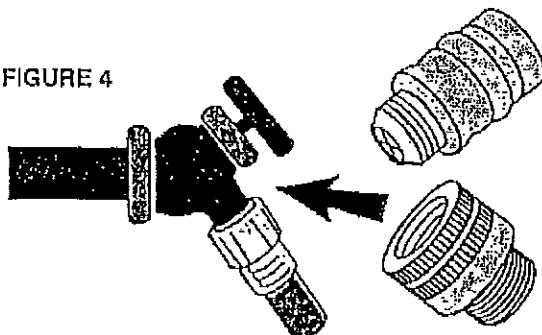
FIGURE 3



To eliminate the risk of reverse flow in toilet tanks, anti-siphon ball cocks should be installed with a minimum 1-inch air gap above the overflow tube. (See figures 2,3) Air gaps should also be left between water outlets and potential contamination such as sinks, tanks, and drains.

To eliminate the chance of backsiphonage with hose bibs, inexpensive and easy to install hose connection vacuum breakers should be installed. (See figure 4). Care must be taken to remove vacuum breakers during freezing weather.

FIGURE 4



Backpressure is the reversal of normal flow in a system due to a pressure higher than the supply line pressure. Backpressure can be created when such things as boilers for heating systems, and pressure producing equipment like pressure washers are used. (See figure 5)

When a boiler heating system is directly connected to a potable water supply there is the potential for a backflow incident. A typical commercial boiler operates under 150 lbs pressure while the typical water main pressure is under 100 lbs pressure. If the boiler malfunctions water will flow in the direction of least resistance. When this happens a backpressure condition is created causing contaminated boiler water to flow back into the drinking water supply. If the system uses black iron pipe or adds chemicals, contamination can occur through backpressure or backsiphonage. Due to the toxicity of boiler chemicals an air gap or Reduced Pressure Backflow Assembly (R.P.B.A.) would be required.

Pressure washers are another potential source of backpressure and can create pressures up to 1000 lbs. per square inch. Most washers are equipped with chemical aspirators. Should a unit malfunction it can inject chemicals used for cleaning into the drinking water. To ensure this does not happen the pressure washer should draw water from a reservoir with a built-in air gap between the water supply and, the flood rim of the reservoir. If this is not possible, a Reduced Pressure Backflow Assembly (R.P.B.A.) must be installed on the unit.

According to the 2009 Uniform Plumbing Code (Chapter 6), and the American Water Works Association's Cross Connection Control Manual, the following is a list of cross-connections that residential customers should look for:

- 1) Air conditioning equipment that has a direct connection to the potable water supply
- 2) Aspirators for garden hoses that siphon fertilizers and pesticides
- 3) Boilers with a direct connection to potable water
- 4) Decorative ponds
- 5) Dialysis equipment
- 6) Equipment that unclogs drains using water pressure
- 7) Heat exchangers or pumps, except for those with double walls and leak path
- 8) High pressure washer
- 9) Hose bibs
- 10) Hot tub or spa
- 11) Irrigation system that is not protected with a backflow assembly
- 12) Photo development equipment, sinks and tanks not protected with an air gap
- 13) Radiator flushing equipment
- 14) Reverse osmosis water treatment units without an air gap to the outlet drain
- 15) Swimming pools
- 16) Toilet ball cocks without an air gap
- 17) Wells that are not separated by an air gap from the potable water supply

If you have any questions, regarding cross connection control, contact Reed Carlson at the City of Ellensburg Cross Connection Control Department (509-962-7278).

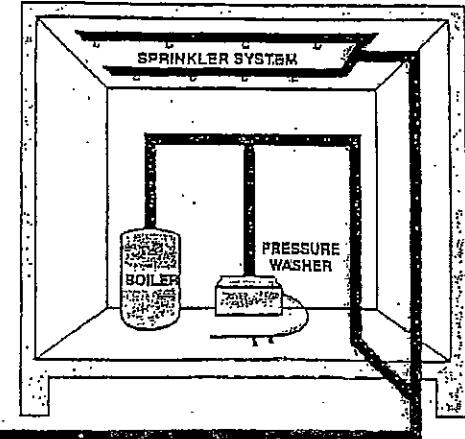


FIGURE 5

Three examples of pressure systems which could cause contamination due to a backpressure situation--boilers, pressure washers and fire systems.