Drinking water systems may become polluted or contaminated through uncontrolled cross connections when backflow occurs.

Backflow is the unwanted flow of non-potable substances back into the consumer’s plumbing system and/or public water system (i.e., drinking water).

There are two types of backflow: backsiphonage and backpressure. B acksiphonage is caused by a negative pressure in the supply line to a facility or plumbing fixture. B acksiphonage may occur during waterline breaks, when repairs are made to the waterlines, when shutting off the water supply, etc.

B ackpressure can occur when the potable water supply is connected to another system operated at a higher pressure or has the ability to create pressure, etc. Principal causes are booster pumps, pressure vessels, elevated plumbing, etc.

Backflow preventers are mechanical devices designed to prevent backflow through cross connections. However, for backflow preventers to protect as designed, they must meet stringent installation requirements.

For further information contact your local water purveyor or the PNWS/AWWA Cross-Connection Control Committee through the PNWS office at (877) 767-2992.
**Why Be Concerned?**

Most water systems in the United States and Canada have good sources of water and/or sophisticated treatment plants to convert impure water to meet drinking water standards. Millions of dollars are spent to make the water potable before it enters the distribution system so most water purveyors think that their supplies are not in jeopardy from this point on. Studies have proven this to be wrong. Drinking water systems may become polluted or contaminated in the distribution system through uncontrolled cross connections.

Cross connections are installed each day in the United States because people are unaware of the problems they can create. Death, illness, contaminated food products, industrial and chemical products rendered useless are some of the consequences of such connections. As a result, many hours and dollars are lost due to cross connections.

**Where are Cross Connections Found?**

Cross connections are found in all plumbing systems. It is important that each cross connection be identified and evaluated as to the type of backflow protection required to protect the drinking water supply. Some plumbing fixtures have built-in backflow protection in the form of a physical air gap. However, most cross connections will need to be controlled through the installation of an approved mechanical backflow prevention device or assembly. Some common cross connections found in plumbing and water systems include:

1. Wash basins and service sinks.
2. Hose bibs.
3. Irrigation sprinkler systems.
4. Auxiliary water supplies.
5. Laboratory and aspirator equipment.
6. Photo developing equipment.
7. Processing tanks.
8. Boilers.
9. Water recirculating systems.
10. Swimming pools.
12. Fire sprinkler systems.

Every water system has cross connections. Plumbing codes and State drinking water regulations require cross connections to be controlled by approved methods (physical air gap) or approved mechanical backflow prevention devices or assemblies. The various types of mechanical backflow preventers include: reduced pressure backflow assembly (RPBA), reduced pressure detector assembly (RPDA), double check valve assembly (DCDA), pressure vacuum breaker assembly (PVBA), spill resistant vacuum breaker assembly (SVBA) and atmospheric vacuum breaker (AVB).

For a backflow preventer to provide proper protection, it must be approved for backflow protection, designed for the degree of hazard and backflow it is controlling, installed correctly, tested annually by a State certified tester, and repaired as necessary. Some States require mandatory backflow protection on certain facilities where high health-hazard-type cross connections are normally found. The following is a partial list of those facilities:

1. Hospitals, mortuaries, clinics.
2. Laboratories.
3. Food and beverage processing.
4. Metal plating and chemical plants.
5. Car washes.
6. Petroleum processing and storage plants.
7. Radioactive processing plants and nuclear reactors.
8. Piers and docks.
9. Sewage treatment plants.

**Wrong:**

Uncontrolled Cross Connection

![Diagram of an uncontrolled cross connection]

**Right:**

Controlled Cross Connection

![Diagram of a controlled cross connection]

**What to Do?**

It is impossible to cover all of the information pertaining to cross connections in a pamphlet. We hope the preceding information will inspire you to further educate yourself on the hazards of unprotected cross connections. Cross connection control manuals and training schools are offered throughout the Northwest. Information on manuals, schools and cross connection control can be obtained from:

**Washington**

Department of Health
Airdustrial Way, Bldg. 3
P.O. Box 47822
Olympia WA 98504-7822
(360) 236-3133

**Oregon**

Oregon Health Division
3420 Cherry Av NE, #110
Keizer OR 97303
(503) 373-7201

**British Columbia, Canada**

BC Water & Waste Association
Ste. 342 – 17 Fawcett Road
Coquitlam B.C. V3K 6V2
(604) 540-0111

**Idaho**

Idaho Division of Environment
1410 N Hilton
Boise ID 83706
(208) 373-0275

Additional sources of information may be found on the PNWS-AWWA web site: www.pnws-awwa.org