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Cross Talk

Winter 2008

Relief Valve Discharge

Walking up to a reduced pressure principle assembly (RP) with a leaky or discharging relief valve doesn't always mean the assembly is malfunctioning. The differential pressure relief valve of the reduced pressure principle assembly will discharge under specific circumstances. In fact, it is, most likely, doing exactly what it is designed to do. To understand the situation fully, it is necessary to review the operation of the reduced pressure principle assembly.

The reduced pressure principle assembly is comprised of two check valves in series with a differential pressure relief valve located between the two check valves. Resilient seated shutoff valves and test cocks are also integral components of this assembly. The check valves act as one-way valves allowing the water to only flow in the direction of flow. Under a backflow condition the checks do not allow water to flow in the reverse direction. Even if one of the checks leaks, the other prevents backflow.



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Foundation Membership

The Foundation's Membership Program provides many benefits to the Members of the Foundation. These include: a twenty-five percent discount on manuals, twenty percent discount on Foundation Training Courses for any employee of the Member company/organization, the *List of Approved Backflow Prevention Assemblies*, printed quarterly, and access to the up-to-the-minute version of the List for those Members with Internet access.

Members are encouraged to call the Foundation with technical questions. The Foundation's Engineering Staff is available to assist Members with the various aspects of field testing backflow preventers, installing backflow preventers and administering their cross-connection control program.

Many consider their Membership with the Foundation one of their best forms of insurance to protect the agency from liability involved when a distribution system becomes contaminated or polluted through cross-connections. Membership in the Foundation helps to provide the tools needed to effectively initiate and run a cross-connection control program.

Below is a list of those who have become members of the Foundation this past quarter:

24 Hour Fire Protection, Inc.	Lincoln Property Company
A+ Waterworks, Inc.	Myoma Water Company
Alt Plumbing	NARA Construction Co., Ltd.
Backflow Prevention of NY	New York State Health Department
Backflow Training Services	One Day Water Works
Cocoa, City of-Transmission/Distribution	Pakpour Consulting Group
Coeur d'Alene Water Department	Palmdale Water District
Global Span Products	Redwood, City of
Houston Area Plumbing JAC	RJG's Backflow Specialist
Johnny M. Anderson	Rural Water Association of Utah
Jose P. Lozano IV, P.E.	Rutland, City of - Water Department
Laird's B & B Maintenance	SANDIS Civil Engineers

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Host a Training Course

Hosting a Foundation Tester or Specialist course is easy and can be valuable for any Foundation Member. Hosting a course provides an opportunity for those involved with cross-connection control and backflow prevention in various parts of the country to be trained by the Foundation Staff as cross-connection control specialists or backflow prevention assembly testers. The Foundation staff has offered training courses in Texas, Hawaii, South Carolina, Indiana, Nevada, and other areas.

There is no cost for the hosting agency to host a Foundation Training Course. The hosting organization will receive complimentary registration for two attendees.



The Tester Course

The Foundation's Course for the Training of Backflow Prevention Assembly Testers is designed to train the attendees in the intricacies of field-testing the double check valve assembly, the reduced pressure principle backflow prevention assembly, the pressure vacuum breaker assembly and the spill-resistant vacuum breaker assembly. Some basic hydraulics and concepts of backflow are discussed, but the main focus of this course is on testing and troubleshooting the backflow prevention assemblies. Following are the main items to consider in the decision to host a Foundation Tester Course.

Meeting Place:

The morning meeting area should be in a room large enough to accommodate at least twenty-six (26) attendees of the five-day course. The room should have a blackboard with chalk or a grease-board with pens for the lectures. The room should also be suitable for multimedia presentations. The afternoon sessions should be held in a suitable place where the course attendees can field test and

troubleshoot backflow prevention assemblies. An adequate water supply with several connections will be necessary for the testing of the backflow prevention assemblies.

Course Materials:

The Foundation will provide, for each student, a binder containing a syllabus, a time schedule for the week and several reference materials. Also provided, for each student, will be a current copy of the Manual of Cross-Connection Control. Backflow prevention assemblies of various manufacturers will be shipped to the location of the course by the Foundation. The assemblies will be set-up with garden hose connections; therefore, an adequate source of water will be necessary. In addition, tools and gages will be provided by the Foundation.

The Foundation will provide a "certificate of completion" for each member of the class who successfully completes the written and performance portions of the final examination. Also, continuing education units (CEU's) are given to students who attend every day of the course. Tester course students receive 3.0 CEU's.

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Relief Valve Discharge: continued

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In a double check valve assembly, should both of the checks leak and a backflow condition occur, backflow could occur through the assembly. With the RP, however, this is unlikely due to the addition of the differential pressure relief valve. The relief valve is designed to discharge water from the region between the two check valves in order to keep the water pressure in that region at least two pounds per square inch (psi) less than the supply pressure—the pressure upstream of the number one check valve.

This is done using a diaphragm with the force of the inlet or line pressure on one side trying to keep the relief valve closed. On the other side of the diaphragm is low pressure (zone of reduced pressure) and the force of the relief valve spring trying to open the relief valve. (The pressure between the two check valves is lower than the line pressure because of the pressure loss through the first check valve.)

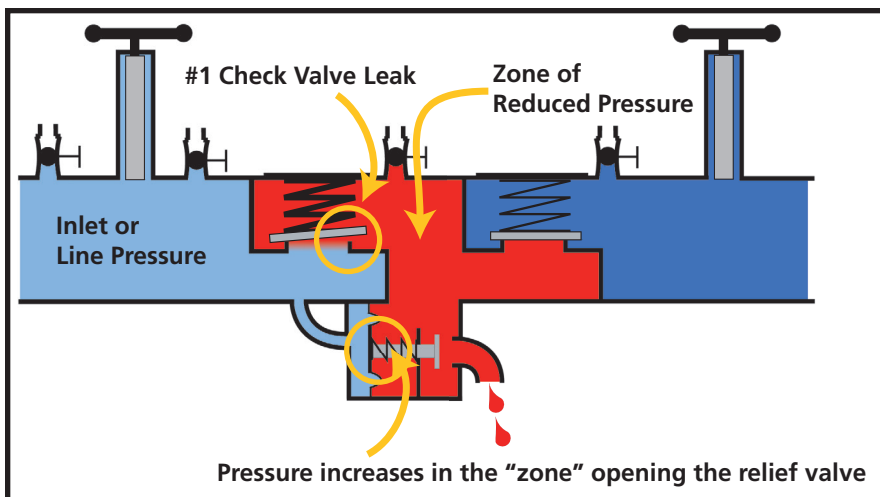
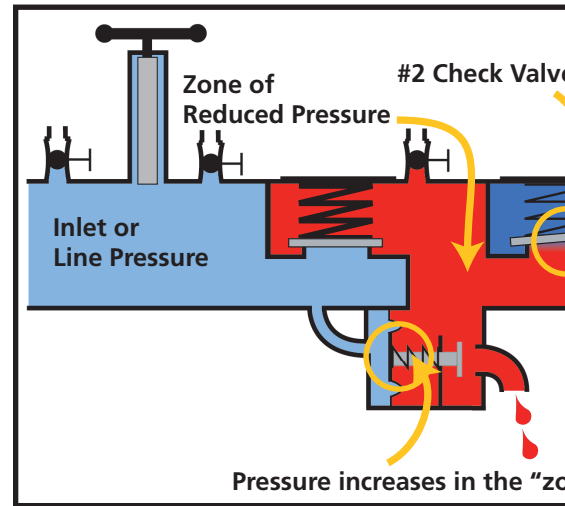
As long as the force of the line pressure is more than the combined force of the low pressure and relief valve spring, the relief valve stays closed. Under normal operating conditions, this is true, and the relief valve will

the cause. However, it should be noted that regardless of the symptom, the assembly should be tested to determine what is actually the condition of the assembly.

The Relief Valve Spits Intermittently

The relief valve may be spitting intermittently. This is typically caused by line pressure fluctuation. If the line pressure is unsteady and fluctuating, the balance across the relief valve diaphragm is not maintained

and the relief valve spits. For example, if the line pressure suddenly drops, the pressure on the high side of the diaphragm will drop and the force of the relief valve spring and the low pressure will overcome the high pressure opening the relief valve. Once the relief valve opens, however, the pressure in the “zone” (the region between the two check valves) will drop. The force of the line pressure will then be higher than the force of the low pressure and the spring and the relief valve will close again. When the pressure drops again, the cycle starts all over. In this case there is nothing actually wrong with the assembly, the relief valve is discharging water from the zone as designed.



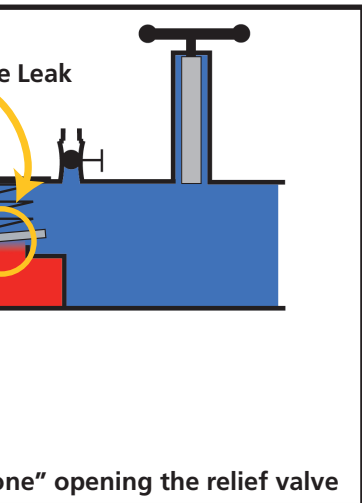
Relief Valve Leaks or Drips Continually.

Figure 1.1

If the relief valve is discharging continually, it is likely because of one of three situations.

remain closed as water flows through the assembly. However, there are several situations, which may cause the relief valve to discharge water. There are different symptoms, which can give the tester a clue as to what may be

The number one check valve could be leaking. If water continually leaks through the number one check valve, pressure in the zone increases as the water leaks into the zone.



This increases pressure in the zone and causes the relief valve to open. Water continually leaks out of the relief valve through a leaking No. 1 check valve (See Figure 1.1). If there is flow through the assembly, the discharging relief valve wouldn't be apparent until the No. 2 shutoff valve is closed during the testing, unless there is no water being used downstream.

Figure 1.2

The pressure in the zone may also increase if there is a leak across the No. 2 check valve when there is a backpressure condition. This too would cause the relief valve to discharge continually (See Figure 1.2).

The final condition that could cause the relief valve to discharge continually would be a leak

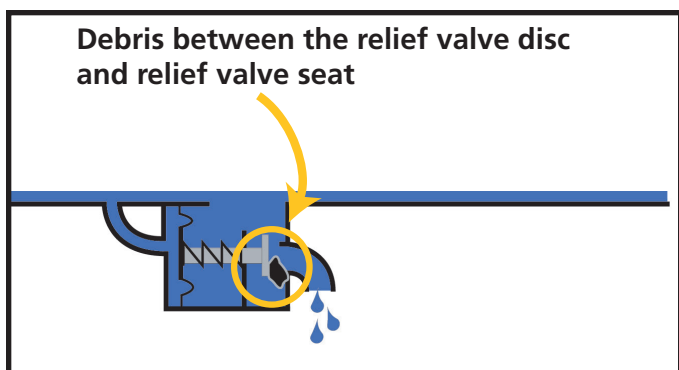


Figure 1.3

in the relief valve itself. There could be debris between the relief valve disc and the relief valve seat, allowing water to leak through the relief valve port (See Figure 1.3).

In each of these cases, there is something wrong with the RP, which requires it to be repaired, or at least cleaned. It is important to note, however, that the RP is not allowing

backflow to occur. The relief valve discharging is actually helping to prevent backflow by keeping the pressure in the "zone" less than inlet pressure.

Relief Valve Discharges Large Quantities of Water Continually.

In some cases, the relief valve may open fully or almost fully and continue to discharge large quantities of water. (It may be that this doesn't occur until the downstream shutoff valve is closed.) In this case the first check is most likely stuck open, or maybe fouled by a large object. The relief valve continues to stay open in order to keep the pressure in the zone less than line pressure. With the first check open a large amount; large quantities of water are flowing into the zone. Therefore, the relief valve opens wide in order to keep the pressure in the zone at least two psi less than the supply pressure. In this case, the first check needs to be repaired.

In each of these cases, it should be noted that the assembly is preventing backflow. Just because water is discharging from the relief valve does not mean that backflow is occurring. It doesn't even mean that there is a problem with the assembly. If the relief valve is spitting because of line pressure fluctuation, there is nothing wrong with the assembly at all; it is doing what it is designed to do. It should be noted that the only way to know for certain what is happening in the assembly is to field test it. So, even if the relief valve is leaking or spitting, it should still be field tested to determine exactly what the problem is. An exception to this is when the relief valve is discharging fully. It may be necessary to turn off the water supply immediately in order to keep it from creating a hazard in the surrounding area. In this case, the assembly would require some maintenance or repair before testing would be possible. ■

Department Receives Naming Gift



L-R: Sony Astani, addressing the crowd with Dean Yortsos, President Sample and Astani's wife Jo.

ment the Sonny Astani Department of Civil and Environmental Engineering.

The Foundation has been a part of the Sonny Astani Department of Civil and Environmental Engineering since 1985.

Sonny Astani is the chairman of Astani Enterprises, one of the largest real estate development companies in Los Angeles. The company investments are valued at over \$1 billion; the firm owns or operates approximately 5,000 apartment units throughout the southern California area and is currently developing approximately 1,700 units of condominiums in downtown Los Angeles.

With the Trojan marching band and University President Steven Sample in attendance the USC Viterbi School of Engineering was proud to name one of its oldest departments after one of its own.

In what is the seventh multimillion-dollar donation from a USC engineering alumnus in the last six years, the Viterbi School of Engineering named its civil and environmental engineering depart-



USC Trojan Marching Band taking part in the festivities.

The \$17 million donation, the largest ever to name such a department, is to help study urban areas that have 10 million or more residents, commonly referred to as "megacities." Currently, there are 15 megacities worldwide, including Los Angeles and New York. ■

In an effort to be more environmentally friendly the Foundation has decided to drop quarterly printing of the entire *List of Approved Assemblies* and move on with plans to print the List, in its entirety, once a year; along with a quarterly print of any updates to the List thereafter. The move comes after the Foundation noted an increase in the electronic use of the List via its website.

In recent years the amount of paper being used for List has nearly tripled. With more assemblies being added to the list, the Foundation decided, beginning in 2008, to print the List in its entirety once every year. The entire List will be printed in the first quarter of every year.

Following the initial print, which will be printed on recycled paper, of the List members will receive a printed sheet with any updates quarterly throughout the year. Keep in mind that the updates will not include anything other than assemblies that have either been added, modified or removed from the List. Unless otherwise noted on the update sheet all assemblies continue to be approved by the Foundation.

The electronic version of the List, which can be downloaded from the Foundation's website, will continue to be updated as changes are made. It continues to be the best way to keep up to date with recent assembly approvals.

If you ever have questions about an assembly's status on the List contact the Foundation via the website or by telephone. ■

The List goes Green

Host a Training Course: continued

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The Specialist Course

The Foundation's Course for the Training of Cross-Connection Control Program Specialists is designed to train the attendees in the various aspects involved in administering a cross-connection control program. Main topics discussed are: Rules & Regulations, Policies & Procedures, Record Keeping, Plan Checks, Public Relations and Site Surveys. Much of the course is dedicated to the site survey to help the attendee assess the degree of hazard at any water using facility. The course includes a

that the instructors can adjust the course to the legal requirements of the region. The Foundation will provide a "certificate of completion" for each member of the class who successfully completes the written and performance portions of the final examination. Also, continuing education units (CEU's) are given to students who attend every day of the course. Tester course students receive 3.5 CEU's.



Field Survey:

The hosting organization needs to locate a facility, which will be suitable for a field inspection on Thursday morning of the class. The facility should be located nearby the classroom and should have several water uses. There should be at least three separate and diverse water uses located at the facility.

short survey of a facility as part of the examination.

Following are the main items to consider in the decision to host a Foundation Specialist Course:

Meeting Place:

The meeting place should be a room large enough to accommodate approximately thirty (30) course participants. The room should have a blackboard with chalk or a greaseboard with pens, along with being suitable for multimedia presentations.

Course Materials:

The Foundation will provide, for each student, a binder containing a syllabus, a time schedule for the week and several reference materials. Also provided, for each student, will be a current copy of the Manual of Cross-Connection Control. In addition, the contact for the hosting agency should provide the Foundation office with local and state regulations so

Before the site is finalized and the proper permission is sought for the inspection, the hosting organization contact should call the Foundation office and discuss the facility with a member of the Foundation's engineering staff. After all the preparations are finalized, the students will then be required to inspect the locations to determine the uses of water, whether there are any actual or potential cross-connections and ultimately determine the degree of hazard. A separate location is necessary for a pre-survey, which takes place earlier in the week.

The Foundation Office is currently in the process of scheduling courses for 2009. If any Member is interested in hosting one of the Foundation's training courses, please visit the Foundation's website or contact the office to obtain a detailed hosting outline or discuss the possibility with one of the Foundation's engineering staff. ■

Training Courses

Tester Course

Los Angeles, CA
5-9 May 2008

Los Angeles, CA
14-18 July 2008

Specialist Course

Los Angeles, CA
28 July-1 August 2008

Upcoming Events

California Environmental Health Assoc.
Annual Educational Symposium
San Diego, CA
24-28 March 2008

CA/NV AWWA
Spring Conference
Hollywood, CA
21-24 April 2008

ABPA International Conference &
Trade Show
Indianapolis, IN
19-21 May 2008

Contact Information

Phone: 866-545-6340

Fax: 213-740-8399

E-mail: fccchr@usc.edu

Website: www.usc.edu/fccchr

Foundation for Cross-Connection Control and Hydraulic Research

University of Southern California
Kaprielian Hall 200
Los Angeles, California 90089-2531

First Class
US Postage PAID
University of
Southern California