

## NRDC Report on US Drinking Water Released

by Dave Leland

The third and latest report on US drinking water supplies, prepared by the Natural Resources Defense Council and entitled "You are What You Drink...", was released in early June. It was timed to coincide with the beginning of the congressional debate of reauthorization of the federal Safe Drinking Water Act. NRDC reviewed the federal database of Safe Drinking Water Act violations for 1993-94 as reported by state programs, the "available scientific literature", and responses to questionnaires sent to specific water suppliers. Their conclusions:

- There is widespread *Cryptosporidium* in our water systems.
- Scientific reviews of waterborne disease estimate that in the US there are from 400,000 to 7 million or more cases of disease per year, with about 1200 deaths annually.
- There are newly discovered or confirmed health hazards from widespread contaminants such as arsenic, trihalomethanes, and aluminum.
- Violations of EPA's basic health standards and water safety testing requirements are widespread and affected 53 million people, 3 million more people than in previous years; enforcement is rare.
- Many water utilities are hiding the facts about contamination.

In a companion report, prepared by the Environmental Working Group and entitled "In the Drink", detailed lists of water systems that violated SDWA standards were cited. These reports cited about 3,000 violations of all types from Oregon water systems in 1993-94 and listed some specific water systems by name.

Surprisingly, there was little response to all this

*Continued on page 3*

*David L. Leland, P.E., is manager of the Drinking Water Program*

## CDC releases workshop report on waterborne cryptosporidiosis

(The following is an excerpt of the summary and conclusions of this report.)

In September 1994, CDC convened a meeting to address the public health threat associated with waterborne cryptosporidiosis. Representatives from 40 states and from regulatory and public health agencies, water utility companies, and advocacy groups discussed approaches to avoiding unnecessary boil-water advisories (i.e., statements to the public advising persons to boil water before drinking it) and preventing and controlling waterborne cryptosporidiosis. Work groups at the meeting addressed four issues: 1) surveillance systems and epidemiologic study designs; 2) public health responses when oocysts are detected in drinking water; 3) cryptosporidiosis in immunocompromised persons; and 4) water sampling methods and interpretation of results. The work groups defined the problems associated with these issues and developed strategies that could be used initially to manage these problems. The work group discussions were summarized, and the conclusions were provided as either a) summaries of current knowledge concerning that issue or b) suggested ways to obtain the information needed to develop useful recommendations. The work group conclusions are for consideration by persons and organizations who must assist with these issues and by those who seek to advance understanding of waterborne cryptosporidiosis.

*Continued on page 5*

### **Inside this issue:**

Cryptosporidium Fact Sheet .....	2
Cross Connection Update .....	6
Drinking Water Advisory Committee Roster .....	7
Training calendar .....	8

# Cryptosporidium

## Health Effects Information Summary - April, 1995

### Oregon Health Division

#### What is cryptosporidiosis?

Cryptosporidiosis is a diarrheal disease caused by a tiny, one-celled parasite called *Cryptosporidium parvum*. It was first identified as a cause of human disease in 1976, and for a while was thought to be very rare. Over the last ten years, however, we have come to know more about this parasite. It seems that *Cryptosporidium* is probably quite common in the United States and elsewhere in the world. Sometimes there are large outbreaks of illness, like the ones that occurred in Milwaukee, Wisconsin in 1993 and in Jackson County, Oregon in 1992, but many cases occur without any obvious connection to other cases.

#### How is it spread?

Besides people, this parasite can infect mammals, including wild animals. Young calves and sheep are often infected. Infected people (or animals) shed this parasite in their feces; you must eat or drink them to get sick. The infectious form (called an *oocyst*) can survive for days or even months in water or soil, so rainfall and runoff can easily wash them into rivers and streams. Some people get infected when they drink water from mountain streams. These streams may look clean, but many are contaminated with *Cryptosporidium* or other germs that can make you sick.

Most of the big outbreaks of cryptosporidiosis described so far have been traced to contaminated drinking water, but person-to-person spread (for example, in daycare centers or households where hand washing habits are poor) is very common.

#### What is the illness like?

Cryptosporidiosis usually causes diarrhea and often symptoms like nausea, vomiting, and stomach pain. Some people have very mild infections, with symptoms that last only a day or two, while others can get very severe diarrhea that lasts for a month or more. Some people may be exposed and not get sick at all. While most persons get over the infection within a month (or less), those who have a deficient immune system to protect them (for example, people with AIDS) may never recover. There is no effective treatment for this infection.

#### How do I know if I have cryptosporidiosis?

The symptoms of cryptosporidiosis are very similar to those caused by many other infections, so you can't tell without a specific test. Your doctor can arrange for a stool exam, if necessary.

#### What is the connection between cryptosporidiosis and drinking water?

There isn't a simple answer to this question. Although most of the big outbreaks of this illness that have been

studied were caused by contaminated drinking water, we know that a lot of transmission has nothing to do with water. At this time, we really don't know how much cryptosporidiosis is waterborne and how much comes from other sources.

What we do know is that this parasite is easy to find in surface waters (lakes, rivers, and streams) around the country, although usually the levels found are very low. Many surface waters are used as sources of drinking water. More and more water utilities are testing for *Cryptosporidium* and we hope to get a better understanding of what these findings mean for public health.

#### Is my tap water safe to drink?

The Health Division is working with Oregon public water suppliers to assure that public water supplies are as safe as they can be. Direct measurement of numbers of oocysts in drinking water supplies is very difficult. Very few laboratories are available that have appropriately trained technicians and capabilities to perform these tests. Finally, interpretation of results is difficult; the presence of oocysts does not directly translate into a health risk, and the absence of oocysts does not mean that there is no risk.

*Cryptosporidium* oocysts are highly resistant to traditional disinfection treatment using chlorine. Conventional filtration processes, in common use in utilities using surface water sources, have been shown to remove greater than 99% of oocysts when the treatment is optimally operated at all times. In fact, the known outbreaks of cryptosporidiosis in municipal water systems were ended by improving the operation of existing filtration treatment systems.

#### What is being done to reduce the risk?

Some Oregon water systems have begun testing for oocysts in their water sources, and some are working with landowners and other interested parties to control potential sources of contamination in their watersheds. Health Division staff has conducted detailed reviews of existing water filtration treatment systems to identify ways to improve operations to produce water of higher quality than required under current standards. The Division continues to work with the 30 communities that are currently unfiltered and must install filtration treatment.

Research on *Cryptosporidium*, lab methods, and water treatment processes by EPA and the water supply community is continuing. The Health Division will continue efforts to keep water system operators and managers informed on recent research developments as they occur.

#### Emergency treatment of drinking water

Small quantities of water containing *Cryptosporidium* oocysts can be made safe for drinking by bringing the water to a full rolling boil for one minute.

**NRDC Report** (Continued from page 1)

locally here in Oregon. The "Oregonian" newspaper ran an article on June 2. Very few phone calls were received here at the drinking water program; the ones we did receive were primarily from the staffs of the water systems cited in the newspaper article.

Clearly, this effort was designed to influence the SDWA reauthorization discussion in Congress, and the tone of the reports was set to support the environmental groups' particular concerns. However, the reports do deal with significant and current issues of drinking water quality. Let's look again at the conclusions of the NRDC report.

**Yes, *Cryptosporidium* is widespread in surface waters and occasionally in treated, filtered water.** Unfortunately, test methods for drinking water are unreliable and the risk associated with particular low numbers of organisms is not known (see article on Page 2).

We had a serious outbreak in Oregon in 1992 in a filtered water supply and, as a result we are focusing a significant level of program effort on assisting communities to improve and optimize filtration and disinfection treatment of surface water sources. Water systems should focus on taking all possible steps to assure that treatment operations are optimal at all times, and that operational and management staff are knowledgeable and appreciate the challenge of waterborne pathogenic microorganisms of all types.

**Yes, control of pathogenic (disease-causing) organisms should be our number one priority.** Pathogenic organisms have acute, or nearly immediate health effects, can cause and have caused large outbreaks, and the health impacts are much less theoretical than those associated with low level chemical contaminants. We need to again focus on optimal treatment of surface water, proper construction of well sources to exclude sanitary hazards, and to start looking at ways to protect all of our water sources. In addition, we need to focus future efforts on development and implementation of upcoming new standards under the Safe Drinking Water Act that relate to microbial contaminants—the Disinfectants/Disinfection By-Products Rule (now proposed), Information Collection Rule (proposed), Enhanced Surface Water Treatment Rule (under development), and the Groundwater Disinfection Rule (under preliminary development).

**Yes, we should focus some effort on chemical contaminants of concern.** Lower maximum levels of trihalomethanes are proposed under the D/DBP rule, the result of a large national consensus effort to develop appropriate new standards to reduce exposure of water users to by-products of disin-

fection. A new and substantially lower arsenic standard is under discussion, but available health effects information is insufficient to identify the level at which arsenic should be regulated. EPA is proposing several major health studies to provide the necessary information to identify a new maximum level that protects health while keeping huge potential water system costs to a minimum. The connection, if any, between aluminum in drinking water and Alzheimer's disease remains controversial in the health care community. Aluminum is not now scheduled for drinking water regulatory action.

The drinking water program focuses on chemical contaminants that have short-term health impacts, or affect susceptible populations. Specifically, we are concentrating on those systems with lead level above the action level, and those systems with high nitrates. In addition, we are attempting to assure that those systems that encountered detections of volatile or synthetic organic chemicals conduct follow up monitoring as required.

**Yes, there are substantial numbers of violations of Safe Drinking Water Act requirements in Oregon.** The drinking water standards, particularly the monitoring requirements, are highly complex; there are many different types of violations related to numbers of samples and deadlines for reporting. A detailed summary of the types of violations cited in the report is shown on Page 4. As you can see, most violations were for reporting requirements and occurred at the small water systems, of which there are many in Oregon.

The drinking water program is currently funded at about half the level estimated by EPA of what would be needed to fully implement and enforce the safe drinking water standards. Therefore, we focus our limited resources on the most serious drinking water problems. These include systems that do not meet Maximum Contaminant Levels and treatment requirements, and those systems that routinely and repeatedly fail to monitor and report on their water quality. These systems receive formal enforcement actions from the drinking water program, and corrections are pursued.

We are less able, however, to address minor technical violations of reporting requirements, or infrequent occurrences of failure by individual water systems to report test results. Unfortunately, these are the violations that make up the bulk of the Oregon violations cited, create the impression of widespread noncompliance with standards and unsafe water, and focus people's attention away from our major water quality concerns discussed above.

**Water systems must take individual responsi-**

**bility for improvements in this area; they must know the requirements and strive to meet them at all times.** For our part, we will continue to make our best efforts to receive all the data and record and report it accurately. Water systems may wish to consider authorizing their lab to report test results on their behalf to improve reporting.

**Yes, water suppliers do need to communicate more with their water users.** The level of public interest in drinking water issues continues to grow. Our experience is that those water suppliers that routinely communicate with users suffer less from local misunderstandings and misinformation, particularly when problems do occur. Apparently, NRDC sent out questionnaires to utilities around the US asking for large volumes of data in a short time; some utilities met their time line and others were unable to do so. This apparently led NRDC to the conclusion that utilities were "hiding" information. Regular communication with users would help local utilities develop readily accessible information to send out in response to inquiries.

**So, what should we learn from all this?** Here's our advice to water systems:

- Know the safe drinking water requirements; strive to meet all of them all the time.
- Take responsibility for your own compliance and

water system reporting data. Report test results on time-know what your test results mean.

- Communicate with water users. If you need to conduct mandatory public notice for a violation-do it (and make sure we get a copy so we can report to EPA that you did it!). Also, communicate other information to your users when there are no problems so you can develop visibility and trust.

**CDC and EPA Offer *Cryptosporidium* Guidance to Immunocompromised Individuals**

In June, EPA and the Centers for Disease Control and Prevention issued a joint guidance on drinking water to people with compromised immune systems. These include people with HIV disease, those under certain chemotherapy treatments, and those recovering from organ transplants. The guidance notes that data is currently insufficient to determine the level of risk these individuals face from consuming tap water that may occasionally contain low levels of *Cryptosporidium* oocysts.

The guidance suggests that people who are concerned should consult with their physician about their personal risk level and that if they wished to take extra precautions, they could boil their drinking water or make use of certain home water filters or bottled waters. Text of the guidance is available from the drinking water program.

**Violations for Community and NonTransient Water Systems**

Violation	System Size*				Total	
	Very Small	Small	Medium	Large		
<b>Water Quality</b>	Fecal Coliform - exceeded maximum level (M)	12	2	0	1	15
	Total Coliform - exceeded maximum level (M)	83	43	5	6	137
	Chemical - exceeded maximum level	0	1	0	0	1
	Failed to meet treatment levels for a filter plant (M)	102	217	57	9	385
<b>Major Reporting</b>	Did not report <i>any</i> Routine coliform results (M)	310	248	7	1	566
	Did not report <i>any</i> Repeat coliform results (M)	52	19	2	1	74
	Did not report Lead and Copper results	367	297	16	0	680
	No operations report for a filtered system (M)	52	65	22	8	147
<b>Minor Reporting</b>	Incomplete operations report for a filter plant (M)	129	182	55	12	378
	Did not report <i>enough</i> Routine coliform results (M)	134	74	13	4	225
	Did not report <i>enough</i> Repeat coliform results (M)	40	16	4	5	65
<b>Total Violations by System size</b>	<b>1281</b>	<b>1164</b>	<b>181</b>	<b>47</b>	<b>2673</b>	

\*Very Small systems have 25 to 500 population  
 Small systems have 501 to 3,300 population  
 Medium systems have 3,301 to 10,000 population  
 Large systems are those over 10,001 population

(M) - Numbers reported are the numbers of monthly violations.

## CDC Workshop (Continued from page 1)

## WORK GROUP CONCLUSIONS

These work group conclusions are the summarized suggestions from the proceedings of each work group, as presented by the work group leaders at the concluding plenary session of the workshop, and they were drafted with multiple opportunities for open input from all participants. The workshop formalized the awareness that current knowledge of *Cryptosporidium*, particularly waterborne cryptosporidiosis, is minimal. This level of knowledge does not provide a scientifically sound basis for many essential decisions regarding the public health risks associated with the infection. This report provides, on the basis of available information, potential strategies for managing cryptosporidiosis. Moreover, these discussions assist with focusing researchers on possible ways to attain the information needed to better understand the risk factors associated with waterborne cryptosporidiosis, thereby enhancing the eventual development of effective prevention strategies.

## Surveillance Systems and Epidemiologic Study Designs

Local, state, and national public health agencies should cooperatively initiate and develop surveillance and epidemiologic investigations to assess the public health significance of low levels of *Cryptosporidium* oocysts in public drinking water.

## Public Health Responses

Discovering *Cryptosporidium* oocysts in low levels in finished water should not be the only reason for issuing a boil-water advisory. Additional support for such an advisory should include other data indicating that the water quality is unacceptable. A task force should be created to develop general guidelines for implementing and lifting boil water advisories and to assist local agencies in deciding when boil-water advisories are necessary. A coordinated local-

to-national effort should be made before implementation of the ICR to provide information concerning *Cryptosporidium* and drinking water to public health officials, water utility officials, health-care providers, immunosuppressed populations, and the general public. Such information should include appropriate prevention strategies.

## Cryptosporidiosis in Immunocompromised Persons

A coalition or task force should be established that will place high priority on educating immunocompromised persons about cryptosporidiosis because of the increased risk for severe disease if they become infected. This group should provide information to immunocompromised persons that explains how to reduce the risk for cryptosporidiosis, regardless of the source of transmission, and about specific measures they can take to further reduce the risk for waterborne transmission.

## Water Sampling Methods and Interpretation of Results

Current methods are limited with regard to detecting oocysts in source and finished drinking water. These technical limitations restrict the ability of public health officials to practically interpret data on the occurrence and public health importance of *Cryptosporidium* in drinking water. Research should be accelerated to develop alternative, dependable methods for detecting *Cryptosporidium* in drinking water.

## CITATION

Centers for Disease Control and Prevention. Assessing the public health threat associated with waterborne cryptosporidiosis: report of a workshop. MMWR 1995;44(No. RR-6):[inclusive page numbers].

**Testing? Who me?  
Nitrates? VOC/SOC?**

Just a reminder for those who need it.

**Nitrate** testing is required yearly of all water systems. If you did yours and sent it in - thank you. If you did it and forgot to mail the results in please take a moment and do it now. If you forgot to do it please call your lab and have it done now and don't forget to mail the results in.

**VOC/SOC or Phase 2/5** tests are required of all community and nontransient noncommunity water systems (like schools and work sites). The smaller systems are to have the test done this year. If you haven't done it yet please call your lab and arrange to have the test done now and avoid the rush at the end of the year. If you have already done the test and mailed in the results - thank you.

If you don't know if you did or didn't do the test, your lab should be able to tell you.

Please refer to  
"Labeling Chemical Tests"  
article on Page 7.

# Cross Connection Update

by Bonnie Waybright

The current list of approved backflow device assemblies is dated June 1995. Call (503)731-4899 or use the Cross Connection Information Order Form to order a copy.

## CROSS CONNECTION RULE REVISIONS

Now that we've had some time to live with the major changes that occurred in the last rule revision, it's time to iron out the bugs. Many changes have been made, ranging from correcting typos to making significant changes.

The most notable revision is the change in backflow device test procedures. The new test procedures will be those contained in the USCFCCCHR *Manual of Cross-Connection Control* 9th Edition. The old test procedures from the 8th Edition of the manual will continue to be accepted until January 1, 1998. This will allow time for current Backflow Device Testers to learn the new procedures. The Health Division is making this change because of the improvement in the Double Check Valve Assembly (DCVA) test procedure. The 8th Edition procedure will fail a DCVA when it deteriorates to the point of allowing backflow while the 9th Edition procedure will fail ailing DCVA before it allows backflow to occur. The new test procedures also address the issue of testing the Spill-Resistant Pressure Vacuum Breaker, a new device that Oregon currently has no test procedure for.

Draft copies of the revised cross connection rules and copies of the new test procedure for the DCVA are now available. The Health Division welcomes your thoughts on the proposed rule revisions. Please send written comments to: Oregon Health Division, Drinking Water Section, PO Box 14450, Portland, OR 97214-0450, Attn: Bonnie Waybright.

## CERTIFICATION

The renewal process for Cross Connection Inspectors and Backflow Device Testers is nearly complete. Applications that were complete and sent in early were processed quickly. Those that came in late, were missing pieces or that were sent in parts that needed to be reunited in our office were delayed.

### Helpful hints for the next renewal:

Keep all certificates that document your attendance and/or successful completion of Updates. You *will* be required to send copies of these documents at renewal time in 1997.

Backflow Device Testers need to keep certificates that document test gauge accuracy verification. You *will* be required to send copies of these documents at renewal time in 1997.

Attend an Update before June 1997! Procrastinators generate a huge demand for Updates at renewal time. Testers and Inspectors outside the Portland area can expect to travel to Portland for last minute Updates.

Remember that renewals received by the Health Division after July 31, 1995 will require an additional \$50.00 reinstatement fee.

## CERTIFIED TESTER/INSPECTOR LISTS

Lists of certified Testers and Inspectors will be available after August 31st. The Health Division provides both "public" and "complete" lists of certified Testers and/or Inspectors.

The public list contains the names of those individuals who want their names made available to potential customers. Water systems may make copies of the public Tester list to distribute to their customers when they need to have their devices tested. The public Inspector list is helpful for water systems looking for an Inspector to contract with or to help them start their cross connection programs.

The complete list contains all names. The purpose of this list is to allow water systems to verify that individuals submitting test reports are certified Backflow Device Testers.

## ANNUAL SUMMARY REPORT

Annual Summary Reports are continuing to trickle in, but many are still missing. **All community water systems**, whether public or private, large or small, are required to submit this report. Community water systems that have not submitted this report need to get it in *as soon as possible!* If you need a new form or have questions about the report, call (503)731-4899, or use the Cross Connection Information Order Form to order a copy of the form.

## CROSS CONNECTION STAFF NOTES

After many years as cross connection secretary, Diane Weis is now administrative specialist, reporting directly to the program manager. We will miss her in the cross connection program, but the promotion she received was well deserved. A big thanks to Diane Weis for the great work she has done in the cross connection program!

**BOB WILLIS RECOGNIZED FOR SERVICE TO THE DRINKING WATER PROGRAM**

At the June meeting of the Drinking Water Advisory Committee, Bob Willis of the Portland Water Bureau was recognized for 10 years of service as Chair of the Committee. We all deeply appreciate Bob's service to the committee and to the Drinking Water Program. Thank you, Bob!

**CROSS CONNECTION INFORMATION**

**ORDER FORM**

To order copies of these documents:

- Check the box corresponding to the document(s) you would like to receive.
- Clearly print or type the address where the information is to be sent.
- Mail this coupon to:  
Oregon Health Division - Drinking Water Program  
PO Box 14450  
Portland, OR 97214-0450  
Attn: Diane Rumage

- Draft cross connection rule revision
- USCFCCHR 9th Edition test procedure for DCVA
- Approved Backflow Device List
- Annual Summary Report Form

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**LABELING CHEMICAL TESTS**

When you send your sample to the lab, please provide the source name and sample composition on the form that comes with the sample kit so your laboratory can include that information on the final report. If you don't provide it, they cannot produce a complete report and when reports are incomplete, we have to set them aside until we have time to call you. Sometimes they are sitting for quite awhile until we reach someone who can supply the missing information. This means that you are not getting credit for testing you may have done.

**DRINKING WATER ADVISORY COMMITTEE**

In June, the term expired for some of the members on the Advisory Committee. Following is a current list of members with their addresses, phone numbers, the associations they represent and the date their term expires. Doug Wise is the new Chairman.

Name and Address	Association	Phone	Term Expires
Jim Buckley Clackamas Co. Env. Hlth. 710 Center St. Oregon City OR 97045	Conference of Local Environmental Health Supervisors	655-8386 F:655-8350	6/98
Pat Curran Curran-McLeod, Inc. 6655 SW Hampton #210 Portland OR 97223	Consulting Engineers Council of Oregon	684-3478 F:624-8247	6/98
Connie Emmons 17725 SW Boones Ferry Rd Lake Oswego OR 97035	League of Women Voters	620-6111	6/97
Jason Green Pacific City Water District Box 88 Pacific City OR 97135	Oregon Association of Water Utilities	965-6636	6/96
Roger Jordan Dallas City Manager Box 67 Dallas OR 97338	League of Oregon Cities	623-2338 F:623-2339	6/96
Mike Kurtz, Mngr. Suburban East Salem WD 3805 LaBranch St. SE Salem OR 97301	Special Districts of Oregon	364-1620	6/99
Linda Marler Jefferson Co. Health Dept. 66 SE D St. #D Madras OR 97741	Conference of Local Health Officials	475-4456 F:475-4454	6/97
Gerry Meyer Douglas Co. Health Dept. 621 W. Madrone Roseburg OR 97470	Oregon Environmental Health Association	440-3500 F:440-3508	6/96
John W.T. Neilson Neilson Research Corp. 245 S. Grape St. Medford OR 97501	Assn. of Official Analytical Chemists	770-5678 F:770-2901	6/97
Thomas Penpraze Corvallis Public Works PO Box 1083 Corvallis OR 97339	Pacific NW Section, American Water Works Assn.	757-6916 F:757-6920	6/98
Mike Propes Commissioner, Polk Co. Courthouse Dallas OR 97338	Oregon Assn. of Counties	623-8173 F:623-0896	6/96
George White (alternate) City of Monmouth 151 W Main St. Monmouth OR 97361	Oregon Association of Water Utilities	838-2173 F:838-0725	6/96
Doug Wise Eugene Water & Elec. Bd. PO Box 10148 Eugene OR 97440	Large Water Systems	484-2411 F:484-3762	6/98
Vacant	Oregon Public Health Association		



Drinking Water Program, Oregon Health Division  
 Department of Human Resources  
 P.O. Box 14450  
 Portland OR 97214-0450

SECOND CLASS  
 POSTAGE  
**PAID**  
 PORTLAND OR

David E. Leland, Manager • 503 / 731-4010

## Training Calendar

### American Water Works Association:

Gary Deadmond/(503)635-0393  
 Sept. 12-14 NW Oregon Subsection  
 Short School, Clackamas  
 Community College

### Oregon Association of Water Utilities:

Dan DeMoss/(503)364-8269  
 Regulation Update  
 Sept. 13 Hood River  
 Oct. 18 Jefferson  
 Nov. 8 Pendleton

CLA-Valve  
 Sept. 6 Eugene

WD & WT Cert Review I, II  
 Oct. 3-5 Wilsonville

Activated Sludge  
 Oct. 11 Newport

Corrosion Control & People Mgt.  
 Oct. 24 Hood River  
 Oct. 25 Salem  
 Oct. 26 Roseburg

WWT & WWC Cert Review I, II  
 Nov. 1-2 Eugene

Small System O&M  
 Nov. 14-15 Tillamook

### Cross Connection/Backflow Courses

Backflow Management Inc. (B)  
 800-824-4385  
 Clackamas Community College (C)  
 (503) 657-6958 ext. 2364

Backflow Device Tester Course  
 Aug. 7-10 Medford (C)  
 Sept. 18-21 Oregon City (C)  
 Sept. 18-21 Portland (B)  
 Dec. 4-7 Portland (B)  
 Dec. 11-14 Oregon City (C)

Backflow Device Tester Update  
 Aug. 11 Medford (C)  
 Aug. 24-25 Coos Bay (C)  
 Oct. 13 Portland (B)  
 Oct. 20 Oregon City (C)  
 Nov. 2-3 Oregon City (C)

Nov. 10 Bend (B)  
 Dec. 8 Oregon City (C)  
 Dec. 8 Portland (B)  
 Dec. 15 Portland (B)

Cross Connection Inspector Course  
 Aug. 21-24 Portland (B)  
 Oct.30-Nov.2 Portland (B)  
 Nov. 13-16 Oregon City (C)

Cross Connection Inspector Update  
 Nov. 3 Portland (B)  
 Nov. 17 Oregon City (C)  
 Dec. 14 Portland (B)

### Water System Training Courses

Drinking Water Program, OHD  
 (503) 731-4317  
 Aug. The Dalles, Bend, Newport  
 Sept. Klamath Falls

**PIPELINE** is published quarterly free of charge by the staff of the Oregon Health Division, Drinking Water Section, 800 NE Oregon St., Portland OR 97232. Second Class postage paid at Portland OR. POSTMASTER: Send address changes to PIPELINE, P.O. Box 14450, Portland OR 97214-0450.