

**PART I REPORT -  
WALKERTON DISEASE OUTBREAK**

*by The Honourable Dennis R. O'Connor*

*The Walkerton outbreak in Canada (May 2000) sickened 2,300 people, and seven people died. The Part I Report of the official inquiry into the May 2000 waterborne disease outbreak was recently released. The Report was authored by the Honourable Dennis R O'Connor, Justice of the Court of Appeal for Ontario, Canada. The Background and Summary of Conclusions from that report are reproduced here. They illustrate what can happen when basic public health protections break down, and remind us why our collective attention to drinking water safety is so important. We encourage you to view the full report at [www.walkertoninquiry.com](http://www.walkertoninquiry.com). This is required reading for all drinking water professionals!*  
- Dave Leland, PE

**Background**

Until May 2000, there was little to distinguish Walkerton from dozens of small towns in southern Ontario. It is a pretty town, located at the foot of gently rolling hills, along the banks of the Saugeen River. Walkerton traces its history back to 1850, when Joseph Walker, an Irish settler, built a sawmill on the river, starting a settlement that adopted his name. In time, it became the county seat for Bruce County. The name survived an amalgamation in 1999, when Walkerton was joined with two farming communities to form the Municipality of Brockton. Walkerton has kept its small-town look and feel. Many of its 4,800 residents make their living from businesses that serve the surrounding farms.

In May 2000, Walkerton's drinking water system became contaminated with deadly bacteria, primarily *Escherichia coli* O157:H7. Seven people died, and more than 2,300 became ill. The community was devastated. The losses were enormous. There were widespread feelings of frustration, anger, and insecurity.

The tragedy triggered alarm about the safety of drinking water across the province. Immediately, many important questions arose. What actually happened in Walkerton? What were the causes? Who was responsible? How could

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**PROGRAM UPDATE**

*by Dave Leland*

**Operator Certification Rules Finalized**

The Oregon operator certification rules are now amended to meet the EPA Operator Certification Guidelines. This brings to successful completion an effort that began way back in 1998! The amended rules are now available on the website. Meeting the EPA guidelines made the following changes to the Oregon program necessary:

- Eliminated exemptions from certification for operators of small groundwater systems, and those systems supervised by registered Professional Engineers,
- Required that appropriately certified operators are present or available at all times that operational decisions are made that affect public health, and
- Eliminated the "Operator-in Training" designation, which allowed operators to write certification exams without meeting experience qualifications.

These changes are not trivial, and some water suppliers in Oregon will need to make adjustments to meet them. We understand that change will take time. We encourage each water supplier to evaluate their operational organization and certification status, determine their needs with respect to the new requirements, and begin to move toward meeting those needs. Change is already evident - record numbers of operators are writing the May exams and applying for initial certification.

We are working with the Drinking Water Advisory Committee to review suggestions received from water suppliers about the experience and education requirements, particularly with respect to Water Distribution

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this have been prevented? Most importantly, how do we make sure this never happens again?

The government of Ontario responded by calling this Inquiry. I have divided the mandate of the Inquiry into two parts. The first, which I refer to as Part 1, relates only to the events in Walkerton. It directs me to inquire into the circumstances that caused the outbreak - including, very importantly, the effect, if any, of government policies, procedures, and practices. The second, Part 2, goes beyond the events in Walkerton, directing me to look into other matters I consider necessary to ensure the safety of Ontario's drinking water. The overarching purpose of both parts of the Inquiry is to make findings and recommendations to ensure the safety of the water supply system in Ontario.

Because of their importance to the community, the hearings for Part 1 were held in Walkerton. Over the course of nine months, the Inquiry heard from 114 witnesses, including residents of the town, local officials, senior civil servants, two former ministers of the environment, and the Premier. The report summarized here outlines my findings and recommendations for Part 1 of the Inquiry.

The Part 2 process has also been completed, and I expect to deliver my report for Part 2 in approximately two months.

I would encourage those who are interested to read the report in full. For convenience, however, this summary provides a brief review, in point form, of my most significant conclusions.

### Summary of Conclusions

- Seven people died, and more than 2,300 became ill. Some people, particularly children, may endure lasting effects.
- The contaminants, largely *E. coli* O157:H7 and *Campylobacter jejuni*, entered the Walkerton system through Well 5 on or shortly after May 12, 2000.
- The primary, if not the only, source of the contamination was manure that had been spread on a farm near Well 5. The owner of this farm followed proper practices and should not be faulted.
- The outbreak would have been prevented by the use of continuous chlorine residual and turbidity monitors at Well 5.
- The failure to use continuous monitors at Well 5 resulted from shortcomings in the approvals and inspections programs of the Ministry of the Environment (MOE). The Walkerton Public Utilities Commission (PUC) operators lacked the training and expertise necessary to identify either the vulner-

ability of Well 5 to surface contamination or the resulting need for continuous chlorine residual and turbidity monitors.

- The scope of the outbreak would very likely have been substantially reduced if the Walkerton PUC operators had measured chlorine residuals at Well 5 daily, as they should have, during the critical period when contamination was entering the system.
- For years, the PUC operators engaged in a host of improper operating practices, including failing to use adequate doses of chlorine, failing to monitor chlorine residuals daily, making false entries about residuals in daily operating records, and misstating the locations at which microbiological samples were taken. The operators knew that these practices were unacceptable and contrary to MOE guidelines and directives.
- The MOE's inspections program should have detected the Walkerton PUC's improper treatment and monitoring practices and ensured that those practices were corrected.
- The PUC commissioners were not aware of the improper treatment and monitoring practices of the PUC operators. However, those who were commissioners in 1998 failed to properly respond to an MOE inspection report that set out significant concerns about water quality and that identified several operating deficiencies at the PUC.
- On Friday, May 19, 2000, and on the days following, the PUC's general manager concealed from the Bruce-Grey-Owen Sound Health Unit and others the adverse test results from water samples taken on May 15 and the fact that Well 7 had operated without a chlorinator during that week and earlier that month. Had he disclosed either of these facts, the health unit would have issued a boil water advisory on May 19, and 300 to 400 illnesses would have been avoided.
- In responding to the outbreak, the health unit acted diligently and should not be faulted for failing to issue the boil water advisory before Sunday, May 21. However, some residents of Walkerton did not become aware of the boil water advisory on May 21. The advisory should have been more broadly disseminated.
- The provincial government's budget reductions led to the discontinuation of government laboratory testing services for municipalities in 1996. In implementing this decision, the government should have enacted a regulation mandating that testing laboratories immediately and directly notify both the MOE and the Medical Officer of Health of adverse results.

Had the government done this, the boil water advisory would have been issued by May 19 at the latest, thereby preventing hundreds of illnesses.

- The provincial government's budget reductions made it less likely that the MOE would have identified both the need for continuous monitors at Well 5 and the improper operating practices of the Walkerton PUC.

- The Part 1 report contains some recommendations directed toward ensuring the safety of drinking water in Ontario. However, the majority of my recommendations in that respect will be in the Part 2 report of this Inquiry.

\* Just out—part 2 of the Walkerton Inquiry is now available at: [www.walkertoninquiry.com](http://www.walkertoninquiry.com)

## NEW MEMBRANE FILTER FOR YOUNGS RIVER LEWIS AND CLARK WD

by Kari Salis

Youngs River Lewis and Clark Water District (YRLCWD) serves 2500 people in Clatsop County, just south of Astoria. They use the North and South Forks of the Barney Creek as their water source and treated the water with chlorine but no filtration. In 1992, they were ordered to install filtration in accordance with the Surface Water Treatment Rule. YRLCWD experienced frequent turbidity spikes greater than 5 NTU, and boil water notices were so common that fold-down signs were installed on every road into the service area (see photo).



*Fold-down signs frequently advised residents to boil their unfiltered water when turbidity was high.*

In order to be approved in Oregon, membrane filters must be certified by a third party, and live cyst challenge studies must show at least 2-log removal for giardia and crypto. In December 2001, construction was completed on a Pall-Microza Membrane filter plant at YRLCWD. Up to 300 gallons per minute goes through a 100 micron strainer and then through one of 24 membrane filter modules, each containing 6500 membrane strands. The filters are backwashed every 12,000 gallons or more frequently if the



*Ric Saavedra, Treatment plant operator, in front of the membrane filter system.*

turbidity is high. Integrity testing is done weekly on each module. No chemicals are used except for an occasional chemical cleaning of the membranes, which happens when the transmembrane pressure reaches 30 psid. This system may require cleaning as little as once per year.

Particle counters and turbidimeters are present on the influent and effluent flows. Finished water turbidity is typically 0.02 NTU, and particle counters (set to measure anything above 0.2 micron) are usually 0. Water quality from the membrane filter is clearly far superior to the unfiltered water. The district has been able to remove their roadside boil water signs, and operation of the new plant is so simple that the operators can spend more time on other tasks. This is an excellent example of a new technology that can provide a significant public health benefit that is still cost-effective and operator-friendly.

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**PROGRAM UPDATE** (continued from page 1)

certification. The DWAC will identify any changes needed here to meet water supplier and operator needs while maintaining compliance with the EPA guidelines.

**Water System Security**

Security issues continue to command attention. Large water suppliers around the U.S. recently applied for available security grants from EPA, and will be using those funds to conduct security assessments of their water systems. This includes all six large water suppliers in Oregon. In Oregon, the first of our one-half day security workshops was held in Rockaway Beach in collaboration with the Oregon Association of Water Utilities. The focus here is on security related to small and medium-sized public water systems. Participants receive a copy of the "Water System Security-A Field Guide" recently published by the American Water Works Association. Look for five additional sessions around the state over the next year. Contact Kurt Putnam of the Drinking Water Program for more information (503-731-4317).

At the recent annual conference of the Pacific Northwest Section-American Water Works Association held in Eugene, security was the focus of a compelling keynote address by Jack Hoffbuhr, Executive Director of AWWA in Denver, Colorado. Jack promoted the "3 Cs" of security - culture, coordination, and communication. Collectively, we must install a sense of security into the culture of our water supply organizations as a core value. Security must be an important part of everyone's job, all the time. We must coordinate with others who play important roles in security, including public safety, emergency responders, public health officials, and the medical community. This coordination should be carried out through an up-to-date and practiced emergency response plan. Finally, we must communicate effectively with the public, media, and other agencies. Don't let the first communication be in a crisis! Good words of wisdom for all of us in the drinking water profession.

**Walkerton Outbreak Inquiry Findings**

Part One of the Report of the Walkerton Inquiry was recently published. The summary of conclusions is reproduced beginning on page 1 of this newsletter.

**Safe Drinking Water Information System (SDWIS-State)**

Program staff have been hard at work implementing the SDWIS-State data management system, developed by EPA for use by the state drinking water programs. This will replace our current system that has served us well, but is really past due for replacement and upgrade. SDWIS-State will significantly improve our capability to track compliance with the coliform regulations, at a full level of detail. So, it is now more important than ever for water suppliers to report on-time, and at the necessary level of detail. We have revised the coliform test result report form accordingly (see article on page 5), as well as the coliform summary report form. We are well into gearing up the chemical compliance module of the new database, beginning with nitrate monitoring schedules. As time goes on, more and more of the data you see presented on the website ("Data On-line") will be generated from SDWIS-State. Additional data system capabilities are contained in the next release of SDWIS-State, expected from EPA in early fall.

**2003 Legislature**

Key statutory and budget issues for the program and water suppliers are beginning to shape up for the 2003 Legislative Assembly. Discussions of agency budget requests are likely to have a particularly keen edge, given the state of the economy. Issues likely to reappear from the 2001 Legislature include expanding the drinking water program capacity to adequately implement and oversee all those new federal drinking water standards, and the direct reporting of water test results from labs to the program. Both of these issues relate to the findings of the Secretary of State Audit Report on the drinking water program, released during the 2001 session.

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## HOW TO FILL OUT A LAB SLIP

by Mary Alvey

1. **Public Water System ID#** - enter the ID number for the system being sampled
2. **Name of Water System** - enter the name of the system being sampled
3. **County** - enter the county where the water system is located
4. **Phone** - enter the phone number that the lab should call if they have questions about the sample or if they need to report a positive result
5. **Collection Date** - enter the date that the sample was collected
6. **Collection Time** - enter the time that the sample was collected, and circle either AM or PM
7. **Type of Sample** - mark the appropriate box
  - **Routine** - mark this box if the sample is a regular routine sample
  - **Repeat** - mark this box if the sample was collected because of a positive routine sample result (see #9)
  - **Special** - mark this box if the test results are not representative of water people are drinking. Results do not need to be sent to the Drinking Water Program. This could be used for samples collected after disinfecting a new water line or prior to reopening a seasonal facility
8. **Date of the initial positive** - if the sample was collected as a repeat, then enter the date that the positive routine sample was collected. Otherwise leave blank
9. **For Repeat samples** - indicate if this sample was collected at the same site as the positive routine, up stream or down stream from the routine site or other site
10. **Collected By** - enter the name of the person collecting the sample
11. **Sample Point** - enter a description of the sample location, such as "123 Main St., hose bib" or "Well #2, sample tap"
12. **Chlorinated?** - mark yes if the system is chlorinated, no if it is not
13. **Free Chlorine** - if the system is chlorinated, use a DPD test kit to measure the free chlorine residual at the site where the sample is collected, and enter the result. If the sample is being collected at a point before chlorination, leave this space blank
14. **Return Address** - enter the address that the test result is to be mailed to

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<p>Enter Public Water System ID # in boxes below:</p> <p>① <table border="1" style="display: inline-table; text-align: center; width: 150px; height: 20px;"> <tr> <td style="width: 20px;">4</td> <td style="width: 20px;">1</td> <td style="width: 20px;">1</td> <td style="width: 20px;">2</td> <td style="width: 20px;">3</td> <td style="width: 20px;">4</td> <td style="width: 20px;">5</td> </tr> </table></p> <p>Name of Water System: ② <u>CRYSTAL CLEAR WATER DIST.</u></p> <p>④ Phone <u>555-1234</u> County <u>FALLS</u> ③</p> <p>⑤ Collection date and time: <u>5</u> / <u>15</u> / <u>92</u> <u>10:35</u> <sup>a.m.</sup> / <u>35</u> <sub>p.m.</sub> ⑥</p> <p>⑦ Type of sample: <input type="checkbox"/> Routine <input checked="" type="checkbox"/> Repeat <input type="checkbox"/> Special *If repeat, date of initial positive <u>5-12-92</u> ⑧</p> <p>⑨ If repeat, location: <input type="checkbox"/> Upstream <input checked="" type="checkbox"/> Same <input type="checkbox"/> Downstream <input type="checkbox"/> Other</p> <p>⑩ Collected by: <u>JOE OPERATOR</u></p> <p>⑪ Sample point: <u>567 MAIN ST. HOSE BIB</u></p> <p>⑫ Chlorinated? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Free chlorine mg/l <u>0.8</u> ⑬</p>	4	1	1	2	3	4	5	<div style="border: 1px solid black; padding: 5px;"> <p><b>MICROBIOLOGICAL ANALYSIS</b> PUBLIC WATER SUPPLIES DRINKING WATER PROGRAM</p> </div> <p style="text-align: center;"><b>LABORATORY RESULTS</b></p> <p>Total coliforms: <input type="checkbox"/> Present* <input type="checkbox"/> Absent Fecal coliforms/<i>E.coli</i>: <input type="checkbox"/> Present* <input type="checkbox"/> Absent <small>*see back of pink copy for interpretation</small></p> <p>Test Methods: Total coliforms: <input type="checkbox"/> MTF <input type="checkbox"/> MF <input type="checkbox"/> P-A <input type="checkbox"/> CF Fecal coliforms: <input type="checkbox"/> EC E. coli: <input type="checkbox"/> CF <input type="checkbox"/> EC+MUG <input type="checkbox"/> Nutrient Agar + MUG <input type="checkbox"/> cytochrome oxidase/Beta-galactosidase</p> <p>*If repeat, sample ID of initial positive: _____ <input type="checkbox"/> Sample invalid: resample immediately</p>
4	1	1	2	3	4	5		
<p>⑭ Return address for report: <u>ATTN: JOE OPERATOR</u> Name <u>CRYSTAL CLEAR WATER DIST.</u> Address <u>P.O. Box 999</u> City, state, zip <u>SPRING CITY, OR 97123</u></p>	<div style="border: 1px solid black; padding: 5px;"> <p><b>Copy Distribution:</b> White: Lab Yellow: Dept. of Human Services Pink: Water System</p> <p>Form # 50-90 (Rev. 1/02)</p> </div> <p>Lab ID # _____ Sample # _____ Date &amp; time received: ____ Received by: _____ Date &amp; time analysis beg Comments:</p> <p><b>Invalidation reason:</b> <input type="checkbox"/> Leaked <input type="checkbox"/> Heavy non-coliform gr <input type="checkbox"/> Other _____</p> <p>Analyst: _____ Review by: _____</p>							
<p>Send results to: DHS-Drinking Water Program: P.O. Box 14350, Portland OR 97293-0350 Phone (503) 731-4381</p>								



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Drinking Water Program  
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**Oregon Association of Water Utilities**

(503) 873-8353

- Aug. 6 Water System Emergency Response Planning & Security
- Aug. 20 SDWA Update & Monitoring Requirements
- Sept. 23 Source Water Protection

**Cross Connection/Backflow Courses**

- Backflow Management Inc. (B)  
(503) 255-1619
- Clackamas Community College (C)  
(503) 657-6958 ext. 2388
- OAWU (O)  
(503) 873-8353

- Backflow Assembly Tester Course
- Sept. 16-20 Oregon City (C)
- Sept. 16-20 Portland (B)

Backflow Assembly Tester Recertification  
Sept. 27 Oregon City (C)

Cross Connection Inspector Course  
Jul. 22-25 Portland (B)

**Water System Training Course**

- Department of Human Services  
Marsha Fox/(503) 731-4899
- Jul. 30 Eugene
- Aug.\* Pendleton, Klamath Falls
- Sept.\* Bend
- \*Dates to be announced

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