WCWC Walkerton Clean Water Centre
An agency of the Government of Ontario

CWAE Centre de Walkerton pour l'assainissement de l'eau
Un organisme du gouvernement de l'Ontario

Statutory Standard of Care - Safe Drinking Water Act, 2002

Training for Municipal Drinking Water System Owners and Decision Makers

Walkerton Clean Water Centre 20 Ontario Road, PO Box 160 Walkerton, ON N0G 2V0

Training Materials

Materials developed by Advisory Group of Mayors, Councillors, Associations and Technical Experts

1) Presentation manual including supplementary and reference material

2) Guide - Taking Care of your Drinking Water - A Guide for members of Municipal Councils

- Both were developed by Advisory Group/MOECC/WCWC
- Aimed at junior councillors

Course Outline

Section 1 - Introduction

- Legislation, Responsibilities and Liabilities
- Multi-Barrier Approach to DW Treatment

Section 2 - Risk Management

- Contextual Risk Management Principles
- Common Risks Facing Drinking Water Systems

Section 3 - Case Studies

- Walkerton, North Battleford, Stratford

Section 4 - What Do I Do Now?

- Achieving a Culture of Prevention
- Training and succession planning

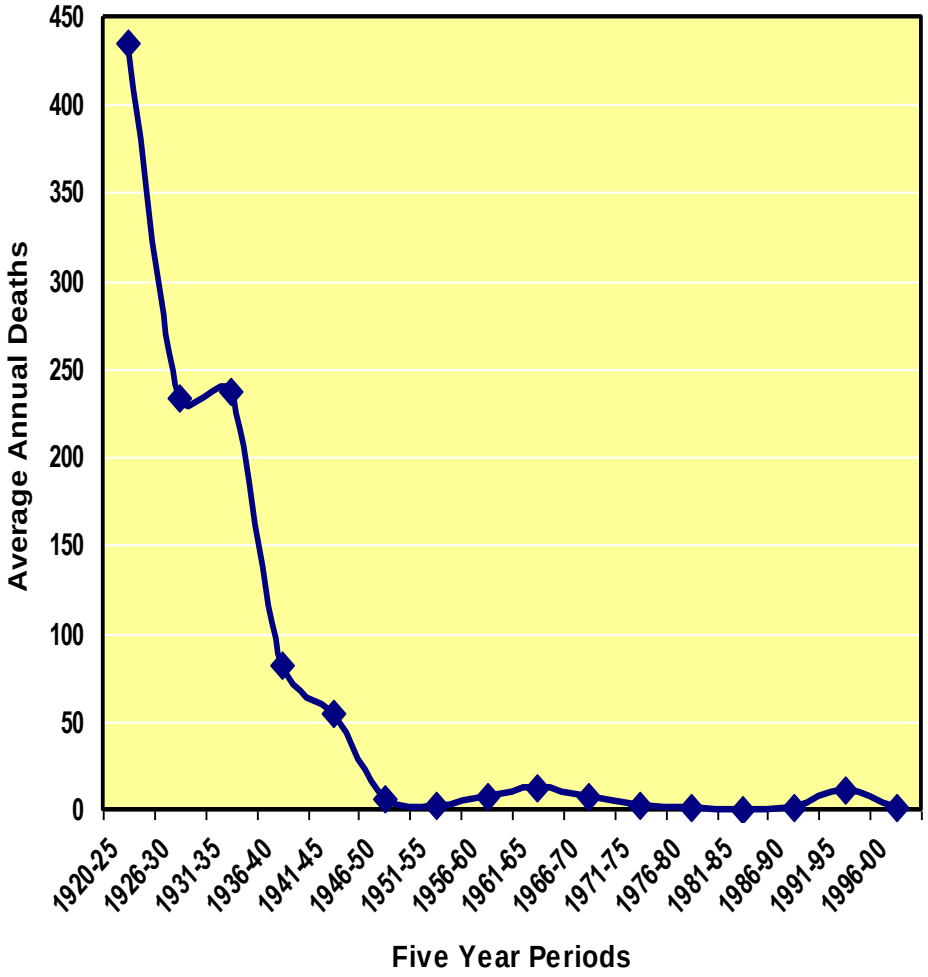
Introduction

- Some of the material for this course is from publications authored by Dr. Steve Hrudey
- Certificates for CEUs available - short test required
- Questions? - brian.jobb@wcwc.ca

Introduction

- Safe drinking water is vital to public health (case studies)
- Safe drinking water is also important for the economic health of a community
- Ontarians expect and are entitled to safe, high quality drinking water
- Municipal officials and councillors have a direct responsibility for ensuring safe, high quality drinking water

Annual Deaths from Waterborne Disease (US)



- Major progress in reducing risks from waterborne disease over the past 100 years
- Society expects clean, safe drinking water

Three Things to Remember

1. **It's your duty** to ensure safe drinking water

- The Statutory Standard of Care is part of the Safe Drinking Water Act, 2002
- It applies to those with decision-making responsibility for municipal drinking water systems or oversee the operating authority of the system:
  - Councillors, mayors, senior municipal officials
  - Legal consequences for failing to carry out the duty, including possible fines or imprisonment

Three Things to Remember

2. Be Informed

- You don’t have to be an expert, but you need to be informed
- You should be asking questions and getting answers
- Seek advice from those with expertise and act prudently on their advice

Three Things to Remember

3. Be Vigilant

- Complacency can pose one of the greatest risks to drinking water systems
- Never simply assume that all is well with the drinking water systems under your care
- The health of your community depends on diligent and prudent oversight

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Question 1

1. Aside from the Standard of Care, do owners have any oversight responsibilities related to their water systems?

    - ❑ Yes
    - ❑ No
    - ❑ Discuss

Section 11:
Duties of Owners & Operating Authorities

- Section 11 of the *Safe Drinking Water Act, 2002* (SDWA) describes the legal responsibilities of owners and operating authorities of municipal drinking water systems
- This has been in effect since 2002

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Section 11: Duties of Owners & Operating Authorities

Owners and operating authorities are responsible for ensuring their drinking water systems:

- meet drinking water quality standards
- are operated in accordance with the Act and its regulations
- are properly maintained
- are staffed and supervised by qualified persons
- comply with requirements for:
  - sampling, monitoring & testing, notification & reporting

SDWA Section 19: Your Duty and Liability

- Specific legal responsibility for decision-makers with authority over municipal drinking water systems
- Also applies to those who oversee the operating authority
- It requires the level of care, diligence and skill that a *reasonably prudent person would be expected to exercise* in a similar situation
- Honesty, competence and integrity required

Who does the Statutory Standard of Care apply to?

- The owner of the municipal drinking water system (typically the municipal corporation)
- If the municipal system is owned by a corporation (other than a municipality) every officer and director of the corporation
- If the system is owned by a municipality anyone overseeing the operating authority or with decision-making authority over the system

Enforcing the Statutory Standard of Care

- A provincial officer can lay a charge against a person to whom the standard applies
- Maximum penalties - $4 million fine and possible imprisonment for up to five years
- Actual penalties would be decided by the courts depending of the severity and consequences of the offence
- See section in the Guide

Safety Through the Multi-Barrier Approach

1. Source water protection
2. Effective treatment
3. Secure distribution
4. Effective monitoring
5. Effective management

- Developed for use across Canada by the Canadian Council of Ministers of Environment
- Failure in one barrier alone may not lead to an outbreak - Ontario's Drinking Water Safety Net

1. Source Water Protection

- Source protection focuses on preventing contamination and depletion of drinking water sources
- Looks at watershed as the basic unit of planning
- Is a locally driven multi-stakeholder process
- The province has funded the entire source protection planning process to date, providing over $240 million.
- The province is providing $13.5 million to small, rural municipalities to help them prepare for and implement source protection plans

1. Source Water Protection (cont'd)

- Several approved source protection plans are in the process of being implemented
- Municipalities will play a key role in implementation - municipalities are responsible for over half of the policies in the plans.
  - Resource Catalogue available through Conservation Ontario to support municipalities to implement education and outreach policies; developed by MOECC.

2. Treatment

- Treatment processes range from simple disinfection (secure groundwater) to highly specialized, complex technologies
- Critical role of treatment is removal and inactivation of pathogens
- Disinfection requirements specified for each facility
  - one of numerous SDWA requirements

3. Water Distribution & Storage

- Water will only be safe if quality is maintained to the consumer's tap
- Utilities are generally responsible for safety to the consumer's property line / plumbing system
- Old infrastructure increases risks; leaks can be an entry point for pathogens.
- 18% of waterborne disease outbreaks in the US were caused by distribution system deficiencies
- Critical to maintain a chlorine residual

4. Effective Monitoring

- Requirements for treated water quality compliance monitoring have increased significantly
  - Monitoring alone does not improve safety unless actions are taken in response
- Continuous monitoring of critical parameters (chlorine and often turbidity) is now required for most systems
- Alarms and automatic shut-down devices are also part of this barrier

5. Effective Management Systems

- Regulatory framework must be effective
  - Ontario takes swift, strong action on adverse water quality incidents
- Owner and management staff of the water system must provide effective oversight

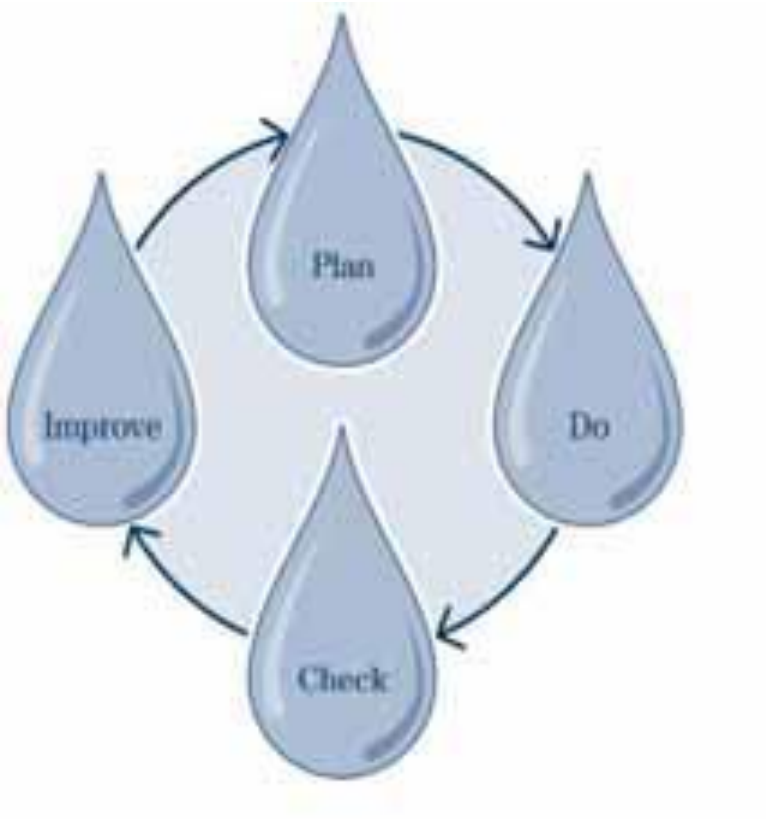
Section 2 - Risk Management

- Common risks for drinking water systems
- Reducing risk

Drinking Water Quality Management Standard – Your Operational Plan

The Operational Plan for your water system includes:

- Source water
- System description
- Risk assessment



What is Safe Drinking Water?

- Safety requires reduction of health risk to "*negligible*" levels

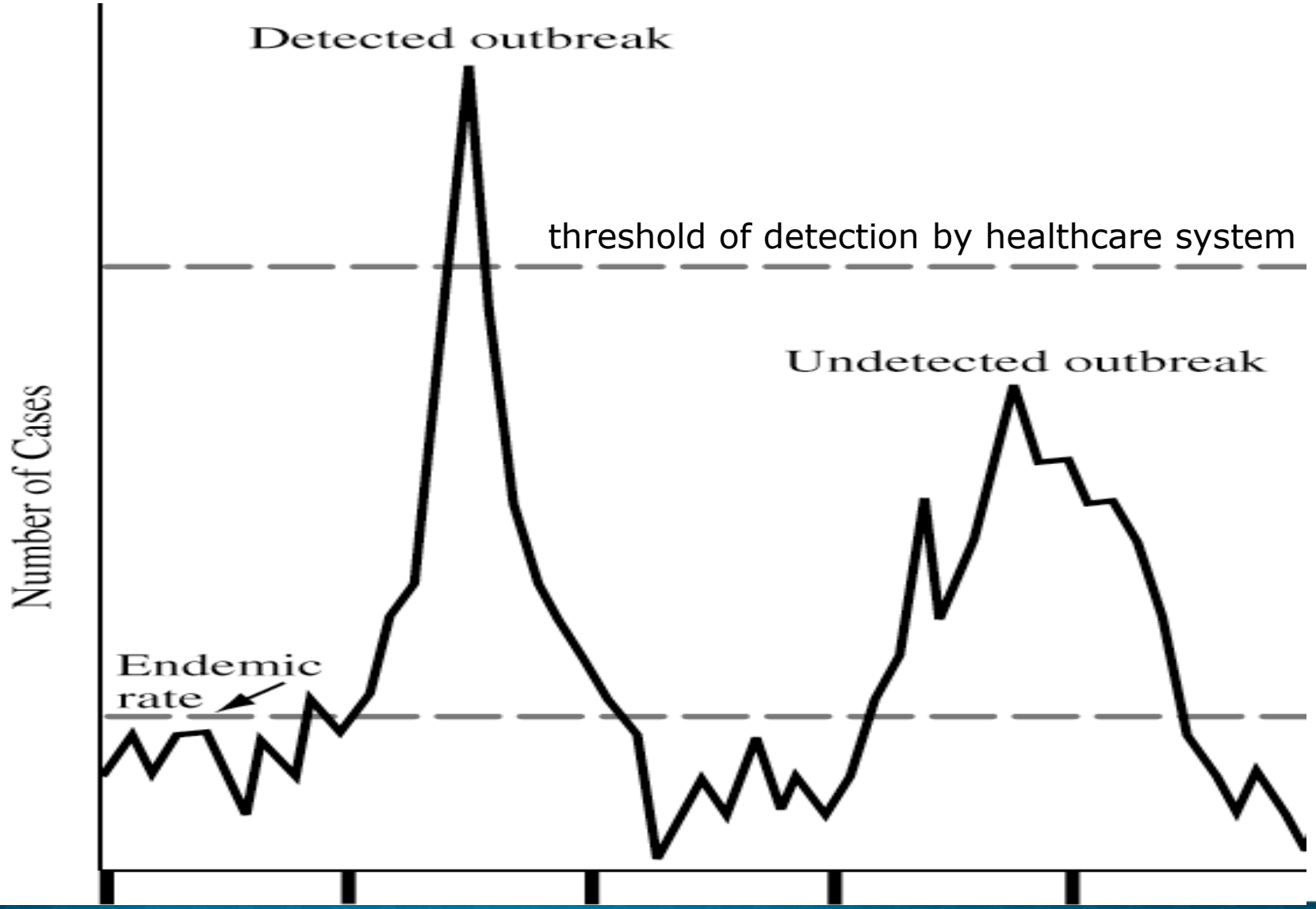
- A pragmatic concept (Hrudey & Krewski 1995):
  - *a safe level has been described as one that the average person does not need to worry about*

Question 2

2. Has the drinking water in my municipality ever made anyone sick?

- ❑ Yes
- ❑ No
- ❑ Don’t know
- ❑ Discuss

Most Waterborne Disease Outbreaks go Undetected



After Frost et al. 1996.

Hazards, Hazardous Events & Risk

- Hazard: agent that can cause harm to public health (physical, chemical, biological or radiological)
- Hazardous Event: event that introduces a hazard, or fails to remove them from the water supply
  - Heavy rainfall (hazardous event) may introduce a pathogen (hazard) into source water
- Risk: The likelihood of a hazardous event allowing a hazard to cause adverse consequences
  - Includes the probability of occurrence and severity of consequences

Guiding Principles in Reducing Risk

The following must be recognized:

I. Pathogens pose the greatest risk
II. Robust multiple barriers are essential
III. Trouble is usually preceded by change
IV. Operators must be capable and responsive
V. DW professionals must be accountable to consumers
VI. Good risk management requires informed decision-making

Question 3

3. Are there pathogens in the untreated source water for my drinking water system?

- ❑ Yes
- ❑ No
- ❑ Don’t know
- ❑ Discuss

I. Pathogens Pose the Greatest Risk

- Pathogens cause human disease; with most other contaminants the outcome is less certain
- Pathogens are everywhere humans and animals are found
- Pathogen sources are never far from water sources
- Pathogens can be removed or inactivated

Pathogen Summary (WHO 2004)

Pathogen	Type	Persistence in water	Resistance to chlorine	Important animal source?
Norovirus	virus	**Long**	Moderate	Potentially
Campylobacter	bacteria	Moderate	Low	Yes
E.H. *E. coli*		Moderate	Low	Yes
Giardia	protozoa	Moderate	Moderate	Yes
Cryptosporidium		**Long**	**High**	Yes

I. Pathogens Pose the Greatest Risk

- Lesser Risks
  - High levels of arsenic, fluoride, selenium, nitrate and lead pose a risk to human health
  - Many toxic chemicals (pesticides) can pose site-specific problems, but
    - they are not common
    - health risks are unclear; precautionary standards
  - Regulations must be met!

II. Robust Multiple Barriers Are Essential

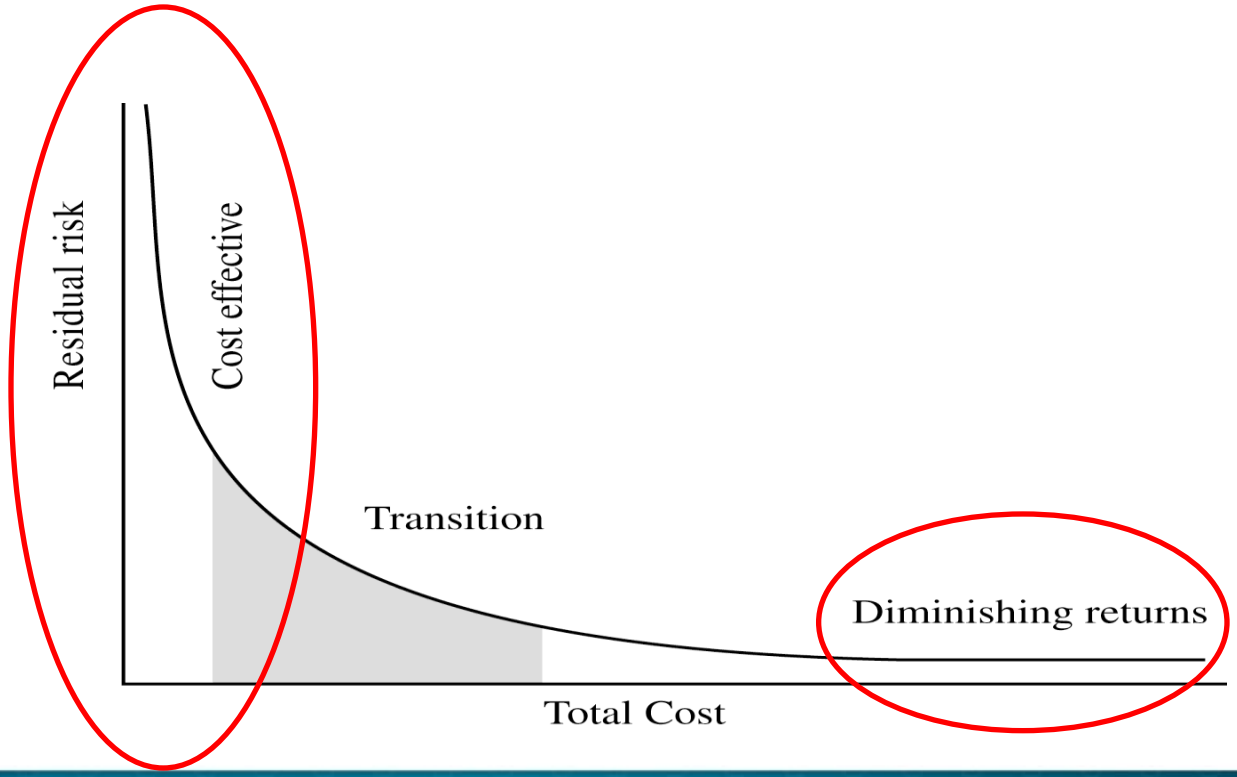
- Human error is inevitable and nature can be unpredictable
- Multiple barriers help to reduce risks of contamination to negligible levels
- Multiple barrier concept has been advocated for many decades
- Focus on optimizing barrier performance, not just compliance

II. Robust Multiple Barriers Are Essential

- Multiple barriers may seem redundant
- Municipal officials and senior managers are generally sensitive to costs
- Multiple barriers are cost-effective if negligible risk (i.e. safe drinking water) is the goal
- Risk reduction is always linked to cost
  - e.g. effective protection of drinking water at the source may reduce long-term costs associated with treatment

II. Robust Multiple Barriers Are Essential

- Greatest risk reduction per unit cost occurs with initial risk reduction, followed by diminishing returns



III. Trouble Usually Preceded by Change

- Treatment processes generally function best under constant conditions
- ~70% of outbreaks have occurred after extreme weather (heavy rainfall, unusual conditions)
- Extra vigilance required when changes in process or operations occur
- Operators must know how to predict and react to problems - generally accomplished through training

IV. Operators Must be Capable & Responsive

- Blaming human error is as helpful as blaming a fall on gravity
- People make mistakes; systems must be made resilient
- Competent, well-informed and dedicated operators are the best guarantee of water safety
- Best operator is one who admits that failure could happen
- All parties need to learn from past mistakes and failures elsewhere

IV. Operators Must be Capable & Responsive

- Ontario's operator certification regulation has dramatically improved competency of operators
- Ineffective training and support will prove to be a mistake if disaster strikes
- Small systems present special challenges
- Programs to provide support for isolated small system operators are critical
- Systems without full-time operators need to establish contact with external resources

V. Drinking Water Professionals Must be Accountable

- Promote a culture of identifying trouble, not hiding or avoiding it
- Listen to consumer complaints (many outbreaks are signaled by consumer complaints)
- Management must document incidents to maximize opportunities to learn from the past
- Management staff must support operators and inform the owner

VI. Risk Management Requires Informed Decision-Making

- Effective risk management requires:
  - being preventive rather than just reactive
  - distinguishing greater risks from lesser ones
  - deal first with greater risks
  - learn from experience

- Sensible decisions depend on a commitment to understanding your system

Risk Management Summary

- Your Operational Plan has an assessment of the risks to public health
- Understand the risks for your utility and the actions that are being taken

Section 3 - Case Studies

Water-related Disasters:

- Disease outbreak in Walkerton, ON
- Disease outbreak in North Battleford, SK
- Distribution system contamination in Stratford, ON

Analysis of failures of the multi-barriers

Case Study 1

Walkerton May 2000

Scope of Outbreak

Walkerton, 2000

- A shallow groundwater well was heavily contaminated by bacteria from cattle manure from a local farm
- More than 2300 individuals were estimated to have illness, caused by the bacteria *E. coli* O157:H7 (60%) and *Campylobacter* spp. (40%)
- 65 were hospitalized, 27 developed hemolytic uremic syndrome (HUS) and 7 died
- A $9 million public inquiry led by Justice Dennis O'Connor was called to:
  - Determine the causes
  - Recommend actions

The Events of May 2000

- Walkerton experienced heavy rains during the 2nd week of May 2000
- Lab spoke to the General Manager (GM) to advise that water samples failed
- Failed test results also faxed to GM
- On three occasions, GM assured Health Unit that the water test results were OK
- The first (of 7) victim died the 3rd week of May 2000

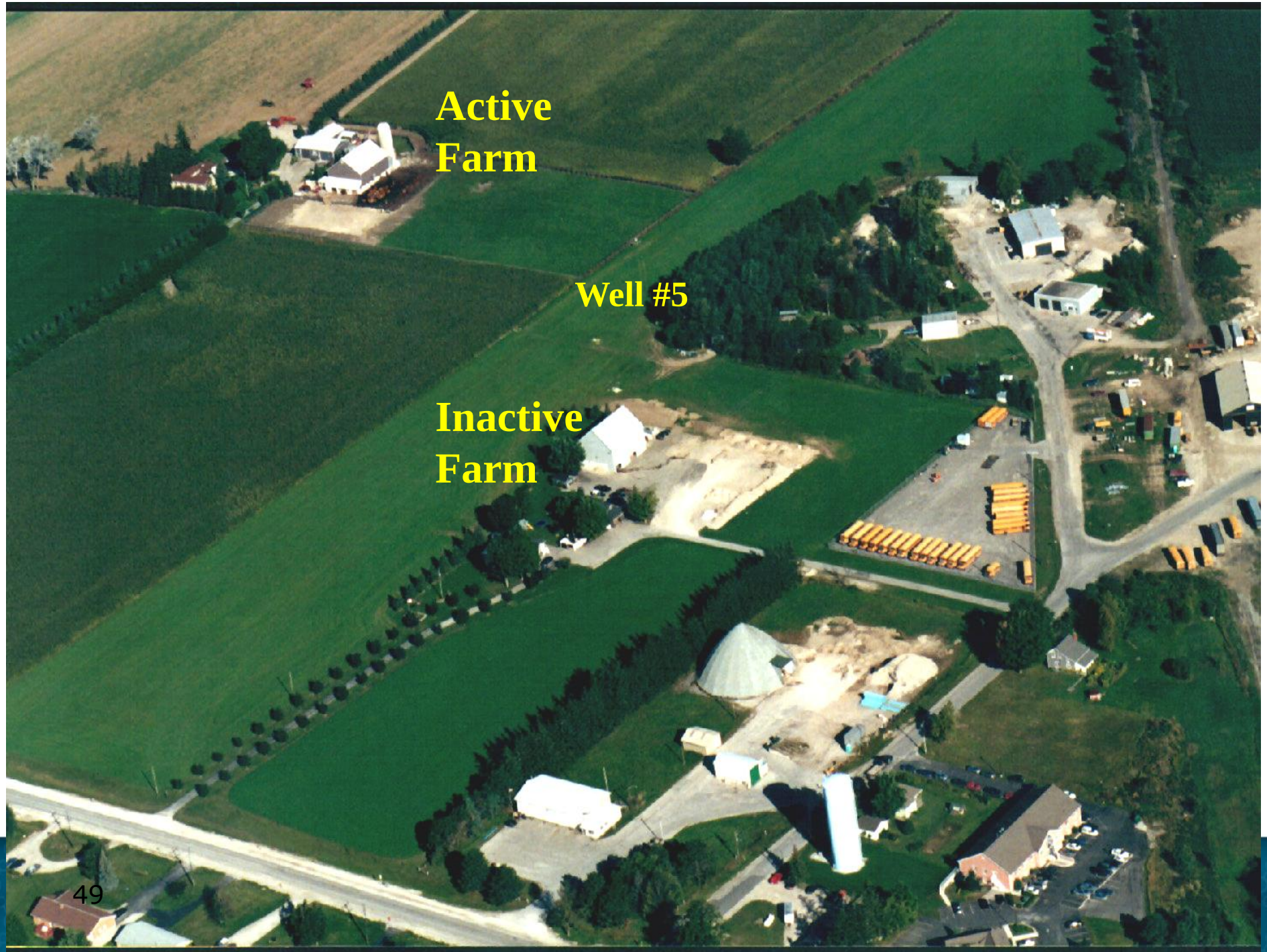
Saugeen River, Walkerton before & during storm

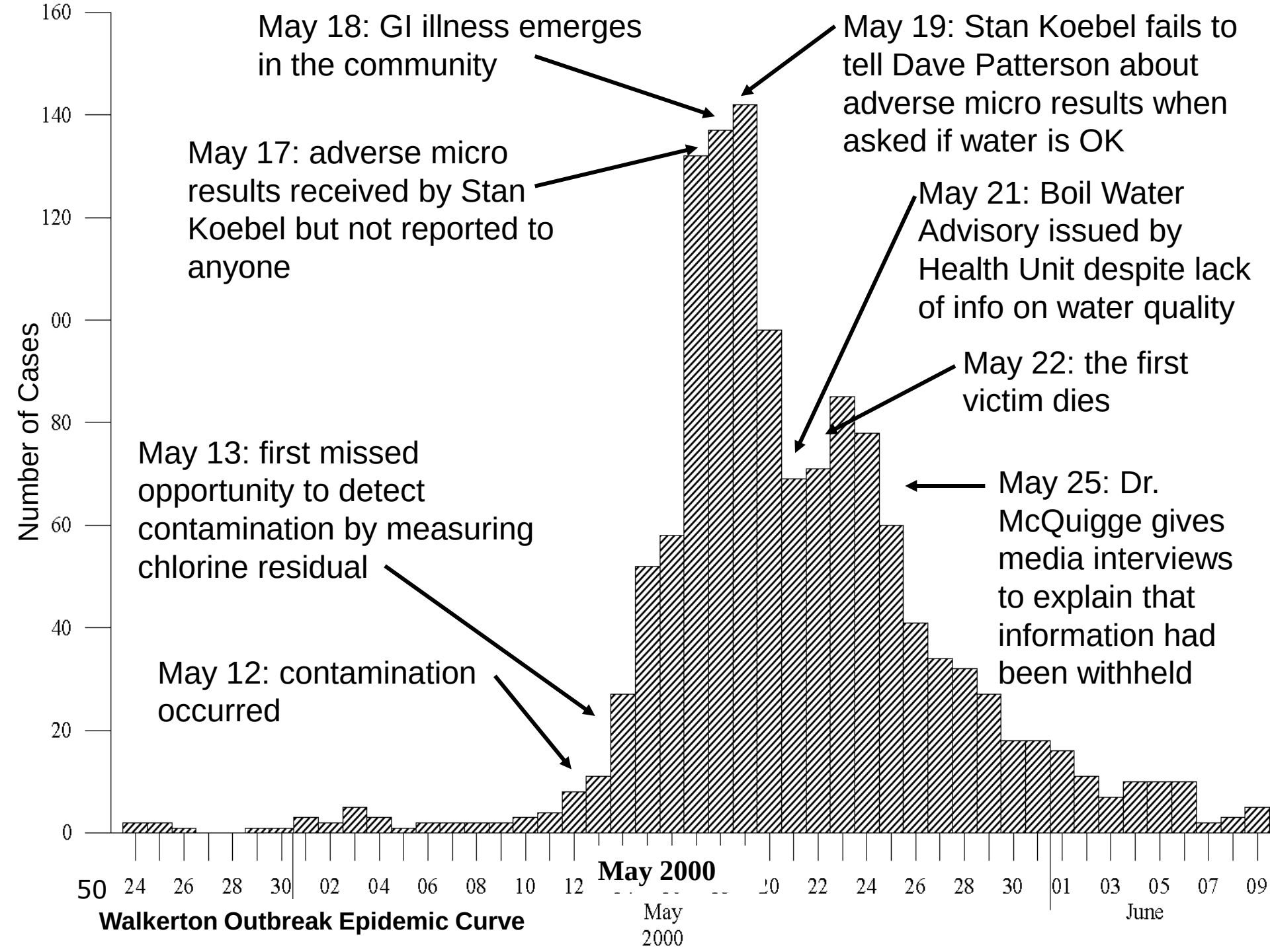
Photos by George & Susan Magwood, Walkerton

Causes of the Outbreak

Walkerton, 2000

- Well 5 (commissioned in 1978) was contaminated during the initial and subsequent testing
- Despite problems, no MOE inspections in the 1980s
- DNA analysis of bacteria from human victims matched with manure samples from the farm
- Chlorine (disinfection) was not being applied properly
- Investigation showed that water levels in nearby surface ponds dropped when Well 5 was operating
- Well 5 was used to obtain soft water at low cost


Active
Farm
Well #5
Inactive
Farm



Walkerton Outbreak Epidemic Curve

Summary Analysis of Failures
Walkerton, 2000

1. Source Water Protection
   - Well 5 was known to be contaminated 22 years before the outbreak
   - Geology of Well 5 made it highly vulnerable to surface contamination:
     - Clear indicators of vulnerability were ignored

Summary Analysis of Failures
Walkerton, 2000

2. Treatment
   - Chlorine is needed for disinfection – only treatment step for this system
   - Operators did not measure chlorine residual properly
   - Chlorine dosing was inconsistent and less than required

Summary Analysis of Failures
Walkerton, 2000

3. Distribution & Storage

   – Many distribution and storage vulnerabilities found but none were significant contributors to outbreak

Summary Analysis of Failures
Walkerton, 2000

4. Monitoring
   - Daily chlorine residual was not done or was done improperly (always 0.5 or 0.75 mg/L)
   - Monthly samples were often intentionally mislabelled
   - Laboratory reported microbiological contamination to GM only (not to the Health Unit)

Summary Analysis of Failures

Walkerton, 2000

5. Management
   - Owner (Council/PUC) did not provide sufficient oversight – previous bad samples and issues raised by MOE
   - Falsified data and lack of staff training
   - System not maintained
   - Regulator failed in oversight role in terms of inspections/approval of well 5 and not following up on identified problems

Concluding Thoughts

Walkerton, 2000

- O'Connor Inquiry - "failure at all levels"
- Complacency was evident at most levels
- Multiple factors came together to cause disaster
- Well 5 had been vulnerable for 22 years
- Outbreak could have been reduced or prevented by measuring chlorine residual and responding appropriately

Concluding Thoughts

Walkerton, 2000

- Microbiological contamination should have been reported to the Health Unit and the Ministry of the Environment (now required)
- Estimated cost of outbreak - $72 million
- Approximate cost of system upgrades - $10 million

Question 4

4. How would you have acted differently than the council in Walkerton?

- ❑ Discuss

Case Study 2

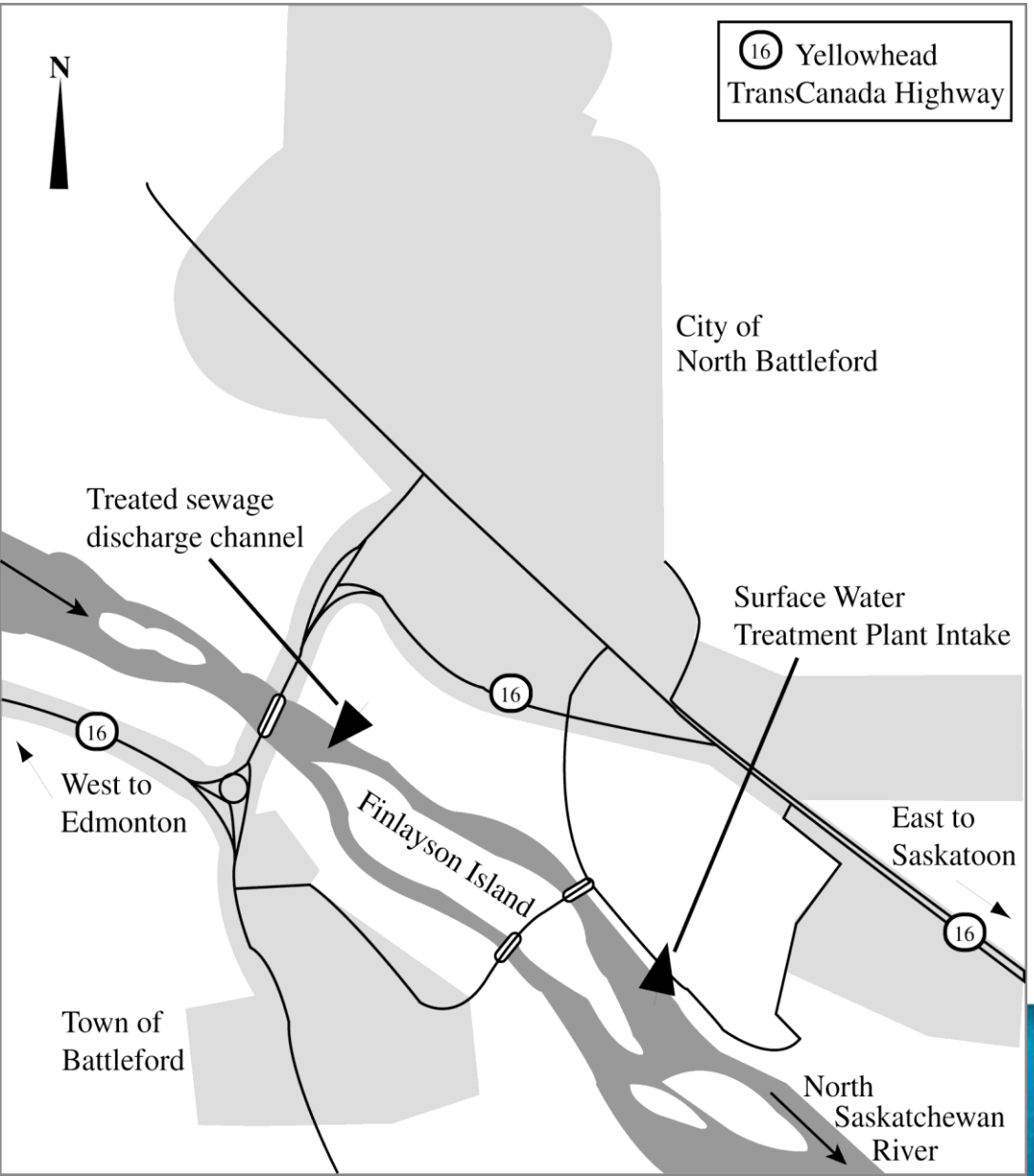
North Battleford SK, March/April 2001

Scope of Outbreak

North Battleford, 2001

- In spring 2001, the raw water serving the City of North Battleford (pop. ~15,000) was contaminated by the protozoan parasite *Cryptosporidium*
- *Cryptosporidium* originated in the City's sewage outfall ~3.5 km upstream of the intake
- An estimated 5,800 to 7,100 in the region experienced illness
- A public inquiry by the Honourable Robert Laing was called to investigate the causes of this outbreak

The North Battleford Water System



- N. Saskatchewan River source known to have high levels of *Cryptosporidium* in spring thaw (manure from cattle operations)
- The water intake was ~3.5km downstream from the City's sewage outfall


sewage outfall
North Saskatchewan River
drinking water intake

Events in North Battleford

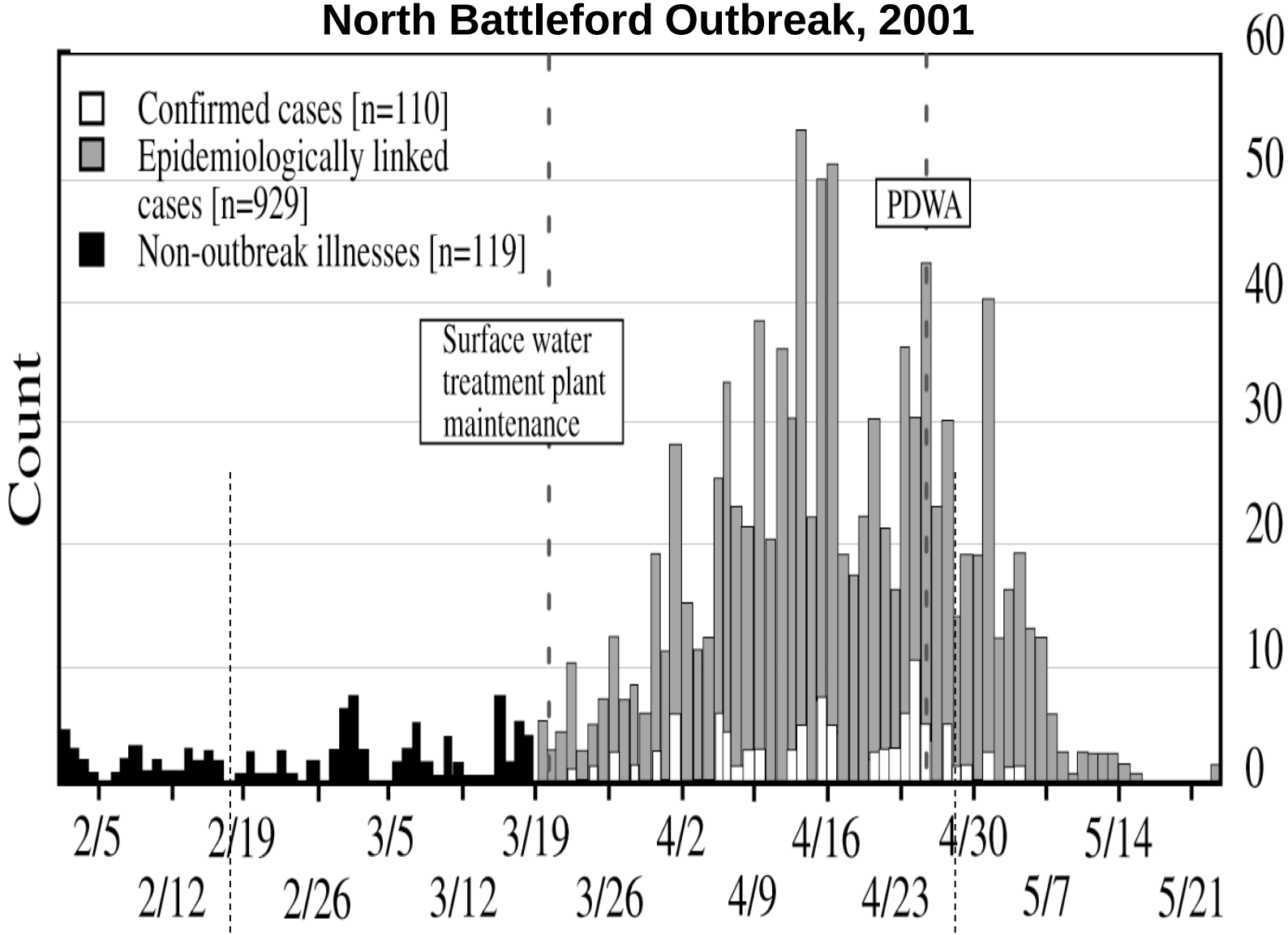
- History of sewage treatment problems and influence of sewage on water treatment plant
- Boil water advisory called in September 2000 due to coliform bacteria and low chlorine residual
- Plant Foreman retires and inexperienced operators performed poorly-timed maintenance in March 2001

Direct Causes of the Outbreak

North Battleford, 2001

- The plant Foreman retired in December 2000, after a previous stress leave
  - Unable to convince management to invest in sewage and water treatment upgrades
- The water treatment plant used chlorination (ineffective for *Cryptosporidium)* so particle removal the only potential safety barrier
- Improper repair by junior staff compromised particle removal

North Battleford Outbreak, 2001



Direct Causes of the Outbreak

North Battleford, 2001

- Direct cause - sewage contamination of raw water
- *Cryptosporidium* in sewage increased as outbreak emerged, further contaminating the source
- Operations were inadequate but operators were trying to improve practice and reduce risks
  - Council and senior management rejected attempts at improvement
- Regulatory neglect by the province

Summary Analysis of Failures
North Battleford, 2001

1. Source Water Protection
   - No watershed protection program
   - Long history of poor sewage treatment practice (warnings dating back to 1963)
   - No action taken on past problems
   - The city continued to dispute the sewage theory even after it was essentially proven

Summary Analysis of Failures
North Battleford, 2001

2. Treatment
   - Chlorination alone not adequate for a raw water contaminated by *Cryptosporidium*
   - Timing of equipment repair was poor
   - Poor particle removal (for weeks) should not have been tolerated
   - Inexperienced operators did not understand the limitations of their treatment system

Summary Analysis of Failures

North Battleford, 2001

3. Distribution and Storage

   - No deficiencies noted

4. Monitoring

   – Operators did not perform tests required to optimize treatment processes
   – Operating procedures were outdated
   – Lack of experience and training!

Summary Analysis of Failures

North Battleford, 2001

5. Management

   – Owner failed to provide sufficient resources to run the system

   – Regulatory neglect

   – Poor communications between public health, the city and the province

     • This delayed identification of outbreak and the issuing of a boil water order

Concluding Thoughts

North Battleford, 2001

- As with the Walkerton case study, the inquiry revealed failure at all levels
- Unlike the Walkerton case study, there was evidence that operators were trying to improve water safety but were frustrated by management and council
- There was little evidence that lessons had been learned from previous failures

Concluding Thoughts - North Battleford, 2001

- The Canadian Environmental Law Association: "*…the people of North Battleford were let down..*"
- Refusal to spend money on the system, <u>despite large contingency fund</u>
- Provincial government was aware of problems, but hadn't inspected the plant in ten years
- Inexperienced operators were unable to heed the warning signs
- Out-of court settlements totaling $3.2 million - Improvements to the water system cost $600,000

Question 5

5. As a councillor in North Battleford, is there anything I could have done to prevent the outbreak?

- ❑ Discuss

Case Study 3

Stratford ON, March 2005

Cross-Connection Event

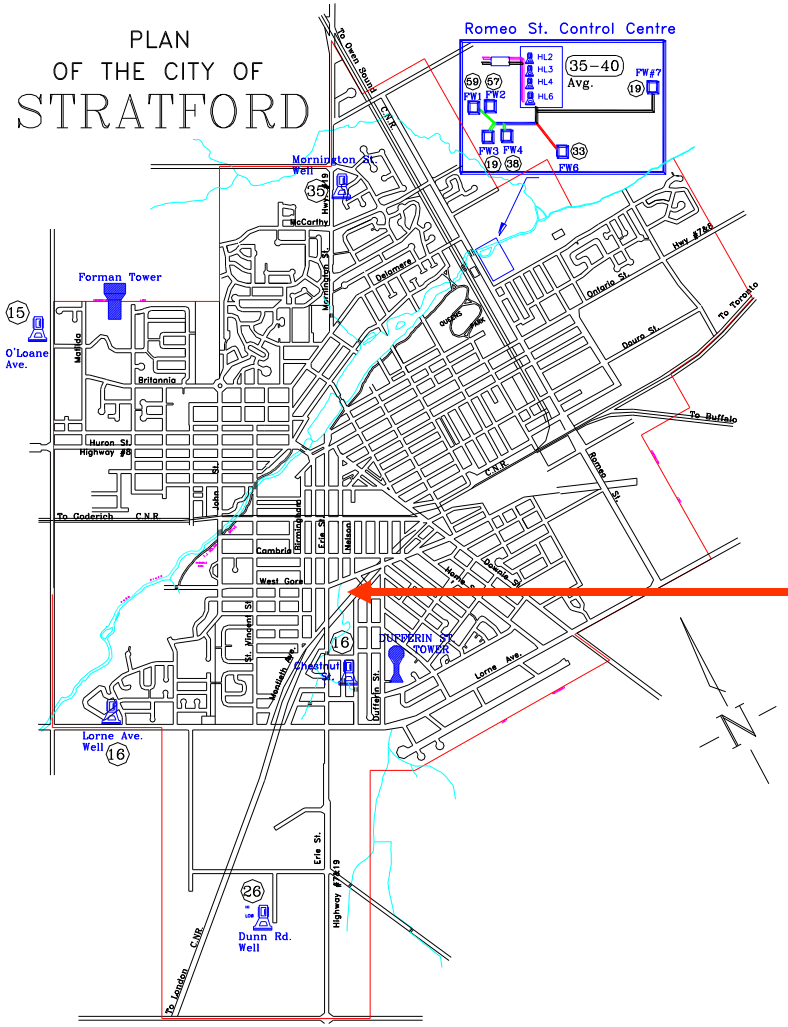
Stratford

ONTARIO CANADA

Dramatically Different!

Key Events – The First 70 Minutes

- *10:20 a.m.* – Call into City Water Division “Pink foaming water from Tap”
- *10:30 a.m.* – Water supervisor confirms
- *11:00 a.m.* – Visit Adjacent Car Wash and shut off water. MSDS Obtained
- *11:07 a.m.* – Call Health Unit and MOE
- *11:30 a.m.* – Commence Flushing Hydrants

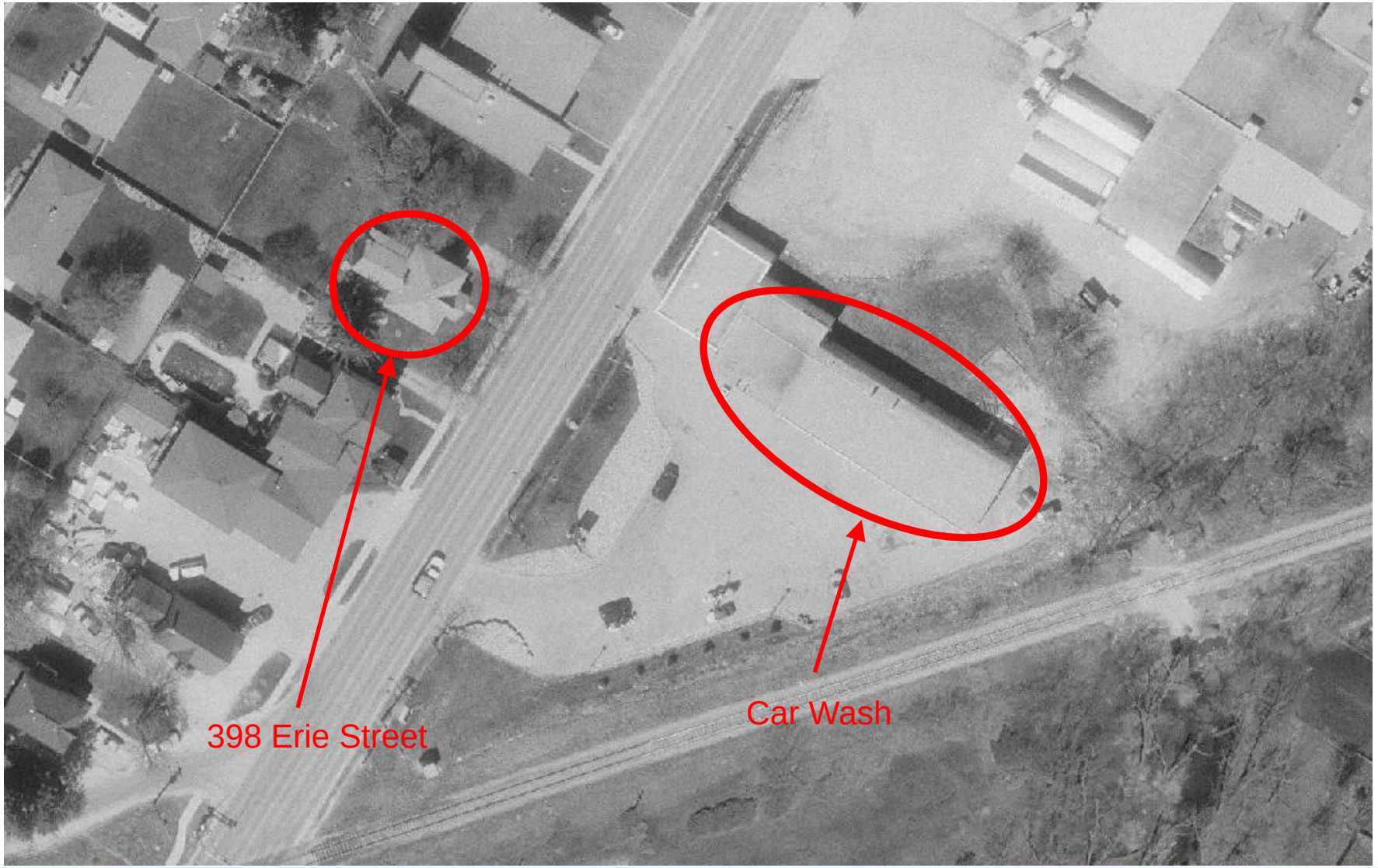


Population – 32,000

11 Wells

2 Elevated Tanks

Car Wash


398 Erie Street
Car Wash

Key Events – The Next 90 Minutes

- *11:40 a.m.* – Meeting with City, Health Unit, MOE
- *12:00 noon* – Drinking Water Advisory Issued
- *12:00 noon* – Emergency Plan called out
- *1:00 p.m.* – Emergency Control Group convenes
- *1:00 p.m.* – Call Stratford restaurants
- *1:00 p.m.* – Call to arrange alternative water supply

MEDIA RELEASE **OFFICE OF THE MAYOR**
THE CORPORATION OF THE CITY OF STRATFORD
CITY HALL, 1 WELLINGTON STREET, P.O. Box 818
STRATFORD, ONTARIO N5A 6W1
Tel: [519-271-0250 (ext. 267)] Fax: [519-271-2783]

FOR IMMEDIATE RELEASE: March 7, 2005, 12:00pm

DRINKING WATER ADVISORY FOR CITY OF STRATFORD

Stratford-A Drinking Water Advisory is in effect for the City of Stratford. The Ministry of Environment and public utilities are working on the problem. The Advisory is due to a spill into the system.

Until further notification, all residents of Stratford are urged NOT TO CONSUME THE WATER. As well, residents should not feed the water to pets, or use the water for bathing or washing.

Residents will be told when the problem is solved. The Medical Officer of Health, or a Public Health Inspector, is the only person who can lift this advisory.

If you are sick, seek medical assistance by going to Stratford General Hospital.

The City of Stratford will be supplying drinking water to residents. More information will be released as it becomes available.

Water Emergency Statistics

Duration of water emergency: **56 hours**

Number of volunteers (not staff): **80 (640 hours)**

Number of flyers delivered: **(13,161 addresses x 4)**

Number of home water deliveries to residents: **391**

Bottled water**: 24,192 cases**

Bulk water: **199,584 liters**

Staff hours at water depots: **825**

Cost to the City after 56 hours: **$188,000**

Web-site hits during Advisory: **4506** (**usually 500/mo**)

Summary Analysis of Failures

1. Source Water Protection

   - Stratford's drinking water supply consists of 11 groundwater wells
   - Samples from all wells were routinely tested and met all MOE requirements
   - This contamination was not the result of a problem with source water contamination

Summary Analysis of Failures

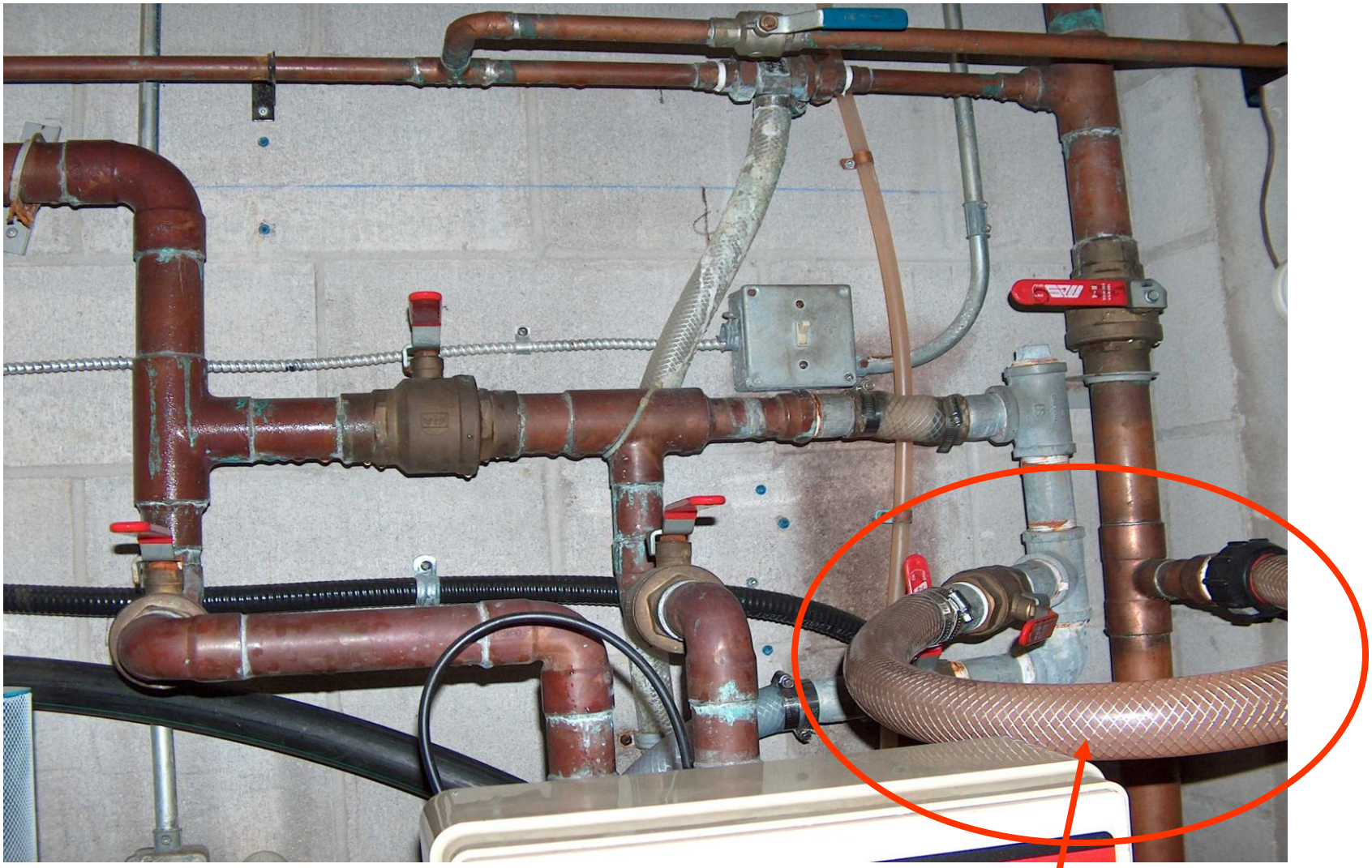
2. Treatment

   - Stratford uses chlorination for disinfection
   - No other treatment is required due to high quality groundwater
   - This contamination was not the result of a problem with the treatment process

Summary Analysis of Failures

3. Distribution & Storage

- This contamination was the direct result of an illegal cross connection at a car wash facility
- Detergent was inadvertently pumped into the municipal water supply because backflow prevention equipment was not installed
- The City of Stratford had a backflow prevention by-law in place that required backflow prevention equipment



Booster Pump 80 PSI
City Pressure 65 PSI

Cross Connection

Summary Analysis of Failures

4. Monitoring
   - Monitoring activities were not implicated in this contamination event
   - The monitoring program was utilized to help determine when the drinking water was safe for consumption

Summary Analysis of Failures

5. Management

- Backflow prevention devices are “plumbing” devices and are not regulated under the Safe Drinking Water Act, 2002
- City Council had implemented a backflow prevention by-law in 2004
- Enforcement of backflow prevention by-laws is challenging but critically important

BY-LAW NUMBER 50-2004

OF THE CORPORATION OF

THE CITY OF STRATFORD

BEING a By-law to regulate the supply of safe and wholesome water to the citizens in the City of Stratford (Cross Connection By-law).

Question 6

Does your municipality have a backflow prevention by-law in place?

- ❑ Yes
- ❑ No
- ❑ Don’t know
- ❑ Discuss

Concluding Thoughts – Stratford 2005

- Guidance Document available:

A Guide for Drinking Water System Owners Seeking To Undertake a Backflow Prevention Program
PIBS #9676e

Summary - Case Studies

- Fecal contamination, pathogens and potential contaminants are everywhere
- Some pathogens are difficult to treat - *Cryptosporidium* seemed like an obscure risk until the 1993 Milwaukee outbreak
- Complacency can arise because waterborne outbreaks are relatively rare
- Relaxation of vigilance can lead to disaster

Summary - Case Studies

Distribution systems are vulnerable because:

- They are generally not visible
- Leaks in distribution system pipes can allow contaminants and pathogens to enter the system
- Cross connections can pose a risk, even if backflow prevention by-laws are in place

Section 4 - What Next?

Practical steps you can take to help ensure effective oversight

Achieving a Culture of Prevention

- Ensure good internal and external communications
- Promote a mentality of continuous improvement
- Promote the understanding of the entire system
  - Challenges and especially limitations
- Always maintain robust multiple barriers from source to tap
- Commitment to learning from past mistakes

Achieving a Culture of Prevention

- Enable recognition of new risks and threats by operational staff (training)
- Ensure that all staff understand that they are entrusted with protecting public health
- “Operational personnel should be given the status, training and compensation comparable with their responsibilities as guardians of the public’s health” (Justice O’Connor)
- Provide sufficient resources

Question 7

If we have a modern drinking water plant should we be concerned about the safety of our drinking water?

- ❑ Yes
- ❑ No
- ❑ Don’t know
- ❑ Discuss

Waterborne Disease Outbreaks

- Milwaukee Wisconsin experienced a massive waterborne disease outbreak in March & April 1993
- Two modern plants with full conventional treatment
- More than 400,000 cases of *Cryptosporidium*, 4,400 hospitalizations and 50 deaths
- Waterloo, Ontario also experienced a *Cryptosporidium* outbreak at the same time

Waterborne Disease Outbreaks

- 48 confirmed and documented waterborne disease outbreaks in Canada between 1993 and 2008
- 288 definite, probable and possible waterborne disease outbreaks in Canada between 1974 and 2001

MOECC Inspections

- Municipal residential drinking water systems inspected annually by MOECC
- Inspection includes:
  - Source water
  - Treatment processes
  - Distribution components
  - Water quality monitoring procedures and practices

MOECC Inspections

- An inspection report will highlight areas of non-compliance and required corrective actions
- The report includes an inspection rating to compare current and past performance and areas for improvement
- Review this report and the actions being taken to respond
- Summary reports and annual reports are also required for municipal systems

Training and Succession Planning

- Ensure that operational staff receive meaningful training - confirm that you have a training plan
- Training may need to go beyond regulated CEU requirements to address operator needs
- A large number of licensed operators in Ontario will be eligible to retire over the next 5 years
- It will take several years to train a new operator - you may need a succession plan

Summary - What Should You Do?

- Foster Competence
- Eliminate Complacency
- Instil a Culture of Prevention
- Learn from Past Mistakes
- Emphasize Good Practice
- Promote Continuous Improvement
- Provide Sufficient Resources

3 Things to Remember

- It’s your duty
- Be informed
- Be vigilant

Thank You!

Questions?

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Additional Reference Materials

- Ontario.ca
- Health Canada
- Walkerton Clean Water Centre Courses www.wcwc.ca
- USEPA
- AWWA
- WHO
- New Zealand Ministry of Health
- Australian Drinking Water Guidelines

Questions you should be able to answer

- Are you confident that your operational personnel fully understands your drinking water system?
- Is there any historic evidence of waterborne disease outbreaks?
- Have you ever had any adverse results and if so have corrective actions been taken?
- Do you have a process for responding to and following up on consumer complaints?
- Do you know basic information about drinking water safety and the operation of water works facilities?

Questions you should be able to answer

- Is your treatment process effectiveness affected by heavy rainfall and/or snowmelt?
- Do you talk/meet regularly with the local health unit?
- Is your source water susceptible to contamination?
- Do your operators have trouble with the treatment process in the spring and/or fall?
- Are you acquainted with the drinking water legislation and regulations?
- Do you know the minimum standards for drinking water?

Questions you Should be Able to Answer

- Are you familiar with your municipal drinking water systems - have I had a tour?
- Do I know how to set the overall policy direction for the municipal drinking water system?
- Do I understand the different roles and responsibilities of decision-makers:?
  - Mayors and municipal councilors
  - Senior management
  - Other municipal officials?

Questions you Should be Able to Answer

- Are you confident that you have competent operators and management?
- Are regular performance appraisals conducted?
- Do you ask for periodic annual reports on the drinking water system from senior management?
- Do you know what to look for in the annual report; what questions must it answer?
- Are your drinking water systems periodically audited?
- What should you do when you receive audit results for consideration?

Questions you Should be Able to Answer

- What should you do if a report identifies a problem?
- How do you determine that appropriate steps are being taken; when outside expertise is needed?
- What are the risks currently facing your drinking water facilities and infrastructure? What are the plans to address these risks?
- Are your drinking water systems financially sustainable for the future? Are there financial plans in place?
- Are there procedures in place for an emergency?

Risk Management Checklist

1. Determine required support/guidance
2. Identify barriers to contamination
3. Identify events that may introduce problems
4. Identify causes, preventive measures, checks and corrective actions
5. Decide on where improvements are needed

Risk Management Checklist

6. Decide on the order of improvements
7. Develop a timetable for improvements
8. Identify links to other quality systems
9. Prepare contingency plans
10. Determine method of performance assessment
11. Decide on communication policy and needs

WHO Water Safety Plans (WHO 2008)

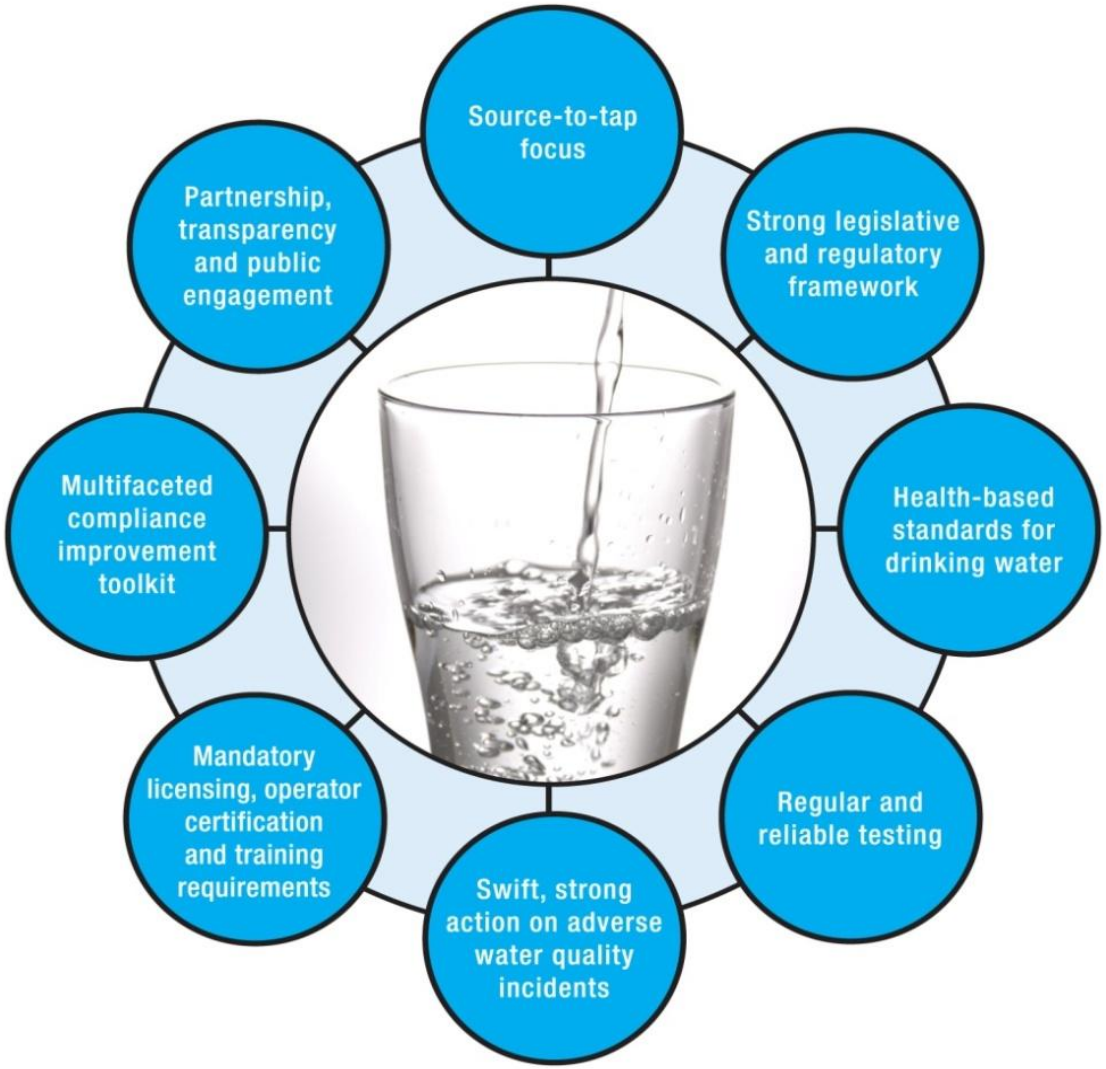
www.who.int/water_sanitation_health/publication_9789241562638/en/index.html

1. Assemble WSP team
2. Describe the water supply system
3. Identify hazards, hazardous events & assess risks
4. Determine control measures, reassess & prioritize risks
5. Develop, implement and maintain an upgrade plan
6. Define monitoring of control measures
7. Prepare management procedures
8. Develop supporting programs
9. Periodic planned review
10. Revise WSP following an incident

Ontario's Drinking Water Protection Safety Net

- Source-to-tap focus
- Strong legislative and regulatory framework
- Health-based standards for drinking water
- Regular and reliable testing
- Swift, strong action on adverse water quality incidents
- Mandatory licensing, operator certification and training requirements
- A multi-faceted compliance improvement tool kit
- Partnership, transparency and public engagement.

Ontario's Drinking Water Protection Safety Net



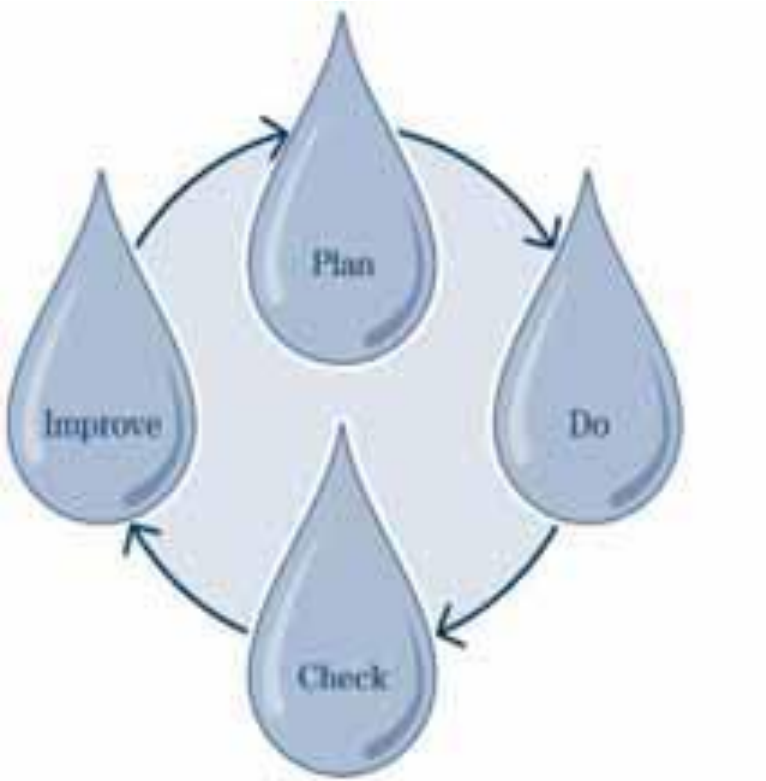
Municipal Drinking Water Licensing Program

- Encourages owners and operators to incorporate “quality” into operation and management
- In order receive or renew a licence the owner and operator must have in place:
  - a drinking waterworks permit
  - an accepted operational plan
  - an accredited operating authority
  - a financial plan, and
  - a permit to take water

DWQMS - Part of Operational Plan

What is already being done (Under DWQMS)

- Water Quality Reporting
- Infrastructure Planning
- Emergency Planning
- Financial Planning
- Water Conservation



Source Water Protection

- Source protection under the *Clean Water Act, 2006* (CWA), is the first step in Ontario's multi-barrier approach to safeguarding drinking water for our communities and our health
- The CWA enables communities to protect their drinking water supplies through the development of collaborative, locally driven, science-based assessment reports and source protection plans
- Locally developed source protection plans will protect the sources of over 450 municipal drinking water systems across Ontario
- Protecting drinking water sources is one of the province's responses to the tragedy in Walkerton and Justice O'Connor's recommendations
- The province has funded the entire source protection planning process to date, providing over $240 million, including:
  - $24.5 million that funded over 3,000 local actions by landowners to protect water supplies
  - $13.5 million to help offset some of the start-up costs for small, rural municipalities as they prepare to implement the plans

Source Water Protection..cont'd

- Source protection plans build on the work that many municipalities, conservation authorities and stakeholders are already doing in the watershed - leveraging local knowledge, expertise and authority
- There are 38 source protection areas across the province delineated on a watershed basis - generally based on existing conservation authority boundaries
- The 38 areas are grouped into 19 source protection areas or regions, each with a locally-based source protection committee (SPC) comprised of:
  - 1/3 municipal representatives
  - 1/3 industrial, agricultural and business interests
  - 1/3 health, environment, and public interests
- SPCs identified local activities that could pose a risk to their water supply and developed plans to manage the risks.
- Municipalities participated in policy drafting and will play a key role in implementing the plans. Municipalities are responsible for over half of the policies in the plans.