Presentation Agenda

Who am I?
What is InfraGuide?
How are best practices developed?

Best practice for monitoring water quality in the distribution system
- Development team and information sources
- How to develop a program
- Key considerations
- On-line monitoring
Who Am I?

Jo-anne Moore, P.Eng.
Project Engineer
Water Division
Delcan Corporation

(613) 738-4160
j.moore@delcan.com
Who Am I – Really?
What is InfraGuide?

- National Guide to Sustainable Municipal Infrastructure
- National network of people
- Published best practice documents

www.infraguide.ca
What is InfraGuide?

Key infrastructure areas

- Potable Water
- Storm and Wastewater
- Roads and Sidewalks
- Environmental Protocols
- Transit
- Decision Making and Investment Planning
How are Best Practices Developed?

Partners: FCM, NRC, Infrastructure Canada

Currently over 300 active volunteers

- municipalities
- trade organizations
- consulting engineers
- contractors
- suppliers
- politicians
- academics
How are Best Practices Developed?

- Set topics/priorities
- Committee proposal
- Select consultant (facilitator)
- Set up working group (experts)
- Document development
- Review: technical committee, stakeholder and peers
- Publish
Published Best Practices

- Available on-line
  www.infraguide.ca

- Hard copies
  1-866-330-3350
  (order form available on-line)

- Regional contact:
  Atlantic Provinces - CBCL Limited
  Nfld. – Jack Caines 709-364-8623
What is InfraGuide?

Key infrastructure areas
- Potable Water
- Storm and Wastewater
- Roads and Sidewalks
- Environmental Protocols
- Transit
- Decision Making and Investment Planning
Potable Water

- Examine municipal or water utility delivery of drinking water to the public
- Suggest ways to ensure public health and safety at least risk and best value
- Up-to-date technical approaches and practices
1. Deterioration and Inspection of Water Distribution Systems
2. Water Use and Loss in the Water Distribution System
3. Selection of Technologies for the Rehabilitation or Replacement of a Water Distribution System
4. Water Quality in Distribution Systems
5. Establishing a Metering Plan to Account for Water Use and Loss
6. Developing a Water Distribution System Renewal Plan
Potable Water - Review

1. Speed and Quality of Linear System Repairs
Potable Water - Development

1. Monitoring Water Quality in the Distribution System

2. Small System Operation and Maintenance Practices

3. Methodologies for Setting a Cross-Connection Control Program
Monitoring Water Quality in the Distribution System

- Development team and information sources
- How to develop a program
- Key considerations
- On-line monitoring
Development Team

- Working group 12 members
- Consultant facilitator
- InfraGuide technical advisor
- Stakeholder and peer reviewers
Information Sources

- Guidance Manual for Monitoring Distribution System Water Quality (AwwaRF)
- Online Monitoring for Drinking Water Utilities (AwwaRF/CRS Proaqua)
- Survey of 11 Canadian municipalities
- Expertise of working group members
How to Develop a Program

- Understand the importance of a Distribution System monitoring program
- Understand your system
- Satisfy regulatory monitoring requirements
- Develop a site-specific program
Key Considerations

1. Determine monitoring parameters
2. Determine monitoring locations
3. Determine monitoring frequency
4. Determine sampling techniques
5. Manage and report monitoring data
Key Considerations

6. Include event-driven monitoring
7. Establish partnerships
8. Develop response procedures
9. Include community monitoring of indicator parameters
10. Maintain and update the monitoring program
1. Monitoring Parameters

- Regulatory requirements
- Public health: chlorine residual, E.coli, disinfection by-products
- Heterotrophic plate count (HPC)
- Many others: turbidity, flow, pressure, ammonia, nitrite, nitrate, temperature, pH, alkalinity, metals, taste, odour, hydrocarbons, etc.
1. Monitoring Parameters

- Treatment process, chemical additions
- Multiple sources
- Distribution system attributes
- Special consumer needs
- Community health concerns
- Historical data
2. Monitoring Locations

- Regulatory requirements
- Historical data
- Sensitive facilities
- Distribution system attributes
- Spatial representation, population/consumer distribution, high flows, system ends
- Operational requirements
3. Monitoring Frequency

- Routine and non-routine
- Regulatory requirements
- Oversampling
- Frequent chlorine – on-line?
- Parameter – time to affect water quality
- Form a history of water quality
- Identify problems – quickly, easily
4. Sampling Techniques

- On-line monitors
- Manual sampling
- Automatic samplers
- Regulatory requirements/frequency
- Remote locations
- Costs – capital and operating
- O&M of equipment
4. Sampling Techniques

- Availability of technology, labs
- Sample storage, preservation, travel
- Sample contamination
- Staff/equipment availability, capability
- Fastest possible receipt of results
5. Data Management

• Data storage and access issues
• Automatic screening and flags:
  1. Results approach unacceptable
  2. Results reach unacceptable
• Computerized system with backup
• Daily review – charts, graphs
• Link to GIS for analysis
• Reporting
6. Event-driven Monitoring

- Procedures for expected events
- Compare with routine results
- Consumer inquiries
- Suspected health problem from drinking water – involve health and province
- Water main break
- Water main flushing and cleaning
6. Event-driven Monitoring

- Fire fighting
- Construction activities
- Operational activities
- Large changes in water usage – seasonal population, plant shutdown
- Floods and other extreme weather
7. Partnerships

- Stakeholders, public, private groups
- Exchange information on problems
- Educate those impacting system
- Establish partnerships now, meet regularly, communication protocols
- Contribute to training programs
7. Partnerships

- Health and fire departments
- Dept. of Environment and Conserv.
- Regulatory agencies/approvals
- Emergency measures/response
- Building/plumbing inspection
- Labs, pharmacies, wholesale
- Consultants, contractors, suppliers
- Industry and special interest groups

DELCAN
8. Response Procedures

- Determine normal/acceptable limits
- Develop response procedures:
  1. Results approach unacceptable
  2. Results reach unacceptable
- Corrective actions: flushing, chemical dosage, valve operation, shutdown facilities, public notices, re-sampling
- Communication protocols, reporting
9. Community Monitoring

- Health-related community parameters
- Acute, seasonal, chronic conditions
- Over-the-counter medicine, hospital and clinic attendance, disease
- Compare local conditions
- Municipality and health department
- Pharmacies
10. Update and Maintain

- Staff training and updates
- Instrument replacement, calibration
- Document and communicate – summary tables and mapping
- Criteria for change: growth, new construction
- Annual review
- Communicate strengths/weaknesses
On-line Monitoring

- Chlorine, pressure, flow – pumping stations, storage facilities, others
- Technological development
- Combination of on-line monitors and manual sampling
- Evaluate *before* purchase and installation
On-line Monitoring

- Timely information
- Consumer confidence
- 24/7
- Regulatory standards
- Cost/benefit analysis – capital costs, operating costs, cost savings, water quality, operations, compliance
- Treatment facility first
On-line Monitoring

- Determine locations: manual sampling, historical data
- Communication system: recording, transfer, retrieval, backup, alarms
- Regular maintenance, reagents, staff training, regular calibration
- Power, drain, operational and weather issues
Questions?

- InfraGuide
- Monitoring Water Quality in the Distribution System
Contact Us

www.infraguide.ca
1-866-330-3350