The Walkerton Inquiry
Expert Meeting on
Treatment, Distribution and Monitoring of Drinking Water

123 Edward Street, 6th Floor Boardroom
(This is the building directly behind the Walkerton Inquiry Offices
at 180 Dundas Street West in Toronto. Edward Street is one block north of
Dundas Street West and we are between Bay Street and University Avenue.)

May 9-10, 2001
Coffee 9:30am, Meeting 10:00am to 4:00pm

Chair: Michèle Prévost

Draft Agenda

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1. **Introduction of Participants**

2. **Review of Agenda Items and Conduct of the Meeting**

Discussion Issues
The selection of water treatment process depends on source water quality, desired finished water quality, reliability of process technologies, operational requirements and costs, characteristics of the distribution system and environmental constraints.

3. **The need for adequate water quality data for surface and groundwater sources** – Source water quality facilitates the economical production of drinking water and enhances its safety. Does the current system provide access to data characterizing the quality of DW source water to understand the vulnerability and sensitivity of our drinking water sources? Should source water criteria be set? Should the benefits of source protection be recognized in regulations? What programs could be considered to increase of knowledge of source water quality? sanitary surveys?

4. **How should water quality goals be set to ensure the selection of adequate treatment barriers?**
   - Should we include unregulated parameters to define treatment & distribution or should only regulated parameters be considered?
   - Should the removal of Cryptosporidium be a WQ goal even if it is not included in the current Ontario regulations? Adding the removal and inactivation of Cryptosporidium significantly influences the choice and cost of treatment.
   - Should emerging WQ parameters such as endocrine disruptors be considered?
   - Should aesthetics parameters such as taste, odour and color, be included to increase customer's acceptance and support to the implementation of treatment?
   - Should the public be involved in the choice of treatment options? How can we secure stakeholder participation in defining water treatment goals and preferred treatment choices?

5. **Which fundamental approaches should underlay the selection of treatment barriers?**
   - What does the multiple barrier concept really mean: multiple treatment barriers? process and operations barriers? barriers provided by all parts of system: source water protection, treatment and distribution?

- What level of redundancy should be built in systems? Should flexibility to meet future regulations be an important criterion?
- Should we focus our efforts to reduce the source of contamination (control of controlled sewer overflow (CSO), increased WW treatment and elimination of untreated sources) or on building additional barriers in DW treatment?
- Should the design of treatment barriers be based on the absolute worse situation rather than on average conditions?

6. **Methodology or framework to define the best treatment barriers to meet multiple water quality objectives**. – When evaluating options for water treatment, several options may be possible. Several systematic approaches have been proposed to identify the best solutions.
   - What are the best practices to select treatment around the world?
   - How is process selection done in Ontario?
   - Does this practice produce the best and safest solutions? How can it be improved?

7. **The trade-off between adequate disinfection and the production of undesirable disinfection by-products –** Disinfection is a process designed to reduce the number of pathogenic micro-organisms and reduce the risk of infection. However the very application of disinfectants causes the production of undesirable disinfection by-products causing the greatest dilemma in water treatment.
   - What should be the drivers of treatment design: microbials or disinfection by-products?
   - Are the current regulations ensuring adequate disinfection of drinking water?
   - Should we strive to meet both objectives regardless of costs?
   - Can we avoid this dilemma?

8. **Tool box of technologies –** Technologies can be considered as tools in the tool box to assemble the proper treatment barriers.
   - How can we better use conventional technologies to meet multiple WQ objectives?
   - Can conventional treatment suffice as regulations evolve and include parameters based on the precautionary principle as seen in Europe?
   - Can we identify innovative technologies that would offer better quality, greater reliability or lower costs? eg: membrane systems and alternative oxidation technologies such as UV disinfection.
   - How can we add innovative technologies to our tool box? Can we ensure timely and safe introduction of innovative technologies to provide opportunities for better water quality and lower cost? Can Ontario or even Canada draw on data and experience abroad to build on existing information rather than repeat the whole evaluation process?
   - What is the role of R&D to ensure the development and timely application of innovative technologies? Is the current level of governmental support (federal-provincial and municipal) sufficient?
   - What would be the proper structure and procedures to keep this process dynamic while ensuring safety?

9. **How do we operate and monitor treatment facilities to minimize the risk of failure?** One of the major causes of outbreaks is transient treatment failure. The efficacy of most treatment process barriers is completely dependant on adequate operations. Treatment failures, even of short duration, constitute a real health risk. It is now widely recognized that quality programs are key elements of safer operations.
   - Several quality programs are applied around the world: what is their role in ensuring safety in treatment?
   - Which model is considered the best and could be applied to Ontario: ISO, Partnership for Safe Drinking Water, etc.?
   - How do we implement these programs in Ontario utilities? Are quality programs applicable to small and very small systems?

- What is the role of treatment monitoring to ensure reliable treatment (on line and offline process monitoring)? What should it include: online turbidity meters on each filter? Particle counting?
- How can we ensure periodical adequate and constructive reviews and audits of the treatment facilities?
- How can we implement efficient remedial measures to correct any treatment failures?

10. How can we meet the challenge of providing safe and cost effective technical solutions to small and very small systems?

- How can we propose treatment and distribution solutions adapted to the constraints of scale (complexity of treatment and operations)?
- How do we ensure quick and adequate remedial response to risk generating events in small and very small systems?
- Should Point-of-Use or Point-of-Entry systems be considered as an alternative for very small systems?

11. Distribution systems. The purpose of a water distribution system is to deliver water in sufficient quantity and of acceptable quality. Distribution systems are complex systems and act as enormous biological and chemical reactors. Distribution systems have been shown to be a source of measurable illness in Canada.

- What are the most important sources of risk in DS? Intrusion through cross-connection, back siphonage, poor replacement practices, inadequate system maintenance, open reservoirs?
- Traditional design of DS and storage is based on capacity and fire flows. This approach is costly and may accentuate water quality deterioration during distribution unless corrective measures are taken. Does this approach have significant negative impacts on WQ? Can we shift away from this approach that lead to over design?
- The distribution system is the last barrier before the consumer. Post disinfection is practiced to provide an additional protection during the transit of water. Major differences in DS disinfection practices exist worldwide. The NA practice calls for the maintenance of a chlorine residual as a preventive measure, whereas the European practices focuses on minimizing the use of chlorine (minimal residual or no residual). What approach should we adopt in Ontario?
- Corrosion of iron and the release of lead and copper are significant water quality issues in DS. Corrosion control is mandatory in several countries whereas Ontario regulations set a standard for lead. Should full corrosion control be included in the regulations? How can corrosion control be best achieved?

12. Monitoring to Ensure Water Quality.

- Current microbiological quality indicators provide information on water quality after a significant delay. Should better indicators be developed and serve as the basis of compliance monitoring?
- Current monitoring of inorganic and organic contaminants is limited in frequency. Should we re evaluate the level of protection provided by this monitoring and adjust its frequency?

13. Role of government in providing technology assistance

- What is and what should be the responsibilities of various entities in providing technical support to utilities?
- Should the province provide technical support to small and large utilities?
- What should be provided to unregulated very small systems: a tool box and information on WQ and risks?