



ODWAC

Ontario Drinking Water Advisory Council

ANNUAL
REPORT
2013-2014



Ontario



Ontario

**Advisory Council on Drinking Water
Quality and Testing Standards**

**Le Conseil consultatif sur les normes
de qualité et d'analyse de l'eau
potable**

“Advising Ontario on Drinking Water Matters”

www.odwac.gov.on.ca

The Ontario Drinking Water Advisory Council, known formally as the Advisory Council on Drinking Water Quality and Testing Standards, is an Agency of the Government of Ontario

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1.0 Message from the Chair

On behalf of the Advisory Council on Drinking Water Quality and Testing Standards, I am pleased to present the 2013-2014 annual report outlining our activities and achievements. The Council has now completed its tenth year of serving the Minister of the Environment and the Province, having commenced our work under the terms of the *Safe Drinking Water Act, 2002*. The Council takes its lead from the recommendation of the Part Two Report of the Walkerton Inquiry to provide the Minister with independent advice, focused on improving the quality and safety of drinking water.

The Council consists of a group of drinking water professionals appointed by the Minister. They have a genuine interest in protecting and improving the safety and quality of Ontario's drinking water, and bring their collective knowledge and experience to the table to formulate advice and provide workable solutions.

One of the most important services we provide to the Minister is to review and make recommendations on drinking water standards. Since 2005, the Council has provided previous Ministers with advice and recommendations on over a dozen important drinking water quality standards (*from arsenic to vinyl chloride*).

Although the Council's advice has been acknowledged, Ontario's standards have not been revised to reflect the recommendations. For some substances, Ontario's current standards are no longer up-to-date with the national guidelines. For Ontario to continue its claim to be one of the leaders in drinking water-related public health protection, these standards must be updated.

The Ministry's drinking water safety net has brought about significant improvements to the quality of drinking water over the past 10 years. The Drinking Water Source Water Protection Program and the Drinking Water Quality Management Standard have demonstrated international leadership. Other jurisdictions have also made advances and are making similar improvements. There is a greater understanding of potential risks which may impact the quality of drinking water, such as enteric protozoa and enteric viruses, endocrine disruptors and personal care products, blue-green algae, climate change, alternative disinfectants, backflow and cross-connections, microbiological field testing, and infrastructure sustainability. The Council monitors and investigates these current and emerging issues, and we follow the latest research and work of leading organizations and when appropriate, bring recommendations to the Minister on actions that could be taken by the Province.

Currently, the Council is completing a comprehensive review and set of recommendations that will reflect the essence of a recent series of guidance documents prepared by Health Canada, which address many new measures for managing microbiological risks in drinking water. There has been significant new research and technological improvements recognized by other jurisdictions. A greater understanding of the importance of a number of pathogens and other related measures such as turbidity, as well as improvements to drinking water treatment approaches, has been emerging. These ideas, which will improve the overall safety of drinking water, need to be reflected in Ontario's practices and procedures.

I would like to, once again, acknowledge the work of Council members, as well as staff of the Ministry of the Environment and the Ministry of Health and Long-Term Care, for their continuing contributions towards our mandate of advising Ontario on drinking water safety.



Jim Merritt

2.0 Council Background and Mandate

On May 23, 2002, Justice O'Connor, in the Part Two Report of the Walkerton Inquiry, recommended the establishment on an "Advisory Council on Standards" for drinking water, as well as making the following specific recommendations:

- Recommendation 25 states that *"In setting drinking water standards for Ontario, the Minister of the Environment should be advised by an Advisory Council on Standards."*
- Recommendation 26 states that *"The Advisory Council on Standards should have the authority to recommend that the provincial government adopt standards for contaminants that are not on the current federal-provincial agenda."*
- Recommendation 27 states that *"The Advisory Council on Standards should consider whether to replace the total coliform test with an E. coli test."*
- Recommendation 29 states that: *"The provincial government should seek the advice of the Advisory Council on Standards regarding the desirability of a turbidity limit that is lower than the limit specified in the federal-provincial Guidelines."*
- Recommendation 31: *"The Advisory Council on Standards should review Ontario's standards for disinfection by-products to take account of the risks that may be posed by the by-products of all chemical and radiation-based disinfectants."*

In recommending an Advisory Council on Standards, Justice O'Connor also noted that:

- It is reasonable to seek expertise from an Advisory Council on standards comprised of members of the broader general public; as such expertise may not reside in the Ministry of the Environment.
- The benefits of an Advisory Council on Standards include transparency in process and increased public participation.
- The Advisory Council on Standards should establish its own process.
- Recommendations made to the Minister of the Environment should be made public and should be supported by the Advisory Council on Standards' rationale.
- The Advisory Council on Standards should also advise the Minister of the Environment with respect to management, treatment, testing, materials, and reporting standards.

On May 12, 2004, The Minister of the Environment announced the establishment of the Ontario Drinking Water Advisory Council (Council), known formally as the "Advisory Council on Drinking-Water Quality and Testing Standards" in the *Safe Drinking Water Act, 2002*.

Enabled under Section 4 of the *Safe Drinking Water Act, 2002*, the Council is “to consider issues relating to standards for drinking-water quality and testing and to make recommendations to the Minister” of the Environment, which are to be “taken into consideration in establishing and revising standards under this Act for drinking-water quality and testing.” (See Appendix B for the relevant sections of the *Safe Drinking Water Act, 2002*)

The Minister of the Environment appointed members from key professional fields representing a cross-section of academia, industry and municipalities, with expertise in the areas of microbiology, toxicology, risk assessment, engineering, utility operations, public health, and others with a record of interest and accomplishment related to drinking water. They are all active in their areas of knowledge and bring their current and direct experience to the Council’s deliberations. (See Appendix F for the *Council Members’ Biographies*)

The broad mandate of the Council is to provide advice and make recommendations to the Minister of the Environment on drinking water quality and testing standards, as well as other drinking water matters deemed appropriate. The role of the Council includes, but is not necessarily limited to, the following core activities:

- **Requests from the Minister of the Environment:**
Providing advice on drinking water policies, practices, procedures, standards, testing methods, and related research, as requested by the Minister of the Environment.
(See Section 4.0)
- **Standards Review:**
Reviewing research, scientific, and technical documentation related to drinking water quality and testing standards, including Federal-Provincial-Territorial priorities, in order to provide advice to the Minister of the Environment on standards and their applicability in Ontario. (See Section 5.0)
- **Council Initiatives:**
Providing recommendations on drinking water matters that the Council has become aware of and has identified as being of interest, and which may merit the attention of the Minister of the Environment.
(See Section 6.0)
- **Stakeholder / General Public Consultations:**
Publishing information on the Environmental Registry and undertaking additional consultations on standards, regulations, or other drinking water matters, to solicit views from stakeholders or the general public, in order to provide advice and recommendations to the Minister of the Environment.

3.0 Summary of Activities and Accomplishments

Following is a summary of the Council's activities and accomplishments from May, 2013 to May, 2014, as well as progress on items reported in previous annual reports:

Requests from the Minister of the Environment: *(See Section 4.0)*

Progress on Requests from Previous Years:

- Wells Regulation (Ontario Regulation 903) Disinfection Requirements
- Corrosion Control / Lead Reduction
- Tritium Standard
- USEPA's Initiatives to Regulate Contaminants as Groups; and Perchlorate, Hexavalent Chromium

Standards Review: *(See Section 5.0)*

Standards Reviews Completed:

- Vinyl Chloride

Standards Currently Under Review:

- *E. coli*
- Total Coliforms
- 1,2-Dichloroethane
- Nitrate and Nitrite
- Selenium
- Toluene, Benzene, Ethylbenzene (TEX)

Standards Prioritization

Council Initiatives: *(See Section 6.0)*

Progress on Initiatives from Previous Years:

- Drinking Water Quality Management Standard
- Ontario Regulation 248 (Drinking-Water Testing Services)
- Clean Water Act Source Protection Plans

Initiatives Currently Under Review:

- Alternatives to Distribution System Chlorination

- Health Canada's Microbiological Guidance and other Substances as they relate to Ontario's Disinfection Procedure, including:
 - Enteric Protozoa
 - Enteric Viruses
 - Turbidity
 - Heterotrophic Plate Counts
 - Waterborne Bacterial Pathogens
 - Guidance on the Use of the Microbiological Drinking Water Quality Guidelines
 - Ammonia
 - Chlorine

Areas of Ongoing Interest:

- Accreditation of Drinking Water Systems
- Backflow and Cross Connections
- Bill S-8 Federal *Safe Drinking Water for First Nations Act*
- Blood Lead Level reports (Health Canada)
- Blue-Green Algae Blooms
- *Cryptosporidium*, *Giardia* Monitoring
- Drinking Water Advisories and Reporting Systems
- Drinking Water Quality Management Standard (DWQMS)
- *E. coli* Field Test Kits
- Endocrine Disruptors / Pharmaceuticals and Personal Care Products
- Financial Plans for Drinking Water Systems (Ministry of the Environment)
- *Great Lakes Protection Act*
- GUDI Terms of Reference Working Group (Ministry of the Environment)
- Hydraulic Fracturing
- Hydrogen Peroxide as a Disinfectant
- Lead in Drinking Water
- Microcystin Field Test Kits
- Municipal Licencing Program (Ministry of the Environment)
- Public Health Ontario (PHO) Role
- Source Characterization and Treatment Requirements
- Source Protection Planning
- Statutory Standard of Care
- *Water Opportunities Act* (Infrastructure Sustainability)
- WaterTAP

Administrative:

- Learning and Development Map
- Agency Office Consolidation (ODWAC and OPAC)

4.0 Requests from the Minister of the Environment

The Minister of the Environment can formally request the Council to provide direct advice and make recommendations on drinking water policies, practices, procedures, standards, testing methods, and related research.

The following requests were referred to the Council by the Minister in a previous annual report year, but there was additional activity and progress made during this reporting period:

4.1 Progress on Requests from Previous Years

Wells Regulation (Ontario Regulation 903) Disinfection Requirements

On December 31, 2007, amendments to the disinfection requirements in the Wells Regulation came into effect, adopting some of the Council's recommendations for disinfection with chlorine with regards to dosage, contact time, flushing, and verification of free chlorine residuals.

The Ministry of the Environment developed two best management practice manuals for the well construction industry. The intent of these two manuals is to provide best practices and greater clarity for the industry and well owners in understanding the Wells Regulation and other relevant legislation that deals with wells.

The ministry released the first manual, *Water Supply Wells – Requirements and Best Management Practices*, to the public in January, 2010 for informational purposes only. The second manual, *Test Holes and Dewatering Wells – Requirements and Best Management Practices* was finalized and released in April 2014.

After consideration of public comments that were received through the EBR for the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual, a decision was made to revise the *Water Supply Wells – Requirements and Best Management Practices* manual. It was updated to correct administrative errors and incorporate new relevant guidance and best management practices that were created in the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual.

In order to ensure consistency of the information, guidance, and best practices provided between the two manuals, the *Water Supply Wells – Requirements and Best Management Practices* manual was posted to the EBR for a 30 day period for public comment in April, 2014, and its finalization is anticipated in the near future.

The Ministry of the Environment also originally released eleven technical bulletins, which summarize the information in the *Water Supply Wells – Requirements and Best Management Practices* manual for interested well owners and the industry sector. An additional set of seventeen technical bulletins, which summarize information in the *Test Holes and Dewatering Wells – Requirements and Best Management Practices* manual has been drafted and is anticipated to be released in 2014.

Corrosion Control / Lead Reduction

Over this annual report period, the Council continued to monitor Ontario's Lead Action Plan in terms of any future regulatory amendments or guidance documentation development.

In February 2014, the Ministry of the Environment's Lead Compliance Program continued its risk-based compliance strategy, initially implemented in 2012-13, to focus its resources on the areas of highest risk. An ongoing self-reporting component was put in place as part of the program and 1,600 owners and operators of schools, private schools and day nurseries were targeted to complete and submit an online report to the Ministry of the Environment.

As well, regulatory amendments, including reduced flushing at schools and day nurseries, continued to be implemented during this annual report period.

Of the twenty large municipal residential drinking water systems required to prepare corrosion control plans, based on their community lead testing results, thirteen systems have prepared plans and received acceptance from the Ministry of the Environment as of May, 2014. Five systems are pursuing lead service line replacement, and the remaining plans are still under evaluation.

Tritium Standard

On February 21, 2007, the Minister of the Environment formally requested that the Council review and provide advice on the current Ontario Drinking Water Quality Standard (ODWQS) for tritium, taking into consideration recommendations made in the 1994 report entitled: "A Standard for Tritium" transmitted to the Minister of Environment and Energy by the Ontario Advisory Committee on Environmental Standards (ACES).

The Council held a public consultation on March 26 and 27, 2008 and the results were incorporated with the input received from individuals and other stakeholders to inform the Council's advice to the Minister of the Environment on the Ontario Drinking Water Quality Standard for tritium.

The Council took considerable effort to review all of the health and risk aspects of tritium exposure to the public from drinking water, and on May 21, 2009, delivered its "Report and Advice on the Ontario Drinking Water Quality Standard for Tritium" to the Minister of the Environment.

The principle recommendation made by the Council was that the Ontario Drinking Water Quality Standard for tritium should be revised to 20 Bq/L (based on a running annual average).

The full report can be found at:

http://www.odwac.gov.on.ca/reports/052109_ODWAC_Tritium_Report.pdf

Throughout this annual report year, the Council continued to monitor the tritium issue, and provided support to the Minister's Office, while the Council's report continued to serve as a source of information. The Council is still awaiting the Ministry of the Environment's amendment to the Ontario Drinking Water Quality Standard for tritium.

USEPA's Initiatives to Regulate Contaminants as Groups, Perchlorate, and Hexavalent Chromium

On March 7, 2011, The Minister of the Environment formally requested the Council to track the United States Environmental Protection Agency's (USEPA) development of new drinking water limits and / or monitoring requirements for perchlorate and hexavalent chromium.

As well the Council was asked to track the USEPA's (*as well as other jurisdiction's*) new approaches to drinking water regulation, which involve the grouping of similar contaminants. The Council was requested to report back to the Minister on whether this approach could / should be used in Ontario, so that the province remains a leader in drinking water protection and keeps abreast of developments in other jurisdictions.

The Council formed a working group and is currently carrying out an action plan involving:

- tracking the USEPA's initiative on regulating contaminants as groups;
- tracking the USEPA's initiative on regulating perchlorate;
- tracking the USEPA's initiative on monitoring for hexavalent chromium;
- tracking Health Canada's initiative on the grouping of some Volatile Organic Compounds;
- investigating other important jurisdictions' possible work on these 3 initiatives;
- seeking direct contact with the USEPA to discuss progress and possible directions first-hand;
- seeking to participate in forums where these 3 initiatives are part of the agenda;
- developing and information database on VOCs; and
- investigating treatment options.

The Council continued to monitor the USEPA's initiative to regulate contaminants as groups. There are still outstanding scientific issues related to the Agency's plan to regulate up to 16 carcinogenic volatile organic compounds (cVOCs) as a single group.

As well, the Council continued to monitor the USEPA's initiatives to monitor for and regulate both perchlorate and hexavalent chromium. The USEPA has delayed both its pending health goal for perchlorate and the determination whether to regulate hexavalent chromium, until questions related to the contaminants' pathways and other scientific issues are resolved.

5.0 Standards Review

Part of the Council's mandate is to provide advice to the Minister of the Environment on proposed drinking water standards, objectives, and guidelines and their applicability in Ontario.

Recommendation 25 of the *Part Two Report of the Walkerton Inquiry*, states that “*In setting drinking water standards for Ontario, the Minister of the Environment should be advised by an Advisory Council on Standards*”.

In order to provide comprehensive advice, the Council assesses Health Canada's Guideline Technical Documents, comments from the national and Ontario public consultation processes, and information on the occurrence and impact that a particular substance is likely to have on the delivery of safe drinking water in the province.

Based on this assessment, the Council may recommend the endorsement of a Canadian Drinking Water Quality Guideline (CDWQG) as an Ontario Drinking Water Quality Standard (ODWQS) in Ontario Regulation 169/03, or as an Objective, or Guideline, or it may make an alternative recommendation. When appropriate, the Council may also conduct independent consultations with stakeholders and technical experts as deemed necessary to formulate its advice.

It should be noted that the Council's protocol is to recommend that all Ontario Standards, Objectives, and Guidelines be at least as stringent, if not more stringent, than the corresponding CDWQGs. (*See Appendix C for the Council's Standards Review Protocol*)

Since 2005, the Council has made a number of recommendations for improved or new Ontario Drinking Water Quality Standards, and is still waiting for the Ministry of the Environment to promulgate the necessary amendments.

Following is an update of the status of the Council's review of standards, from May, 2013 to May, 2014, as well as progress on standards reported on in previous annual report years:

5.1 Standards Reviews Completed

Vinyl Chloride

The Council assessed Health Canada's Guideline Technical Document for vinyl chloride, which reaffirmed the 1987 Canadian Drinking Water Quality Guideline at a maximum acceptable concentration (MAC) of 0.002 mg/L.

Since vinyl chloride has been deemed to be a linear non-threshold carcinogen, the Council's process for recommending a Standard for Ontario is to start with an incremental lifetime cancer risk of one in a million, and then apply a “As Low As Reasonably Practicable” (ALARP) approach by posing a series of questions designed to determine whether a Standard should remain at the one in a million risk level, or whether there are reasons to vary from it, such as measurability, treatability, or economic issues.

Based on Health Canada's assessment of vinyl chloride, the one in a million level of risk derived is equal to 0.00004 mg/L, which is fifty times higher than one in a million. Commercial laboratories which analyze for vinyl chloride in drinking water currently cannot routinely achieve the detection limits necessary to support a 0.00004 mg/L Standard. The Council determined, however, that these laboratories *could* support a 0.001 mg/L Standard, but also acknowledges that this risk level is equal to twenty-five in a million, which is higher than the Council's health-based target for this type of contaminant.

The Council continues to monitor vinyl chloride's practical detection limits and, if analytical methods used by commercial drinking water testing laboratories facilitate the revision of this Standard, a future recommendation could be made.

Therefore, on October 30, 2013, the Council transmitted its advice to the Minister of the Environment, recommending that the Ministry of the Environment maintain set a more stringent Ontario Drinking Water Quality Standard of 0.001 mg/L for vinyl chloride in drinking water. (*See Appendix A*)

5.2 Standards Currently Under Review

The following standards are still under review by the Council. Presentations were received and discussions took place on Health Canada's Documents for Public Comment and / or Guideline Technical Documents. The Council will continue to assess these contaminants and will provide formal advice to the Minister of the Environment in an appropriate and timely fashion, if warranted. The Standards include:

- *E. coli*
- Total Coliforms
- 1,2-Dichloroethane
- Nitrate and Nitrite
- Selenium
- Toluene, Benzene, Ethylbenzene (TEX)

Other drinking water contaminants and related substances, which the Council had discussions on, but did not formally review, included:

- 1-4, Dioxane
- Adenosine Tri Phosphate (ATP) (*as an operational parameter*)
- Adenovirus
- Aeromonas
- Cyanotoxins
- Formaldehyde
- Hexavalent Chromium
- Lead

- Nano-silver
- Norovirus
- Perchlorate
- Perfluorooctanesulfonic acid (PFOS)
- Perfluorooctanoic acid (PFOA)
- Peroxide

5.3 Standards Prioritization

Part of the Council's mandate is to provide advice and make recommendations on matters relating to the prioritization of the review and development of standards for drinking water quality in Ontario.

In addition, the *Part Two Report of the Walkerton Inquiry* noted in Recommendation 26, that "*The Advisory Council on Standards should have the authority to recommend that the provincial government adopt standards for contaminants that are not on the current federal-provincial agenda.*"

Specifically, in establishing its own process, the Council has chosen to review, on a yearly basis, the list of priority substances as developed by the Federal-Provincial-Territorial (FPT) Committee on Drinking Water (CDW).

The purpose of this review is to recommend the addition of substances for Ontario to put forward, that may not be on the current National Priority List, and / or to recommend the bumping-up of existing substances as deemed important for the province. For the May, 2013 to May, 2014 Council year, a review was completed and the Council concurred with the National Priority List.

6.0 Council Initiatives

While the Minister of the Environment can request that the Council provide advice on specific matters related to drinking water, the Council can also choose to engage in drinking water matters, which it has identified as being of interest, and which, in its opinion, may merit the attention of the Minister of the Environment, and the Ministry of the Environment.

The process by which the Council engages in its initiatives is as follows:

- Initiatives are identified through the Council's priority-setting process.
- The Council decides whether or not to form a working group to facilitate tasks, based on the complexity of the initiative.
- The Council or working group then decides how to best approach each initiative using any or all of the following means, including:
 - inviting a Ministry of the Environment expert make a presentation to the Council
 - inviting an external expert make a presentation to the Council
 - carrying out a literature search
 - holding a stakeholder and / or experts workshop and / or symposium
 - facilitating a research project
- The conclusions and suggested recommendations are deliberated by the full Council, and advice is developed and transmitted to the Minister of the Environment, in cases where it is deemed to merit some attention and / or action.

Even though advice may have already been transmitted in some cases, many of these initiatives are of an on-going nature. As such, the Council remains engaged from the perspective of reviewing the development of legislative, regulatory and policy amendments, in order to provide on-going advice to the Minister of the Environment. Following is a brief outline of the initiatives that the Council was engaged in from May, 2013 to May, 2014:

6.1 Progress on Initiatives from Previous Years

The Council transmitted advice on the following initiatives to the Minister of the Environment in previous annual report years. Progress, however, was made during this annual reporting period, and is summarized below:

Drinking Water Quality Management Standard

Over this annual report period, the Council continued to monitor progress on the implementation and updating of the Drinking Water Quality Monitoring Standard (DWQMS).

In December 2013, the Council was provided with an update on the five-year Licence renewal process that began in the fall of 2013. As of May 2014, municipalities have started to receive their renewed Licences and this process will continue into 2016.

The Ministry of the Environment also continued their review of the DWQMS, the Municipal Drinking Water Licensing Program (Licensing Program) and Accreditation Program for Operating Authorities. Stakeholder surveys were distributed, and the Ministry of the Environment collected feedback through a variety of outreach activities, including a series of DWQMS workshops, which have been used to identify areas where the DWQMS and associated guidance material can be clarified, resulting in proposed revisions to the standard.

Once finalized, the Ministry of the Environment will post the revised Drinking Water Quality Management Standard and updated guidance material on Ontario's Environmental Registry for public consultation.

Ontario Regulation 248 (Drinking-Water Testing Services)

Over this annual report period, the Council continued to discuss the use of microbiological field test kits, which could provide an additional tool for drinking water system operators to identify and assess potential threats.

Clean Water Act: Source Protection Plans

Over this annual report period, the Council continued to monitor the Source Protection planning process.

All 19 Source Protection Planning Committees have completed their proposed source protection plans and have submitted them to the Minister of the Environment for review and approval. The first plan, for the Lakehead Source Protection Area, came into effect in October, 2013. The Niagara Peninsula and Mattagami Region Source Protection Area plans will come into effect in October, 2014. The Ministry continues to review the remaining plans.

6.2 Initiatives Currently Under Review

The Council continues to be actively engaged in the following initiatives with a view towards potentially providing advice to the Minister of the Environment in the future:

Health Canada's Microbiological Guidance and other Substances as they relate to Ontario's Disinfection Procedure

The Council was made aware that the Ministry of the Environment is revising the "*Procedure for Disinfection of Drinking Water in Ontario*" (Procedure).

The original Procedure was dated April 16, 2003, and the Council provided advice to the Minister on September 20, 2005, ahead of the current revision, which is dated June 4, 2006.

The Council has taken great interest in this next revision to the Procedure due to the importance of its operational-level application, and the convergence of many treatment-based standards and other pertinent guidance.

To this end, the Council has been formally reviewing all of Health Canada's guidance documentation, related to the microbiological safety of drinking water as well as other treatment-related substances, in order to determine their applicability and appropriateness for use here in Ontario, through the Procedure. Guidance reviews include:

- Enteric Protozoa
- Enteric Viruses
- Turbidity
- Heterotrophic Plate Counts
- Waterborne Bacterial Pathogens
- Guidance on the Use of the Microbiological Drinking Water Quality Guidelines
- Ammonia
- Chlorine

Alternatives to Distribution System Chlorination

The Council had become aware that some jurisdictions other than Ontario have quite different approaches to both primary and secondary disinfection (the practice of maintaining a *chlorine* residual in the distribution system). In some other jurisdictions, much less reliance is placed on chemical disinfection, and particularly in the use of chlorine, than is the case in Ontario.

Given its role of providing advice to the Minister of the Environment, it was considered desirable for the Council to become better informed on this matter. To this end, the Council held a symposium on September 22, 2008, to hear from experts in many other jurisdictions.

An ensuing expert panel session was held on September 23, 2008, comprised of the experts and several Council members, with the goal of developing possible recommendations for the province so that it may be in a position to consider a process to allow for alternative approaches to disinfection, particularly for distributed water.

The Council continued its research on alternative approaches to drinking water disinfection and will report on its findings, conclusions, and possible recommendations in near the future.

6.3 Areas of Ongoing Interest

The Council formally engaged in the following additional areas of interest by requesting presentations on these topics with a view towards providing advice to the Minister of the Environment, if deemed appropriate, in the future:

- GUDI Terms of Reference Working Group: December 14, 2012 – Aziz Ahmed, Ministry of the Environment (MOE)
- USEPA Revised Total Coliform Rule: February 22, 2013 – Albert Simhon, Ministry of the Environment (MOE)

As well, the Council deliberated on the following topics, which were brought forward by its own Members, as a result of their awareness of issues in the drinking water world. It was determined that advice to the Minister of the Environment on these issues was not warranted at this time.

- Backflow and Cross-Connections
 - Blood Lead Level reports (Health Canada)
 - Blue-Green Algae Blooms
 - Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA)
 - Canada-U.S. Great Lakes Water Quality Agreement
 - Drinking Water Quality Management Standard (DWQMS)
 - Drinking Water Research Initiatives in Ontario
 - Endocrine Disruptors / Pharmaceuticals and Personal Care Products
 - First Nations Drinking Water Quality and Federal Bill S-8
 - Ground Source Heat Pumps (Ontario Regulation 98/12)
 - Hydraulic Fracturing
 - Inspection Program for Drinking Water Systems
 - Microcystin Field Test Kits
 - MOE reorganization moving wastewater responsibilities to the DWMD
 - MOHLTC Small Drinking Water Systems
 - Municipal Licencing Program and Accreditation
 - NMYRR Systems and Designated Facilities Inspections and Compliance
 - Ontario Public Health Standards
 - Ontario's Great Lakes Strategy and the Great Lakes Protection Act
 - Public Health Agency of Canada's (PHAC) Role
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- Public Health Ontario (PHO) Role
- Quantitative Microbiological Risk Assessment (QMRA)
- Statutory Standard of Care
- Water Opportunities Act (infrastructure sustainability)
- Water Safety in Large Buildings

6.4 Administrative

Memorandum of Understanding

On July 7, 2010, the Chair of the Council and the Minister of the Environment both signed a Memorandum of Understanding (MOU), replacing the Terms of Reference from November 5, 2004. This MOU was re-affirmed on May 31, 2012, by the current Minister of the Environment.

The MOU clearly outlines the roles and responsibilities of both the Council and the Ministry of the Environment, and reaffirms the importance of working together to ensure Ontario remains a leader in drinking water protection, through an up-to-date and transparent standards-setting process, involving increased public input. *(See Appendix D)*

Learning and Development Map

The use of Learning and Development Maps is promoted government-wide for Agencies, Boards, and Commissions. To this end, the Council continued to update its Learning and Development Map, as it continues to be a living document.

The purpose of the Learning and Development Map is to:

- promote a learning culture and continuous improvement;
- identify key learning and development needs and opportunities for members and staff *(Identification of the key learning and development needs are via the Council's "all things drinking water" mandate and core activities such as: Requests from the Minister of the Environment (See Section 4.0); Standards Review (See Section 5.0); and Council Initiatives (See Section 6.0));*
- identify individual members' excellence in certain areas and promote the sharing of skills;
- coordinate learning and development in an efficient and structured fashion;
- promote and protect the Council's reputation and credibility leading to public confidence; and
- promote the Council's presence and profile leading to industry awareness and acceptance.

The Learning and Development Map has been and will continue to be carried out via:

- listing key conferences / courses / presentations to Council and cross-referencing with member / staff learning and development needs;

- seeking financial support for those members where a key learning / development need has been identified, an opportunity exists, and the member has no financial support from their employer or industry association;
- seeking financial support for staff where a key learning / development need has been identified and an opportunity exists;
- having at least 1 attendee at each key conference / training course;
- considering allocation of limited resources; and
- providing written reports back to the Council.

Agency Office Consolidation (ODWAC and OPAC)

In the fall of 2013, the Ontario Drinking Water Advisory Council (ODWAC) and the Ontario Pesticides Advisory Committee (OPAC) combined their respective office spaces, achieving considerable savings for the Ministry of the Environment and the province, through space reduction and the sharing of physical and human resources. The Council's Executive Assistant has taken on more responsibility with a new dual role without the benefit of extra resources.

Appendix A - Advice on Vinyl Chloride

40 St. Clair Avenue West
3rd Floor
Toronto, Ontario
M4V 1M2

Tel 416.212.7779
Fax 416.212.7595

40, avenue St. Clair ouest
3^e étage
Toronto, Ontario
M4V 1M2

Tél 416.212.7779
Télééc 416.212.7595



October 30, 2013

The Honourable Jim Bradley
Minister of the Environment
77 Wellesley Street West
11th Floor, Ferguson Block
Toronto, Ontario M7A 2T5

Dear Minister Bradley:

Re: Advice on the Ontario Drinking Water Quality Standard for Vinyl Chloride

Part of the Ontario Drinking Water Advisory Council's mandate is to provide you with advice on proposed drinking water standards, objectives, or guidelines and their applicability in Ontario.

In order to provide comprehensive advice, the Council assesses Health Canada's Guideline Technical Documents and Guidance Documents, comments from the national public consultation process, and information on the occurrence and impact that a particular substance is likely to have on the delivery of safe drinking water in Ontario.

Based on this assessment, the Council may recommend the endorsement of a Canadian Drinking Water Quality Guideline (CDWQG) as an Ontario Drinking Water Quality Standard (ODWQS) in Ontario Regulation 169/03, or as an Objective, or a Guideline, or it may make an alternative recommendation. The Council may also conduct independent consultations with stakeholders and technical experts as deemed necessary to formulate its advice. The Council has now completed its review of vinyl chloride in drinking water.

Health Canada, through the Federal-Provincial-Territorial process, has completed its review of the health risks associated with vinyl chloride in drinking water, incorporating all relevant routes of exposure from drinking water (i.e. ingestion, inhalation, and skin absorption), assessing new studies and approaches, and considering the availability of appropriate treatment technology.

Vinyl chloride is primarily a synthetic chemical although it may be formed naturally in soils. It can enter drinking water through industrial discharges, chemical and latex manufacturing plants, as a result of the biodegradation of synthetic solvents, and leaching from polyvinyl chloride pipes. Due to its volatility, vinyl chloride is primarily of concern where groundwater is used as a source for drinking water systems.

Based on their review, Health Canada has chosen to reaffirm its previous (1987) CDWQG at a maximum acceptable concentration (MAC) of 0.002 mg/L, which is identical to Ontario's current ODWQS.

Vinyl chloride is classified as a Group 1 carcinogen (i.e. carcinogenic to humans), has no safe threshold, and its response-dose relationship is considered linear. This means that theoretically, any source of exposure may increase the risk of cancer.

For contaminants classified as carcinogens, Health Canada has defined "essentially negligible" "as a range from one new cancer above background levels per hundred thousand people to one new cancer above background levels per million people.

However, Health Canada's Guideline Technical Document on vinyl chloride states that "the estimated lifetime cancer risk associated with ingestion of water containing vinyl chloride at the proposed MAC of 0.002 mg/L is fifty in a million, which falls outside of the range that is considered to represent "essentially negligible".

This Council has deemed that, for Ontario, chemical Standards for carcinogenic contaminants should be established at a level which represents an estimated lifetime (70 years) risk of cancer incidence that is considered to be "essentially negligible" or as close to "essentially negligible" as reasonably practicable. For the Council, this risk level is one in a million, which, for vinyl chloride, is equivalent to 0.00004 mg/L.

However, commercial laboratories that analyze for vinyl chloride in drinking water currently cannot routinely achieve the detection limits necessary to support an ODWQS of 0.00004 mg/L, and there is no official process available in Canada to change this.

The Council has determined that these laboratories *could* support an ODWQS of 0.001 mg/L, but also acknowledges that this risk level is equal to twenty-five in a million, which is higher than the Council's health-based target for this type of contaminant.

The Council will continue to monitor vinyl chloride's practical detection limits and will keep you apprised if analytical methods used by commercial drinking water testing laboratories facilitate the revision of this Standard to a more stringent level.

According to Ministry of the Environment staff, all regulated Drinking Water Systems in Ontario should currently be able to meet a more stringent Standard of 0.001 mg/L.

It should also be noted that, if any level of vinyl chloride is detected by DWSP or any drinking water system's own monitoring results, the cause is investigated. This is in keeping with Health Canada's policy that "every effort should be made to maintain vinyl chloride levels in drinking water as low as reasonably achievable", known as the ALARA principle, which the Council supports.

The Council, therefore, recommends that the Ministry of the Environment set a more stringent Ontario Drinking Water Quality Standard of 0.001 mg/L for vinyl chloride.

For reference, limits in other jurisdictions are as follows: United States Environmental Protection Agency (USEPA, 2000): 0.002 mg/L; World Health Organization (WHO, 2004): 0.0003 mg/L; Australia (NHMRC, 2004): 0.003 mg/L; and California's current (1989) Maximum Contaminant Level is 0.0005 mg/L. International limits vary between jurisdictions due to different approaches and policies employed in developing their respective standards or guidelines (including acceptable levels of risk, body weights and consumption rates).

Vinyl chloride is one of the contaminants identified as part of the USEPA's review of carcinogenic volatile organic compounds (cVOCs) group review. These cVOCs are the first to be slated for regulation as a group by the USEPA. In a March 7, 2011 letter addressed to me, the Minister of the Environment requested that this USEPA initiative be tracked by the Council, with consideration towards its applicability to Ontario's drinking water protection framework. To this end, the Council will continue to keep abreast of this initiative, and will report back to you, as the USEPA advances its review of this group, which may include any possible new advice on vinyl chloride.

The Council acknowledges and understands that a more stringent ODWQS for vinyl chloride may affect the province's Site Condition Standards for Contaminated Sites under potable groundwater scenarios, whenever vinyl chloride is found in groundwater or, whenever soil is contaminated with vinyl chloride and mitigation measures are under consideration.

The Council feels that its recommendation on a more stringent ODWQS for vinyl chloride will enable continuous improvement in the quality of drinking water for Ontarians

Sincerely,

ORIGINAL SIGNED BY:

Jim Merritt, Chair
Ontario Drinking Water Advisory Council

Appendix B - Relevant Legislation

- *Safe Drinking Water Act, 2002, Sections 4-5*

Advisory Council on Drinking-water Quality and Testing Standards

4. (1) The Minister shall establish an advisory body known in English as the “Advisory Council on Drinking-water Quality and Testing Standards” and in French as “Conseil consultatif sur les normes de qualité et d’analyse de l’eau potable” to consider issues relating to standards for drinking-water quality and testing and to make recommendations to the Minister. 2002, c. 32, s. 4 (1).

Appointment of members

(2) The members of the Advisory Council shall be appointed by the Minister. 2002, c. 32, s. 4 (2).

Notice

(3) The Advisory Council may publish information in the Registry. 2002, c. 32, s. 4 (3).

Consideration by Minister

5. The Minister shall ensure that all recommendations of the Advisory Council on Drinking-water Quality and Testing Standards are taken into consideration in establishing and revising standards under this Act for drinking-water quality and testing. 2002, c. 32, s. 5.

Appendix C - Council's Standards Review Protocol

The following summary table and detailed descriptions of the Council's Standards Review Protocol were developed to address and implement Recommendation #25 of the Part Two Report of the Walkerton Inquiry, which states that "In setting drinking water quality standards for Ontario, the Minister of the Environment should be advised by an Advisory Council on Standards." The protocol focuses and guides the Council in providing timely advice to the Minister of the Environment on standards.

Summary Table

Federal Stage	MOE Stage	Council Stage				
				Issue	Input	Output
National Priority Setting	MOE Input into Priorities	1	a. Convey Substances of Interest to MOE (yearly)	Substances of Interest addressed	Proposed National Priority List	Conveyance of Substances of Interest to Minister of the Environment (<i>formal</i>)
			b. Review Final National Priority List	Substances of Interest NOT included on the list to be addressed by MOE	Final National Priority List	Conveyance of Substances of Interest NOT included on the list to Minister of the Environment (<i>formal</i>)
Scientific / Technical Review			<i>No Council Involvement</i>			
Guideline Technical Document	Review & Comment	2	a. Assess Guideline Technical Document	Concerns with document addressed	Draft Guideline Technical Document, decision sought, references, presentation	Information for formulation of advice on Ontario's position
National Public Consultation			b. Propose Interim Ontario Standard (<i>if warranted</i>) i. Undertake Independent Consultation (<i>if warranted</i>)			

Federal Stage	MOE Stage	Council Stage				
				Issue	Input	Output
Assess comments from National Public Consultation	Assess comments from National Public Consultation	3	Assess Comments from National Public Consultation	Concerns with national public comments addressed	Public comments from National consultation	Information for formulation of advice on Ontario's position
Draft Final Guideline Technical Document	Review & Comment	4	a. Assess Draft Final Guideline Technical Document b. Undertake Independent Consultation (if warranted) c. Determine and convey Position to MOE (informal)	Concerns with document addressed	Draft Final Guideline Technical Document; Presentation by MOE / HC expert	Conveyance of Council's advice to Ministry of the Environment and Minister's Office staff (informal)
	Convey Ontario's Position to CDW, CHE		<i>No Council Involvement</i>			
CDW, CHE Approval of Guideline Technical Document and Canadian Drinking Water Quality Guideline		5	Transmit Advice Letter to Minister (Proposed Ontario Standard, Objective, or Guideline, and operational advice, if necessary)	Ontario Concerns with final document addressed	Final Guideline Technical Document	Conveyance of Council's advice to Minister of the Environment (formal)
	Ontario public consultation via EBR Proposal		<i>No Council Involvement</i>			
	Assess EBR comments		<i>No Council Involvement</i>			
	Post EBR Decision		<i>No Council Involvement</i>			
	Revise Reg. 169, and / or other guidance documents as necessary		<i>No Council Involvement</i>			

Council Engagement Stage 1:

a. Convey Council's Substances of Interest to the MOE

The question before the Council at this sub-stage is:

Are there any substances of interest that are not already on the proposed National Priority List?

Priorities Considerations:

- Does the substance have an adverse health effect?
- Is the substance known or likely to occur at levels of concern?
- Would regulating the substance provide a meaningful opportunity for risk reduction?
- Would research of this substance (which could include collecting occurrence data, treatment data, health effects data, and developing analytical methods) constitute a good use of resources and funding?

Notes:

- Must account for emerging and emergency parameters (like NDMA)
- Can suggest re-ranking of parameters
- Minister may call on Council at any time for advice

Input: Ministry of the Environment Liaison staff member to supply the Council with the *proposed* National Priority List for review. Council members then identify substances of interest (that are not already on the list) and prepare for their discussion at the June meeting of every year.

Output: Council to submit a list of substances of interest to the Minister of the Environment to be considered for inclusion in Ontario's Standards Plan, and input into the Federal-Provincial-Territorial process.

b. Review Final National Priority List

The question before the Council at this sub-stage is:

Are there any substances that the Council recommended for inclusion on the National Priority List, that did not make the List, and, if so, what action should the Council take?

This sub-stage is directly linked to Recommendation #26 of the Part Two Report of the Walkerton Inquiry, which states that “*The Advisory Council on Standards should have the authority to recommend that the provincial government adopt standards for contaminants that are not on the current federal-provincial agenda.*”

Input: Ministry of the Environment Liaison staff member to supply the Council with the *final* National Priority List for review. Council members then review the National Priority List and identify the Council’s substances of interest that did not get included, if any. The Council will then prepare for discussion of these substances to decide what steps should be taken, including whether to advise the Ministry of the Environment to undertake their own standard review.

Output: Council to convey advice on next steps for the Substances of Interest (that did not get included in the Final National Priority List) to the Minister for the Ministry of the Environment to undertake its own scientific / technical review in consideration of the preparation of a document for public consultation.

Council Engagement Stage 2:

a. Assess Guideline Technical Comment

The question before the Council at this sub-stage is:

Does the Council have any concerns with the Guideline Technical Document?

The Council's role in this stage is to assess the Guideline Technical Document arising from the National Process, relying primarily on the knowledge and experience of its members, and possibly including such aspects as economic impacts, occurrence data, treatment data, and analytical methods, with consideration given to "Nice to Have" versus "Need to Have" information.

In the event that the above-mentioned aspects cannot easily be addressed, it may be determined that additional information or work is required. If so, the following process will be initiated, in consultation with the Ministry of the Environment's Standards Development Branch (SDB), to assist the review of the substance in question:

Process for Requesting Information from the Ministry:

- Consult with SDB Director and Ministry of the Environment Liaison staff member to clarify Council's request
- Consult with SDB. If deemed simple, requested information be supplied to Council through Ministry of the Environment Liaison staff member
- Consult with SDB. If deemed complex, Ministry of the Environment Liaison staff member to provide ideas on next steps to the Council
- If under \$25,000, Council could initiate and project-manage the research in cooperation with SDB
- If over \$25,000, Council to formally advise Minister of study / research need

Input: Guideline Technical Document, decision sought, scientific references, and a presentation by the Ministry (including information on the range of values and possible compromises made at the national level, and known and potential contentious issues), and *if required*, information per the above 5 step process for requesting information from the Minister or Ministry.

Output: Council to use information to develop advice for inclusion in the analysis and formulation of Ontario's position.

b. Propose Interim Ontario Standard (If warranted)

The question before the Council at this sub-stage is:

Does Ontario need an interim standard while the National Process is undertaken?

The Council will assess the Draft Guideline Technical Document to consider whether or not to advise Ontario to adopt an interim standard.

Input: Council to receive Draft Guideline Technical Document, and, when required, other documentation for review, decision sought, scientific references, and a presentation by the Ministry (including information on the range of values and possible compromises made at the national level, as well as known and potential contentious issues).

Output: Council to convey advice on possible interim standard to the Minister for implementation consideration by the Ministry of the Environment.

i. Undertake Independent Consultation (If warranted)

The question before the Council at this sub-stage is:

Does the Council feel that it needs to undertake its own consultation to gain a better understanding of stakeholder and public concerns?

The Council could use the following consultation methods to obtain more or different information about a standard: EBR Information Posting, peer review, stakeholder information sessions, or public meetings.

Input: Draft Guideline Technical Document

Output: Council to use information gleaned from independent consultation process to provide advice to the Ministry of the Environment, for inclusion in Ontario's position.

Council Engagement Stage 3:

Assess Comments from National Public Consultation

The question before the Council at this stage is:

Does the Council have any concerns that arise from the comments received from the national public consultation?

The Council's role in this stage is to take into account comments received from the National public consultation process.

Input: Council to receive public comments from the national consultation.

Output: Council to use comments received for inclusion in the analysis and formulation of Ontario's position, as well as to assess the Draft Final Guidance Technical Document in Stage 4.

Council Engagement Stage 4:

a. Assess Draft Final Guideline Technical Document

The question before the Council at this sub-stage is:

Does the Council have any concerns with the Draft Final Guideline Technical Document?

This stage is positioned after public consultation, but before the Canadian Drinking Water Quality Guideline is approved, or any other document goes to the Federal-Provincial-Territorial Committee on Drinking Water (CDW) and the Federal-Provincial-Territorial Committee on Health and the Environment (CHE).

The Council's role in this stage is to assess the Draft Final Guideline Technical Document, taking into account the assessment of the comments received from the National public consultation process in Stage 3.

Input: Draft Final Guideline Technical Document; Presentation by Ministry of the Environment and / or Health Canada expert.

Output: Assessment to be used in providing advice to the Ministry of the Environment on the acceptability of the Draft Final Guideline Technical Document, in relation to Ontario.

b. Undertake Independent Consultation (If warranted)

The question before the Council at this sub-stage is:

Does the Council feel that it needs to undertake its own consultation to gain a better understanding of stakeholder and public concerns?

The Council could use the following consultation methods to obtain more or different information about a standard: EBR Information Posting, peer review, stakeholder information sessions, or public meetings.

Input: Draft Final Guideline Technical Document and comments received from the National public consultation process.

Output: Council to use information gleaned from independent consultation process to provide advice to the Ministry of the Environment, for inclusion in Ontario's position.

c. Determine and Convey Position to MOE (Informal)

There are 2 questions before the Council at this sub-stage:

1. *Should the Ontario Standard be set at a level different from the Canadian Drinking Water Quality Guideline?*
2. *How should the Standard be applied in Ontario?*

The Council's role in this stage is to propose an Ontario Drinking Water Quality Standard, Objective or Guideline, including operational advice, if deemed necessary, in order to provide advice on how the standard is to be applied in Ontario, in regards to sampling, compliance, and regulation.

It should be noted that the Council will only propose an Ontario Drinking Water Quality Standard, Objective, or Guideline that is equivalent to or more stringent than a Canadian Drinking Water Quality Guideline.

Input: Draft Final Guideline Technical Document, comments received from the National public consultation process, and information gleaned from independent consultation process, if undertaken.

Output: Council to provide informal advice to the Ministry of the Environment on the proposed Ontario Drinking Water Quality Standard, Objective, or Guideline, and its application in Ontario, if deemed necessary.

Council Engagement Stage 5:

Transmit Advice Letter to Minister (*Formal*)

The Council's role in this stage is to formally transmit its advice to the Minister of the Environment, on a proposed Ontario Drinking Water Quality Standard, Objective, or Guideline, or an alternative recommendation.

This transmittal can occur any time after approval has been granted for the Canadian Drinking Water Quality Guideline by both the Committee on Drinking Water (CDW) and the Committee on Health and the Environment (CHE).

The advice may also outline how the standard is to be applied in Ontario, in regards to sampling, compliance, and regulation, if warranted.

It should be noted that the Council will only propose an Ontario Drinking Water Quality Standard, Objective, or Guideline that is equivalent to or more stringent than a Canadian Drinking Water Quality Guideline, or existing Ontario Drinking Water Quality Standard.

Input: Ministry of the Environment Liaison staff member notify the Council when both CDW and CHE have approved the final Canadian Drinking Water Quality Guideline, and supply the final Guideline Technical Document to the Council.

Output: Council to provide formal advice to the Minister of the Environment on the proposed Ontario Drinking Water Quality Standard, Objective, or Guideline, and its application in Ontario, or make an alternative recommendation, if warranted.

Appendix D - Memorandum of Understanding

The following Memorandum of Understanding was agreed upon by the Council and finalized by the Council's Chair and the Minister of the Environment, on July 7, 2010, replacing the Terms of Reference of November 5, 2004. It was also re-affirmed on May 31, 2012.

MEMORANDUM OF UNDERSTANDING

Between:

Minister of the Environment

and

**Advisory Council on
Drinking Water Quality and Testing Standards**

Memorandum of Understanding

ADVISORY COUNCIL ON DRINKING WATER QUALITY AND TESTING STANDARDS

THIS MEMORANDUM OF UNDERSTANDING (“MOU”) is made in triplicate and is effective as of the date set out in Section 13.

1. Definitions

When used in the MOU, the following words or expressions have the following meanings:

- a) “**Chair**” means the Chair of the Advisory Council on Drinking Water Quality and Testing Standards;
- b) “**Council**” means the Advisory Council on Drinking Water Quality and Testing Standards;
- c) “**Deputy Minister**” means the Deputy Minister of the Environment
- d) “**Fiscal Year**” means the period commencing on May 12 and ending on the following May 11;
- e) “**Government**” means the Ontario Government;
- f) “**MBC**” means Management Board of Cabinet;
- g) “**Minister**” means the Ontario Minister of the Environment, or his or her delegate;
- h) “**MOE**” means the Ontario Ministry of the Environment;
- i) “**MOHLTC**” means the Ontario Ministry of Health and Long-Term Care;
- j) “**PSOA**” means the *Public Service of Ontario Act, 2006*, S.O. 2006, c. 35, Sched. A, as amended;
- k) “**Registry**” means the environmental registry established under section 5 of the *Environmental Bill of Rights, 1993*, as amended from time to time; and,
- l) “**SDWA**” means the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32, as amended from time to time.

2. Background

The Government is responsible for regulating drinking water in Ontario under the SDWA, the *Clean Water Act, 2006*, as amended, and their regulations.

The Council is an advisory agency as classified by MBC in accordance with the Ontario Government’s ‘Agency Establishment and Accountability Directive’. The Council is prescribed as a public body and a commission public body for the purposes of the PSOA, pursuant to Ontario Regulation 374/07 “Public Bodies and Commission Public Bodies – Definitions”.

Upon signing, this MOU will replace the existing terms of reference for the Council that was effective November 5, 2004.

3. Legislative Authority

The legislative authority for the Council is set out in Section 4 of the SDWA.

4. Mandate

As set out in Section 4 of the SDWA the Council:

(a) will consider issues relating to standards for drinking water quality and testing and make recommendations to the Minister; and

(b) may publish information in the Registry.

In particular, the Council will:

- a) advise the Minister on issues and initiatives related to standards, methods and procedures for drinking water quality and testing brought forward to the Council by the Minister or raised by members of the Council;
- b) make recommendations to the Minister and report annually upon the activities of the Council; and
- c) ensure its advice reflects the principles that drinking water standards should be based on a precautionary approach and that if the standards are met, a reasonable and informed person would feel safe drinking the water.

5. Expected Outcomes and Timelines

For the purposes of developing its advice to the Minister, the Council may:

- a) review research and scientific and technical documentation related to drinking water quality and testing standards;
- b) recommend the development or adoption of drinking water quality and testing standards, including those not currently on the Federal Government's or Ontario Government's respective agendas;
- c) publish information in the Registry, and undertake additional consultation with, and solicit views from, the general public as necessary; and
- d) when directed by the Minister, provide advice on:
 - i. policies, practices and procedures to be used in the development of drinking water quality and testing standards; or
 - ii. priorities for the development of drinking water quality and testing standards, testing methods and related research.

The Council, through the Chair, will report to and provide written advice to the Minister or his or her delegate as directed. From time to time the Chair will also keep the Minister or his or her delegate informed of drinking water-related issues or events that may concern the Minister in the exercise of his or her responsibilities.

6. Roles and Responsibilities

i) The Minister:

- a) is accountable to the Legislative Assembly for the performance of the Council in the fulfillment of its objects and mandate and compliance with applicable TB/MBC guidelines, directives and policies;
- b) is responsible for reporting and responding to the Legislative Assembly on the affairs of the Council;
- c) is responsible for representing the Council in the Cabinet and its committees, the Legislative Assembly and before committees of the Legislature;
- d) will inform the Chair of the Government's priorities and broad policy directions for the Council, and when appropriate or necessary, will take action or direct that corrective action be taken in respect of the fulfillment of the Council's mandate;
- e) will consult, as appropriate, with the Chair (and others) on significant new directions for the Council and/or when the Government is considering regulatory or legislative changes for the Council;
- f) shall make Council member appointments and reappointments pursuant to the process established by legislation or by Management Board of Cabinet, after consultation with the Chair; and,
- g) may meet with the Chair as required.

ii) The Deputy Minister:

- a) is accountable to the Minister for the performance of the Ministry in providing administrative and organizational support to the Council and for carrying out the roles and responsibilities assigned to the Deputy Minister by the Minister, applicable TB/MBC directives and this MOU;
- b) will fulfill any responsibilities of the Minister, with respect to the Council, which may be delegated to the Deputy Minister by the Minister;

- c) ensures that the Ministry is providing to the Council the administrative and organizational support, financial and other services as set out in this MOU, including:
 - providing the Council with a single point of contact within the Ministry for ongoing monitoring, reporting and liaison between the Ministry and the Council;
 - interpreting Government directives, guidelines, the SDWA and applicable legislation, and
 - undertaking the preparation of all Cabinet, TB/MBC and any other submissions (with supporting documentation) required to obtain any Government approvals necessary for the Council;
- d) undertakes, on the Minister's behalf, to inform and to discuss the policies of the Ministry that apply to the Council;
- e) will meet with the Chair, as required, to discuss matters of mutual importance to the Council and the Ministry, such as services provided by the Ministry to the Council; and,
- f) may, where appropriate, delegate to any of the Ministry's staff any of the responsibilities assigned to the Deputy Minister in this MOU.

iii) **The Chair:**

- a) is accountable to the Minister for the operation of the Council in accordance with the SDWA, this MOU, the approved annual report, applicable TB/MBC and Ministry of Finance directives, policies and guidelines, any other agreement /protocol with the Ministry and directions from the Minister;
 - b) provides strategic leadership for the Council through overall direction on existing priorities and opportunities to enhance the Council's delivery of its mandate as set out in the SDWA;
 - c) undertakes that public funds are used with integrity and honesty and ensures that the Council operates within the approved funding in the fulfillment of its mandate;
 - d) on behalf of the Council, may recommend appropriate amendments to the SDWA or this MOU;
 - e) provides leadership and direction to the Council particularly with respect to the translation of Government policy into mandate of the Council;
-

- f) keeps the Minister informed of issues or events that may concern the Ministry or the government and keeps the Deputy Minister informed as appropriate;
- g) is responsible under the PSOA to act as the ethics executive for Council for all that falls under the ethical framework (oaths of office, disclosure of wrongdoing, conflict of interest and political activity). In this role, the Chair is required to inform the Minister when a disclosure of wrongdoing is received, of the outcome of the disclosure (i.e., no wrongdoing found, referral to another forum, corrective action taken) and to provide any other information as requested by the Minister;
- h) is responsible for reviewing the Council's annual report and bringing it forward to the Minister and the Deputy Minister by August 31 of each year;
- i) is responsible for notifying the Minister of appointment vacancies and making recommendations to the Minister on appointments and reappointments of Council members pursuant to the process for Council appointments established by Management Board of Cabinet;
- j) keeps ongoing liaison with the Ministry's Assistant Deputy Minister of Environmental Science and Standards Division and the Chief Drinking Water Inspector, Assistant Deputy Minister of Drinking Water Management Division to exchange information, identify issues and concerns.

7. Composition

Council members are appointed by the Minister pursuant to Section 4 of the SDWA and are subject to member selection and appointment as stipulated by the Ontario Government's Public Appointments Processing Guide or any successor document. A maximum of fifteen (15) members, one of whom shall be appointed Chair and one of whom may be appointed Vice-Chair, will be chosen from those individuals with expertise in the areas of microbiology, toxicology, risk assessment, engineering, utility operations, public health, and drinking water-related issues.

8. Communications

The Council may publish information on the Registry.

The Council's advice is to be provided to the Minister. Under this MOU, public release of all advice or materials must be approved by the Minister.

The Council's advice is for the Minister. Any publicly released advice or materials under this MOU will be the sole property of Her Majesty the Queen in Right of Ontario and will include the copyright notice "© Queen's Printer for Ontario, [Insert Date Here]".

9. MBC Directives

The Council is subject to and shall comply with the Treasury Board/MBC and Ministry of Finance Directives specified in Schedule 1 to this MOU and any other directives, guidelines and policies that may be applicable to the Council pursuant to its classification as an Advisory Agency and a Commission public body under the PSOA unless the Council is explicitly exempted by MBC and the exemption is communicated in writing to the Chair by the Ministry.

10. Financial Staffing and Administrative Support

The MOE will provide the full range of financial, executive and administrative support services of the same quality and standards as provided to the MOE's own line divisions and branches, either directly or through shared service agreements.

The MOE shall designate one (1) staff liaison member, to act as a Council resource and a link to the MOE.

The MOHLTC may designate one (1) staff liaison member, to act as a Council resource and a link to the MOHLTC.

11. Conflict of Interest and Confidentiality

All Council members appointed by the Minister shall abide by the conflict of interest rules set out in Ontario Regulation 381/07 "Conflict of Interest Rules for Public Servants (Ministry) and Former Public Servants (Ministry)" made under the *Public Service of Ontario Act, 2006*, Schedule A, as amended. For ease of reference, Ontario Regulation 381/07 is reproduced at Schedule 2. [Note, for the purpose of interpretation with respect to this MOU, the term 'public servant' as referred to in O. Reg. 381/07 can be substituted with the term 'Council member'].

Council members will execute a Conflict of Interest and Confidentiality Undertaking provided by the MOE prior to assuming the responsibilities described in this MOU.

12. Administrative Considerations

The Chair will establish meeting schedules. Meetings will be monthly or as deemed necessary.

Council members and Council staff who are Ontario Government employees will not receive additional remuneration for time served on the Council but may receive reimbursement for reasonable expenses in accordance with Management Board of Cabinet directives and guidelines.

Council members and Council staff who are not Ontario Government employees will receive remuneration as determined by the Lieutenant Governor in Council for Ontario for meeting days and time required for official Council business, and will receive reimbursement for reasonable expenses in accordance with Management Board of Cabinet directives and guidelines.

13. Duration of MOU

The MOU will become effective on the date the Minister signs the MOU and will remain in effect for five (5) years from the date of the Minister's signature.

Notwithstanding the sentence above, the MOU shall remain in effect for no more than six (6) additional months until a newly signed MOU is provided to the Secretary, MBC.

14. Process for Review and Amendment

This MOU shall be reviewed upon appointment of a new Minister or a new Chair. The purpose of the review is to ensure that the Minister or the Chair, as the case may be, is aware of this MOU and to give the Minister or the Chair the opportunity to amend this MOU. Where the Minister and the Chair agree to continue this MOU with or without requiring any amendment, both parties must affirm the continuance and set out the amendments to the MOU, if any, in writing.

This MOU may be amended in writing at any time with the agreement of the Minister and the Council. Either the Minister or the Council through the Chair may propose amendments to this MOU.

FOR HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO AS REPRESENTED BY THE MINISTER OF THE ENVIRONMENT

Per: Original Signed by:
The Honourable John Gerretsen
Minister

Date: July 7, 2010

FOR THE ADVISORY COUNCIL ON DRINKING WATER QUALITY AND TESTING STANDARDS

Per: Original Signed by:
Jim Merritt
Chair

Date: July 7, 2010

SCHEDULE 1

MBC DIRECTIVES APPLICABLE TO ADVISORY COUNCIL ON DRINKING WATER QUALITY AND TESTING STANDARDS

The Council is required to comply with all government directives which are applicable to an Advisory Agency. Amended, revised or successive directives continue to apply to the Council. Where a directive applies, all associated policies, procedures and guidelines also apply.

In addition to the above, any newly established government directive that applies to an Advisory Agency applies to the Council, unless explicitly exempted in accordance with government practices.

All Treasury Board/MBC and Ministry of Finance directives and policies apply to the Council.
Without limiting the generality of the foregoing, the directives include the following:

- Accountability Directive
- Advertising Content Directive
- Agency Establishment and Accountability Directive
- Delegation of Authority Key Directive
- Government Appointees Directive
- Procurement Directive
- Travel, Meal & Hospitality Expenses Directive

SCHEDULE 2

Public Service of Ontario Act, 2006

ONTARIO REGULATION 381/07

CONFLICT OF INTEREST RULES FOR PUBLIC SERVANTS (MINISTRY) AND FORMER PUBLIC SERVANTS (MINISTRY)

Consolidation Period: From August 20, 2007 to the e-Laws currency date.

No amendments.

PART I RULES FOR PUBLIC SERVANTS WHO WORK IN A MINISTRY

INTERPRETATION

Definitions

1. In this Part,

“confidential information” means information that is not available to the public and that, if disclosed, could result in harm to the Crown or could give the person to whom it is disclosed an advantage;

“gift” includes a benefit of any kind;

“spouse” means,

(a) a spouse as defined in section 1 of the *Family Law Act*, or

(b) either of two persons who live together in a conjugal relationship outside marriage.
O. Reg. 381/07, s. 1.

Application

2. This Part applies to every public servant who works in a ministry. O. Reg. 381/07, s. 2.

PROHIBITED CONDUCT

Benefiting self, spouse or children

3. (1) A public servant shall not use or attempt to use his or her employment by the Crown to directly or indirectly benefit himself or herself or his or her spouse or children. O. Reg. 381/07, s. 3 (1).

(2) A public servant shall not allow the prospect of his or her future employment by a person or entity to detrimentally affect the performance of his or her duties to the Crown. O. Reg. 381/07, s. 3 (2).

Accepting gifts

4. (1) A public servant shall not accept a gift from any of the following persons or entities if a reasonable person might conclude that the gift could influence the public servant when performing his or her duties to the Crown:

1. A person, group or entity that has dealings with the Crown.
2. A person, group or entity to whom the public servant provides services in the course of his or her duties to the Crown.
3. A person, group or entity that seeks to do business with the Crown. O. Reg. 381/07, s. 4 (1).

(2) Subsection (1) shall not operate to prevent a public servant from accepting a gift of nominal value given as an expression of courtesy or hospitality if doing so is reasonable in the circumstances. O. Reg. 381/07, s. 4 (2).

(3) A public servant who receives a gift in the circumstances described in subsection (1) shall notify his or her ethics executive. O. Reg. 381/07, s. 4 (3).

Disclosing confidential information

5. (1) A public servant shall not disclose confidential information obtained during the course of his or her employment by the Crown to a person or entity unless the public servant is authorized to do so by law or by the Crown. O. Reg. 381/07, s. 5 (1).

(2) A public servant shall not use confidential information in a business or undertaking outside his or her work for the Crown. O. Reg. 381/07, s. 5 (2).

(3) A public servant shall not accept a gift directly or indirectly in exchange for disclosing confidential information. O. Reg. 381/07, s. 5 (3).

Giving preferential treatment

6. (1) When performing his or her duties to the Crown, a public servant shall not give preferential treatment to any person or entity, including a person or entity in which the public servant or a member of his or her family or a friend has an interest. O. Reg. 381/07, s. 6 (1).

(2) When performing his or her duties to the Crown, a public servant shall endeavour to avoid creating the appearance that preferential treatment is being given to a person or entity that could benefit from it. O. Reg. 381/07, s. 6 (2).

(3) A public servant shall not offer assistance to a person or entity in dealing with the Crown other than assistance given in the ordinary course of the public servant's employment. O. Reg. 381/07, s. 6 (3).

Hiring family members

7. (1) A public servant shall not, on behalf of the Crown, hire his or her spouse, child, parent or sibling. O. Reg. 381/07, s. 7 (1).

(2) A public servant shall not, on behalf of the Crown, enter into a contract with his or her spouse, child, parent or sibling or with a person or entity in which any of them has a substantial interest. O. Reg. 381/07, s. 7 (2).

(3) A public servant who hires a person on behalf of the Crown shall ensure that the person does not report to, or supervise the work of, the person's spouse, child, parent or sibling. O. Reg. 381/07, s. 7 (3).

(4) A public servant who reports to, or supervises the work of, his or her spouse, child, parent or sibling shall notify his or her ethics executive. O. Reg. 381/07, s. 7 (4).

Engaging in business, etc.

8. A public servant shall not become employed by or engage in a business or undertaking outside his or her employment by the Crown in any of the following circumstances:

1. If the public servant's private interests in connection with the employment or undertaking could conflict with his or her duties to the Crown.
2. If the employment or undertaking would interfere with the public servant's ability to perform his or her duties to the Crown.
3. If the employment is in a professional capacity and is likely to influence or detrimentally affect the public servant's ability to perform his or her duties to the Crown.
4. If the employment would constitute full-time employment for another person. However, this paragraph does not apply with respect to a public servant who is employed part-time by the Crown. This paragraph also does not apply with respect to a public servant who is on an authorized leave of absence from his or her position, but only if the employment is not contrary to or inconsistent with the terms of the leave of absence.
5. If, in connection with the employment or undertaking, any person would derive an advantage from the public servant's employment as a public servant.
6. If government premises, equipment or supplies are used in the employment or undertaking. O. Reg. 381/07, s. 8.

Participating in decision-making

9. (1) A public servant shall not participate in decision-making by the Crown with respect to a matter that the public servant is able to influence in the course of his or her duties if the public servant could benefit from the decision. O. Reg. 381/07, s. 9 (1).

(2) Subsection (1) does not apply if the public servant obtains the prior approval of his or her ethics executive to participate in decision-making by the Crown with respect to the matter. O. Reg. 381/07, s. 9 (2).

(3) A public servant who, in the course of his or her employment in a ministry, is a member of a body or group shall not participate in, or attempt to influence, decision-making by the body or group with respect to a matter if the public servant could benefit from the decision or if, as a result of the decision, the interests of the body or group could conflict with the interests of the Crown. O. Reg. 381/07, s. 9 (3).

(4) A public servant described in subsection (3) shall inform the body or group if the circumstances described in that subsection exist. O. Reg. 381/07, s. 9 (4).

MATTERS THAT MIGHT INVOLVE THE PRIVATE SECTOR

Interpretation

10. (1) Sections 11 and 12 apply to every public servant who works in a ministry, who routinely works on one or more matters that might involve the private sector and who has access to confidential information about the matter obtained during the course of his or her employment by the Crown. O. Reg. 381/07, s. 10 (1).

(2) In this section and in sections 11 and 12,

“matter that might involve the private sector” means a matter,

- (a) that relates to services currently provided under a program of the Crown or by a public body, an agency of the Crown or a corporation controlled by the Crown with respect to which it is possible that a private sector entity will provide all or part of the financing for the services or will provide some or all of the services, and
- (b) that has been referred to a ministry, a public body or an agency of the Crown by the Executive Council or a member of the Executive Council for review or implementation. O. Reg. 381/07, s. 10 (2).

Duty to declare certain financial interests

11. (1) When a public servant described in subsection 10 (1) begins work on a matter that might involve the private sector, he or she shall make a declaration to the Conflict of Interest Commissioner in which the public servant discloses the following matters respecting his or her financial interests:

1. A legal or beneficial interest of the public servant in securities or derivatives of corporations or governments, other than the Government of Ontario.
2. A legal or beneficial interest of the public servant in a business entity or a commercial operation or in the assets of such an entity or operation.
3. A legal or beneficial interest of the public servant in real property.
4. A legal or beneficial interest of the public servant in a mutual fund that is operated as an investment club where,
 - i. its shares or units are held by not more than 50 persons and its indebtedness has never been offered to the public,
 - ii. it does not pay or give any remuneration for investment advice or in respect of trades in securities, except normal brokerage fees, and
 - iii. all of its members are required to make contributions in proportion to the shares or units each holds for the purpose of financing its operations. O. Reg. 381/07, s. 11 (1).

(2) Despite subsection (1), the public servant is not required to disclose his or her legal or beneficial interest in any of the following:

1. A mutual fund within the meaning of subsection 1 (1) of the *Securities Act* other than a mutual fund described in paragraph 4 of subsection (1) of this Regulation.
2. Fixed-value securities issued or guaranteed by a government or a government agency.

3. A guaranteed investment certificate or similar financial instrument issued by a financial institution entitled by law to issue such instruments.
4. A registered pension plan, an employee benefit plan, an annuity or life insurance policy or a deferred profit sharing plan.
5. Real property that the public servant, or a member of his or her family, uses primarily as a residence or for recreational purposes. O. Reg. 381/07, s. 11 (2).

(3) The public servant shall disclose the information required by subsection (1), with necessary modifications, in respect of his or her spouse and dependent children, but only to the extent that the legal or beneficial interests of the spouse or a child could create a conflict of interest. O. Reg. 381/07, s. 11 (3).

(4) For the purpose of subsection (3), the public servant shall make reasonable efforts to obtain information about the financial interests described in subsection (1) of his or her spouse and dependent children. O. Reg. 381/07, s. 11 (4).

(5) The public servant shall give the Conflict of Interest Commissioner a revised declaration whenever there is a change in any of the information required to be disclosed. O. Reg. 381/07, s. 11 (5).

Prohibition on certain purchases

12. (1) A public servant described in subsection 10 (1) shall not purchase, or cause another person to purchase on his or her behalf, a legal or beneficial interest in an entity that is carrying on, or proposes to carry on, an activity relating to a matter that might involve the private sector. O. Reg. 381/07, s. 12 (1).

(2) Despite subsection (1), a public servant may purchase an interest in a mutual fund (within the meaning of subsection 1 (1) of the *Securities Act*) that includes securities of a person or entity described in subsection (1) but not an interest in a mutual fund described in paragraph 4 of subsection 11 (1) of this Regulation that includes such securities. O. Reg. 381/07, s. 12 (2).

(3) The prohibition described in subsection (1) ceases to have effect with respect to the matter,

- (a) six months after the date on which the action in respect of the matter is completed; or
- (b) six months after the date the Crown ceases to work on the matter. O. Reg. 381/07, s. 12 (3).

List of positions

13. (1) The Public Service Commission shall maintain a current list of positions in which public servants work in a ministry and routinely work on one or more matters that might involve the private sector. O. Reg. 381/07, s. 13 (1).

(2) The Commission shall ensure that public servants employed by the Crown in the positions described in subsection (1) are advised of the duties and restrictions imposed upon them under sections 11 and 12. O. Reg. 381/07, s. 13 (2).

(3) Every ethics executive shall notify the Commission of changes to be made to the list with respect to those persons for whom he or she is the ethics executive. O. Reg. 381/07, s. 13 (3).

PART II
RULES FOR FORMER PUBLIC SERVANTS WHO WORKED IN A MINISTRY

INTERPRETATION

Definition

14. In this Part,

“designated senior position” means any of the following positions:

1. The Secretary of the Cabinet.
2. Deputy minister, associate deputy minister or assistant deputy minister.
3. A position that is classified under subsection 33 (1) of the Act as SMG 2, XOFA 1, XOFA 2, ITX 2, ITX 3 or ITX 4. O. Reg. 381/07, s. 14.

Application

15. (1) This Part applies with respect to every former public servant who, immediately before he or she ceased to be a public servant, worked in a ministry. O. Reg. 381/07, s. 15 (1).

(2) Despite subsection (1), this Part does not apply to a person who ceases to be a public servant before the day on which section 57 of the Act comes into force. O. Reg. 381/07, s. 15 (2).

PROHIBITED CONDUCT

Seeking preferential treatment, etc.

16. A former public servant shall not seek preferential treatment by, or privileged access to, public servants who work in a minister’s office, a ministry or a public body. O. Reg. 381/07, s. 16.

Disclosing confidential information

17. (1) A former public servant shall not disclose confidential information obtained during the course of his or her employment by the Crown to a person or entity unless the former public servant is authorized to do so by law or by the Crown. O. Reg. 381/07, s. 17 (1).

(2) A former public servant shall not use confidential information in a business or undertaking. O. Reg. 381/07, s. 17 (2).

Restriction on lobbying

18. (1) This section applies to a former public servant who, immediately before ceasing to be a public servant, was employed in a designated senior position. O. Reg. 381/07, s. 18 (1).

(2) For 12 months after ceasing to be a public servant, the former public servant shall not lobby any of the following persons on behalf of a public body or another person or entity:

1. A public servant who works in a ministry or public body in which the former public servant worked at any time during the 12 months before he or she ceased to be a public servant.
 2. The minister of any ministry in which the former public servant worked at any time during the 12 months before he or she ceased to be a public servant.
-

3. A public servant who works in the office of a minister described in paragraph 2.
O. Reg. 381/07, s. 18 (2).

Restriction on employment, etc.

19. (1) This section applies to a former public servant who, immediately before ceasing to be a public servant, was employed in a designated senior position and who, at any time during the 12 months before he or she ceased to be employed as a public servant, in the course of his or her employment as a public servant,

- (a) had substantial involvement with a public body or another person or entity; and
 - (b) had access to confidential information that, if it were to be disclosed to the public body, person or entity, could result in harm to the Crown or could give the public body, person or entity an unfair advantage in relation to one or more third parties.
- O. Reg. 381/07, s. 19 (1).

(2) For 12 months after ceasing to be a public servant, the former public servant shall not accept employment with the public body, person or entity or serve as a member of the board of directors or other governing body of the public body, person or entity. O. Reg. 381/07, s. 19 (2).

Restriction re certain transactions

20. (1) This section applies to a former public servant who, when he or she was a public servant working in a ministry, advised the Crown about a particular proceeding, negotiation or other transaction. O. Reg. 381/07, s. 20 (1).

(2) The former public servant shall not advise or otherwise assist any public body or any other person or entity in connection with the particular proceeding, negotiation or other transaction until the Crown ceases to be involved in it. O. Reg. 381/07, s. 20 (2).

(3) Despite subsection (2), the former public servant may continue to advise or otherwise assist the Crown in connection with the particular proceeding, negotiation or other transaction. O. Reg. 381/07, s. 20 (3).

21. Omitted (provides for coming into force of provisions of this Regulation). O. Reg. 381/07, s. 21.

Appendix E - Website

The Council's website, www.odwac.gov.on.ca, continued to be an important source of information for the general public, drinking water stakeholders, Ministry of the Environment, and Ministry of Health and Long-Term Care staff.

The Council's website was re-developed and updated to provide information on:

- History and establishment of the Council
- Mandate
- Requests from the Minister of the Environment
- Standards Review
- Proactive Initiatives
- Stakeholder Consultations
- Public Minutes from Council Meetings
- Reports to the Minister of the Environment
- Annual Reports
- Drinking Water-related Announcements
- Links to other Drinking Water-related Websites
- Members' Biographies
- Contact Information

Appendix F - Council Members' Biographies

Dr. Susan Andrews is an Associate Professor of Civil Engineering at the University of Toronto and was previously an Associate Professor of Civil Engineering at the University of Waterloo. She earned both her B.Sc. and her M.Sc. in Chemistry at the University of Alberta, and her PhD in Civil Engineering also at the University of Alberta. Dr. Andrews is an Associate Program Leader (Infrastructure) for the Canadian Water Network, former director of the Walkerton Clean Water Centre and former Chair of the Ontario Water Works Association. She is a member of the Association of Environmental Engineering and Science Professors, the American Water Works Association, the Water Environment Federation, the Chemical Institute of Canada, the American Chemical Society, the Canadian Association on Water Quality, the International Water Association, the Ontario Water Works Association and the Society for Teaching and Learning in Higher Education.

Ian Douglas has over 25 years of experience in design, research, and plant operations in the industrial and environmental sector. He earned degrees in both Chemistry (1984) and Chemical Engineering (1987) from the University of Western Ontario. As Water Quality Engineer for the City of Ottawa, he has worked on more than 50 research and optimization projects with various research organizations and universities. During 2007 Ian spent a 1-year work term at Health Canada working on microbial risk assessment and treatment guidelines. During 2010, he was appointed as Adjunct Professor in Civil Engineering at the University of Toronto.

Michèle Giddings has more than 25 years of experience in drinking water-related science, policy and research. She is the Manager of the Water Quality and Science Division in the Water and Air Quality Bureau, Healthy Environments & Consumer Safety Branch, Health Canada and is a member of Health Canada's Secretariat for the Federal / Provincial / Territorial Committee on Drinking Water. Ms. Giddings is also a member of the World Health Organization's Drinking Water Quality Committee and co-coordinator of the Disinfectants and Disinfection By-products Working Group which are responsible for the development of the World Health Organization's *Guidelines for Drinking Water-water Quality*. Ms. Giddings has also developed a number of drinking water guidelines for Health Canada and the World Health Organization. She is also a member of the America Water Works Association (AWWA), the Ontario Water Works Association (OWWA) and on the Board of Directors of the Canadian Association for Laboratory Accreditation (CALA [formerly CAEAL]).

Derek Hill is a professional engineer with over 28 years of experience in planning, project management, design, contract administration and construction of infrastructure projects including buildings. Mr. Hill is a member of the Seneca Nation from the Six Nations of the Grand River Territory. He has worked for Public Works Canada, Mushkegowuk Council, private consulting, the Town of Fort Erie, and Six Nations Council. Since 2009, he has worked with the Ontario First Nations Technical Services Corporation as a Senior Engineer out of the Toronto office. In this role he provides engineering, construction and technical advisory services to First Nations and Tribal Councils across Ontario. The projects involve all types of infrastructure including buildings from concept through to commissioning of the facilities.

Rod Holme is a consultant with broad technical and project management experience in municipal water supply. In addition to his role as a Vice President in a major international consulting company, he has also played an active role in professional Associations. He has served as Chair of the Ontario Water Works Association, President of the American Water Works Association, and most recently as Chair of a Joint Committee of the Ontario Water Works and Ontario Municipal Water Associations in providing input into the Walkerton Inquiry, and working with the Ontario Ministry of the Environment in implementing the Inquiry recommendations. Mr. Holme is also a member of the Australian Water Association, having graduated as a Bachelor of Engineering from the University of Sydney and started his career with Sydney Water.

Dr. Peter Huck is a Professor and NSERC Chair in Water Treatment in the Department of Civil Engineering at the University of Waterloo. The mission of the Chair, which is now in its fifth five-year term, is to conduct fundamentally based yet practically oriented research related to drinking water. Dr. Huck is well respected internationally and served as a member of the Expert Panel for Part I of the Walkerton Inquiry.

Dr. Alexander Hukowich is the former Medical Officer of Health for the Haliburton, Kawartha, Pine Ridge Health Unit and coroner for Northumberland County, and was nominated for the Council by the Association of Local Public Health Agencies.

Dr. Robert Lannigan is the Program Head Laboratory Medicine, London Health Sciences Centre, Pathology and Laboratory Medicine, Department of Pathology and Laboratory Medicine, Schulich School of Medicine and Dentistry, Western University. Dr. Lannigan is also a Professor of Pathology and Laboratory Medicine, Microbiology and Immunology and Medicine, Western University, as well as a member of the American Society of Microbiology, and the Association of Medical Microbiology and Infectious Diseases, Canada, and is also a member of the Ontario Medical Association.

Jim Merritt is a senior consultant focused on environmental consulting, municipal infrastructure and water management. Mr. Merritt has assisted clients with managing regulatory issues, operational and organizational planning and strategic assessments of environmental situations. Mr. Merritt was the Assistant Deputy Minister of Operations Division with the Ontario Ministry of the Environment, responsible for environmental protection and regulatory services, including approvals and environmental assessments. Mr. Merritt also led the establishment of the Ontario Clean Water Agency and was the vice-president responsible for water and wastewater plant operations, engineering services, computer systems and information management. While with the Ministry of the Environment, Mr. Merritt served in various Directorship positions, including Central Region, Policy and Planning Branch, and the Administrative Services Branch, and is currently the Chair of the Advisory Council on Drinking Water Quality and Testing Standards.

Dr. Ken Roberts, of Toronto, is a Professional Engineer who has been active in the field of water resources management and engineering for more than 40 years. His professional experience in the Ontario Ministry of the Environment, with XCG Consultants Ltd. and as a private consultant, has encompassed both water and wastewater policy, treatment and research with a primary focus on drinking water. Dr. Roberts maintains many international contacts and supports the drinking water industry in numerous capacities through his American Water Works Association professional involvement.

John Rudnickas was the Manager of Water Quality for the City of Toronto. A chemist by trade, Mr. Rudnickas has extensive experience in all aspects of quality assurance / quality control in large drinking water systems, and was responsible for the management of the City of Toronto's accredited and licensed laboratory for drinking water testing. Mr. Rudnickas is currently involved with the Walkerton Clean Water Centre in the training of drinking water operators, and is a member of the Ontario Water Works Association and is on the Water Quality Committee of the Canadian Water and Wastewater Association. Mr. Rudnickas is also a member of the American Water Works Association.

Dr. Janice Sargeant is a Food Animal Veterinarian and currently Director of the Centre for Public Health and Zoonoses at the University of Guelph. She is a former Faculty member at the Kansas State University College of Veterinary Medicine and in the Department of Clinical Epidemiology and Biostatistics at McMaster University. Dr. Sargeant is a member of the Biosecurity Research Institute Advisory Committee at Kansas State University. She is also a former panel member of the Council of Canadian Academies "Healthy Animals, Healthy Canada: The expert Panel on Animal Health Risk Assessment". She received her Doctor of Veterinary Medical degree and a Ph.D. in Epidemiology from the University of Guelph.

Joanne Thompson is a hydrogeologist and Senior Group Leader, Development Hydrogeology with R.J. Burnside & Associates Limited. Ms. Thompson is a professional geoscientist and has more than 25 years of experience working in aquifer characterization, groundwater supply and water quality assessment. She holds a B.Sc. in Geology from McMaster University and a M.Sc. in Petroleum Hydrogeology from the University of Alberta. She serves as Director and Communications Officer for the Canadian National Chapter of the International Association of Hydrogeologists.

Robert Walton, a Professional Engineer, is the Director of Public Works for the County of Oxford. He is the former Manager of Water and Wastewater Services. Prior to joining the County of Oxford, Mr. Walton worked as a consulting engineer. Mr. Walton represents the Ontario Municipal Water Association as the co-chair of the Joint Executive Committee with the Ontario Water Works Association.

Appendix G - Contact Information

Mailing Address:

Ontario Drinking Water Advisory Council
40 St. Clair Avenue West, 7th Floor
Toronto, Ontario, Canada
M4V 1M2

Chair:

Jim Merritt
416-314-3606
jim.merritt@ontario.ca

Staff:

Scott Barrett, Executive Assistant
416-212-7596
scott.barrett@ontario.ca

Iris Biggar, Administrative Assistant

416-212-7779
iris.biggar@ontario.ca

Fax:

416-314-9237

Website:

www.odwac.gov.on.ca



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Ontario Drinking Water Advisory Council

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