



**McMaster University**

*International Scientific Symposium*

August 26 and 27, 2010

Room: MDCL 1309

Hamilton, Ontario

***Human Health and the Biological Effects of Tritium in  
Drinking Water***

Prudent Policy through Science – Addressing the ODWAC  
New Recommendation

*Co-Chairs:*

*Dr. Douglas R. Boreham, Ph.D.*

*Professor, Department of Medical Physics and Applied Radiation Sciences,  
McMaster University, Hamilton Ontario*

*Dr. William Morgan, Ph.D., D.Sc.*

*Director, Radiation Biology and Biophysics, Biological Sciences, Pacific  
Northwest National Laboratory (PNNL), Richland, WA.*

Registration and Information:

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## **Symposium Overview**

The specific aim of this scientific symposium is to address the new recommendation proposed by the Ontario Drinking Water Advisory Council (ODWAC) to lower the limit of tritium in drinking water from its current 7000 Bq/L to 20 Bq/L. We have brought together numerous international experts in radiation sciences, regulators, government, and industrial stakeholders. The intent of this meeting is to support policy makers and regulators develop prudent guiding principles based on sound science. The biological effect of low level radiation exposures on humans is the central theme with emphasis on tritium beta radiation. During this symposium we will assess if the proposed new limits are supported by modern science, if the methodologies used to develop the recommendation were appropriate, and if the new recommended value will have the benefit of improved human health. It will be important to determine if the costs to society of the new recommendations are justified and if this significant change in policy will have any influence on public concern or opinion about health consequences of radiation exposure.

### **August 26, 2010 - Room MDCL 1309**

7:30 - 8:30 am – Registration

(Coffee and Light Snacks – MDCL Main Floor South West Hallway)

8:30 am – Welcome (Co-Chairs D. Boreham, B. Morgan).

8:35 am – Opening Address, Dr. Mo Elbestawi, VP Research, McMaster University.

8:40 am – Symposium Overview



## **SESSION 1. Tritium Production, Radiation Dosimetry/Biodistribution.**

9:00 am – Dr. Armando Antoniazzi, Senior Scientist  
Nuclear Waste and Tritium Solutions, Kinectrics Inc.  
“Tritium and CANDU Power Production”

9:20 am – Dr. Tony Waker, Professor,  
University of Ontario Institute of Technology  
“Tritium Microdosimetry”

9:40 am – Dr. Brant Ulsh,  
National Institute for Occupational Safety and Health  
“Tritium Dose and Relative Risk in Perspective”

10:00 am – Dr. Gary Kramer, Head,  
National Internal Radiation Assessment Section,  
National Calibration Reference Centre for Bioassay and In Vivo Monitoring,  
Health Canada  
“Dosimetry and Radiation Risk”

### ***Nutrition Break 10:20 – 10:40 am***

## **SESSION 2. ODWAC Recommendation, Position Statements.**

10:40 am – Mr. Jim Merritt,  
Ontario Drinking Water Advisory Council Tritium Recommendation:  
Summary and Overview.

11:00 am – Mr. Dave Tucker, Senior Health Physicist  
McMaster University – Canadian Radiation Protection Association (CRPA)  
Position Statement: The Canadian Radiation Protection Association Position on  
Reducing the Ontario DWL for Tritium

11:20 am – Mr. Steve Coupland,  
Canadian Nuclear Association (CNA)  
Position Statement



### **SESSION 3. Radiation Protection and Linear Extrapolation from High Doses**

11:30 am –Dr. Doug Chambers, Director of Risk and Radioactivity Studies,  
SENES  
“Tritium – Health Risks, Regulatory Issues and Public Perception”

12:00 pm –Dr. Ed Calabrese, Professor of Toxicology,  
Department of Public Health; Environmental Health Sciences  
University of Massachusetts  
“Historical Blunders: The Road to Linearity”

***Lunch 12:30-1:30 pm***

### **SESSION 4. Radiation Risk and Low Dose Radiation Biology Part 1.**

1:30 pm – Dr. Ron Mitchel, Researcher Emeritus,  
Atomic Energy of Canada Limited  
“Low Dose Radiation Effects: Testing the Assumptions”

2:00 pm – Dr. Kazuo Sakai, Director,  
Research Center for Radiation Protection  
National Institute of Radiological Sciences

2:30 pm – Dr. Antone Brooks,  
Pacific North West National Laboratory

***Nutrition Break 3:00-3:20 pm***

### **SESSION 5. Free Radical Biology and Low Dose Adaptation**

3:20 pm – Dr. Douglas Spitz, Professor and Director,  
Free Radical and Radiation Biology Program,  
Department of Radiation Oncology,  
Holden Comprehensive Cancer Center, University of Iowa,  
“Low Dose Radiation and Adaptive Oxidative Stress”



3:50 pm – Dr. Dave Knox, Research Scientist,  
National Microbiology Laboratory, Public Health Agency of Canada  
“Low Dose Radiation and Adaptation in Disease Progression”

4:20 pm – Isabelle Dublineau,  
Institut de Radioprotection et de Surete Nucleaire (IRSN),  
Laboratoire de RadioTOXicologie experimentale, Service de RadioBiologie et  
d’Epidemiologie, Direction de la RadioProtection de l’Homme

***Reception – Wine and Cheese 5:00-6:00 pm***

**August 27, 2010 - Room MDCL 1309**

**SESSION 6. Policy, Society, Perception Considerations**

8:30 am – Dr. Paul Locke, Associate Professor,  
Department of Environmental Health Sciences,  
John Hopkins School of Public Health  
“Radiobiology, Tritium and the Policy-Making Process”

9:00 am – Duane Bratt, Chair & Associate Professor,  
Department of Policy Studies,  
Mount Royal University  
“The Policy Process and Tritium Levels”

9:30 am – Dr. Jason Donev, Instructor,  
Department of Physics and Astronomy,  
University of Calgary  
“An Educator Talks About Public Perception of Radiation Safety”

***Nutrition Break 10:00 -10:30 am***

10:30 am –Dr. Colin Seymour, Professor,  
Department of Medical Physics and Applied Radiation Science,  
McMaster University



10:50 am –Dr. Francois Lemay, Director,  
International Safety Research

## **SESSION 7. Radiation Risk and Low Dose Radiation Biology Part 2.**

11:10 am –Dr. Edouard Azzam, Professor  
New Jersey Medical School Cancer Center  
“*In Vitro* and *In Vivo* Adaptive Responses to Ionizing Radiation: The Underlying Mechanisms”

11:40 am – Dr. Jacquelyn Yanch,  
Department of Nuclear Science and Engineering  
Massachusetts Institute of Technology (MIT),

12:10 am –Dr. Roger Howell, Chief  
Division of Radiation Research, NJMS Cancer Center;  
Professor of Radiology, University of Medicine and Dentistry of New Jersey

***Lunch 12:40 – 1:30 pm***

## **SESSION 8. Tritium Regulations and National and International Considerations**

1:30 pm – Dr. Patsy Thompson, Director General  
Directorate of Environmental and Radiation Protection and Assessment,  
Canadian Nuclear Safety Commission  
“Balancing Science and Public Health Policy Considerations in the Regulation of Tritium in Drinking Water: The CNSC Perspective”

2:00 pm – Dr. Don Hart,  
EcoMetrix Inc.  
“Tritium in Groundwater around a Tritium Light Manufacturing Facility”

2:30 pm – Dr. Tony Hooker, Manager  
Radiation Health, Radiation Protection Division,  
South Australian Environment Protection Authority  
“Tritium: An Australian Perspective”



## **SESSION 9. Meeting Summary and Conclusion of Symposium**

3:00 pm – Dr. Doug Boreham and Dr. Bill Morgan

3:30 pm – Symposium close