



## **Great Lakes Public Forum--Ellen Dailey, Director, SOS Great Lakes**

Good afternoon Mr. Goffin, Mr. Davis, and fellow panelists.

Thank you for the opportunity to present my comments to the International Joint Commission (IJC) and to aid in the efforts to meet the goals of the Great Lakes Water Quality Agreement.

A number of challenges threaten the sustainability of the Great Lakes. These include toxic chemicals, such as legacy contaminants and substances of emerging concern.

The websites of both the Environmental Protection Agency (EPA) and Environment Canada state that chemicals of mutual concern are those that originate from anthropogenic sources and that are potentially harmful to human health or the environment.

According to the IJC, hundreds of chemicals have been identified in the Great Lakes ecosystem. As of 1994, 362 contaminants had been confirmed as being present in measurable concentrations in the water, sediments and/or in the tissues of fish, wildlife or humans. At the time of the 1994 report, 126 of these substances had been linked to toxic effects on various life processes.

Some of these chemicals have been labeled “critical” and “priority contaminants” based on factors such as presence and ambient concentration, degree of toxicity, persistence in the environment, bioavailability, and the potential to bioconcentrate and bioaccumulate in the Great Lakes environment.

Yesterday I brought to your attention two reports that were prepared for the IJC in the 1990s about radionuclides in the Great Lakes. Today I would like to elaborate on this topic and why it is imperative that radionuclides be included in Annex 3 of the Great Lakes Water Quality Agreement as a Chemical of Mutual Concern.

The “Inventory of Radionuclides in the Great Lakes” (1997) study concluded that radionuclides were present in the lakes and that the majority were from anthropogenic sources. The study also indicated that the radionuclides are

bioavailable, toxic, persistent in the environment, and have the potential to bioconcentrate and bioaccumulate.

The IJC's Nuclear Task Force noted that the bioaccumulation, biomagnification, and transfer factors used to describe the cycling of radionuclides and their transfer along exposure pathways to biota, including humans, came from the long history of work done in oceans, estuarine, and river environments. Comparable studies for the Great Lakes freshwater environment were virtually nonexistent. Yet for the Great Lakes, the need for transfer factors that describe lake environments is critical.

### ***Toxicity of radionuclides***

The Canadian Nuclear Safety Commission (CNSC), World Health Organization (WHO), and the American Cancer Society websites point out that exposure to ionizing radiation carries health risks. The review also states that some populations are more sensitive to the effects of radiation exposure such as women, children and, of course, the fetus.

The health risks include cancer, hereditary effects, cataracts, cardiovascular disease and stroke, immune effects, premature aging, radiation sickness, and death. Cancers associated with high dose exposure include leukemia, multiple myeloma, breast, bladder, colon, liver, lung, esophageal, ovarian, stomach, and thyroid cancers. Literature from the U.S. Department of Health and Human Services also suggests a possible association between radiation exposure and skin, prostatic, sinus, laryngeal, and pancreatic cancers.

Leukemia, a type of cancer that arises in the bone marrow, and thyroid cancer are among the most common radiation-induced cancers. The reason for this may be sensitivity of the cell line or the cell's propensity for uptake of a given radioactive element. The thyroid gland normally takes up iodine and bone takes up strontium. Each of these elements has a radioactive isotope produced by nuclear fission and is found in the Great Lakes.

Thyroid cancer is known to be prevalent in the Great Lakes basin population. According to the Canadian Cancer Statistics 2013 report, the incidence rate for thyroid cancer is increasing. Furthermore, the increased incidence observed is more than the increase being seen with other major cancers. There was a 6.8 percent per year increase in males since 1998 and a 7 percent per year increase in females since 2002.

Less known are the potential hereditary effects of ionizing radiation. Potential hereditary effects include congenital malformation, cognitive impairment, microcephaly, growth restriction of the fetus, prematurity, infertility and pregnancy

loss, including miscarriage, fetal death, neonatal death and infant death. In addition, ionizing radiation may increase the risk of cancers and other health problems in future generations due to the subtle ongoing biological impacts that may become pronounced and irreversible over time through genetic mutations. The insidiousness of radiation injury is seen in its propensity to present only after irreversible genetic damage has already occurred over an unknown period of time.

The BEIR VII report on health effects of ionizing radiation concludes that current scientific evidence is consistent with the hypothesis that there is a linear dose response relationship between exposure to ionizing radiation and the development of radiation induced solid cancers in humans.

Human activities, both historic and current, have altered and will continue to impact the Great Lakes ecosystem and the biological diversity it sustains. Ontario Power Generation (OPG)'s proposed Deep Geological Repository (DGR) has the potential to leak radionuclides into the Great Lakes, and will likely leak, as no other DGR in the world has been successful in containing the toxic wastes it stores. The radioactivity and long-term toxicity of these lethal wastes could threaten present and future generations.

The Commissioner of Environment and Sustainable Development issued a report yesterday citing the CNSC for not providing appropriate inspections to ensure that nuclear facilities are meeting the regulatory requirements. It is imperative that a binational group be able to look at the data to determine what is truly happening with radionuclides in the Great Lakes.

We look to the continued comity between our two countries to motivate Canada and the United States to add Radionuclides to the list of Chemicals of Mutual Concern under Annex 3 of the Great Lakes Water Quality Agreement.