

**Response to  
Environmental Petition 245 filed by Mr. Peter L.D. Van Caulart  
under Section 22 of the *Auditor General Act*  
Received May 16, 2008**

**Petition for the discontinuation of the addition of toxic substances to our  
drinking water (inorganic fluorides, inorganic arsenic, lead)**

**September 13, 2008**

Minister of Health and the Minister for the Federal Economic  
Development Initiative for Northern Ontario

## **Background:**

Health Canada works with the provinces and territories to develop the Guidelines for Canadian Drinking Water Quality. The Guidelines are then used by each province and territory as a basis to establish their own requirements for drinking water quality. Fluoride is one of the many substances for which a guideline has been established. The Maximum Acceptable Concentration (MAC) for fluoride has been established taking into consideration all sources of exposure to fluoride, including foods and dental products. In Canada, the fluoridation of drinking water supplies is a decision that is made by each municipality, in collaboration with the appropriate provincial or territorial authority. This decision may also include consultation with residents, often through a referendum.

Fluoride occurs naturally in many source waters in Canada. It can also be added to drinking water as a public health measure to protect dental health and prevent or reduce tooth decay. The fluoridation of drinking water supplies is a well-accepted measure to protect public health and is strongly supported by scientific evidence. Fluoride is used internationally to protect dental health. It has been added to public drinking water supplies around the world for more than half a century, as a public health/dental health measure. The use of fluoride in the prevention of dental caries continues to be endorsed by over 90 national and international professional health organizations including Health Canada, the Canadian Dental Association, the Canadian Medical Association, the World Health Organization and the Food and Drug Administration of the United States.

As part of its ongoing review of the health effects of exposure to fluoride in drinking water, Health Canada convened a panel of experts in January 2007 to provide advice and recommendations based on the current state of relevant science with respect to the fluoridation of water. Advice was sought from the Expert Panel on five specific issues of concern including Total Daily Intake of Fluoride; Dental Fluorosis; Other Health Effects; Risk Assessment; and Drinking Water Fluoridation: Risks and Benefits. Discussions were based on topic-specific literature reviews developed and presented by some of the invited experts.

The report produced by the Expert Panel will be used to help inform the development of an updated fluoride guideline for Canadian drinking water, by ensuring our analysis is based on the latest scientific evidence. The Expert Panel report was posted online and can be found at <http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/2008-fluoride-fluorure/index-eng.php>.

Health Canada will continue to monitor the science and review new scientific reports and articles which explore possible links between fluoride and various health effects to ensure the health of Canadians is protected.

1. *In legal circles when one product is advertised for use and then another product is used in its place, it is called “bait and switch”. Please provide evidence that Health Canada or Public Health have informed the public that we are putting H<sub>2</sub>SiF<sub>6</sub> or Na<sub>2</sub>SiF<sub>6</sub> into drinking water and not “fluoride”? Provide evidence of such notices.*

The fluorosilicate compounds you mention readily hydrolyse in water to release fluoride ions, which means that drinking water is not a source of exposure to these compounds. Fluorosilicate compounds are added as a source of the mineral nutrient fluoride.

Health Canada endorses the fluoridation of drinking water to prevent tooth decay, but does not participate in the decision to fluoridate a water supply. Provincial and territorial governments, in collaboration with their municipalities, decide whether or not to fluoridate their drinking water and the amount of fluoride to be added. This decision may include consultation with residents, often through a referendum.

3. *How has Health Canada or Environmental Canada communicated concern about increasing lead levels in drinking water, hence source water? If so, which federal agency will conduct research to determine the relative contributions of the mixtures of free chlorine or chloramine and fluorosilicates to our lead in drinking water?*

Levels of lead in drinking water are due to leaching from materials within the distribution system and residential plumbing system. Lead is not generally found naturally in the environment in Canada. Provincial/territorial governments are generally responsible for the safety of drinking water. Health Canada and the Federal-Provincial-Territorial Committee on Drinking Water have developed a guidance document on controlling corrosion in drinking water distribution systems. Public consultation of the document has been conducted. The document, once finalized and approved through Federal-Provincial-Territorial processes, will be posted on Health Canada’s website at [www.healthcanada.gc.ca/waterquality](http://www.healthcanada.gc.ca/waterquality).

4. *What is Health Canada’s current position with respect to the American Dental Association’s explanation that fluoride works topically, not by swallowing (JADA Cover Story July 2000)? Agree or not?*

There are beneficial effects of fluoride from both topical and systemic exposures. The maximum reduction in dental decay is achieved when fluoride is available preeruptively (systemically) for incorporation during all stages of tooth formation and posteruptively (topically) at the tooth surface. Water fluoridation provides both types of exposure.

5. *Has Public Works or the Treasury Board made a cost assessment of how much the use of H<sub>2</sub>SiF<sub>6</sub> and Na<sub>2</sub>SiF<sub>6</sub> are costing taxpayers in terms of infrastructure? Please provide estimates and the source of these estimates.*

From Health Canada’s perspective, there are no data available to support the suggestion that fluoridation additives have a negative impact on infrastructure.

6. *Australia and US governments are being sued for health harm caused by water fluoridation. What type of risk assessment has Health Canada or any other government agency done to assess potential liability on this issue for the government of Canada?*

Health Canada endorses the fluoridation of drinking water to prevent tooth decay, but does not participate in the decision to fluoridate a water supply. Provincial and territorial governments are generally responsible for the safety of drinking water. In collaboration with their municipalities, they decide whether or not to fluoridate and the amount of fluoride to be added. Health Canada's guideline for fluoride in drinking water is protective of the health of all Canadians.

7. *The CDC states: "Studies have shown that even a drop of 0.2 mg/L below the optimum (fluoride) level can reduce dental benefits significantly." According to the estimates by CDC, "optimal" fluoride levels for Ontario should be 1.2mg/L or higher. According to CDC's own calculations, the concentrations (0.5-0.8mg/L) recommended by Ont. MOE are ineffective. Why does Health Canada continue to promote this ineffective method of delivering this unregulated drug when even the Centers for Disease Control optimal dosage formula demonstrate that it is ineffective?*

It is not appropriate to use calculations from an external agency to assess the adequacy of a fluoridation program, considering their data and conclusions are based on a different exposure pattern. Health Canada has based its conclusions on exposure data specific for the Canadian situation and developed the Guidelines for Canadian Drinking Water Quality accordingly. Health Canada endorses the fluoridation of drinking water to prevent tooth decay, but does not make the decision on whether or not to fluoridate drinking water. Provincial and territorial governments are generally responsible for the safety of drinking water. In collaboration with their municipalities, they decide whether or not to fluoridate and the amount of fluoride to be added.

8. *Does Health Canada still use the Galagan-Vermillion formula and the assumptions on which it was based (e.g. Galagan and Vermillion assumed that, on average, 44% of the American children's fluid intake was milk, which has negligible fluoride levels) to determine water fluoridation concentration guidelines? If so, please provide rationale and research evidence. If not, why?*
9. *Does Health Canada believe that 44% of Canadian children's fluid intake is milk? If so, why? Please provide rationale and research evidence. If not, why?*

Answer to Questions 8 & 9:

Health Canada has conducted its own assessment of exposure to fluoride, based on foods and water available in Canada. Health Canada does not use the Galagan-Vermillion formula. Further information can be found on Health Canada's website at [www.healthcanada.gc.ca/waterquality](http://www.healthcanada.gc.ca/waterquality)

10. *Does Health Canada contend that drinking water providers may compel the ingestion of, and dermal exposures to, fluoride through our addition of a direct water additive?*

Fluoridation is the process by which a drinking water provider will adjust the level of fluoride that is naturally present in most Canadian source waters to the optimal level to protect dental health. Health Canada endorses the fluoridation of drinking water to prevent tooth decay, but does not participate in the decision to fluoridate a water supply. Provincial and territorial governments are generally responsible for the safety of drinking water. In collaboration with their municipalities, they decide whether or not to fluoridate and the amount of fluoride to be added.

11. *Which government agency is responsible for disclosing all sources of, and quantifying, potential and historically based exposures to fluoride?*

There is no federal agency responsible for such data.

14. *H<sub>2</sub>SiF<sub>6</sub>, Na<sub>2</sub>SiF<sub>6</sub> are the primary agents used in >95% of water fluoridation schemes in the USA and assumably in Canada. These products are incorporated into the food chain through reconstituted beverages (fruit beverages, sodas) and food processing (cooking, washing). Does Health Canada have any responsibility to prevent the sale of toxic substances, as defined by CEPA (inorganic fluorides such as H<sub>2</sub>SiF<sub>6</sub>, Na<sub>2</sub>SiF<sub>6</sub> which are anthropogenic) for consumption? Does any other federal government agency (Environment Canada?) have a responsibility to prevent the sale of toxic substances in our food chain?*

Fluoridated drinking water is not a source of exposure to hydrofluorosilicic acid, nor was hydrofluorosilicic acid included in the CEPA assessment of inorganic fluorides. Fluoridation additives certified for use in drinking water are not classified as CEPA toxic. When added to water, fluorosilicate compounds readily hydrolyse completely to release fluoride ions, which means that drinking water is not a source of exposure to these compounds.

15. *The Safe Drinking Water Act of Ontario, section 20, does not permit the addition of drinking water health hazards to our drinking water; dilution of drinking water health hazards is no defence. What proof Can Environment Canada or Health Canada or any other relevant government agency show that the toxic substances used in water fluoridation (H<sub>2</sub>SiF<sub>6</sub>, Na<sub>2</sub>SiF<sub>6</sub>) their complex silicate by-products and co-contaminants arsenic, lead (see Urbansky 2002, Coplan 2007, Smith, 1999) are not drinking water health hazards? (Urbansky concluded that hydroxo-fluoro SiF derivatives exist in drinking water. Coplan et al 2007 also demonstrates that many fluorosilicates exist in drinking water H<sub>2</sub>SiF<sub>6</sub>, H<sub>2</sub>SiF<sub>6</sub> •SiF<sub>4</sub>, Na<sub>2</sub>SiF<sub>6</sub>). Please provide references.*

When added to water, fluorosilicate compounds readily hydrolyse completely to release fluoride ions, which means that drinking water is not a source of exposure to these compounds. For questions regarding the interpretation of the Safe Drinking Water Act of Ontario, please communicate directly with the Ontario Ministry of the Environment.

16. *Does Health Canada, Environment Canada or any other relevant government agency disagree with the above evidence that fluorosilicates do not completely dissociate and may re-associate? If so, please provide rationale and complete references.*

17. *Can Health Canada, Environment Canada or any other relevant government agency prove that complete dissociation occurs despite the above evidence? If so, please provide references.*
18. *Which SINGLE peer-reviewed publication in an established scientific journal that establishes the SAFETY of either fluorosilicic acid or sodium silicofluoride ( $H_2SiF_6$ ,  $Na_2SiF_6$ ) for all individuals, over a lifetime of ingestion, using conventional animal studies of toxicology (and neurotoxicology) can Health Canada or any other relevant government agency provide as evidence of such?*

Answers to Questions 16, 17 & 18:

Fluorosilicate compounds readily hydrolyse in water to release fluoride ions, which means that drinking water is not a source of exposure to these compounds. This is based on currently available research and science.

The research community has focussed to date on levels that would result from exposures in occupational settings. A review of the toxicological literature on Sodium Hexafluorosilicate and on Fluorosilicic Acid conducted for the National Institute of Environmental Health Sciences is available at the following URL:

[http://ntp.niehs.nih.gov/ntp/htdocs/Chem\\_Background/ExSumPDF/Fluorosilicates.pdf](http://ntp.niehs.nih.gov/ntp/htdocs/Chem_Background/ExSumPDF/Fluorosilicates.pdf)

Health Canada does not conduct research on the chemistry of fluoride species.

20. *What published studies have satisfied you that when a child has developed dental fluorosis that fluoride has caused no other damage <<http://salsa.democracynaction.org/dia/track.jsp?v=2&c=11vtZ6CYQhmMqAt8rVhVBUIUQHKaz7Xd>> to the child's developing tissues?*

Exposure to fluoride has been linked to dental fluorosis and, at extremely high exposure levels, skeletal fluorosis. Based on a thorough review of the available relevant scientific literature, the weight of evidence does not support any other adverse effects.

Health Canada conducts internal scientific reviews of original relevant scientific studies that are published in internationally recognized peer-reviewed journals. Health Canada continues to monitor the science and review new scientific reports and articles to ensure the department's decisions are supported by the weight of credible evidence from relevant peer reviewed scientific studies.

- R4. *Will Health Canada recommend that this practice of adding hydrofluorosilicic acid or sodium silicofluoride and associated contaminants to drinking water, hence source water, stop immediately? If not, why?*

Fluoridated drinking water is not a source of exposure to hydrofluorosilicic acid. When added to water, fluorosilicate compounds readily hydrolyse completely to release fluoride ions, which means that drinking water is not a source of exposure to these compounds.

Drinking water fluoridation is considered to be a safe and effective public health method to reduce the prevalence of dental caries in the population, as supported by many International Organizations (e.g., World Health Organization, Australian Government, U.S. Centers for Disease Control and Prevention, American Dental Association, Canadian Dental Association, British Dental Association, Institute of Medicine, etc.). As Health Canada uses a population-based approach in the risk assessment process, drinking water guidelines are based upon the sub-population of greatest risk and are therefore protective of all Canadians.

Health Canada endorses the fluoridation of drinking water to prevent tooth decay, but does not make the decision on whether or not to fluoridate drinking water. Provincial and territorial governments are generally responsible for the safety of drinking water. In collaboration with their municipalities, they decide whether or not to fluoridate and the amount of fluoride to be added.