Radioactive Substances are in (Hydro)fluorosilicic acid

(uranium, radium 226 & 228, apha and beta particles)

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These and other heavy metals are an inherent part of phosphate rock.

The most recent AWWA Standard for Fluorosilicic Acid B703-00 (2006 edition) Page ix states: (attachment)

"The transfer of contaminants from chemicals to processed water or the residual solids is becoming a problem of greater concern."

According to “American Water Works Association (AWWA) and Cargill Fertilizer Inc., (hydro)fluorosilicic acid contains radionuclides.

1. **AWWA Standard for Fluorosilicic Acid B703-06 (2006) Page 13 (attachment)** lists the following radionuclides as contaminants in fluorosilicic acid; beta particle and photon activity, gross alpha particle activity, radium 226 and 228 (combined), uranium.

2. **Letter from Cargill Fertilizer Inc. February 20, 1998 to US CDC** which provides the radiological content of a sample of 23% hydrofluorosilicic acid done by Thornton Laboratories, Inc in Florida dated February 13, 1998 also lists the above radioactive compounds as part of the product. (attachment)

National Sanitation Foundation (NSF) Standard 60

National Sanitation Foundation (NSF) has repeatedly denied the existence of radioactive compounds in their fluorosilicate by-product, in various letters (despite the evidence from Cargill, one of the largest manufacturers of fluorosilicates in North America and AWWA). NSF also continues to deny the presence of radioactive compounds on their online fact sheets.

A letter written by Stan Hazan, General Manager, Drinking Water Additives Certification Program to the Honorable Ken Calvert, Chairman Subcommittee on Energy and the Environment, Committee on Science, U. S. House of Representatives July 7, 2000 states:

> “Beginning in early 1998, NSF went beyond Standard 60 requirements and voluntarily began testing fluoridation chemicals for the presence of radionuclides (alpha and beta emitters) utilizing EPA Test Method 900.0, as specified in Annex B of ANSUNSF Standard 60. To date, we have not found any sample with a positive (detected) result, with detection limits of 4 pCi/liter and 3 pCi/liter for gross alpha and gross beta, respectively. Table 1”

A letter from George Glasser dated December 18, 1997 to James T. Howell. Secretary of Health, Florida Department of Health, points out that NSF denied that alpha or beta radiation was present in hydrofluorosilicic acid. (attachment)

Several explanations are possible.

It would seem apparent that NSF does not measure the actual product but a theoretical standard for this product. For whatever tests that NSF Standard 60 requires, their published number of tests do not match the number of tests specified by the standard, based on the number of manufacturers and handlers known to exist.

Published # tests ≠ # tests required by NSF Standard 60

Best Manufacturing Practices not followed by NSF Standard 60

We know from the Congressional Hearings of 1999-2000 that the product hydrofluorosilicic acid has not undergone clinical studies and that this product does not satisfy Best Manufacturing Practices. NSF only requires batch testing **once a year** – not with every batch. We do not know the contents of every batch of fluorosilicates sold to municipalities.

Testing that has been performed demonstrates a lack of batch consistency of contaminants and HFSA content (NSF and AWWA permits fluorosilicic acid concentrations of between 20 and 30% - AWWA Standard for Fluorosilicic Acid B703-06 Section 4.2

> "The fluorosilicic acid shall contain between 20 and 30 percent fluorosilicic acid by weight").
>
> "Compositional analyses are not required by the NSF standard. The verification of composition is performed during the annual unannounced plant inspection by NSF auditors who verify sources and ratios of labeled ingredients. Separately, there are industry standards from AWWA (American Water Works Association) (ANSI/AWWA B702-99 for Sodium Fluorosilicate and ANSI/AWWA B703a-97 for Fluosilicic Acid) that provide for compositional requirements." Stan Hazan letter July 7, 2000

If we assume that NSF is independent of all political or governmental pressures, George Glasser offers another explanation as to why NSF has been unable to find radioactive compounds. Fluorosilicates in hydrofluorosilicic acid are soluble fluorides. Radionuclides and heavy metals are not necessarily miscible (cannot be mixed) with homogenous ionic distribution in the solution. Glasser also points out that "Fluorosilicic acid has a propensity to stratify, and sometimes the silicates may precipitate out of solution."

Obviously, the time of storage has an influence on the homogeneity of these compounds in the solution. Bulk supplies used in water treatment facilities will permit this stratification or

heavy metals and silicates to occur unless a recirculation mechanism is in place.

AWWA Standard for Fluorosilicic Acid 703-06

Because of this, AWWA Standard for Fluorosilicic Acid 703-06, Section 5.1, states that fluorosilicate samples:

- should be taken from various levels in bulk tanks - “at least five different 500ml portions shall be taken from different places int he container (top, middle, and bottom) and combined to form a composite sample that is representative of the entire container” - or
- they should roll the drums before a sample is drawn to evenly distribute the radionuclides and heavy metals - “the containers to be sampled shall first be mixed by rolling or other suitable means.”.

Dissociation of Fluorosilicates & Sodium Fluoride – NOT THE SAME PRODUCT

The dissociation properties of hydrofluorosilicic acid are also unknown at this point in time. Evidence suggests that these products do not completely dissociate and may reassociate in acidic environments such as in the gut, in acid beverages such as soda pops, fruit beverages, teas and coffees and acidic foods which use fluoridated water during processing.

Many fluorosilicate compounds are known to exist. To use experiments using sodium fluoride in double distilled water as “evidence” that fluorosilicates dissociate; to use pure fluorosilicates with no contaminants (Crosby 1969) lacks scientific rigour.

Sodium fluoride is a different compound with only one fluoride ion attached to the sodium, whereas fluorosilicates are hexafluorosilicates, with 6 fluorides attached to the silicon. To **assume** that they behave exactly the same in biological systems is not acceptable.

NOTE: Although we add fluorosilicates to our drinking water, levels of fluorosilicates have NEVER been measured in our drinking water.

Fluorosilicates and Lead – Synergistic Effects

NSF Standard 60 makes no allowance for synergistic effects of contaminants in their establishment of 10% of MAC/MCL of contaminants in a manufacturer's product.

Recent papers (Maas et al 2007, Coplan et al 2007, Masters and Coplan 1999, 2000) demonstrate that fluorosilicates contribute not only directly (lead is the second most common contaminant, after arsenic – NSF online Fact Sheet) to the lead content of our drinking water, but indirectly (fluorosilicates chemically and mechanically release lead from leaded pipes, lead solder and leaded brass. See Maas et al 2007).

NOTE: Municipalities do not measure lead levels at the tap, after the fluoridated water has travelled through the water distribution system. They routinely measure lead levels BEFORE the water travels through the lead and brass pipes and fixtures.

With a lack of consistency in the product itself, how can research be done on such an elusive product?

For all of the above reasons, fluoride levels in tap water will fluctuate.
For all of the above reasons, contaminant levels in tap water will fluctuate.

There are TOO MANY VARIABLES TO CONTROL with this product.

The letter from Mike Wells, Lab Manager, Cargill Fertilizer Inc. to Tom Reeves, Center for Disease Control, implies that because these levels are below the MCL/MAC, the additions of these contaminants is acceptable. (attachment)

What Cargill fails to note is that although these radioactive substances and other heavy metals found in fluorosilicates are all low levels, they accumulate in the body. These toxic substances, by definition, are bio-accumulative.

What Cargill also fails to note is that although these radioactive substances and heavy metals found in fluorosilicates are all low levels, their synergistic effects with other contaminants are not considered.

What Cargill also fails to note is that the NSF Standard 60 has no limit to the number of contaminants permissible in the fluorosilicates.

What Cargill also fails to notes is that NSF Standard 60 has established an SPAC of 10% of the MAC for contaminants which is being ignored for fluorosilicates even though fluorosilicates are considered to be “HAZARDOUS WASTE” by both relevant Canadian and USA government agencies. 10% of the 1.5mg/L MAC for fluoride in drinking water set by Health Canada would only allow fluoride levels of 0.15mg/L. This exceeds the CWQG set by Health Canada and exceeds the recommended levels of fluoride used for artificial water fluoridation by Health Canada of 0.8-1.0mg/L.

4mg/L MCL for fluoride in drinking water set by the US EPA would allow fluoride levels of 0.4mg/L.

Ontario Safe Drinking Water Act of Ontario, Canada 2002

The Ontario Safe Drinking Water Act of Ontario 2002 prohibits the addition of anything that is a drinking water health hazard and dilution of these products is no defence for doing so. Hydrofluorosilic acid in drinking water harms many individuals because we cannot control the dose (dental fluorosis, skeletal fluorosis, endocrine/thyroid suppression, neurotoxic effects,

etc.). Such potential health harm is described in detail in the *"Fluoride in Drinking Water: A Scientific Review of EPA's Standards".*

SDWA 2002

Section 20 (1): (1) No person shall cause or permit any thing to enter a drinking-water system if it could result in,

(a) a drinking-water health hazard;

(b) a contravention of a prescribed standard;

Section 20 (3): Dilution no defence

For the purposes of prosecuting the offence of contravening subsection (1), it is not necessary to prove that the thing, if it was diluted when or after it entered the system, continued to result in or could have resulted in a drinking-water health hazard.

Uranium has been and is mined from phosphate rock: Evidence

The Geology of Florida, edited by Anthony F. Randazzo and Douglas S. Jones 1997 University Press of Florida:

"In addition to uranium, fluorine is an economic byproduct of phosphoric-acid production ... During acid production this gas is recovered as fluorosilicic acid (H2SiF6) in wet scrubbers that are part of the environmental-protection equipment."

Uranium Prospects; Soaring Prices Have Mines Thinking About Reviving Extraction Processes in Tampa Bay Tribune, May 10, 2007, by Ted Jackovics, p 1 Business section reports:

"Phosphate companies previously had established a half-dozen uranium extraction operations in Florida and two in Louisiana...Those were mostly discarded when... [prices] declined, making it unprofitable to extract uranium from phosphate."

"Now the soaring price of uranium may create a new source of revenue, prompting mining companies to consider restarting long-dormant operations to extract uranium from phosphate." This news report goes on to state that uranium "shows up at 50 to 200 parts per million" in phosphate laden earth. "Mining for uranium-laden phosphate rock begins with a dragline that scrapes a "matrix" of clay, sand and phosphate rock from the earth. The matrix is processed to separate the clay and sand from phosphate rock. Then the phosphate rock is mixed with sulfuric acid. The [sulphuric] acid contains the uranium. The next step is to mix a solvent with the phosphoric acid to extract the uranium. The resultant solvent mixture – minus the acid – is sent to another plant where the uranium is removed as yellowcake."

Phosphate Processor Gearing Up to Extract Uranium Within 4 Years

Tampa Bay Tribune, September 6, 2007, by Ted Jackovics, p 1 Business section reports:

“Phosphate contains minute amounts of uranium that some mining companies extract and sell to the nuclear power industry.”

Radioactive Dumps Dot Region
Tampa Bay Tribune, July 21, 1991, by Morris Kennedy and Booth Gunter

“State health officials have allowed hundreds of tons of radioactive debris to be buried at 11 Central Florida locations – unaware another state agency had identified most of the sites as sources of ground-water pollution. The debris has been buried over the last 10 years inside ash-gray hills, called gypsum stacks...Inside the mounds are radioactive clothing, trash, equipment and a potentially more dangerous residue called radium scale, all of which phosphate fertilizer companies routinely bury there.”

State Trusts Chemical Plants to Ensure Radiation Safety
Tampa Bay Tribune, July 22, 1991, by Morris Kennedy and Booth Gunter

“HRS [Department of Health and Rehabilitative Services] has allowed phosphate and uranium companies to continue burying radioactive waste within their mounds of gypsum waste, unaware that the state's environmental agency had documented water pollution at a dozen such mounds.”

CONCLUSION

Heavy metals, including uranium, are inherent to the phosphate rock and resulting products, including (hydro)fluorosilicic acid. The uranium content is high enough to be profitable for companies to mine and sell to the nuclear industry.

Because of the known contaminants and lack of Best Manufacturing Practices to control the numbers of contaminants and the level of contaminants in fluorosilicates, government agencies have been unable to find researchers willing to use this product.

THERE ARE TOO MANY KNOWN AND UNKNOWN CONTAMINANTS.
SYNERGISTIC EFFECTS OF THESE CONTAMINANTS ARE NOT BEING CONSIDERED.
THERE ARE TOO MANY VARIABLES.

References

American Water Works Association (AWWA) B703-00
American Water Works Association (AWWA) B703-06
Letter from Mike Wells, Lab Manager, Cargill Fertilizer Inc. to Mr. Tom Reeves, Feb 20, 1998.
Letter from James T. Howell MD MPH, Secretary of Florida Department of Health to Mr. George C. Glasser, January 22, 1998.