

SCHER: Fluoridation - Call for Information

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1. I wish to draw your Committee's attention to certain issues of concern relating to the use of fluorosilicates in water fluoridation. I recognise that your study calls for scientific evidence, and I propose to raise a small number of issues that fall within the direct scope of your Committee.
2. But it is also important that you should be aware of the effects that political interference with the methodology used to collect some scientific evidence, particularly within the UK, invalidates much of the evidence that is in the public domain and that is widely used to support the claims that fluoridation presents no health risks to the public.
3. I have therefore divided this submission into three sections. The first deals with the failure within the European Community Administration to comply with the legal obligations to regulate all chemical substances used with the intent to medicate individuals, and its relevance to the constitution of the Committee that you have assembled to carry out this study.
4. The second deals with the problem of deliberate political manipulation of research and data, and has a direct bearing on the reliability of data on water fluoridation, particularly in the field of epidemiology, published in the UK and Ireland.
5. The third raises issues that are of concern in the field of toxicology and environment. Relevant reference sources are indicated in the text, and have been attached to this submission.

Section 1. Constitution of the Committee carrying out this review.

6. The study of the health risks that may be associated with the use of water fluoridation agents is an issue that falls directly within the remit of the European Medicines Agency (EMA), and is not exclusively within the remits of the component Committees that are currently involved in this review. It is therefore a matter of concern that the EMA does not appear to be included as a member of your Committee.
7. On its Internet web site the EMA states that its primary regulatory role is 'to provide the best possible scientific advice on any question relating to the evaluation of the quality, safety and efficacy of medicinal products for human or veterinary use'. As a prophylactic medical intervention water fluoridation is clearly a practice that the EMA is required to regulate, so it is therefore a matter of considerable concern that historically it has failed to exercise its mandate to assess and regulate the medicinal use of fluoridation chemicals.
8. Since fluoridated water is without question a medicinal product (legally it is a 'medicinal water'), it can be argued that it is the responsibility of the EMA to carry out this review of the safety of the medicinal use of fluoridation chemicals. Unfortunately, its failure to do so has permitted the UK and Irish Governments to take an equally improper position, and to claim that these chemicals are not medicinal within the definitions laid out in Article 1 of the Medicines for Human Use Directive (2004/27/EC). This decision is incompatible with the

clarifications on the classification of medicinal products that have been issued by the European Court of Justice, in landmark cases such as Van Bennekom, Montiel and Sammadi, ter Voort, and others.(Refs)

9. In the absence of EMEA recognition of the medicinal nature of this intervention and the need for appropriate regulation as such, fluoridated water continues to be regarded inappropriately and improperly by both the UK and Irish Governments as a food. This is despite the exclusion of medicinal waters from food legislation under the Drinking Water Directive (98/83/EC), the Regulation 178/2002/EC on the general principles and requirements of food law, and the Food Safety Regulations(93/43/EEC)
10. However, since the EMEA has repeatedly failed to acknowledge the issues currently before your Committees, I believe that your work is of value and has legitimacy, in that it does at least provide a forum within which the issues of the safety of these chemicals can be assessed independently of the clear pro-fluoridation bias amongst certain Commissioners who have responsibilities within the EC health sector.
11. But I do believe that you should consider whether in fact the EMEA should be asked to participate in this review, in order to legitimise the scope and direction of your analyses, and to ensure that it will have then to take appropriate action should your review indicate the need for reform of the present unsatisfactory situation.

Section 2. The effect of political influence on scientific methodology in fluoridation research.

12. If a medical intervention is carried out without appropriate regulation and monitoring or regard to confounding factors, then any data obtained that purports to provide scientific or clinical information on that intervention is invalid and worthless. Unfortunately, the vast majority of 'research' on the health effects of water fluoridation on large populations appears to be of this nature.
13. One of the most important issues relating to the reliability of published data in fluoridation research has emerged from Elise Bassin's work on osteosarcoma,¹ details of which others will have already submitted to your Committee. But quite distinct from the apparent relationship between fluoridation and osteosarcoma that she found, it is the very evident contrast between her methodology and that employed by many other researchers in the field that is so important in this new review.
14. The data on which she worked had been collected by her supervisor, but then analysed by him without regard to the diversity of the confounding factors within the exposure backgrounds of his subjects; unsurprisingly, his results found no association between fluoridation and disease. However, when Bassin re-examined the case histories of the subjects, she separated them into specific age and sex cohorts. This revealed a very significant increase in early-onset osteosarcoma in young males who had been exposed to fluoridated water supplies during a specific short developmental period of their childhood. The crucial factor was her identification of the appropriate discrete cohorts of subjects that enabled her to detect this anomaly. This was in stark contrast to the vast majority of epidemiological surveys that have failed to adopt this type of critical appraisal on highly diverse raw data.

1. 1 Bassin E.B. (2001). Association Between Fluoride in Drinking Water During Growth and Development and the Incidence of Osteosarcoma for Children and Adolescents. Doctoral Thesis, Harvard School of Dental Medicine.

15. Few if any other studies appear to have attempted to determine whether evidence of other specific conditions may be buried in the morass of raw data that has been placed in the public domain, and it is likely that most of this material, in its present form, and the conclusions derived from its analysis, are unsound.

Political pressure influencing research methodology.

16. Political and commercial pressures are widely acknowledged to be exerted on researchers, and to influence both the performance of research programmes and the publication of results that may be inconvenient to their sponsors. In Bassin's case, it has been claimed that publication of her PhD Thesis was suppressed for some years. Covert activities by individuals with vested interests are directly responsible for the existing regulatory failure at both EC and National levels, both within the scientific community itself and within the administrative framework under which research work is carried out on water fluoridation, and have profound implications for your review.
17. The extraordinarily lax approach to the elimination of confounding factors within the pro-fluoridation research sector has permitted unsound conclusions to be embraced by politicians and incorporated into national health policies in the UK and the Irish Republic. As a direct result of this, the very process of 'research' has been subverted, with deliberate attempts made to conceal evidence of harm that would, if recognised and admitted publicly, challenge the political basis on which water fluoridation is permitted in these two Member States.

Misrepresentation of dental health in the UK.

18. As a direct result of the failure of the EMEA to implement its full mandate with respect to fluoridation chemicals, the practice of water fluoridation is now promoted as State policy by the medical establishments in the UK and the Republic of Ireland. Health professionals, even at the highest levels, are permitted to issue prohibited claims that the product has medicinal properties, in contravention of European Directives dealing with the regulation and advertising of medicinal products and foods. This is even in defiance of national statutes banning the issue of such claims, which constitute criminal offences under national legislation derived from Community law.
19. In the UK, dental health statistics are collected by the British Association for the Study of Community Health (BASCD). Data collectors are instructed that teeth showing signs of moderate or severe fluorosis are to be counted as 'sound'². This is the only regular nationwide assessment of children's dental health, and it would appear to provide an appropriate opportunity to collect evidence of fluorosis, but this condition is specifically excluded from the study. It is not appropriate to speculate on the reason for this remarkable anomaly – suffice it to say that no data appear to exist on the prevalence of dental fluorosis, the only obvious external sign of chronic fluoride poisoning, in the British public. This adverse and avoidable medical condition has, quite literally, been expunged from the records.
20. In contrast, in the Irish Republic such data are available, and show that dental fluorosis is now at epidemic levels – around 37% of all adults have it in some form - in all fluoridated water areas. It is even speculated that fluorosis represents a greater dental health problem than the condition that fluoridation purports to prevent. In the absence of such data in the UK, the prevalence of fluorosis in Irish populations must therefore be used as a proxy for UK (in

² British Association for the Study of Community Dentistry. Dental epidemiological survey of 5-year-old children in Wales 2003/4

practice, English) communities. This is unacceptable, and requires remediation by the acceptance that fluoridation is a medicinal intervention, and as such all adverse side effects should be recorded and appropriate action taken to reduce or prevent them. This can only be done if fluoridation is subjected to the full range of constraints under which all medicinal products are manufactured, formulated, licensed, distributed and monitored.

Misleading allegations of poor dental health in target communities.

21. UK data on dental health are misused to compile 'League Tables' that purport to sort individual towns and communities into their apparent ranking order, based on the extent to which their children have decayed, missing and filled teeth ('dmft' for primary dentition and 'DMFT' for permanent dentition). These Tables are then used to mislead communities – and health sector professionals who should know better – that specified areas are in particular need of fluoridation to protect the teeth of their children, who are invariably described as having 'some of the worst teeth in the country'
22. Such claims are fraudulent by misrepresentation, and serve the purely political objective of attempting to justify the imposition of fluoridation on specific communities. They generally emphasise reportedly poor dmft data rather than less alarming DMFT, since these are far more variable and more easily misrepresented to the public. DMFT data are more relevant, because they are indicative of the probable lifetime dental health state of the community.
23. But these data cannot validly be used to construct such Tables, since they are never accompanied by any indication of their reliability or error rates. Without specified Confidence Limits, **dmft/DMFT data cannot be used to compare different populations** – it is statistically meaningless to do so. This point was made by the authors of the 'York Review of Water Fluoridation' in 2000, yet the medical and dental establishments persist in propagating this improper use of the data, and the practice continues to this day.
24. Your Committees should therefore note that all such data from the UK should be regarded as being potentially unscientific. At least some have been obtained using politically manipulated methodology, designed to mislead the public into accepting Centrally-mandated policy instead of allowing people to make their own decision based on scientifically credible and verifiable methodology.

Wider political implications of permitting fluoridation

Conflicting legislation

25. I will not here detail the many legal issues that arise from the continued violation of EC law by permitting the continuation of the current water fluoridation policies in these two States, since they lie outside the Terms of Reference of your study, and are currently before another Committee of the EC. Suffice it to state that the abandonment of the mandatory medicinal regulation of the prophylactic use of fluorosilicates in water fluoridation, in violation of the Medicines for Human Use Directive³, has repercussions under European legislation governing the disposal of hazardous wastes, the contamination of groundwater, the provision of drinking water and the international marketing of processed foods throughout the European Community. It is also relevant to the importation of processed foods into the EC from external States that practice water fluoridation. The discharge of large quantities of a registered

3 2004/27/EC on Medicines for Human Use

hazardous chemical substance to substantial proportions of large river drainage basins is also an issue that is relevant to the implementation of the Water Framework Directive ⁴, yet appears to be ignored by both the Health and the Environment Sectors.

Absence of an assessment of the environmental impacts of water fluoridation.

26. I will instead identify issues that I believe you need to address - they are purely examples that expose the potential hazards of the policy of the indiscriminate discharge of thousands of tonnes of fluorosilicates into the environment without any attempt to carry out a relevant Environmental Impact Assessment (EIA) of the practice. Environmental impacts have a habit of transferring through complex food chains and affecting human populations in unexpected, and occasionally, dramatic fashions. The potentially significant indirect and cumulative effects of exposure to exotic fluorine chemicals through ecological processes need to be included in your study if it is to have full credibility within the scientific community.
27. As far as I am aware, no EIA has ever been carried out in the two Member States that practice water fluoridation on a significant scale (although this would also apply to those small areas of Spain in which fluorosilicates are used in this fashion). I believe that this is largely because it is assumed that the discharges are trivial because they occur over vast areas of territory at allegedly harmless dilutions, and that the environmental effects of fluorosilicates are entirely equivalent to those of the 'natural fluoride' that is already present in some water resources.
28. But this absence of scrutiny can also be attributed to institutional reluctance to permit a detailed EIA that might establish the medical damage of dental fluorosis experienced by very large numbers of individuals in already fluoridated areas of the UK and Ireland, who would undoubtedly then seek recourse to compensation through the Courts of the two Member States, or though the European Courts should the national Courts be recalcitrant in dealing with their cases

Is water fluoridation a medical activity or a covert waste disposal activity?

29. As a professional Environmental Scientist I am concerned that the use of fluorosilicic acid may not be entirely what it purports to be, and that your assessment of its safety needs to cover a rather wider field than purely that of human health. It is widely acknowledged that dental decay rates have fallen dramatically across the whole of Europe in the past few decades, regardless of whether or not drinking water has been fluoridated. It is therefore a matter of public concern that the astonishingly low 'targeting efficiency' of the addition of fluorosilicates to public water supplies results in far less than 1% of the 'fluoride' added to drinking water reaching those relatively few children who are alleged to be liable to benefit from it.
30. More than 99% of the fluorosilicates, or their dissociation products in water, either enter groundwater through leakage, or surface water through wastewater discharges. Since fluorosilicic acid is mainly derived from controlled waste products, captured in the pollution prevention equipment of large industrial chemical processing plants, it is classified as a waste under the terms of the Waste Framework Directive⁵.
31. Inorganic fluorides (excluding calcium fluoride) are classed as hazardous chemicals under the

4 2000/60/EC Water Framework Directive

5 2006/12/EC Waste Framework Directive

Hazardous Waste Directive⁶, so the deliberate discharge of over 99% of this hazardous waste to ground and surface water may be regarded as an improper disposal of a hazardous waste, rather than as a legitimate public health measure.

32. It raises legal questions under the Waste Directive, the Groundwater Protection Directive⁷, and the Water Framework Directive that are not within the scope of your study, but that themselves imply the requirement for consideration and regulation of this practice in their own right, and not merely on account of the toxicological and public safety issues that your Committees are required to study. As part of your recommendations you should therefore emphasise the need to carry out a full EIA of the use and disposal of this chemical within the EC.

Section 3. Potential ecological significance of increased discharges of fluoride to inland waters.

33. In many areas of the UK and Ireland increasing pressure to exploit inland water resources has resulted in very high extraction rates of both surface run-off and groundwater aquifers. In the Thames Valley, for example, it has often been suggested that water may be used up to six times, and subjected to repeated purification in water treatment works, before it eventually reaches the sea. Consequently, what appears to be natural water in the lower reaches of rivers

flowing through heavily populated areas is actually, to a large extent, the final effluent discharged from many local water treatment works. Since waste water treatment does not remove fluoride from the effluent, the final drainage into the lower reaches of rivers and into estuaries may, in effect, be composed largely of fluoridated water.

34. The British Government currently plans to increase water fluoridation from the present level of around 10% of the population of England to 40%. Inevitably, this will raise the quantity of fluoridated effluent discharged to rivers by a similar proportion. As far as I am aware, no assessment of the potential ecological effects of this has been made, yet it is planned that several thousands of tonnes of fluorosilicic acid will be disposed on in British waters annually as a direct result of this policy.
35. In Ireland the potential toxic threat to the public is somewhat greater than in the UK. Seventy percent of Irish public drinking water supplies are fluoridated (compared to 10% in the UK – but twice as many British people are exposed to the product). In addition, the control of residual aluminium concentrations in Irish processed drinking water is extremely poor, with significant failures to comply with the maximum permissible levels of aluminium in drinking water being experienced persistently throughout large areas of the country.
36. The supply of water containing physiologically significant concentrations of aluminium and fluoride to Irish consumers is widespread and continuous. Both of these elements are capable of causing neurotoxic effects in humans, but in combination they have the potential to act synergistically in the low pH of the human stomach to form aluminofluoride complexes that are more neurotoxic than the sum of each of the components alone. The issue of the toxicity of fluoride in conjunction with soluble aluminium in drinking water supplies is therefore one to which your Committee needs to pay special attention.⁸

6 91/689/EC Hazardous Waste Directive

7 2006/118/EC on the Protection of Groundwater Against Pollution

8 Anna Strunecká & Jiří Patočka, Pharmacological and toxicological effects of aluminofluoride complexes. Fluoride 1999 Vol. 32 No. 4 230-242

The significance of fluoride in the environment

37. Although fluorine is a common constituent of the Earth's crust, it is generally present in a relatively insoluble form. Claims that 'all natural waters contain some fluoride' are deliberately misleading. Although it is possible to detect very low levels of naturally-occurring fluoride in many sources with sensitive analytical equipment, the claim (invariably by those wishing to persuade the listener that fluoride has medicinal properties) implies that all water sources already contain physiologically significant and beneficial quantities. This is used to forward the claim that many drinking water sources need more fluoride to be added, to provide the full 'benefit' in reducing dental caries. Given its known toxicity, a more rational approach would be to acknowledge that most water sources fortunately do NOT contain fluoride at toxicologically significant levels of contamination.
38. Whilst it is true that some surface waters already contain simple inorganic fluoride (not fluorosilicate-derived hydrolysis products), by fluoridating a large proportion of public water supplies there will inevitably be a marked increase in the concentrations of fluoride in many surface waters, as a result of the reckless expansion programmes planned for certain Member States of the European Community and elsewhere. The concentration – and therefore potentially the bioavailability – of fluoride to living freshwater ecosystems will therefore increase. Since dental fluorosis already occurs in populations not yet fluoridated, but increases dramatically soon after fluoridation is introduced, the deliberate addition of yet more to the environment is to be avoided.

Environmental risks from organo-fluorine compounds

39. Organo-fluorine compounds are rare in nature, but they are of increasing environmental concern. They now constitute around 9% of all agrochemicals, and the trend in their production and use continues upwards. Their eco-toxicity is much higher than that of inorganic fluoride, and they are persistent chemicals that have disparate impacts on some species, whilst being relatively innocuous to others. They therefore have the potential to alter ecological balances and disrupt community structures in ways that are only now beginning to be investigated.
40. A few plants produce toxic organo-fluorine compounds, but recent research has shown that some bacteria are also able to convert inorganic fluoride to organo-fluorine compounds. As far as I am aware, no assessment has been carried out of the risk that increased inorganic fluoride concentrations in fresh surface waters might lead to a rise in the generation of secondary organo-fluorine compounds in the environment. Nor is there any information on how such toxic chemicals might subsequently be subject to bio-accumulation and metabolism in the food chains of either unexploited but ecologically significant species, or may be subject to bio-accumulation in plants and animals that are used as a source of human food.
41. Fluorinated compounds are desirable for commercial use because they are relatively stable, but their persistence also makes them potentially significant environmental contaminants. Some commercially-produced organo-fluorine compounds used in the environment have been found to be susceptible to partial defluorination, but it is unclear what are the ultimate locations and biological effects of fluorinated compounds, their constituents and their transformational products in the environment.⁹

⁹ Blake D Key, Howell R D, and Criddle C S 1997. Fluorinated Organics in the Biosphere. Environmental Science and Technology Vol.31:No 9; 2445-2544 <http://www.stanford.edu/group/evpilot/pdf/es961007c%202.pdf> accessed 6th

42. At least two species of bacteria are known to be able to metabolise inorganic fluoride to fluoroacetate. Caution should be used in evaluating the apparent absence of a wider range of species capable of this process, as this may be an artifact caused by the absence of research - absence of evidence is not evidence of absence. Conversion of inorganic fluoride to fluoroacetate by *Streptomyces cattleya* is now known to occur in conditions that may be replicated in nature¹⁰.
43. When ingested and metabolized, fluoroacetate is transformed in cells to fluorocitrate, a strong enzyme inhibitor that blocks the citric acid cycle, with potentially lethal effects. Both dogs and rabbits have been shown to accumulate fluoroacetate following repeated sublethal doses until lethal levels are attained¹¹. The LD50 of fluoroacetate in dogs is extremely low – 0.06mg/kg, so exposure to even trace environmental contamination levels over a period of time can lead to death in some species.
44. Death usually results from either respiratory arrest following severe convulsions, gradual cardiac failure or ventricular fibrillation, or progressive depression of the CNS with either respiratory or cardiac failure as the terminal event. There is a general tendency for herbivores to exhibit cardiac effects, carnivores to develop CNS convulsions or depression, and omnivores to exhibit effects upon both organ systems.

Disruption of ecosystem community structure by organo-fluorine compounds

45. In Australia, a number of indigenous plants produce fluoroacetate as a deterrent to grazing by native herbivores, and many of these indigenous animals have evolved a tolerance to fluoroacetate, as have the native carnivores that eat them. However, this chemical can be toxic to introduced species such as sheep, goats, dogs, foxes and rabbits. This is the basis of the deliberate use of fluoroacetate to control introduced mammalian pest species in Australia.
46. The bodies of endemic Australian herbivores can contain sufficient fluoroacetate to poison introduced carnivores that eat them. The ecological effect of such selective toxicity can be important - the occurrence of the Red-tailed Phascogale (an endangered small native marsupial) in areas of Australia where plants that contain fluoracetate also occur may be a result of the protection these toxic plants provide to endemic species, from competition with livestock and from predation by introduced carnivores.
47. In a complex ecosystem, and especially where faunal and flora changes are expected to occur as the changing climate progresses, the environmental effects of potentially increased bioavailability of naturally generated fluoroacetate, especially where it supplements anthropogenic distribution of artificially manufactured organo-fluorine compounds, is liable to be highly complex but should not be ignored. Selectively toxic effects on some species, leaving others unaffected, may result in ecological imbalances that could precipitate unpredictable but significant ecosystem instabilities.
48. The following examples are only two possible scenarios of economically significant processes that could be vulnerable to increased fluoride and/or organo-fluorine substances in surface waters. Fluoroacetate is known to destabilise the formation of biofilms, on which very

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10 T Tamura, M Wada, N Esaki and K Soda 1995. Synthesis of fluoroacetate from fluoride, glycerol, and beta-hydroxypyruvate by *Streptomyces cattleya*. J. Bacteriol., 05 1995, 2265-2269, Vol 177, No. 9

11 US Environmental Protection Agency Integrated Risk Information System; Sodium fluoroacetate, CASRN 62-74-8 <http://www.chem.uic.edu/web1/OCOL3/IRIS/SUBST/0469.HTM#II>. Accessed 6th April 2009

significant ecological productivity depends. Anthropogenic processes that rely on biofilm activity include the development of films of Cyanobacteria ('Blue-Green Algae') on the surface of mud in rice paddyfields, which can be a major (or even the main) source of nitrogen in the fertilisation of rice paddyfields. A second example is the stripping of nutrients from sewage effluent by the biofilm that develops on the surfaces of the porous media used in trickling filters in waste water treatment plants.

49. I am not aware of any research into the effects – if any – of water fluoridation on the efficiency and stability of biofilms in wastewater treatment plants receiving such effluents, nor whether any increase in organo-fluorine compounds, either within the films or in the outflowing water, may result from this. But it is important to be aware that both of the processes that I have described are vital to important aspects of human community management, yet appear not to be considered in the rush to fluoridate water supplies for arguable medicinal purposes.

Toxicology of fluorosilicates

Inappropriate chemical analogues used in toxicological research.

50. As a scientist who regularly works in the field of ecotoxicology I am concerned that the toxicology of fluorosilicates has been so severely neglected, especially in view of the prevalence of water fluoridation and the millions of people subject to this controversial product. Few if any large-scale clinical assessments have been made of the effects of fluorosilicates on human health. Most appear to have relied on using pharmacological-grade sodium fluoride and similar chemicals, rather than the technical grade fluorosilicates employed in the commercial fluoridation of public water supplies.
51. Rare exceptions include the research of Masters and Coplan and their associates in the USA on the effects of fluoridation on very large numbers of subjects. This identified an unexpected but statistically significant increase in the blood lead levels of young people living in fluoridated water areas, and consequential increase in anti-social behaviour. (The original papers on these studies will have been submitted to your Committee already and are not included here.) Whether a Bassin-style refinement of the analysis of the many sub-cohorts involved in these important studies would reveal additional or more precise relationships (were this actually possible) is a matter for speculation.

The dissociation controversy, and its relevance to human exposure.

52. It is common practice of fluoridation proponents to claim that water fluoridation is simply 'topping up natural levels of fluoride', when it is evident that it is no such thing. It is alleged that, on hydrolysis, fluorosilicates dissociate into nothing but fluoride, a chemically illiterate claim that has no foundation in reality. But the real issue is not whether the resultant solution of fluorosilicate constitutes is sufficiently identical to unfluoridated processed water to correspond to the 'water for human consumption' that is defined by EC legislation as the only legal form of water that can be supplied to domestic premises through publicly-operated water supply systems. The toxicological issue is, precisely what is the result of administering water that has had fluorosilicate added to it ***once it reaches the first point of absorption in the human body, the stomach?***
53. It is here that the real difference between water containing 'natural' fluoride and fluoridated water becomes apparent. The environment of the human stomach is totally different to that

which exists within the water distribution system, or at 'the point of compliance' (the customers' taps) where water quality standards are considered to apply to drinking water under EC law. Instead of being slightly alkaline, the stomach environment is extremely acidic. The pH in the stomach is commonly around 2, whilst that of processed water is around pH 7.5 to 8.

54. There is therefore an increase in acidity at the location where the potential toxicity of fluorosilicate-treated water becomes relevant, amounting to some 5 to 6 orders of magnitude greater than at the customers' taps. At this pH, the hydrolytic dissociation of fluorosilicates is complex, and the claims that the bioavailability of fluoride in fluoridated water is not significantly different to that of 'natural' fluoride are entirely misconceived and wrong. Indeed, it is possible that the apparently slightly higher bioavailability of fluoride from fluoridated water that has been reported by some workers may be due to the presence of as yet unspecified fluorosilicate degradation and association products that are entirely absent when water containing 'natural' fluoride is consumed.
55. Coplan ¹² and others have noted that, at the pH of the human stomach silicon complexes, including silicon tetrafluoride that was the target of the pollution prevention effluent scrubbers of the primary production facilities, unexpectedly reappear. This has toxicological implications that are quite unrelated to the issue of the direct toxicity of fluoride itself. It appears that this aspect of the toxicology of fluoridation chemicals has been seriously neglected¹³. Administering pure fluoride to test subjects (whether human or otherwise) is entirely unrelated to the administration of fluorosilicates, and the resultant data from the former cannot reliably be applied to the latter.
56. Your Committee may well need to investigate this disparity in many of the toxicological studies that have been published in support of fluoridation, since a number of physiologically active chemical entities may become present in the human gut as a result of administering fluorosilicates that are entirely absent when pure forms of fluoride are ingested.

In conclusion, I thank you for your time in examining this submission, and wish you every success in reviewing this complex and difficult field.

Douglas Cross

12 Coplan MJ, Patch SC, Masters RD and Bachman MS. Confirmation of and explanations for elevated blood lead and other disorders in children exposed to water disinfection and fluoridation chemicals. *NeuroToxicology* 2007. 28: 1032-1042

13 Coplan MJ and Masters R D 2001. Silicofluorides and fluoridation. *Fluoride* Vol. 34 No. 3 161-164 2001 Guest editorial. p.161