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Re: Response to WAC 197-11-960 Environmental Checklist for Tacoma-Pierce County Health Department Fluoridation Resolution

Introduction

The Tacoma-Pierce County Health Department (referred to hereafter as the Health Department) has proposed, on the basis of public health policy, to impose fluoridation of the water supplies of a number of communities under its jurisdiction whose water purveyors serve 5,000 or more people.

Those making the proposal have completed and submitted a checklist to SEPA to assist SEPA to identify possible environmental impacts. The presentation of an argument to rationalize the policy would appear to be inappropriate in this instance, although much of the checklist is taken up with this aspect.

In spite of this, the Health Department does not discuss the findings of the most recent reviews of fluoridation, that of the National Health Service's Centre for Reviews and Dissemination, the University of York (UK), 2000 (1) and that prepared by D. Locker for the Ontario (Canada) Ministry of Health, 1999 (released in 2001) (2). These show that supporting literature for fluoridation is of poor quality, that benefits are low (15% in

York study), that dental fluorosis prevalence is high (48% in York study) and that many associations with such serious problems as cancer, bone fragility are flagged. In addition, the concept that fluoridation provides specific advantage to low socioeconomic groups has no basis in fact. These findings by agencies that may be expected to have orthodox views plus the acceptance that any fluoride benefit, if there is any, is due to the topical rather than systemic action has seriously questioned the basis for fluoridation policy.

It is the purpose of this document to comment specifically on the checklist dealing with the environmental impact of the proposal.

Effects on fresh water and marine environment

An important area in which problems may be foreseen is that dealing with the effect of additional fluoride entering the fresh water and marine environment (Puyallup River and Puget Sound) and its possible effects on the ecosystems.

The Health Department appears to have no disagreement with the conclusions of others such as the Government of Canada Environmental Protection Act that estimated adverse effect thresholds (lethal, growth impairment and egg production) are 0.28 mg/L fluoride for fresh water species and 0.5 mg/L fluoride for marine species (3). They also recognize that a field study on the Columbia River established that a concentration of 0.2 mg/L fluoride inhibited the migration of important commercial species of salmon thereby adding significance to the thresholds calculated from laboratory studies (4). Warrington in a study for the British Columbia Ministry of Environment also identified 0.2 mg/L fluoride as a "critical level" for fresh water species (5)

The Health Department must demonstrate that these critical levels fluoride will not be encountered in the receiving waters from sewage treatment plants in the geographical region under review after the commencement of fluoridation. In pursuit of this objective, the Health Department presents data and calculations. These data, primarily from a paper written by T.T. Masuda in 1964 (6) are now more than 40 years old (the latest collected in 1961) and apply to systems in the State of California. No data are presented relative to

current conditions especially in the communities effected by the proposal. This applies in particular to concentrations of fluoride found in raw sewage, after primary treatment and secondary treatment prior to discharge. Concentrations of fluoride in effluent from septic tank systems are not presented. These are relevant, as are more up-to-date readings of the concentration of fluoride in the receiving waters.

The assumption upon which calculations of fluoride concentration in the effluent and receiving waters after fluoridation is based is not correct. It is a misinterpretation of Masuda's data.

Masuda showed that what he termed "organic fluoride" (fluoride from food, beverages, dental products) was reduced by the bacterial action of secondary treatment whereas "inorganic fluoride" in the water supply (both natural and added) was only slightly reduced during primary treatment by adsorption to particles.

The Health Department, in its calculations assumes an influent concentration of 1.3 mg/L fluoride and a 50% removal that is an adaptation of the 57% figure presented by Masuda. This influent concentration is (by coincidence?) identical to that reported (in table 8 of Masuda's paper) as the mean concentration in raw sewage (range 0.5-1.8 mg/L) excluding water related fluorides for the 56 California communities surveyed.

The mean value of domestic sewage including fluoride in the water supply at a mean concentration of 0.25 mg/L (range 0.1-0.4 mg/L) was reported as 1.55 mg/L fluoride in raw sewage and 0.63 mg/L fluoride in secondary effluent (range 0.3-1.5). The fluoride in the water supply was reduced from 0.25 mg/L to 0.24 mg/L in secondary effluent. It follows that if the concentration were to be at the mean of 1.0 mg/L that is proposed, the domestic sewage and secondary effluent would be considerably higher. For example, domestic sewage fluoride concentration could be at a level of 2.3 mg/L and 1.15 mg/L in secondary effluent after a 50% reduction. This calculation continues to use 1961 data for residual waste fluoride. Current data for this component that Masuda calls "organic fluorides" may be shown to have increased over the years. An effluent level of the

magnitude of 1.15 mg/L fluoride is not out of line with other studies. Singer and Armstrong (1977) (7) found effluent levels in fluoridated (at 1.0 mg/L) Minneapolis-St. Paul of 1.21 mg/L and non-fluoridated Brainerd (0.13 mg/L in water) of 0.38. The City of Kamloops in British Columbia when it was fluoridated to 1.0 mg/L is known to have effluent levels discharged to the Thompson River to 1.5 mg/L (personal communication).

The calculation of the discharge to the Puyallup river of 0.65 mg/L fluoride presented by the Health Department is more likely to be in the region of 1.5 mg/L.

As a result of this error, all calculations presented in the checklist with the intention of demonstrating that effluent after fluoridation presents no hazard to the fresh water or marine ecosystems should be disregarded.

Actual measurement of present concentrations presently in the sewage systems of the communities considered for fluoridation are required to give a modicum of credibility to any calculations in addition to the correct interpretation of the reduction process. Current measurement would also serve as a method for the evaluation of the sewage systems and would indicate whether there are risks of overload.

In addition, actual measurements may indicate that levels of fluoride in wastewater from food and beverages have increased since 1964 owing to more "importation" of products prepared in an increased number of fluoridated communities. There may be more residual fluoride pesticides and fungicides in food and beverages, the use of fluoride dental products may have increased as may medications such as Prozac that contain fluorides.

Other environmental concerns

Sediment

Fluoride in effluent not only enters receiving waters but also is accumulated in sediment either locally or in the estuary. Considering the long life (estimated at 1-2 million years (8)) this might be of importance especially its known effect on benthic organisms and the fact that dredging may increase water concentrations of fluoride.

Sewage sludge

Sewage sludge with high concentrations (236 mg/L in dry solids (Singer 1977)(7)) may be spread on the ground with entry into surface and ground water as well as giving rise to fluoride containing dust that can contaminate surface water and grazing areas.

Surface run-off

Run-off into surface waters from activities such as lawn watering, car washing and fighting fires is presented in the checklist. However, it must be stressed that this run-off that may enter streams and other receiving waters contains fluoride at the concentration proposed for these communities (mean 1.0 mg/L).

Transportation hazards

Dangers are inherent in the transportation of sodium fluoride by rail or motor transport where spills may occur requiring HAZMAT procedures.

Terrorist risk

Sodium fluoride is a potential target for terrorist activities as it is basic requirement for Sarin gas that has been used, for example, in Japan. In addition, intentional overfeed has a potential as a weapon of mass disruption/destruction.

Sodium fluoride as product

The checklist makes no mention of the specific features of the product to be used. Sodium Fluoride used for water fluoridation is “commercial grade” prepared from silicofluoride waste from the phosphate fertilizer industry. In the process of manufacture impurities are permitted in the final product that may be toxic. These are elements such as lead, arsenic, and cadmium and in some instances, radioactive nucleotides. These may be considered to be environmental problems. These contaminants are not only ingested by consumers but also destined to enter the sewage treatment process and discharge into receiving waters.

Conclusion

This checklist prepared and submitted by the Tacoma-Pierce County Health Department should be rejected by SEPA on the grounds that it fails to present credible information required to identify possible environmental impacts. There is a pre-occupation with

justifying fluoridation as public health policy rather than honestly appraising its growing lack of scientific support and environmental consequences. There are a number of omissions.

The process would benefit by committing resources to carry out studies of the fluoride concentrations in the various components of sewage systems of the regional area proposed for fluoridation and current values for fluoride concentrations in the receiving waters.

The small "benefit" (15% caries reduction) shown currently for water fluoridation may well be overshadowed by the increased prevalence of dental fluorosis and the potential risks to the environment.

Respectfully submitted,

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References

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