

**Response to Concerns Raised by the Aluminium of Canada
on the Proposed Order Adding
Toxic Substances to Schedule I of CEPA**

Schedule I Should not Include Natural Substances

Environment Canada and Health Canada concur with the Association's viewpoint that there are large quantities of fluorides and PAHs naturally present in the environment. We do not concur, however, with their view that reducing anthropogenic emissions would have little overall benefit on the quality of the environment or human health. There were many situations documented in the assessment reports showing that anthropogenic sources significantly increased levels in nearby locations (e.g., fluoride levels in deer browse on Cornwall Island adjacent to the aluminum smelter, levels of PAHs in Hamilton Harbour near steel mills). The potential therefore exists for adverse effects on biota that would otherwise be tolerant of background levels. We believe that in such situations reduction of anthropogenic emissions would have a positive benefit for the environment.

The focus of the risk management phase for natural substances such as fluorides and PAHs will be to identify and mitigate risks only in those areas where anthropogenic sources have augmented levels above those that can be tolerated by biota that would normally be present in the area.

Concerning the issue of natural occurrence, Health Canada notes that while it may be true that some of the PSL substances are naturally-occurring, anthropogenic releases are additive and avoidable, as opposed to those from natural sources. Therefore it is reasonable to expect that reduction of the former releases would reduce health and environmental risks. This is particularly significant for those substances for which the critical health effect (cancer) induced through interaction with genetic material, is considered not to have a threshold, i.e., substances for which there is believed to be some chance of adverse effect at any level of exposure. Therefore on this basis, the goal of Health Canada is to minimize these risks by examining means to reduce human exposure to these substances, and accordingly believes that effort should be directed toward reduction of exposure of the Canadian population to the extent possible.

The Association raised the point that inclusion of inorganic fluorides and PAHs on Schedule I is unprecedented for naturally-occurring substances such as these. It should be emphasized that this approach is not unprecedented in that it is often desirable to reduce the environmental load from anthropogenic sources of some naturally-occurring (not to be confused with "non-toxic") substances. This is evidenced by the inclusion of naturally-occurring substances such as lead and mercury and the proposed inclusion of many others, such as inorganic cadmium and arsenic compounds, on Schedule I.

Fluorides: The Assessment Report is Based on Incomplete and Old Data

The Association claims that “the conclusion of the assessment report is based on the potential effect on the most sensitive plants with the highest concentrations observed sometimes up to 15 years ago.” This is a gross oversimplification of the evidence presented in the assessment report. First, the majority of studies determining levels in air near industrial sources were carried out in the late 1980s and early 1990s, with several studies carried out just prior to the publication of the 1993 assessment report. Second, mean concentrations near industrial sources rather than “highest” concentrations were compared to the levels causing effects on plants. Those “most sensitive” plant species included balsam fir, black spruce, and larch which are widespread in Canada and of ecological and commercial importance. Third, the assessment conclusion was also based on predicted effects on aquatic invertebrates and fish, and terrestrial herbivores, not just “sensitive plants.” Environment Canada rejects the Association assertion that “the report has been overly conservative in its conclusions based on information not representing the actual situation.”

The fact that vegetation can be affected by fluoride emissions was demonstrated in a study of vegetation in the vicinity of a phosphorus plant in Newfoundland (which has since closed), in which seed production of three species of coniferous trees was significantly impaired.

Fluorides: Direct Comparison Between Lab Testing and Concentrations in the Environment are Inadequate

Toxicity tests conducted in the laboratory indicate that sensitive aquatic organisms could be adversely affected by concentrations of inorganic fluorides occurring in Canadian waters. Such tests are used as the basis for regulatory and other decisions in all OECD and other jurisdictions.

Fluorides: Emissions and Quality of the Surrounding Environment are Already Regulated for Major Sources of Fluorides

In their letter, the Association notes that aluminum smelters, which are the major source of hydrogen fluoride, are already regulated via provincial air emission limits and fluoride limits in forage. While this point will clearly be an important one during the risk management stage, it plays no role in determining whether the substance is “toxic” as defined by CEPA or should be placed on Schedule I. All substances are regulated to some degree (e.g., Fisheries Act covers all substances

released to the aquatic environment that could be harmful to fish or fish habitat). Yet, there are often situations where a particular release or an aspect of a substance's life cycle is not adequately addressed. During the risk management stage, existing regulations on emissions from aluminum smelters will certainly be considered in deciding what measures are necessary to control fluoride emissions. The intention will be to ensure that federal risk reduction measures do not duplicate or conflict with the already existing provincial regulations. To that end, industry and provinces would be invited to participate in discussions of management options.

PAHs: The Assessment Report is Based on Incomplete or Old Data

In their letter, the Association claims that the assessment of PAHs is based on old data, and that recent data indicate substantial reductions in atmospheric emissions and concentrations in ambient air. The assessment conclusion with regard to effects to the environment, however, was based on neoplastic, genotoxic and population-level effects to sediment-dwelling biota in locations such as Sydney Harbour, Hamilton Harbour, and Kettle Creek (Port Stanley, Ontario). The studies that documented these effects were published in the late 1980s and early 1990s, with several published just prior to the assessment report in 1994. Given their persistence in sediments, it is likely that PAHs still pose a significant risk in these and similarly contaminated locations.

One of the Association's points concerns the possibility that the assessment conclusion for PAHs may have changed if newer data had been used. While emissions from industrial sources may have declined since the assessments were completed, it is improbable that incorporation of new data would change the results of the assessment that PAHs are carcinogens likely acting through a genetic mechanism for which there is no threshold. Rather, it might impact upon the magnitude of reduction. In view of this, while new data could be submitted and considered, as resources permit, it should not delay examination of appropriate additional measures to reduce emissions.

PAHs: The Assessment Impact on Human Health was Incomplete, Based on Exposure Levels and Carcinogenic Potential Largely Overestimated

The Association states that the Assessment Report does not offer sufficient information to demonstrate if there is a significant incremental risk for populations in the vicinity of **HSS** aluminum smelters. In fact, the highest exposure potency indices calculated in the risk assessment, were based on levels of PAHs in communities in which there were aluminum smelters.

Another assertion is that exposure levels were overestimated in the assessments. This is not likely as the exposure estimate included only a small portion of PAHs in the environment, those for which data were available. Nonetheless as stated above, the PAHs examined were concluded to be probable human carcinogens with indications of genotoxic potential. Therefore Health Canada's approach would be that there is no identifiable threshold below which the critical health effect would not occur, and consequently that exposure should be reduced to the extent possible. While decreases in emissions and resultant exposure levels may have occurred in recent years, on-going efforts to further reduce emissions are in keeping with Health Canada's goal of reduction of human exposure to substances declared toxic under CEPA.

PAHs: Recent Studies Indicate no Measurable Risks for Humans and the Environment Around Soderberg Smelters

The conclusions of the evaluation for PAHs were based on links established between PAHs in sediments and adverse effects on sediment-dwelling invertebrates and bottom-dwelling fish. Concentrations of PAHs in drainage ditches along railway lines and utility rights-of-way may be elevated to levels that could cause harm to aquatic organisms. Neoplastic and genotoxic effects have been associated with exposure to PAHs for both terrestrial and aquatic organisms under laboratory conditions. Cancerous tumours have been observed in bottom-dwelling fish from Canadian sites where sediments are highly contaminated by PAHs. These sites are not necessarily related to aluminum smelters but could conceivably include smelters such as the Soderberg smelters.

Again, regarding risks to human health posed by the Soderberg smelters, for the PAHs identified as "probably carcinogenic to humans", there is believed to be some chance of adverse effects at any level of exposure. Accordingly, Health Canada feels that it is not possible to determine an acceptable level of exposure, and that the latter should be reduced to the extent possible.

Conclusions

Environment Canada and Health Canada believe that available evidence supports the conclusion that inorganic fluorides and polycyclic aromatic hydrocarbons are "toxic" as defined in Section 11 of CEPA. The departments further believe that sufficient data are available about these compounds to move to the risk management stage. Stakeholders will be consulted in the process of developing any action resulting in new federal risk management activities. Therefore, there is no justification or need for a Board of Review to inquire into the nature and extent of the danger posed by the substances.