To: Doug Wright
Director of Program
Commission for Environmental Cooperation

Re: Public Review Draft : Phase I North American Regional Action Plan
Dioxins and Furans, and Hexachlorobenzene

Dear Mr. Wright,

I would like to offer the following comments on the Public Review Draft of the Phase I NARAP for Dioxins, Furans and Hexachlorobenzene.

Given the stated objective of this NARAP (to reduce exposure of these chemicals to ecosystems, fish and wildlife, and especially humans), I feel that this document focuses far too much on the human exposure component and ignores some important considerations for terrestrial wildlife. Although I agree that the two principal exposure pathways for the human food supply are 1) air deposition onto vegetation and subsequent consumption by livestock and 2) uptake from water (and diet) by fish, an important exposure pathway for terrestrial animals is from soil via consumption of invertebrates like earthworms and insects. The following articles provide evidence of this assertion:

Hendriks et al (1995). Modeling & Monitoring Organochlorine and Heavy Metal Accumulation in Soils, Earthworms and Shews in Rhine-Delta Floodplains. *Arch. Environ. Contam. Toxicol.* **29:** 115-127.

Krauss et al (2000). Availability of PAHs and PCBs to Earthworms in Urban Soils. *Environ. Sci. Technol.* **34:** 4335-4340.

Matscheko et al (2002). Application of Sewage Sludge to Arable Land – Soil Concentrations of PBDEs and Polychlorinated Dibenzo-*p*-dioxins, dibenzofurans and biphenyls and their accumulation in Earthworms. *Environ. Toxicol. Chem.* **21(12):** 2515-2525.

Other authors who have conducted extensive research on this topic include A. Belfroid and T. Jager.

As another example, the 2000 USEPA Draft Guidelines for establishing "Eco-SSL" (Ecological Soil Screening Levels) for contaminated sites also incorporate a dietary uptake model for terrestrial animals using empirically derived Biota-Soil Accumulation Factors (BSAFs) for earthworms. An example derivation of an "Eco-SSL" can be found in Regan et al (2002). (Environ. Toxicol. Chem. 21(4): 882-890).

Although far from conclusive, the following articles provide some direct evidence of avian poisonings related to exposure to persistent organic pollutants.

Okoniewski and Novesky (1993). Bird poisonings with cyclodienes in suburbia: Links to historic use on turf. *J. Wildl. Manage.* **57(3)**: 630-639.

Stansley and Roscoe (1999). Chlordane poisoning of birds in New Jersey, USA. *Environ. Toxicol. Chem.* **18(9)**: 2095-2099.

Stansley et al (2001). Food-chain aspects of chlordane poisoning in birds and bats. *Arch. Environ. Contam. Toxicol.* **40**: 285-291.

Although target actions to reduce human exposure and environmental releases will also benefit non-human species, I still feel that it is important to focus a little more attention on the potential hazards to terrestrial animals. For example, in addition to the contaminants deposited directly onto the soil, contaminants deposited aerially on plant leaves will eventually be incorporated into the soil as decaying litter and also be present in animal manure and thus be available to terrestrial invertebrates and higher trophic level species.

To address these concerns, the Monitoring and Assessment component of the NARAP could be modified to at least include collecting and analyzing soil and invertebrate samples. Mechanistic bioaccumulation models could then be applied to estimate the concentrations in higher level organisms and feed into some kind of risk assessment.

Please feel free to contact me if you have any questions or comments about this letter.

Sincerely,

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