

Assessment of “Traditional Food” Diets in the Arctic

September 23, 2008

Prepared by

Susan Hunter Youngren, Ph.D.

Bergeson & Campbell, P.C.
1203 Nineteenth Street, N.W.
Suite 300
Washington, D.C. 20036

Prepared for

Makhteshim-Agan of North America, Inc.

EPA has raised concerns about potential exposure to the population residing in the Arctic region. This concern is heightened by a perceived lack of information on the diet of this subpopulation. There are no data specific to this subpopulation in the diet survey (Continuing Survey of Food Intakes by Individuals or CSFII) used by EPA in the dietary risk assessment conducted for endosulfan.

There are, however, data on the consumption of traditional foods by people residing in the Arctic region that EPA did not consider in the dietary risk assessment. The Centre for Indigenous Peoples' Nutrition and Environment (CINE) conducted three major studies of dietary intake in Arctic communities of Canada from the late 1980s to the late 1990s.¹ The objectives of the studies were to understand the patterns of traditional food use as well as assessing the benefits and risks of using traditional food. The studies were conducted in a manner similar to the diet studies in the U.S. that EPA has relied upon; they used 24-hour food recall surveys of individuals in randomly selected households from 44 communities in three different cultural areas (the Yukon First Nations, Dene and Metis, and Inuit).² A total of 3,689 interviews were conducted and more than 700 food samples were collected. EPA should consider and use the data collected in these interviews to assess potential dietary risk for the U.S. population residing in the Arctic.

The traditional food items most often consumed included moose, caribou, whitefish, char, seal, trout, salmon, coney, goose, musk ox, crowberry, and partridge.³ Traditional food ranged from 6-40% of the food use as a percent of total dietary energy. The highest food intake level was for males greater than 61 years old in the Dene and Metis communities with a geometric mean consumption of 528 grams per day and a 99.9th percentile consumption of 715 grams of traditional food per day (with the 99.9th percentile calculated from the geometric mean and standard deviation).⁴ Males 0-12 years old consumed an average of 150 grams of traditional food per day.⁵

¹ Indian and Northern Affairs Canada (2003). *Toxic Substances in the Arctic and Human Health – Canadian Arctic Contaminants Assessment Report II*. Minister of Indian Affairs and Northern Development, Northern Contaminants Program, Ottawa, Canada at 11, available at http://www.aincinac.gc.ca/ncp/pub/helt/helt5_e.html.

² The Yukon First Nations communities are in the Yukon territory of Canada with some areas bordering the southwest area of Alaska; the Dene and Metis communities are in the middle and western portion of Canada with some communities close to the northwest area of Alaska; and the Inuit communities are in the eastern and far eastern portion of the Arctic region of Canada. *Id.* (Figure 2.1.1).

³ *Id.* at 12.

⁴ Receveur, O., Boulay, M., Kuhnlein, H.V. (1997). Decreasing Traditional Food Use Affects Diet Quality for Adult Dene/Metis in 16 Communities of the Canadian Northwest Territories. *J. Nutrition* 127:2179-2186 at 2184.

These consumption values show that any exposure to endosulfan in traditional foods would be minimal. For example, using the additional contaminant studies conducted in the Arctic and in northern parts of the U.S. that EPA has added to the docket (EPA-HQOPP-2008-0615), the highest measured concentration in an Alaskan fish monitoring paper was 0.068 ppb in chum.⁶ Endosulfan was grouped as “not detected in over 75% of all the tissue samples”⁷ collected and analyzed. The report refers to data from other available Alaska monitoring studies and concludes:

- Organochlorine contaminant concentrations in Alaska fish are low, and are not expected to cause adverse health effects in even the most frequent fish consumers.
- The Alaska Division of Public Health continues to recommend the unrestricted consumption of fish from Alaska waters.
- Ongoing monitoring is needed to better understand the factors influencing contaminant concentrations in Alaska fish and wildlife, actual exposure levels in humans who consume wild foods, and trends in contaminant concentrations over time.⁸

If the highest measured concentration of 0.068 ppb that was found in less than 75% of all the samples was assumed to be in **all** of the traditional food eaten, the dose for an adult male greater than 61 years of age would be 7×10^{-7} mg endosulfan/kg body weight. If this is compared to the aRfD of 0.015 mg/kg, the MOE is over 21,000. If the same concentration is used for a 10 kg child ingesting 150 grams of traditional food, the resulting dose is 1×10^{-6} mg/kg with an MOE greater than 14,000. Neither of these doses would have any impact on the total dose in the current dietary risk assessment.

⁵ Kuhnlein, H.V. (1995). Benefits and Risks of Traditional Food for Indigenous Peoples: Focus on Dietary Intakes of Arctic Men. *Canadian J. Physiological Pharmacol.* 73:765-771 at 766.

⁶ Alaska Department of Environmental Conservation Fish Monitoring Program: Analysis of Organic Contaminants at 22, EPA-HQ-OPP-2008-0615-0002.

⁷ *Id.* at 6.

⁸ *Id.* at 17.

This is a very conservative estimate of dose and potential risk as it assumes that all traditional food eaten is contaminated with the highest concentration of endosulfan detected. It would not typically be assumed or expected that all of the food consumed would be contaminated, particularly if the 99.9th percentile consumption value was used (as was done for the adult male). Moreover, it would not typically be assumed or expected that all of the food would have the highest residue level found, particularly when it was found in less than 75% of the samples. Finally, if this estimate were to be added to the current risk assessment, certain foods and their contributing dose would need to be removed from the assessment as it is unlikely that a person could or would consume these levels of traditional food in addition to market foods.