



Arctic Contaminants: An Unfinished Agenda

By Robbie Keith

In January 1998 DIAND announced funding commitments of \$6 million annually for the full 5-year programme contemplated for NCP-II. This announcement responds to concerns of Aboriginal peoples' organizations, and CARC applauds the government's commitment to continue this essential research into the serious problem of northern contaminants.

For six years the Northern Contaminants Program (NCP), funded by the federal government and co-ordinated by the Department of Indian Affairs and Northern Development (DIAND), focused the efforts of scientists and Aboriginal peoples to document the nature of contaminants in the Arctic, their sources, modes of transport, pathways, distribution, and uptake in the ecological systems of the Arctic.

Exposure levels among the people living there were recorded. Canada's roles in domestic and international contaminants management were examined.

The unprecedented levels of exposure to contaminants found among many Aboriginal people in the Arctic, along with a growing sense that the integrity of ecological systems was at risk, created a sense of urgency. It became necessary to know—soon—what both science and traditional knowledge could tell us about the problems. More than 100 studies of contaminants from both distant and local sources were documented in the *Canadian Arctic Contaminants Assessment Report* (CACAR). The NCP is widely recognized as one of the most detailed scientific appraisals of contaminants ever undertaken. As a collaborative research programme involving the scientific community, Aboriginal organizations, public policy makers, and public administrators, it is a lesson in successful partnerships. All who took part are to be applauded for their initiative. We now know a great deal more about Arctic contaminants.

In spite of the accomplishments of the NCP, we remain troubled by unknowns, uncertainties, imponderables, and resistance on the part of some industrial interests and government agencies to adopt well-reasoned precautionary, preventive, mitigative, and restorative responses. A sense of disquiet continues to permeate discussions on contaminants across the country. Some of that disquiet is found in the articles that follow in this issue of *Northern Perspectives*.

The Northern Contaminants Program

We begin *Northern Perspectives* with a summary by Chris Furgal and Robbie Keith of the key findings of the *Canadian Arctic Contaminants Assessment Report*. Russell Shearer, of DIAND, outlines "The Next Steps" of the Northern Contaminants Program, noting greater emphasis this time on human health, quantification of risks and benefits of country foods, and Aboriginal leadership in communications and public information.

While CARC applauds the effort and commitment of those who have worked to guide the NCP and those whose research informed it, much remains to be known and great political leadership will be required to deal effectively with the threats to human and ecological health.

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- Further research is needed now to fill major gaps in scientific knowledge. For example, we need more information about the relationships between exposure to contaminants and effects, especially in the fetus and children. We know too little about the effects of chronic exposure to relatively low levels of contaminants. We need better information about the relationship between laboratory animal studies and human effects. We also need to link scientific and legal knowledge to develop policy and regulatory frameworks that will eliminate or reduce the presence of harmful contaminants.
- Even though limited evidence is available, there is documentation to indicate that fetal and early infant development may be impaired by the presence of some contaminants in the mother. The potential for significant inter-generational effects involving the immune system, chromosome change, and reproductive problems should be sufficient to warrant major research commitments. The well-being of future generations should be a national policy priority.
- Research is only part of the requirement: a fresh approach to Arctic science policy, including a reinvigorated Canadian Polar Commission, is needed. In this era of government "restraint," uncertainty about the will to sustain Arctic science—in particular, contaminant research—is worrisome.

Aboriginal Perspectives

The Council of Yukon First Nations, the Dene Nation, the Métis Nation of the Northwest Territories, the Labrador Inuit Association, and Inuit Circumpolar Conference-Canada have outlined some of their positions and concerns. Aboriginal people were among the first to draw attention to contaminants when they noted changes in the flesh and organs of the animals and fish they hunt. Not surprisingly, they now seek genuine involvement at all levels of decision making, from local to international, in their quest for elimination of pollution at source and clean-up. Aboriginal people were a part of the Canadian negotiating team to amend the Migratory Birds Convention, an international treaty between Canada and the United States. CARC believes they should be included as negotiators on international contaminants agreements. The northern Aboriginal organizations recognize the necessity for international action and want Canada to adopt strong positions in international fora. And everyone wants clear, straightforward answers to the issues. The NCP was a successful collaboration between Aboriginal, scientific, and administrative stakeholders. Continuing collaboration is necessary, they say, for everyone to have confidence in the "Next Steps." We should also note the following:

- Aboriginal organizations across the Canadian North have done much to raise public awareness of the importance and urgency of the contaminants issue. They have emphasized the public health perspective—and the challenge they face in trying to balance the superior nutritional value of country foods with exposure to harmful contaminants.
- We have yet to recognize fully the contributions of traditional knowledge to the effects of exposure to contaminants on human health and the environment.
- Aboriginal people believe Canada's position, and the real goal, must be to eliminate toxic chemicals from the air and waterways of the world—and thus from the foods that nourish people and define, in cultural and social terms, who they are.

International Regulation of Contaminants

In his discussion of regulating persistent organic pollutants (POPs), Professor Nigel Bankes provides an overview of existing international regulations and global and regional steps being taken to create new regulations, as well as a critique of a draft protocol to regulate POPs. Professor Bankes underscores the precedent-setting effect of the current protocol negotiations on POPs for upcoming negotiations on a global United Nations regulation. Negotiations on a POPs

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protocol under the Long-range Transboundary Air Pollution framework of the Economic Commission for Europe continue with many critical elements of the protocol unresolved. Bankes argues that the protocol's "ultimate objective" should be "the protection of humans and components of the environment, especially upper trophic levels, from the harmful effects of POPs," and goes on to suggest that such an objective provides the criterion against which to measure the effectiveness of the protocol. He suggests further that current substance exemptions are too broad; obligations are limited by national laws, regulations, and practices; there is too little acknowledgement in the protocol of the special character of Arctic peoples and environments; trade rules should be used to protect human health; and the procedures for adding substances to the "lists" are contentious. He suggests an Arctic regional seas approach to deal with land-based POPs pollution. As well, he adds his voice to those calling for Aboriginal representation on Canada's negotiating team.

CARC would add the following points:

- Although progress is being made on a protocol among the members of the Economic Commission for Europe, a United Nations treaty is further off. The Arctic Council, slated to be launched later in 1998, has no agenda at this time and thus its interest and influence remain questionable. The pace of LRTAP negotiations is "snail-like." The POPs issue has not galvanized international action in the way that ozone depleting substances (CFCs) did. CARC believes that the Government of Canada must commit itself to protecting the health of Arctic residents and the living resources on which many of them depend.
- The clean-up of contaminated military and industrial sites in the North shows little sign of serious commitment by the federal government. CARC's work on the "Arms for Clean-up Deal," in which Canada agreed to accept a line-of-credit for military equipment from the U.S.A. in lieu of money for cleaning up the DEW line sites, did not unearth any signals that our government takes the contaminants issue, and northerners' health, seriously.

Canada and POPs Policy

Terry Fenge chronicles the efforts of five major northern Canadian Aboriginal organizations to get federal government recognition of POPs as a public health issue and support for a LRTAP protocol whose goal is "to protect human health and the environment from the adverse effects of persistent organic pollutants subject to long-range transboundary atmospheric transport by taking measures, consistent with the precautionary principle, to control, reduce, or eliminate their discharge, emission, and loss." CARC believes that the manner in which the federal government has approached the LRTAP/POPs protocol is indicative of too much emphasis on the economic and trade perspectives and too little concern for public health. The health of northern Canadians should be a major foreign policy issue. In its report *Canada and the Circumpolar World*, the Parliamentary Standing Committee on Foreign Affairs and International Trade calls for the Government of Canada to "redouble its efforts to conclude LRTAP protocols on POPs" and urges a broadening of the Northern Contaminants Program to "focus more clearly on the links between contaminants and public health."

CARC is also concerned that Parliament has not played a significant role in the POPs issue. For that matter, until recently neither had Cabinet. As Terry Fenge notes, until this past autumn, the lead in developing this country's negotiating position had been taken by bureaucrats, not by elected officials. We believe the issue of human health is much too important to be left to unaccountable officials.

Also troubling is the unwillingness of officials to provide timely and complete information. With peoples' health at risk, we can see no reasonable argument for withholding information and failing to include those most affected in the negotiations of important policy matters. In this post-tainted blood inquiry period, one wonders who may be liable in the future for today's contaminants.

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Now is the time not just for federal leadership but for truly national leadership shared by all the key parties—Aboriginal, federal, and territorial. Canada distinguished itself in the international community in 1997 on the issue of land mines. By joining forces with those truly committed to ridding the world of those terrible devices, Canadians demonstrated the level of resolve needed to achieve a victory for humanity. CARC now urges all parties to dedicate themselves to a similar challenge—the task of eliminating contaminants from the food, waters, air, and land of northern peoples in Canada and throughout the circumpolar Arctic. This is what sustainable development is really about.

Robbie Keith was the Executive Director of the Canadian Arctic Resources Committee.

Canadian Arctic Contaminants Assessment Report: Overview and Summary

by Chris M. Furgal and Robbie Keith

Introduction

In June 1997 The Arctic Environmental Strategy (AES) -Northern Contaminants Program (NCP) issued a report entitled *Canadian Arctic Contaminants Assessment Report (CACAR)*, a culmination of six years of scientific research and more than 100 studies.¹ It is the most comprehensive collection and report of data on environmental contamination in the Canadian Arctic to date. Accompanying the report, the NCP also published a less technical volume entitled *Highlights of the Canadian Arctic Contaminants Assessment Report: a community reference manual*, which was aimed at community health and environment representatives in the North.² This article summarizes the CA CAR documents and provides an overview of the key elements of the report.

Contaminants in the Arctic:

Reasons for Concern

The Arctic was once considered a pristine environment; however, during the last 20 years, scientists have found significant levels of industrial and agricultural chemicals in its ecosystem and in the people who live there. The contaminants include organochlorines [OCs, also referred to as persistent organic pollutants (POPs)], heavy metals, and radionuclides, which originate principally from distant industrial and agricultural regions of the world. There are some local sources such as mines and radar station sites, but their contribution to contaminant loading is far less than that of those originating through long-range transport (table 1). Persistent contaminants have been detected throughout Arctic ecosystems—air, surface seawater, suspended sediments, snow,³ fish, marine mammals, seabirds,⁴ and terrestrial plants and animals.⁵

Several of the contaminants of concern in the Arctic are no longer used in Canada and their use has, in many cases, been banned or restricted in most of the developed world. Because they continue to be used in many developing nations, however, reduction of contamination in the Canadian Arctic can be achieved only through global action.

The presence of environmental contaminants in the Arctic is especially important because of the specificity of this ecosystem. Many of these chemicals condense in cold environments and the Arctic is such a "cold trap," typified by long-lived, fat-rich organisms that accumulate and concentrate contaminants to the upper levels of the food chain. Unexpectedly high levels of organic contaminants and metals have been detected in some Arctic fish, seals, and whales that are important parts of the diets and nutrition of many Arctic residents. Chemical contamination of these traditional foods provides a critical path of contaminant transfer to human consumers, particularly northern Aboriginal peoples.⁶ Although the message currently given to northerners is to continue their consumption of country foods, detection of elevated levels of contaminants has generated human health advisories to decrease consumption of or eliminate from the diet certain tissues and species of fish and wildlife in specific areas of Yukon and the Northwest Territories.⁷

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The NCP

The Northern Contaminants Program was designed to determine the types and levels of contaminants in the Arctic, the extent to which people are exposed, the effects of such exposure, and the impacts of strategies to reduce or eliminate contamination and human exposure to contaminants. The *CACAR* documents the current state of contamination in the Canadian Arctic environment, including the status and trends of contaminant levels, and compares findings in the Canadian North with findings from other areas of the world.

A multidisciplinary approach was adopted and managed by the Department of Indian Affairs and Northern Development (DIAND) in partnership with five Aboriginal organizations—Inuit Tapirisat of Canada (ITC); Inuit Circumpolar Conference (ICC); Métis Nation-NWT; Council of Yukon First Nations (CYFN); and the Dene Nation—and several federal and territorial government departments and agencies including the Department of the Environment, Fisheries and Oceans, Health Canada, and GNWT Health (figure 1). Some of the research was carried out by government scientists; some in universities across the country; and some by the NCP's Aboriginal partners. Inuit Tapirisat of Canada prepared a report entitled "Researcher Guidelines for Planning Communications and Community Participation," which outlines a series of requirements for community participation and communication through all stages of research from proposal development to the reporting of results. These guidelines were endorsed by the NCP science managers in 1994 and issued as part of the application package for all research proposals to the NCP starting in 1994/95.

The NCP's findings are of concern because of the potential human health implications for many northern native peoples arising from their dependence on traditionally harvested foods and their position as high food-chain consumers. As many as 91% of native households in the Northwest Territories consume traditionally harvested meat and fish, and 22% have reported that all their meat and fish are obtained through harvest activities. When traditionally harvested foods are reduced or eliminated as a food source, there are serious nutritional, socio-economic, and cultural impacts on northern Aboriginal peoples.

What Did We Learn?

Contaminants: Sources, Pathways, and Fate

Human activities in industrialized and agricultural regions in both developed and developing countries are the main sources of contaminants in the Canadian Arctic. Accurate and complete information is required on the release of these pollutants into the environment to develop effective international strategies to reduce the input of contaminants to the Arctic.

It is difficult to determine the proportion of anthropogenic versus natural sources of heavy metals to the total contaminant loading to the Arctic. From an economic perspective, the extraction of base and precious metals has, for many years, been important to the North, where nickel, copper, lead, zinc, silver, and gold are all currently mined. The by-products of the mining industry may result in elevated levels of trace metals and other contaminants within a localized area and may threaten human health and the local environment. In contrast, localized, naturally elevated concentrations of heavy metals in areas undisturbed by human activities may result in elevated concentrations in resident biota but have little consequence for the health of the biota. For example, natural mercury sources occur regionally in parts of the western Arctic, whereas natural cadmium sources are more widespread across the Canadian Arctic.

Detectable levels of radioactivity result mostly from the natural radioactive decay of uranium and thorium in minerals of the region. People living in the North are now exposed to greater amounts of naturally occurring radionuclides than to radionuclides from anthropogenic sources. Historically, anthropogenic radionuclides in the Canadian North originated from atmospheric testing of nuclear and thermonuclear weapons between 1955 and 1963 and the radioactive fallout from the Chernobyl accident in 1986. Cesium levels in Arctic biota have generally declined since 1963 and fallout from Chernobyl has imbedded itself in soil and lake sediment. Other possible, yet small, sources of radionuclides include the burning-up of nuclear-powered satellites upon re-entry to the atmosphere, discharges from nuclear power plants and reprocessing plants, and nuclear waste dumping directly into the Arctic Ocean.⁸ The impact of the ocean disposal of nuclear waste remains

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unmeasured. Generally, levels of radionuclides in the air, water, or soil of the Canadian Arctic are similar to or lower than levels in more temperate areas.

Local sources of pollution within the Canadian Arctic include abandoned radar sites and military installations, northern mining activities, and local garbage dumps. Although these sources are not the principal cause of the widespread distribution of contaminants in the Canadian Arctic, they pose a threat to the health of local ecosystems by emitting a variety of pollutants (including POPs and heavy metals). It is estimated that approximately 0.2% of the Yukon and NWT landmass is contaminated by polychlorinated biphenyls (PCBs) from abandoned distant early warning (DEW) line sites. The Arctic Environmental Strategy Action on Waste Programs has inventoried several sites contaminated from these sources and their restoration is a priority for the Department of Indian Affairs and Northern Development.

NCP work indicates that the atmosphere is the most important pathway to the Arctic for POPs, heavy metals, and radionuclides and their transport is dependent on a number of factors, including the circulation patterns of global and Arctic air masses, temperature, and a phenomenon known as the "cold-condensation" effect, in which substances evaporate easily in warmer, temperate latitudes where they are used travel to the Arctic and condense in the cooler temperatures.⁹

Air temperature influences POPs transport; an increase in temperature results in a corresponding increase in the carrying potential of an air mass. Although summer air masses have the potential to carry larger amounts of POPs, predominant wind direction and additional atmospheric processes such as increased light-sensitive chemical activity, a build-up in moisture and resulting increase in rainfall remove contaminants from the air masses, actually decreasing the amount of contaminants transported to the Arctic in summer.

Future efforts to quantify POPs entering the Canadian Arctic will be confounded by distinguishing "new" sources of POPs from those that have been re-volatilized from previous deposition. For example, compounds such as hexachlorocyclohexane (HCH) may reach saturation levels in the oceans at certain times of the year, then are volatilized from the ocean to the atmosphere (a reversal of flux). They may then re-deposit or be transported out of the Arctic.

Oceans, rivers, and sea ice are additional transporters of contaminants to the Canadian Arctic, although the atmosphere is the most significant. Contaminants present in the atmosphere reach the Arctic in a matter of days, whereas contaminants transported by ocean currents and sea ice may take years or decades.

Spatial Trends: Location and Exposure

The diet of Inuit people in the eastern Arctic consists mostly of marine mammals, whereas Aboriginal peoples of the Mackenzie Valley region harvest mainly terrestrial wildlife, particularly large mammals such as caribou and moose.¹⁰ Fish is a seasonal staple across the Arctic. Organochlorine levels are generally higher in marine mammals, which feed at a higher level in the food chain and tend to accumulate larger fat reserves. Consequently, the estimated average intake of organochlorines is higher in communities that consume marine mammals than in communities that consume terrestrial mammals. This is evidenced by the human blood analyses conducted under the NCP.

Among Arctic communities with similar dietary dependence on marine mammals, differences in exposure to the heavy metals mercury and cadmium might be expected to be consistent with east-west differences in the levels observed in marine mammal tissues. Although marine mammals collected in the western Arctic were found to have higher mercury levels than eastern Arctic animals, blood mercury levels among Aboriginals are higher in the north and east than in the west. This finding supports the importance of the composition of diet, as marine mammals make up a smaller portion of the traditional diet of the Sahtu Dene/Métis from the western Arctic than of the Inuit from the eastern Arctic. Even though relatively high levels of total mercury and methylmercury have been measured in the commonly consumed portions of marine mammals, such as the meat (muscle) and muktuk (skin and blubber), the off-setting benefits of these components of a traditional diet have prompted health professionals to recommend no change in the amount of muktuk consumed by northern Aboriginals.

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Many freshwater fish consumed by northern residents have mercury levels in edible tissues that exceed the consumption guidelines; however, no observed adverse health effects are associated with these elevated levels either in the fish or among humans.¹¹

Higher cadmium concentrations—attributed to the natural geology of the region—were observed in marine biota from the eastern Arctic than in those from the west. In general, cadmium levels in the kidneys and livers of Canadian Arctic marine mammals are similar to levels found in terrestrial animals such as caribou and moose and as high or higher than levels observed in similar species in more temperate areas. Blood cadmium levels of people from western and eastern Arctic communities are not available for comparison.

In contrast to the observed spatial trends in heavy metals in the tissues of marine and terrestrial mammals, no clear spatial trends of the heavy metals cadmium and mercury were observed in waterfowl from the western and the eastern Arctic. Similarly, there were no clear spatial trends of POPs in seabirds.¹²

The major organochlorines present in marine biota are PCBs and toxaphene. Unlike the spatial variation observed for heavy metals in marine mammals, the ranges in concentrations of organochlorines were generally similar among most marine mammals.

Spatial trends in contaminant levels in snow, air, and sediment provide insight into the sources and quantities of contaminants transported to the Canadian Arctic. Levels of contaminants measured in snow and air are subject to large variations attributed to a combination of factors including analytical methods, seasonality, and depositional trends.

Results from the snowfall measurements show hexachlorobenzene (HCB) and PCBs to be the most consistently distributed contaminants in snow samples. A comparison of HCH, dichlorodiphenyltrichloroethane (DDT), HCB, and PCB levels in snowfall in the Arctic and near Lake Superior, Ontario, indicated that the Arctic region is as polluted as regions to the south. These results support the importance of atmospheric transport in delivering contaminants to the Arctic. Spatial data for estimating air-borne contaminant levels of heavy metals are limited; therefore no spatial trends for air-borne metals in the Arctic currently exist.

Contaminant Levels over Time

The limited long-term data for Canadian Arctic biota levels of contaminants among air, snow, water, and soil demonstrate no consistent pattern over time; levels of some contaminants have increased while others have decreased.

Concentrations of organochlorines in marine mammals and sea birds declined in the period 1970 to 1980 and have recently leveled off. Levels of mercury and cadmium in ringed seals and beluga whales appear to have increased during the last decade in the eastern Arctic and in the last 20 years in the western Arctic. Levels of radionuclides in caribou muscle are decreasing: studies show levels from four to more than ten times lower than those measured in the 1960s.

Data from Arctic ice cores sampled for polyaromatic hydrocarbons (PAHs), PCBs, and lead generally reflect changes in the anthropogenic use and release of these contaminants to the global environment. From 1980 to 1993 there was a steady increase in PAH deposition. Data on PCBs indicate high deposition before 1969 followed by a significant decrease paralleling the discontinuance of production and use of PCBs in several countries. PCBs are still used in closed systems (electrical) and sometimes exist as microcontaminants. Despite the ban on their production, PCBs continue to be released into the environment; their rate of deposition to the Arctic was constant between 1990 and 1993. HCHs, one of the few organochlorine insecticides (lindane) still in large-scale global use, have been measured and show a decline from 1979 to 1993. The use of one form of HCH in particular, alpha-HCH, has declined dramatically in developing countries, contributing to a decline in overall HCH levels in the environment. This issue is complicated though, as often only the total HCH concentrations are measured.

Ice-core data from the Greenland Ice Cap show a decline in lead concentrations since the 1970s, coinciding with a decrease in the use of lead-alkyl gasoline additives in Canada, the United States, and Europe. Over a similar timeframe, lead concentrations in the air at Alert, NWT, have decreased—but to a lesser degree. These results reflect the greater influence of Eurasian emissions at Alert.

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Conflicting evidence from the sediment core data for mercury highlights the difficulty in determining whether its source is anthropogenic or natural. However, global atmospheric concentrations of mercury in the northern hemisphere have been increasing for the past several hundred years and anthropogenic releases to the atmosphere have been identified as the cause of a three-fold increase in global air and ocean surface water concentrations.¹³ The evidence from several Canadian Arctic sediment cores supports this conclusion.

It is imperative that we continue monitoring contaminant levels in the Arctic if we are to understand more completely the extent to which people and the environment are exposed.

Ecosystem Health

Evidence for ecosystem effects in the Arctic as a result of contaminants is currently derived from studies on indicator species, comparisons of contaminant levels in Arctic wildlife with those in the same or similar species in locations where effects have been observed, and studies of biological responses based on biochemical indicators.

To date, no adverse effects have been reported in Arctic mink populations, which generally have lower contaminant levels than other North American mink populations. The tundra peregrine falcons did not suffer the extreme population declines experienced by southern populations in the 1960s as a result of the pesticide DDT; however, eggshell thinning is evident. Because peregrine falcons are migratory, they are exposed to organochlorines in over-wintering habitats and the exposure contribution from the Arctic is difficult to determine. Levels of organochlorines in the eggs, blood plasma, tissue, and the prey species of the tundra peregrine falcon population nesting at Rankin Inlet are within the range that will result in failure of a portion of the reproductive attempts each year.

Some research was conducted under the NCP to identify biological responses to ecosystem stress in the Arctic, but the lack of significant dose-response data for Arctic animals limits our ability to draw clear conclusions. Moreover, determining effects of contaminants on populations of Arctic biota is difficult in the absence of 'healthy' comparative population data. The baseline population data for many Arctic animals, including polar bears, seals, and seabirds, are available for only 20 years, during which contaminant tissue levels have been relatively constant. Therefore, with the possible exception of the peregrine falcon, the effects of organochlorines on the health of Arctic wildlife—in particular, marine mammals—at the individual or population level are inconclusive.

In Arctic ecosystems, there is a need to link measured biological effects in animals such as the polar bear, beluga, and narwhal with studies on population dynamics. Mean concentrations of the contaminant 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in polar bear liver and in walrus blubber from northern Quebec are at or above the threshold found for immunosuppression in North Sea harbour seals; however, concentrations of TCDD in Arctic ringed seal or beluga blubber are three to five times lower than those associated with impaired immune function (depressed leucocyte activity) in harbour seals. The effects of immunosuppression in Arctic wildlife may be obvious only during times of additional stress such as prolonged periods of starvation during which fat reserves and associated contaminants are mobilized. In the Canadian Arctic, the polar bear is probably at greatest risk from exposure to organochlorines because of its consumption of ringed seal tissue. Levels of TCDD concentrations in the tissue of ringed seal from the Canadian Arctic are at or near Canadian and United States tissue-guideline values established to protect fish-eating wildlife.

Caribou, beluga, and narwhal from the Canadian Arctic are exposed to high levels of heavy metals, especially cadmium, but the effects of the exposure are inconclusive. It is thought that Arctic biota may have adapted to relatively high exposure levels to metals and radionuclides occurring naturally in the Arctic.

Human Health

Aboriginal peoples and scientists agree that a diet based on traditional foods has important nutritional, cultural, and economic benefits and a decrease in the consumption of those foods generally results in the loss of the benefits. Dietary shifts occur for a number of reasons, including a concern about environmental contaminants. Recent research suggests that poor diets and other lifestyle changes have contributed to the increasing incidence of diseases such as diabetes and cardiovascular problems among

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northern Aboriginals.¹⁴ Historically these diseases have been seen in low numbers in northern Aboriginal populations as a result of the benefits of a traditional lifestyle including traditional foods.

At present, the greatest risk associated with the consumption of traditionally harvested food is from exposure to certain organochlorines, especially chlordane, toxaphene, and PCBs, and to the heavy metals, including cadmium and mercury. Although concern about these contaminants has led to assessments of human health risk and decisions based on risk management procedures, such assessments do not always result in recommendations to limit consumption of country foods. Some nutritionists believe that the known benefits of a traditional diet outweigh uncertainties and risks associated with such a diet.

The few studies conducted suggest the greatest health concern is for the fetus, through transplacental exposure, and for newborns through breast-feeding.¹⁵ Maternal and cord-blood studies have been conducted in the Mackenzie-Kitikmeot region, Keewatin and Baffin regions, Nunavik, and Greenland to assess transplacental exposure to contaminants.¹⁶ Relatively high levels of organochlorines, mainly PCBs, measured in the cord-blood of newborns from some communities in the eastern Arctic may be related to a higher consumption of marine mammals.

The NCP and other research projects have yet to determine conclusively the implications of exposure for human health. Recent research associates dioxin, furan, and PCB levels in human milk with subtle clinical, immunological, and neurodevelopmental alterations in a group of infants and children from the Netherlands. A similar potential association between immune system deficits in infants and increasing PCB, dioxin, and furan levels in human milk is a preliminary indication in an ongoing study of Canadian Inuit. Very little is known about the inter-generational effects associated with long-term exposure to these contaminants.

Although the presence of elevated levels of some POPs in the milk of Inuit women has raised justifiable concern among nursing mothers in the Arctic, abandoning breast-feeding poses a far greater health risk than the few known and many unknown risks associated with infant exposure to contaminants through human milk.

In the Canadian Arctic, levels of lead in northern residents show no reasons for concern. Northern residents may be exposed to cadmium through the consumption of certain traditional foods such as organ meats (liver and kidney); however, the major exposure to cadmium in the North occurs through cigarette smoking. Human exposure to mercury is of particular concern because methylmercury—the organic form—is bioaccumulative, biomagnifies, and is a potent neurotoxin. While there are no observed adverse human health effects directly attributed to exposure to methylmercury in the Canadian Arctic, this does not mean that there have been no effects. The *CACAR* states, "Methylmercury, in addition to other factors ... has likely collectively contributed to past and present socio-cultural problems within ... communities."¹⁷

In the Canadian Arctic, human body burdens of cesium, the anthropogenic radionuclide of greatest concern, have declined during the last 30 years, a phenomenon attributed to the decrease in above-ground nuclear weapons testing. Today, people who live in the North receive more than 95% of their radiation dose from naturally occurring radionuclides. Bioconcentration in the food chain may result in exposure to higher levels of some radionuclides, primarily the naturally occurring radionuclides lead-210 (210Pb) and polonium-210 (210Po), among people who consume large amounts of traditional foods.

Health Risk Assessment, Management, and Communication

In recognition of past improper approaches to managing risks related to food-chain contaminants and in communicating information to Arctic residents, the NCP partners promoted a more inclusive approach, involving communities more directly in the conduct of the risk management and communication processes. Determining the risks and benefits of continuing to eat a diet of traditional foods is a difficult challenge. Individuals, families, and public health officials must consider the potential risks from exposure to contaminants and the risks associated with abandoning a traditional diet, including its known nutritional, social, and economic benefits. Effective decision making and dissemination of information require that communities be involved in efforts to reduce exposure to contaminants without sacrificing the many benefits of a diet based on traditional foods. In the short term, this may mean reducing the consumption of certain organs or tissues of some animals

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known to accumulate high levels of contaminants, for example, burbot livers from Lake Laberge and Atlin Lake in Yukon and caribou liver in other regions of the North. Reducing consumption of certain foods in the diet, however, must coincide with increasing consumption of alternative, highly nutritious, locally available, and affordable foods.

In response to urging from the AES partners, a change to the Human Health Risk Assessment process was initiated under the NCP because it became clear that Aboriginal organizations must have the knowledge and capacity to be involved with health assessment decisions concerning their member communities. Where the NCP and its participants are concerned, the health risk assessment and management process now involves three main stages.

1. **Initiation and conduct of assessment:** involves transfer of raw data from the initiating party (i.e., government departments, Aboriginal organizations, communities) to Health Canada and distribution of this data and all relevant correspondence to the other government departments and Aboriginal organizations.
2. **Evaluation of assessment results:** mediated through territorial contaminants committees, which adapt responses based on the results and the communities affected. This allows for the consideration of nutritional, cultural, and social benefits of continued harvesting and consumption—factors that are not incorporated in the Health Canada assessments.
3. **Communications:** contact with communities and the public is mediated through the territorial contaminants committees. All participating parties agree on key messages and release of the assessment and evaluation results.

Traditional Knowledge and Local Observations

Many of the questions that researchers are working to answer involve information needs that can be satisfied only by long-term observation, detailed familiarity with the environment, the capacity to recognize changes and abnormalities in the environment, and continued sampling and monitoring. Traditional knowledge held by people living in northern communities has been accumulated through generations of year-round observation, sampling, and monitoring, combined with an intimate familiarity with the local environment. A number of NCP projects have taken advice from local hunters and Elders in identifying good sampling locations and times for their studies. In the investigation into the oceanography of the Husky Lakes, co-operation between Elders and scientists found four specific examples of traditional knowledge that led to focused scientific inquiry.¹⁸ However, the NCP is not a traditional knowledge study.

There is a growing recognition that traditional knowledge can also contribute to programme planning. There is a potential to use traditional knowledge to improve scientific approaches in hypothesis formation, research planning, and policy development, but this represents a significant challenge because there are few, if any, practical models of the specific application of traditional knowledge in scientific programme planning. Although the NCP has not formally attempted to collect and analyze traditional knowledge, information on local observations through feedback at workshops and community meetings has been recorded on an ad hoc basis and is described in the *CACAR* as an example of the types of information that can be gained from consideration of traditional knowledge (table 2).

Communication with Communities

In recognizing the importance of community-level communication, the NCP has devoted resources to the exchange of information and ideas between the programme and northern residents. This includes dissemination of programme results and extends to the development and provision of educational and communication tools related to contaminants and to the gathering of community concerns and priorities regarding contaminants. As a result of the efforts of the Aboriginal partners, NCP communications activities are now considered to be a responsibility of all programme participants. These activities include community workshops to exchange information on contaminants; discussion of NCP activities and research results with leaders, youth, and other community members; reporting on Aboriginal partners' projects and programmes; and support for the involvement of local contaminants committees or representatives in regional projects.

Inuit Tapirisat Canada (ITC) developed "Researcher Guidelines for Planning Communications and Community Participation," and work is under way at ITC on a guidebook for communities on their rights and choices in negotiating research relationships. ITC has also examined how communication occurred in a variety of contaminants incidents involving

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country food in Aboriginal communities and identified Inuit knowledge and communication needs regarding contaminants in three Inuit communities ("Communicating about Contaminants in Country Food").

The Denendeh National Office and Mackenzie Regional Health Service developed nutrition fact sheets to illustrate the nutritional and socio-economic benefits of Dene traditional foods and assisted communities in identifying alternative traditional food sources should health advisories affect their choice of diet.

The Métis Nation's Contaminant Education Program: Contaminants Curriculum Project has integrated contaminant information and materials with existing grade-school curricula and adult education programmes across the NWT. The Métis Nation-NWT has also published a lay person's guide to the NCP, which uses non-technical language to explain the main issues and concerns of the programme.

Council of Yukon First Nations' communications activities under the NCP have been integrated into a holistic environmental education programme that has included workshops and one-on-one consultations with community leaders and environmental representatives.

The Inuit Circumpolar Conference brought together approximately 500 participants from Chukotka, Canada, Alaska, and Greenland for a contaminants workshop as part of its 1995 General Assembly. Among the recommendations from the participants was a proposal to develop an Inuit International Action Plan to assist Inuit in working with contaminants researchers.

The NCP and Domestic and International Action on Contaminants

The use of NCP research is far-reaching. It is used to respond to community information needs and supports the need for action in domestic and international policy. NCP results have been critical in demonstrating the global importance of long-range transport of contaminants. Supported by leading-edge scientific evidence, NCP participants have raised domestic and international awareness of the immediate human health and environmental concerns of long-range contamination and have accelerated the pace of action towards control of such substances (table 3).

Chris Furgal is the Research Assistant with the Eco-Research Project at the University of Waterloo.

Robbie Keith was the Executive Director of the Canadian Arctic Resources Committee.

Northern Contaminants Program: The Next Steps

By Russ Shearer

The Northern Contaminants Program (NCP) was established in response to concern about human exposure to elevated levels of contaminants in wildlife species important to the traditional diets of northern Aboriginal peoples. A major component of phase I of the NCP (NCP-I) was to collect data to determine the levels, geographic extent, and source of contaminants in the Arctic and the probable duration of the problem.

Research conducted under NCP-I included atmospheric monitoring, snow and water sampling, studies of transport and deposition processes for a variety of chemicals, extensive surveys of contaminant levels in a variety of wildlife species, measurements of human exposures, dietary studies, analysis of nutritional and other benefits of traditional diets, and preliminary studies on effects of contaminants. The data enabled us to understand the spatial patterns and temporal trends of contaminants in the Arctic, confirmed our suspicions that the major sources of contaminants were other countries, and were an important element in our assessment of human health risks resulting from contaminants in traditional foods (including consideration of benefits from continued consumption of those foods).

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Data generated through NCP-I are synthesized in the *Canadian Arctic Contaminants Assessment Report* (CACAR), a 460-page report that draws together all of the findings and identifies key knowledge gaps and future scientific priorities for research. The CACAR provided a starting point for extensive consultations conducted in 1997 to find the common elements between the concerns and priorities of northern communities and the scientific needs identified as critical for addressing the issue of contamination in Canada's Arctic. Aboriginal organizations, northern communities, contaminants researchers, programme managers, and other stakeholders throughout the North were involved in this consultation.

In 1998, the NCP will conduct a second phase (NCP-II) to address immediate health and safety needs. A greater emphasis will be placed on research designed to answer questions about the impacts on human health that may result from current levels of contamination in key Arctic food species. Data from NCP-I will allow NCP-II to set priorities for future research based on the most important species for human exposure to contaminants, the level and type of contaminant exposures that are most relevant for Arctic humans, and geographic locations and target populations that are most at risk.

NCP-II will emphasize research needed to better quantify risks to human health from current exposures to contaminants. To ensure a balanced assessment of the risks, importance will be placed on characterization and quantification of benefits associated with traditional diets.

Communications activities will continue to evolve under NCP-II. Whereas the early years of NCP-I concentrated on building awareness, disseminating information, and creating an understanding of contaminants issues, the latter stages initiated a dialogue between northerners and the scientific community to help support the ability to deal with specific issues at the local level. Under the leadership of the northern Aboriginal organizations, NCP-II will continue to support this evolving approach to communications and education.

Finally, the NCP effort to achieve international controls of contaminants will remain strong. During NCP-I, negotiation of a protocol on persistent organic pollutants (POPs), encompassing most of the northern hemisphere, was initiated and the process is expected to be complete in early 1998.

As NCP-II begins, initiation of negotiations for a legally binding global instrument on POPs is slated to commence under the United Nations Environment Programme, and a new phase of the circumpolar Arctic Monitoring and Assessment Programme will get under way. NCP-II will continue to generate the data that allow Canada to play a leading role in these initiatives.

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Contaminants in the Yukon

By Norma Kassi

I was raised on Old Crow Flats in northern Yukon. Old Crow Flats is one of the world's great wetlands, having more than 2000 lakes throughout 600,000 hectares just above the Arctic Circle. The name of my people—Vuntut Gwitchin—means "the caribou people of the lakes." We've lived here for thousands and thousands of years.

For a long time I've watched the birds come back to Old Crow Flats every spring. I remember, when I was about ten years old, sitting with my grandfather at one very special lake where a lot of birds used to come. They would land there, play, and meet one another after their long trip. They made a lot of noise, they were singing, they were happy, they were telling stories—loons, swans, geese, and others I know only in my own language.

My grandfather said to me, "You know, some day when you're a woman you're going to see a lot of changes. When there's only loons out there, you're going to know then that something's wrong with the land and with the weather."

That was thirty years ago. Now I go back to Old Crow Flats every three or four years, and I see the changes in the land. I sit at that same spot and I remember my grandfather's words. Every time I return I see fewer animals, fewer fish, fewer birds. The water is silent and so crystal clear I can see to the bottom. There used to be so much activity, so much aquatic life—such as insects and little shrimp-like things that are food for other animals like muskrat—that I couldn't see to the bottom. Now I can. And now I see a pair of loons out there, and that's about it.

I work in the Northern Contaminants Program and as Environmental Co-ordinator for the Council of Yukon First Nations, and for many years during the fight to save our caribou I've been watching the land closely. Six years ago, at one of the places I used to fish with my grandfather, I caught a fish with sores and soft flesh. When I went back this spring, there were no fish. There are changes to the pattern of the caribou migration and to the behaviour and populations of beaver and muskrat. The migratory birds still come, but they're not as abundant as they once were. We used to pick a few of their eggs, but now we don't bother because they don't taste very good. On the land, the plants grow much faster than before, but have very few berries on them.

We hear about contamination coming into the Arctic, WB radiation, and alarming accounts of elevated PCB levels in our neighbours, the Inuit people. Yet we hear conflicting information about the level of danger. We're beginning to see deformities in our animals, lesions and softening of the flesh of our fish, and the eradication of habitat for migratory animals. I am very concerned for our immediate future and for the health of our people in the next generation.

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Because of such concerns, the Council of Yukon First Nations did a study of traditional foods with the Centre of Indigenous Peoples' Nutrition and Environment at McGill University. We checked for contaminants in approximately 400 samples of foods and plants that Yukon First Nations people consume. We also did dietary studies and analyzed the nutrient value of foods.

The results show some levels of contaminants in our foods. A few areas, such as Lake Laberge and Carcross, have particularly elevated levels. Among the contaminants that have shown up are toxaphene, PAHs (polycyclic aromatic hydrocarbons), dioxin, and furans. Cadmium has been found in caribou kidneys in southern Yukon. In northern Yukon, we're concerned about radiation affecting the caribou herd.

We also looked at the nutrient value of Yukon "country foods" in comparison with market foods and found that it far outweighs the risk from contaminants. We fear, however, that Aboriginal peoples are moving away from traditional foods towards market foods. Non-Aboriginal people living in the Arctic can survive well on store-bought foods, but indigenous peoples cannot. Most of us can't afford good vegetables and good meat; nor do we like to eat a lot of vegetables and fruit. The diet that suits us comes from the land, from the animals, fish, birds, and plants. The Elders say if we eat market foods we will die faster; already we see increased levels of cancer and chronic disease among our people.

Another concern is the cumulative effect of all these contaminants. How might the accumulation of DDT, mercury, cadmium, heavy metals, POPs, PCBs, toxaphene—I can't even name them all—affect our health? The First Nations people are at the top of the food chain in Yukon. We need traditional foods to stay healthy, but contaminants that affect the food chain will hit us hardest of all. Already there are cases of serious contamination of traditional food sources in parts of southern Yukon, and chiefs of the southern Yukon First Nations are demanding immediate clean-up of all local sources of contaminants.

Traditional knowledge and long-term observation tell us that changes are happening far too fast. World leaders must make some decisions soon. Local bans on the use of chemicals are not enough, since banned chemicals are being manufactured and used in other countries and, because of global air and water circulation patterns, end up in the Arctic, where they persist far longer than they would in warmer countries. The use and manufacture of these chemicals must be stopped at the source.

Indigenous peoples should be involved at every level—from local to national and international—of negotiation regarding chemicals and persistent organic pollutants. We must be permitted to share our intimate knowledge of the Arctic and to take part in the process of decision making. If industry negotiates only with industry and governments, then the decisions made will reflect an improper balance between economics and the health of the Arctic and Arctic peoples.

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I'm optimistic that if world leaders really get concerned and begin to listen to indigenous peoples, we can address this issue for the long term. Communication is important. Scientists and governments need to tell the truth about all contaminants and involve us in discussion. We have to be true partners in this and be honest with each other. It is the indigenous peoples who have to live with the consequences of contamination, and it's not a good legacy to leave for our children.

If the situation stays the way it is now, with indigenous peoples on the outside of negotiations, we can never restore health to the Arctic.

Norma Kassi is Environmental Co-ordinator, Council of Yukon First Nations.

Partnership for Effective Communication

By Judy Farrow

Ask anyone in the Northwest Territories what he or she has learned from the Northern Contaminants Program and the answer probably will be a question such as, "Is our food safe to eat?" or "What's being done about the dump?"

Everyone knows there is a problem, but technical reports, their summaries, and visits by research scientists don't provide the answers for the average person living in a small community north of 60°. The questions and answers need a context. People want direct, simple answers to questions about their specific situation, but even after six years of extensive research we are not able to provide them. Is our food safe to eat? An unqualified "yes" or "no" is neither correct nor ethical; but why these answers are inappropriate is difficult to communicate across cultures.

While Métis and other Aboriginal people tend to view problems holistically, western scientific methodology is not always able to accommodate that scope; the questions that science can answer are not necessarily the questions being asked by Aboriginal people. Scientific research is able to give us information about specific facets of a problem, but it has practical limitations. Limitations of scientific method, accepted and understood by the scientific community, are not always fully explained to the larger population. If they are not communicated at the outset, the process is open to media exploitation of its limitations. Cross-cultural communication is essential both before and after research.

The Arctic Environmental Strategy (AES) had four components: Action on Contaminants; Action on Waste; Action on Water; and Action on the Environment/Economy Integration. The AES ended on 31 March 1997, and has been replaced, in part, by the Northern Contaminants Program—implemented as NCP Phase II (NCP-II). The NCP was the AES component with the broadest scope, addressing contaminants and their impact on individuals living in northern Canada as well as international action on the use of substances that ultimately contaminate the global environment.

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The NCP was directed by technical and management committees that included representatives from northern Aboriginal organizations (Council of Yukon First Nations, Dene Nation, Métis Nation-NWT, Inuit Tapirisat Canada, and Inuit Circumpolar Conference), Yukon and NWT health and environment departments, federal government departments (Health Canada, Environment Canada, and Fisheries and Oceans Canada), and academic institutions conducting research in the Arctic. This programme and style of management allowed the Métis Nation-NWT to participate in both the management and the project levels; the Aboriginal partners played a major role in directing the priorities and setting the goals that are important to northerners. Northern communities participated in the design of research projects and negotiated with the researcher how results should be published or released. Much of the NCP research in Dene/Métis communities, for example, was conducted following negotiated research agreements with the communities involved.

The Métis people, for whom respect for the environment and education are priorities, have made important contributions to the development of the Northwest Territories. The Arctic Environmental Strategy: Northern Contaminants Program (AES: NCP) provided an opportunity to address their areas of concern. Métis are now concerned that, although the issue of contaminants affects everyone in northern Canada without regard for political boundaries or ethnic origin, the five-year renewal of NCP Phase II has been announced with a commitment for only one year of funding. The executive of the Métis Nation-NWT has been directed by its membership at the Annual General Assembly to address this urgent issue and to demand, in the strongest terms, that participating departments of the Government of Canada commit financial resources to fund adequately the five years of work identified for NCP-II.

The active participation of the Métis Nation and other Aboriginal organizations at the managerial level of the NCP has helped shape the programme to include a large education and communications component.

In this respect, the NCP has provided us with a model that can accommodate and foster respect for some common sense solutions. We must build on the model of government and Aboriginal partnerships established in Phase I. Knowledge gaps identified in Phase I should be addressed, and a process for ongoing monitoring of contaminant levels needs to be established. Continuing the partnership with Aboriginal organizations, the NCP must address the broader concerns of northern residents about contaminants. Education and communication are key components that will enable us to answer the complex question, "Is the food safe to eat?"; or perhaps even more important, to understand that this question is not necessarily the best question we could ask.

Judy Farrow is Education Co-ordinator, Métis Nation.

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Comments from the Dene Nation

by **Stephanie Papik**

In June 1997 the Northern Contaminants Program released a report on six years of contaminants-related work: *Canadian Arctic Contaminants Assessment Report (CACAR)*.

The report provides evidence that contaminants are an issue in the North. Although contaminant levels in the Upper Mackenzie River region are low, we must work together to ensure that they do not increase over time. This can be done only by involving individuals, communities, regions, nations, and international organizations.

The format of the *CACAR* groups the information by contaminants studied rather than by species affected. If the information were presented to show contaminant impact on species it would make it easier for people to make informed choices about the type of food they will eat.

Contaminants as a Public Health Issue

The good news from the *CACAR* is that the levels of contaminants in traditional Dene foods are low because these foods are low in fat and near the bottom of the food chain. The shorter the food chain, the less magnification of contaminants occurs, particularly in the case of organochlorines.

What Canada Should be Doing on an International Front

Persistent organic pollutants (POPs), heavy metals, radionuclides, and other contaminants enter the Arctic by long-range transport in air and, to a lesser degree, water currents.

Many of the contaminants of concern in the Arctic are pesticides and industrial chemicals that are no longer used in Canada and that have been banned or restricted for use in much of the developed world; however, because POPs are in use in many developing nations, POPs contamination in the Canadian Arctic can be reduced only through global action.

To move towards this objective, Canada must maintain a strong position at the United Nations European Commission on Economics (UN/ECE) negotiations on the long-range transport of POPs. Leading up to the October 1997 UN/ECE meeting in Geneva, the Dene Nation was active in urging the minister of Foreign Affairs, Lloyd Axworthy, to uphold a strong position by insisting that the following be included in the protocol:

- Short-chain chlorinated paraffins, lindane, and pentachlorophenol, which are already severely restricted under Canadian legislation
- Trade prohibitions (import/export controls). Signatories to be protocol need to send a strong message to UNEP's global process that there will no longer be markets for these substances
- A mechanism whereby new substances may be added to the list if science so determines

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The outcome of the UN/ECE negotiations will affect the United Nations Environmental Protection (UNEP) global process protocol on POPs. If these three measures are included at the UN/ECE, it is likely that they will also be included in the UNEP protocol, making them legally binding and global.

Stephanie Papik is Manager, Lands and Environment Department, Dene Nation.

Dealing with Environmental Contaminants in Labrador

The Labrador Eco-Research Steering Committee

We are Sikumiut—"the people of the sea ice." The Labrador Inuit, occupants of northern Labrador for thousands of years, now live in five small communities along the northern coast of Labrador and in the upper Lake Melville area. Our way of life has always been defined by our relationship to the environment. Harvesting wildlife from the land and waters has been our primary source of food and income and the foundation of our cultural and social life.

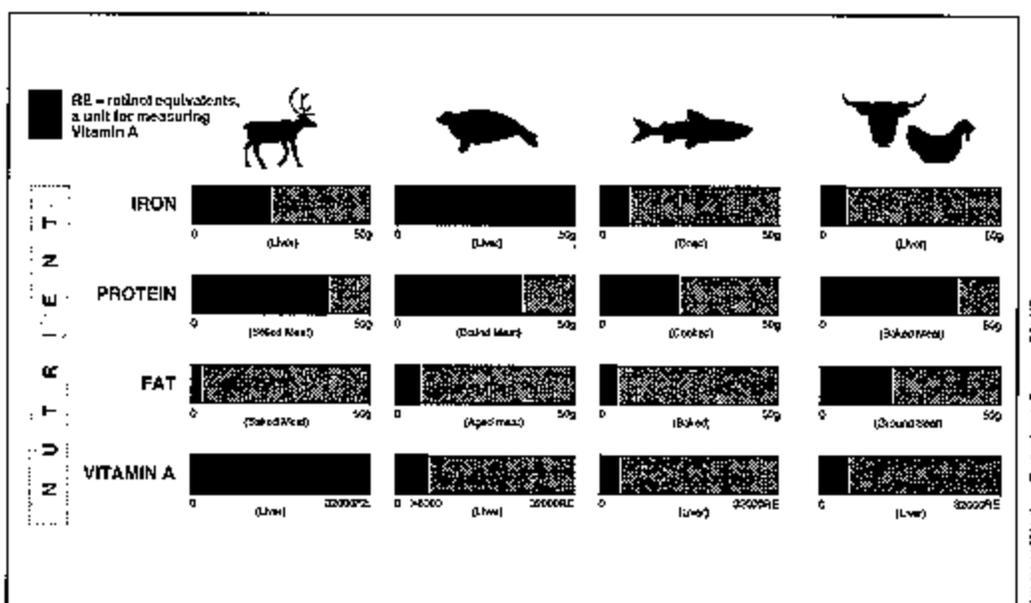
Our relationship to the land and its resources, especially through our harvesting activities, continues to be our most important source of psychological well-being and health. This relationship is changing, however. The loss of the ground fishery and the fur markets has had devastating effects on our communities. It has reduced our income and therefore our ability to invest in equipment and supplies that enable us to continue harvesting wildlife and gain access to our traditional foods.

The threat of the Voisey's Bay project, in the heart of Labrador Inuit territory, is simply the most recent of a long line of changes we have experienced. By themselves, these changes pose significant threats to our way of life as Inuit; contaminants in our environment, our food, and our water make the challenges even greater.

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Nutritional Value of Traditional/Country Food and Store-bought Food



We live in a region that once was clean, healthy, and untouched. But we have learned that this is no longer the case. During the past 15 years our Elders have noticed and discussed changes in the environment that are similar to those reported in other regions of the North. We are part of a much larger Inuit culture spanning Arctic Canada, Alaska, and Greenland, and we hear of contamination in the people and environments of other northern regions. We wonder to what extent our environment and people are affected. We have seen more sick animals, significant changes in their behaviour and health, and fewer numbers of some species. In 1987, provincial officials told us not to eat the livers or kidneys of our caribou because they were contaminated with cadmium. In 1989 we were told of PCBs on a radar site in a region of northern Labrador extensively fished and hunted by Inuit. In 1997 we are still trying to determine the extent of this contamination and the most effective way to clean it up. Mining is also of great concern to residents in our region. People are concerned about the effect on health from past uranium mining activities and looming nickel mining operations.

During the past three years we have begun to investigate some of these questions through our involvement in the Tri-Council Eco-Research programme. A local research office and a steering committee to oversee and direct projects here in Labrador have made a significant contribution, even though funding is scarce and we face many other issues daily. We have started to gather information and we have begun to educate our community health and environmental workers on these issues through two workshops held in co-operation with the people at the Centre for Indigenous Peoples' Nutrition and Environment.

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Despite these activities, relatively little attention has been given to the situation in Labrador. In many national programmes and projects we are not considered part of the "northern" regions although we face the same issues and circumstances. We feel that we can contribute a great deal and would benefit from inclusion in such initiatives at all stages of information collection, decision making, and communication. As well, we believe strongly that many of these issues must be dealt with from a regional perspective. For others—such as environmental contamination—that go far beyond the reaches of our communities yet are central to our lives, national and international efforts must be marshalled. No matter what the scope, however, we need to include and listen to those affected daily by these contaminants to find solutions to the existing problems. Only then can we begin to deal with these issues threatening all people of the North.

Labrador Eco-Research Steering Committee, Labrador Inuit Association.

Steps towards the International Regulation of POPs

By Nigel Bankes

Comprehensive international regulation of persistent organic pollutants (POPs) will involve measures to control, reduce, or eliminate their production, use, trade, and disposal. Such regulation will have to recognize that POPs exist as manufactured substances, as by-product emissions from industrial processes, and in wastes. Measured against these requirements, current international regulation of POPs is inadequate.

I have three objectives in this paper: first, to assess the limited existing international regulation; second, to provide an account of global and regional steps being taken to negotiate international instruments to provide for the comprehensive regulation of POPs; and, third, to provide a detailed critique of the draft protocol emerging from the regional negotiations under the auspices of the Economic Commission for Europe.

Existing Regulation of POPs

The international instrument that deals most specifically with the problem of POPs is the Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal. This convention establishes the principle of prior informed consent (PIC) of the importer of hazardous waste before transboundary movement of the waste and contains obligations relevant to domestic waste management. The convention requires states to minimize the generation of hazardous waste and to ensure the availability of adequate disposal facilities for the environmentally sound management of hazardous wastes to minimize the consequences for human health and the environment.

It is important to note that the Basel Convention applies only to "waste," which it defines as "substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law." It is evident therefore that the Basel Convention supplies but a small part of a necessary regulatory regime for POPs.

In addition to the Basel Convention, a complete survey of international instruments relevant to POPs would include the environmental provisions of the Law of the Sea Convention especially those dealing with land-based marine pollution, and provisions in regional seas agreements that require the parties to take steps to reduce or phase out toxic substances. Regional seas agreements relevant to the Arctic include the not-yet-in-force Convention for the Protection of the Marine

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Environment of the North-East Atlantic. It bears emphasizing that there is no similar regional seas agreement among the Arctic states covering the Arctic Basin, although there is an initiative under way to develop a Regional Programme of Action for the Protection of the Arctic Marine Environment (PAME) from Land-based Activities. This initiative is occurring under the auspices of the working group on PAME established by the Arctic Monitoring and Assessment Programme (AMAP). The programme will also serve as a regional component of the Global Programme of Action adopted at the Washington Intergovernmental Conference in November 1995. The newly established Arctic Council could usefully consider whether the proposed Regional Programme of Action is an adequate measure or whether it should be supplemented by a regional convention.

Proposed Global Measures to Regulate POPs

States are currently developing more comprehensive measures to regulate POPs in two categories: an appropriate global instrument under the auspices of the United Nations Environment Programme (UNEP) and regional measures under the auspices of the United Nations (UN) Economic Commission for Europe (ECE). The ECE negotiations are well advanced and will likely serve as a model for a global instrument. A global instrument is equally important for Arctic Canada, as it is undoubtedly the case that a significant portion of the contaminants deposited in the high latitudes has its source outside the ECE region.

Global Measures: UNEP

In February 1997 the Governing Council of UNEP decided to initiate immediate international action "to protect human health and the environment through measures which will reduce and/or eliminate ... the emission and discharges" of 12 listed POPs. It is anticipated that these global negotiations will commence in summer 1998. The UNEP decision to develop a legally binding global agreement follows its consideration of a report from the Intergovernmental Forum on Chemical Safety (IFCS). I welcome both the IFCS report and the UNEP decision that parallels it so closely, but I am concerned that neither document specifically refers to the Arctic, the polar regions, or the special challenges facing indigenous peoples, all notwithstanding the body of evidence demonstrating the systematic migration of POPs to cooler latitudes. For example, while both documents address possible human health and socio-economic effects of POPs, the comments deal with the potential effects of phasing out POPs (especially those used in food production and as vector control agents) and do not recognize the socio-economic impacts for indigenous peoples who may need to consider altering diet and lifestyle as a result of contaminated food sources.

I suggest therefore that the challenge for Canada and other Arctic states is to ensure that Arctic concerns and the interests of indigenous peoples are front and centre on the global POPs agenda. I provide specific recommendations in the concluding section.

Regional Measures: The Role of the Economic Commission for Europe

Readers unfamiliar with the profligate use of acronyms in this area of international environmental law should pause for a moment to grasp the role of the Economic Commission for Europe (ECE). It should not be confused with the European Community (the EC or its earlier manifestations, the EEC or the Common Market). It is not a regional economic integration organization or a free trade zone and, most important of all, its membership is not confined to Europe.

The ECE was one of a number of similar regional organizations established after World War II to deal with post-war reconstruction and co-operation. Its current membership includes not only western and southern European countries but also Canada, the United States, Russia, and other eastern European states.

The ECE emerged during the thawing of cold war politics when it assumed a leading role in facilitating environmental co-operation between western and soviet block countries in the mid-1970s. This led directly to the negotiation of one of the

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first so-called "framework environmental agreements," the Convention on Long-range Transboundary Air Pollution (LRTAP). The LRTAP was long on grand talk about reducing air pollution and short on concrete commitments, but it did establish an institutional structure for ongoing co-operation (the Executive Body) that has paid exceptional dividends through the last two decades in the form of a series of protocols dealing with various aspects of the long-range transboundary transport of air pollutants. These include two protocols on sulphur dioxide, one protocol on nitrogen oxides, one on volatile organic compounds, and one dealing with the financing of the Cooperative Programme for Monitoring and Evaluation (EMEP) of LRTAP. The EMEP is of special significance here because it provided the model for the parallel Arctic Monitoring and Assessment Programme (AMAP) established as part of the Rovaniemi initiative. Those programmes (and their national counterparts) have been instrumental in helping to develop the scientific record to justify negotiation of the various protocols.

I think it is fair to say that, until the last few years, the ECE's agenda and its priorities for negotiating protocols have been driven in large part by the European metropolitan centres and not by the concerns of the Arctic periphery. The problems of smog and acid precipitation loom larger in Europe than do the problems of contaminants in Arctic food chains. The feedback link between energy generation and respiratory problems is clearer. Canadians shared common cause with Germany and the Nordic countries in pressing for the development of the sulphur dioxide and nitrogen oxides protocols, but we can safely assume that acid precipitation would not have been high on the agenda for the ECE without German interest in the topic.

Hence, it was a cause for some celebration in 1989 when Canada and Sweden succeeded in persuading the executive body to establish a Task Force on POPs. In 1994, following the practice established for previous protocols, the parties to LRTAP agreed to establish an Ad Hoc Preparatory Working Group on POPs with the goal of preparing a draft protocol that would form the basis for further negotiations.

The first negotiating session was held January 20-24, 1997. The text is far from final and much remains square-bracketed (i.e., not-yet-agreed-to) with alternative versions of basic obligations. Following is a thumb-nail sketch of the draft as it emerged from the second negotiating session.

Substances Covered

The substances scheduled for elimination and listed in Annex A are aldrin; chlordane; DDT; dieldrin; endrin, hexabrombiphenyl; hexachlorobenzene; mirex; toxaphene; chlordecone; heptachlor; and PCBs. Discussions continue with respect to moving short-chain chlorinated paraffins (SCCP), lindane, and pentachlorophenol (PCP) to the Annex A list from Annex B where, with chlordecone, they are currently scheduled for restrictions on use. In addition to these two annexes, there will be an additional annex (now labelled Annex E), which will provide annual emission levels for three groups of substances that are produced as by-products to other industrial processes polyaromatic hydrocarbons (PAHs), dioxins, and furans.

The Basic and Other Obligations

The basic obligations of the parties, stipulated in draft Article 2, are three-fold: to eliminate the production and use of Annex A substances; to restrict the use of Annex B substances; and to take effective measures to stabilize or reduce emissions of Annex E substances. The base year for Annex E obligations remains square-bracketed. In addition to the basic Article 2 obligations, parties are expected to adopt national strategies and programmes, maintain inventory information for emissions, sales, and consumption of listed substances, handle wastes in an environmentally sound manner, and endeavour to encourage use of the best available techniques with respect to all aspects of the use of POPs.

Further measures to restrict trade in POPs and to use trade measures to enforce the protocol remain square-bracketed.

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Procedural Requirements

As is typical with similar international instruments, parties will undertake a variety of procedural obligations including exchanging information and technology, providing for public awareness and information (Article 3) (but only to the extent consistent with national laws and regulations), and meeting reporting requirements (Article 5). As well, there are provisions dealing with research development and monitoring. Text dealing with compliance monitoring and reviews by the parties through the Executive Body continues to be square-bracketed (articles 7 and 8).

Essential Use Exemption and Amendments

Article 13 contains a list of exemptions. Some of its language is narrow and deals with specific use and time-limited exceptions, but the article also contains square-bracketed text allowing an exemption where "no alternative to the substance exists for the proposed use."

Article 11 deals with the procedure for amending the protocol and adding substances to the annexes and needs to be read in conjunction with Annex J, which provides square-bracketed text on the information that a party must submit in support of a claim to add substances to the annexes. I offer some comment on this process in the concluding section.

Criticisms and Recommendations

1. The protocol currently lacks a purposive objectives clause. Under the heading "Scope," the protocol indicates that its aim is "to control, reduce or eliminate discharges, emissions and losses of [POPs] which Parties deem [may] cause [significant] adverse effects on the environment or human health as a result of their long-range transboundary atmospheric transport." What this article lacks is a statement of an ultimate objective such as the protection of humans and components of the environment, especially upper trophic levels, from the harmful effects of POPs. I suggest that a statement of the ultimate objective of the protocol will be a useful criterion against which to measure proposed additions to the protocol and annexes. As well, the drafters have failed to incorporate fully the precautionary principle in the operative articles of the protocol. Although the precautionary principle is referred to in the draft preamble and there is related square-bracketed text in Annex J dealing with the information required to support the addition of substances to Annex A, this is surely inadequate incorporation of the principle in a protocol designed to deal with substances that pose such a serious risk to human health and the environment. A possible statement to incorporate both ideas follows:

The objective of this protocol is to protect the environment and human health from the adverse effects of persistent organic pollutants subject to long-range transboundary atmospheric transport by taking measures, consistent with the precautionary principle, to control, reduce, or eliminate their discharge, emission, and loss.

2. The scope of the exemptions clause is too broad. Some of the square-bracketed text of Article 13 permits a very broad range of "essential use exemptions." Given the human health concerns related to the use of these substances, these limitations should be more narrowly framed.
3. Many of the procedural information exchange obligations listed in Article 3 are limited by the extent to which they are consistent with national laws, regulations, and practices. I think that the drafters need to examine this section carefully to ascertain which of these obligations really need to be subject to this caveat to protect national autonomy and flexibility and which should be simply prescriptive international norms.
4. The draft protocol contains no recognition of the special threat posed by POPs to the lifestyles and cultures of indigenous peoples in Canada and elsewhere within the circumpolar world. In my view, one of the goals of this protocol, and the one vitally important measure of its success, will be the extent to which it affords protection to those peoples and cultures. The language of the protocol should recognize that reality. Inclusion of the foregoing

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suggested objectives clause would help achieve this, but one might also provide expressly in the preamble as follows.

Cognizant of the particular and immediate threat posed by persistent organic pollutants to the physical and cultural well-being of indigenous peoples and others who are dependent on the harvest of country foods, and taking account of the special responsibility of states for indigenous peoples and the need for urgent action....

5. The protocol does contain a somewhat passing preambular reference to the Arctic but this hardly seems adequate for two reasons. First, there is firm scientific support for the view that cold climates are especially affected by long-range transport and deposition of POPs. Second, it treats the Arctic as if it were an area outside the UN/ECE region—a linguistic treatment that encourages the metropolitan centres to discount the importance of the region and its concern. By adding clauses such as the following to the preamble, it would be possible to raise the profile of the Arctic.

Recognizing that many persistent organic pollutants migrate to the Arctic, where they deposit and accumulate in Arctic terrestrial and aquatic ecosystems....

Acknowledging that Arctic ecosystems are especially vulnerable to the serious threat posed by persistent organic pollutants, which have been shown to biomagnify and bioaccumulate in the lipid-rich tissues of high trophic level Arctic organisms....

6. References in the protocol to the regulation of trade in POPs and to the use of trade measures to enforce protocol obligations are currently square-bracketed because of concerns about their consistency with trade rules. This is too big a topic to canvass here, but I would urge that we "push the envelope" a little by making maximum use of existing exceptions in international trade instruments for the protection of public health and the conservation of natural resources. I also think that we should anticipate interpretive developments in multilateral trade instruments and support those who argue that we need to adopt some proportionality justification when balancing the environmental threats the POPs protocol will combat against the trade impairment effects of proposed measures.
7. The procedure for adding new substances to Annex A remains contentious. All agree that proposals for adding new substances should be science-based (i.e., there should be an adequate record that speaks to essential criteria including persistence, bioaccumulation, exposure, and long-range transport, but views differ on whether proposals should also provide information on other matters including the socio-economic effects of imposing a ban but not the socio-economic effects of making country food a danger to health! I would argue that Canada's position should be driven by its obligation to protect its indigenous peoples and to implement the precautionary principle and that therefore Canada should resist the temptation to add political or technical hurdles to the listing process. I also think that there may be merit in allowing non-state parties to initiate the listing process. An expanded list of possible initiators might include NGOs, international indigenous peoples' organizations like the Inuit Circumpolar Conference, and other international organizations.
8. Canada should urge the Arctic Council to assess the need for, and value of, a regional seas agreement among Arctic basin states to deal, *inter alia*, with all sources of land-based marine pollution including POPs. As noted, this would go beyond the existing proposals to develop a Regional Programme of Action.
9. Canada should take steps to ensure that Arctic concerns and the concerns of indigenous peoples are front and centre on the global agenda for the UNEP-led POPs negotiations. Among several options, Canada could include representatives of indigenous peoples within its delegation. The delegation sent by Canada to the Rio meetings in 1992 sets a precedent for this sort of involvement. Alternatively, Canada could provide financial and other support to an international coalition of indigenous peoples to assist their independent participation as an NGO observer.

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POPs in the Arctic: Turning Science into Policy

By Terry Fenge

Introduction

During the last 30 years, northern Canada has changed fundamentally as a result of land-claims settlements, political and constitutional development, mineral and oil and gas exploration and development, the introduction of television, and investment in schools, hospitals, houses, roads, and other infrastructure. Yet in other ways, it has changed very little. Inuit, Dene, Métis, and First Nations continue to hunt, fish, trap, and gather. They eat what the land provides.

Resilient but adaptable, northern peoples move forward, adjusting to economic and social processes from outside the North. But certain important issues can no longer be dealt with solely by residents of this region or even by Arctic states either singly or collectively. Global processes such as climate change and increased WB radiation—which have marked effects in the North—require global solutions. In particular, northerners suffer the public health and environmental consequences of transboundary contaminants brought to the Arctic by winds and currents from tropical and temperate countries. What are these contaminants and what are their effects? How serious is the problem? Must "country food" diets change to avoid ingestion of contaminants? How can we get rid of them? What are the territorial and federal governments doing? How best can the concerns of Arctic residents be brought to bear in international decision making? The answers to these questions will largely determine the face of the North well into the next century and will fully test the resilience and adaptability of northern peoples.

Transboundary Contaminants: The Information Base

Although largely ignored by the mainstream media, two significant scientific reports on transboundary contaminants in the Arctic were published in spring 1997. The first—*Canadian Arctic Contaminants Assessment Report* (CACAR): presented six years of leading-edge research into contaminants in the Canadian North funded through the federal government's Northern Contaminants Program (NCP), a component of the Arctic Environmental Strategy (AES). The CACAR, which deals solely with northern Canada, is complemented by the Arctic Monitoring and Assessment Programme's *Arctic Pollution Issues: A State of the Arctic Environment Report*. This superbly produced report is a major component of the Arctic Environmental Protection Strategy (AEPS), which was put in place by the eight circumpolar Arctic nations in 1991 (see *Northern Perspectives* 21:4, Winter 1993-1994).

Both reports show that toxic, volatile, and persistent organic pollutants (POPs) used in tropical and temperate countries are transported through the atmosphere and deposited in the Arctic "sink." These many and varied pollutants, often with long and difficult to pronounce names, include pesticides (dieldrin, DDT, toxaphene, chlordane, and hexachlorocyclohexane); several industrial compounds (PCBs, HCBs, and short-chain chlorinated paraffins); and some industrial and combustion by-products (PAHs, PCDDs, and PCDFs). [See box, for full names.]

Once in the Arctic, many POPs bioaccumulate and biomagnify in the food chain. They have a high lipid solubility, which means they concentrate in the fatty tissue of animals—particularly those in the marine environment. In northern Canada many Aboriginal people ingest POPs when they eat country food. Depending upon the type and amount of country food consumed, many Inuit, in particular, have levels of POPs in their bodies well in excess of the "level of concern" defined by Health Canada. In autumn 1997, studies of Inuit women in the Keewatin and Baffin regions of the Northwest Territories showed that 59 and 65 per cent respectively of those studied had quantities of PCBs in their blood as much as five times beyond this level. The Arctic may be wild but, unfortunately, it is far from pristine.

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To northerners this is primarily a public health Issue and only secondarily an environmental matter. All involved are concerned with the long-term health effects on people chronically exposed to POPs through their food. This is why the federal government is currently sponsoring research into the public health impacts of POPs in the Arctic and has renewed the NCP for a further five years.

POPs are considered to be endocrine disruptors that cause reproductive, neurological, and immune system dysfunctions. Research already completed in the United States points to learning "deficits" and subtle behavioural effects in children born to mothers with high levels of POPs in their bodies. Most of these pollutants have intergenerational effects, for they pass the placental barrier. Women in these studies had consumed, over a long period, large quantities of Lake Michigan fish contaminated with POPs. The levels of POPs in the mothers and their children are generally below levels recorded in many Inuit in northern Canada and Greenland.

Available evidence suggests that POPs in the Arctic have an impact on public health, although further research is needed to quantify the risks. Decision makers need to be cautious in the dietary advice they give to northerners, for it makes no sense to dissuade people from eating highly nutritious country food when alternative store-bought goods are often prohibitively expensive and some are linked to increasing rates of diabetes and other ailments among Aboriginal peoples. In the same vein, government agencies continue to advise northern women to breast-feed their infants.

International Controls: A Long-term Solution

The only long-term solution to this problem is to reduce the emissions of POPs at source. This is far more easily said than done, for it requires countries in both the developing and the developed world to reduce emissions of POPs from substances important to agriculture and industry. Although public health in the Arctic is not a priority among tropical and temperate countries, the environmental security and public health of northern Aboriginal peoples in Canada and throughout the circumpolar Arctic is determined by the environmental, agricultural, and industrial policies of countries in Europe, Latin America, Asia, and elsewhere.

Reducing global emissions of POPs to protect the public health of northern peoples is a major foreign policy challenge facing Canada and other Arctic nations.

What is the prospect that international controls will reduce emissions of POPs to the environment? What avenues can governments use to translate research and science into international policy and action? What role is Canada playing in these processes? To what degree will Arctic nations co-operate in international fora to press for reduction of POPs emissions? Many Canadians will be surprised to learn that international discussion to control emission of POPs has been under way for some years; that formal negotiations began in January 1997; and that Canada played a key role in getting control of POPs emissions on the international agenda.

The international response to POPs in the Arctic followed publication in the late 1980s of data that showed women in Baffin Island and northern Quebec had high levels of POPs in their bodies, particularly in their blood and breast-milk. This data surprised scientists and in part prompted the establishment in 1991 of the Arctic Monitoring and Assessment Programme (AMAP), an eight-nation programme to research and publicize the full nature of the problem. At roughly the same time, Canada and Sweden suggested that the emissions of POPs be addressed through a protocol to the Convention on Long-range Transboundary Air Pollution (LRTAP). This short convention, signed in 1979, brings together countries of North America, Europe, and the former Soviet Union under the umbrella of the United Nations Economic Commission for Europe (UN/ECE).

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Towards a POPs Protocol to the Convention on LRTAP

Designed to address acid rain, the Convention on LRTAP has had several detailed protocols—legally binding technical agreements dealing with emissions of sulphur, nitrogen oxides, and other substances appended to it. Although a POPs protocol to LRTAP would not address emissions of POPs from developing countries in Latin America, Asia, or Africa—major sources of POPs that end up in the Arctic—achieving it was judged an essential step towards a global agreement, for it would signal that the industrialized world was committed to dealing with this issue. Indeed, faced with data made available through the NCP, and with foreknowledge of publication of the *CA CAR* and the AMAP report, the Governing Council of the United Nations Environment Programme (UNEP) agreed to sponsor negotiation of a legally binding global convention on 13 named POPs—the "dirty dozen" [see box below]. These negotiations are scheduled to begin in summer 1998 in Montreal and may conclude by 2001. UNEP is currently organizing workshops to raise the awareness of states and non-governmental organizations in Russia, Southeast Asia, Africa, and Latin America about the environmental and public health implications of POPs emissions and to prepare the ground for the global negotiations.

In 1991, the LRTAP Working Group on Strategies, a technical body comprising representatives of all parties to the convention, asked for and received from a Canadian task force a scientific rationale for a POPs protocol. In 1994, the LRTAP Executive Body, a permanent institution established by the convention, struck an Ad Hoc Preparatory Working Group on POPs that in 1995 was asked to draft a "composite negotiating text," a document to restrict, ban, or phase out uses of 15 named POPs. This group brought together representatives of approximately 30 countries under the chair of a civil servant in the Canadian Department of Indian Affairs and Northern Development who was at the time assisting in the preparation of both the *CACAR* and the AMAP report. Formal negotiations on this text began in January 1997 at the United Nations in Geneva. Further negotiations were held in June, October, and December. The text of the protocol is now agreed on and awaits ministers' signatures in June 1998 at Arhus, Denmark.

Involvement by Northern Aboriginal Peoples in the POPs Protocol

It is one thing to advocate international controls on emissions of POPs, as Canada has done effectively, but something entirely different to markedly influence negotiations to achieve this end. Moreover, as Lloyd Axworthy, Minister of Foreign Affairs and International Trade, said recently, "nothing is ever clear in international negotiations." While Inuit, Dene, Métis, the Council of Yukon First Nations, and the two territorial governments participated strongly in the early to mid- 1990s in the NCP, these interests had little to do with Canada's preparation for LRTAP negotiations. Indeed, the Canadian negotiating team was composed solely of Ottawa-based federal government agencies.

The federal Department of the Environment (DOE), initially the lead Canadian agency in LRTAP negotiations, sponsored conference calls with representatives of industry, governments, Aboriginal peoples, environmental groups, and other interested parties to keep all informed. These calls, often involving more than 20 participants, proved unwieldy and did little to equip these interests to influence events. Moreover, the Aboriginal peoples in the North, to whom the issue of transboundary contaminants is of direct and compelling importance, were uneasy when participating in conference calls as one interest among many: they certainly did not wish DOE to assume that such calls constituted appropriate consultation. These peoples were acutely aware of their Aboriginal and treaty rights and the fiduciary obligations of the Crown towards them, which placed significant consultative burdens upon the federal government before engaging in international negotiations that might affect their rights. At no stage were northern Aboriginal peoples invited to assist the federal government in developing its formal negotiating position.

Faced with the imminent publication of the *CACAR* and the AMAP report, about which they knew a great deal through their involvement in the NCP, and responding to growing concern among their constituents about the public health implications of POPs in the Arctic, the Inuit Circumpolar Conference (ICC), the Inuit Tapirisat of Canada (ITC), Dene Nation, Métis Nation-NWT, and the Council of Yukon First Nations (CYFN) formed a coalition in March 1997 to constructively influence Canada's position in LRTAP and in proposed global POPs negotiations. The Department of the

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Environment encouraged the Aboriginal peoples' organizations to form the coalition, and modest funding was obtained from the NCP. The Aboriginal peoples took to heart AMAP's recommendation:

The Arctic countries should take all necessary steps to ensure that their domestic responsibilities and arrangements to reduce contaminant inputs to the Arctic region are fully implemented. If these responsibilities and arrangements are not addressed in an appropriate manner, the justification for recommending actions aimed at reducing transboundary contaminants with sources outside of the Arctic will be accordingly diminished....

The AMAP countries, all being parties to the Convention on Long-range Transboundary Air Pollution (LRTAP), should work vigorously for the expeditious completion of negotiations for ... a protocol on POPs.... In addition, the AMAP countries should strongly support the work of the international negotiating committee, to be established early in 1998 ... to prepare an international, legally-binding global agreement on controls for thirteen specified POPs.¹

Canada's Approach to the POPs Protocol

Some weeks later, the coalition members read a carefully crafted letter written on 21 March 1997 to the Department of Foreign Affairs and International Trade (DFAIT) on behalf of the federal departments of Industry, Natural Resources, and Agriculture and Agri-food and the Pest Management Regulatory Agency. Written well after the first LRTAP negotiating session in Geneva, this letter suggested that all was not well in the Canadian approach to the issue or on the Canadian negotiating team. Citing the "urgent need for a Federal Strategy for POPs," including Cabinet instructions to the negotiating team, and the need for DFAIT rather than DOE to lead and co-ordinate Canada's efforts, the letter suggested:

Actions on these substances can be expected to have significant economic impacts, by virtue of reducing or eliminating markets for specific products and associated industries, and by requiring substantial investment in technology designed to reduce or eliminate byproducts of a wide range of manufacturing processes.²

The Aboriginal peoples were concerned with this letter's characterization of the POPs issue as an economic matter, rather than as a question of public health. This was particularly puzzling in light of the reporting relationship of the Pest Management Regulatory Agency to the minister of Health, who, it was felt, should automatically see this as a health issue. With this in mind, the coalition questioned the letter's political approval. In addition, Aboriginal peoples were surprised to learn that Canada's position in Geneva was the result not of Cabinet-approved instructions but of agreements among federal civil servants. This, they felt, did not mirror concern in the North about POPs and public health and was not consistent with the expenditure of considerable sums of money over many years through the NCP to ascertain the nature of the problem or with Canada's considerable efforts to persuade other countries to negotiate a POPs protocol. The letter revealed that in the midst of international negotiations federal agencies disagreed not only on Canada's position but also on the make-up and leadership of the negotiating team! This did not inspire confidence, and the coalition feared that the agencies referenced in the letter might use the promised Cabinet process to weaken Canada's negotiating position on 18 named substances already being discussed in Geneva. These concerns prompted a 1 May letter signed by the political leaders of all five organizations to the minister of Foreign Affairs and International Trade.

In their letter, the Aboriginal peoples pointed out that the proposed POPs protocol to LRTAP would, in fact, have few economic implications, for none of the 18 named substances is manufactured in Canada and only four are used in Canada. In addition, they noted that the International Chemical Council Association, of which the Canadian Chemical Producers Association is a member, supported the protocol. In a direct appeal to the minister, they said:

For more than five years we have observed and applauded an aggressive Canadian commitment to dealing with long-range transport of POPs. We are puzzled by this apparent change of heart on an issue the federal government has so effectively convinced us to be of immediate concern and importance to our environment and our health.

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We ask you to give this issue your personal attention and to encourage your Cabinet colleagues to define a negotiating position that fully takes into account the environmental and public health implications of POPs to northern aboriginal peoples.³

Further evidence to support the appeal to the minister arose in a letter from DIAND to the Pest Management Regulatory Agency concerning inclusion in the protocol of the pesticide lindane. The letter acknowledged that the Canadian team had "decided to recommend that Canada will not support the inclusion of any controls on Lindane....including restrictions which may be compatible with current Canadian regulations... [as] the presently valid Canadian risk assessment for this substance would not justify such action."⁴

Having noted that DIAND would, perforce, "respect" this decision, the letter noted that significant, if preliminary, evidence in the CACAR and the AMAP report showed lindane to be a real public health concern in the North. In the Baffin region, dietary surveys had shown that nearly 15 per cent of women studied ingested more than the advised tolerable daily intake (TDI) of HCH—a component of lindane. Copies of the risk assessment and supporting data forming the basis for Canada's regulatory regime for lindane were requested, but the Pest Management Regulatory Agency declined, citing proprietary concerns. To the coalition, this raised questions about the methods and data used to conduct the risk assessment and its current validity. As well, the coalition wondered how this agency could function as a member of the Canadian negotiating team while denying requested information to a federal department on the same team. The coalition could see no reason why information relating to the public health of northerners should be withheld. In December 1997, the ICC formally asked the Pest Management Regulatory Agency for this information⁵ and was similarly refused.⁶

The June 1997 Negotiating Session

Now thoroughly concerned about the Canadian position, the Aboriginal peoples coalition used ICC's "consultative" status to the United Nations Economic and Social Council to send an observer to the 16-20 June POPs negotiating session in Geneva. The observer reported that Canada was taking a more cautious and conservative position than virtually any other nation on the inclusion of many substances, restriction on uses, addition of future substances, and import and export controls. This caution seemed curiously at odds with Canada's earlier and successful attempts to persuade LRTAP countries to negotiate a POPs protocol. The observer also reported that representatives of industry observing the events were in close contact with the delegation from the United States, but that no environmental, public-interest, or other non-governmental groups were in attendance. National and international media either did not know about the negotiations or had chosen not to cover them. The Canadian delegation was now co-chaired by the departments of the Environment and Foreign Affairs and International Trade.

These various changes did not go unnoticed; representatives of two other Arctic delegations approached the ICC observer asking whether Canada had changed its view on the need for a POPs protocol. The advocacy of economic development agencies in Ottawa seemed to be having a marked effect on Canada's negotiating position and posture.

Back in Ottawa

This conclusion was bolstered by a letter from the minister of Foreign Affairs and International Trade in response to the 1 May letter from the Aboriginal peoples coalition:

You express concern that consideration of economic interests could delay and weaken potential control mechanisms for POPs. I wish to assure you that the final Canadian mandate for the negotiations will be based on principles of sustainable development, which involve a thorough consideration of all environmental, social and economic concerns. Our position will also take into account the views expressed by Northern Aboriginal organizations during the consultations that preceded the launch of negotiations.⁷

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The final sentence left all wondering what "consultations" the minister presumed had taken place. The fact that the minister characterized this as a sustainable development issue and not as a matter of public health confirmed that important agencies in Ottawa, with the notable exception of DIAND, saw the issue differently from those it directly affected. The Aboriginal peoples wondered whether their public health might be "traded off" in the rough and tumble of international politics.

Based on observations in Geneva and assuming that in the autumn Cabinet would provide negotiators with a formal mandate to conclude a POPs protocol, the coalition advised the minister of Foreign Affairs and International Trade in an 8 August letter that Canada's position was "not acceptable." Citing Canada's refusal to include short-chain chlorinated paraffins (SCCP), lindane, or pentachlorophenol (PCP) in the protocol, to support inclusion of trade-restrictive measures (import/export controls), or to invest authority in the convention Executive Body to add substances to the protocol as and when science showed them to be of concern, the Aboriginal peoples concluded:

To Inuit, Dene and Metis, and First Nations in northern Canada, contamination of the wildlife we hunt and eat is a matter of public health, and as such is an issue we take seriously above all others. A significant percentage of aboriginal people in the North have levels of certain POPs in their bodies which greatly exceed Health Canada's "level of concern " We recommend to you that the Canadian position be reassessed. Canada should join the majority of other LRTAP Convention countries in supporting an effective Protocol that lays a strong foundation for negotiation of the UNEP legally binding POPs instrument.⁸

The federal Cabinet approved a negotiating mandate on 9 October 1997. The minister of the Environment tabled the correspondence from the Aboriginal peoples to illustrate the depth of opinion and concern on the issue. Influential in raising the profile of the issue in Ottawa were several Members of Parliament who had contacted ministers about this "national interest" issue; the summer 1997 report of the Parliamentary Committee on Foreign Affairs and International Trade into Canada's Arctic policy, which called upon the government to "redouble" its efforts to conclude an expansive POPs protocol to LRTAP; and the work of the Canadian Polar Commission and the Canadian Arctic Resources Committee.

Geneva in October

Two representatives of the Aboriginal peoples coalition observed proceedings at the October 1997 negotiating session in Geneva and pressed their concerns with delegations during breaks. The Danish, Norwegian, and Canadian delegations were particularly helpful in facilitating this involvement. This was originally billed as the final such session, but additional meetings of heads of delegation—to which observers, including northern Aboriginal peoples, are not invited—and formal negotiating sessions were held in late 1997 and early 1998. Perhaps the most startling revelation at the October session was from the Russian delegation, which admitted that PCBs are still being manufactured in the Federation of Russia. Canada's position was less rigid than that of the previous June. Remaining firmly against import and export controls, Canada now accepted that lindane could be included in the protocol as a restricted substance, but insisted that all current uses of the pesticide be allowed to continue. Canada refused to accept any date to phase out lindane but did agree to a future "review" of its uses.

With an eye to proposed negotiation of a global agreement on POPs, the Aboriginal peoples tabled, through the supportive Swedish chair, a paper that, if adopted, would partially ground the LRTAP POPs protocol in Arctic, Aboriginal, and public health concerns. They proposed the amendment and/or addition of four clauses to the protocol's preamble, and a new clause outlining the protocol's scope:

Aware that persistent organic pollutants resist degradation under natural conditions, particularly in cold climates, and that certain persistent organic pollutants have been associated with adverse effects on human health and the environment, and that this is an immediate public health issue for Arctic indigenous peoples;

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Recognizing that many persistent organic pollutants migrate to the Arctic where they deposit and accumulate in terrestrial and aquatic ecosystems;

Acknowledging that Arctic ecosystems are especially vulnerable to the serious threat posed by persistent organic pollutants which have been shown to bioaccumulate in the lipid-rich tissues of Arctic organisms;

Cognizant of the particular and immediate threat posed by persistent organic pollutants to the physical and cultural well being of indigenous peoples and others who are dependent on the harvest of country foods;

The ultimate objective of this protocol is to protect human health and the environment from the adverse effects of persistent organic pollutants subject to long-range transboundary atmospheric transport by taking measures, consistent with the precautionary principle, to control, reduce or eliminate their discharge, emission, and loss.

The American delegation and representatives of Scandinavian countries warmly welcomed this intervention and proposed to support this language. In subsequent meetings of heads of delegation, the preambular language proposed by the Aboriginal peoples was, in part, accepted. Unfortunately, the clause detailing the protocol's scope was not.

Conclusions and Questions

It would be unfair to draw hard conclusions from events to date; only when a final document is available will we be able to judge whether Canada, in particular, has done a good job. Nevertheless, it is not too early to make several observations.

While transboundary contaminants affect people in many parts of Canada, the health of people resident in the North who eat country food is most obviously at risk. Northerners quite rightly expect the federal government to understand this and to involve them in preparing for and conducting international negotiations. Such has not been the case. Federal agencies in charge of negotiations have little knowledge of the special circumstances that distinguish the territorial North from the provincial South; neither do they fully appreciate federal obligations to northern Aboriginal peoples under comprehensive land-claims and self-government agreements and Aboriginal rights or as a result of the Crown's fiduciary relationship with Inuit, Dene, Métis, and First Nations. These obligations suggest that the departments of the Environment and Foreign Affairs and International Trade should directly involve Aboriginal peoples in defining Canada's negotiating position. There may be legal as well as political and moral reasons to do so.

It is not unusual for Aboriginal people to be included on federal government delegations to international meetings and negotiations involving, for example, the Convention on Biological Diversity, the Migratory Birds Convention, or the Arctic Environmental Protection Strategy. Yet no invitations have been issued to any northern residents—Aboriginal or non-Aboriginal—to join the Canadian delegation to the LRTAP POPs negotiations. Ottawa is approaching these negotiations as if they involve federal rather than national interests. This is a mistake. The Aboriginal peoples coalition has had to invite itself into the domestic and international processes. But striving to play a constructive and advisory role while simultaneously looking over the shoulder of the Canadian delegation and reporting what it sees are not always compatible roles.

The Canadian approach to the LRTAP POPs process should not be repeated in the forthcoming global POPs negotiations. As the recent Kyoto conference on climate change illustrates, negotiating with developing countries is not easy, for there is a wide—and perhaps growing—gap between the views and objectives of developed nations in the North and developing nations in the South in relation to environmental issues. While Arctic concerns will not assume centre stage during global negotiations, Aboriginal peoples in northern Canada and the circumpolar Arctic may be able to engage residents, interest groups, and even governments in key developing countries to promote the case for a global POPs treaty and in so doing bring a more positive hue to north-south relations. The Aboriginal peoples coalition appreciates this opportunity and is

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discussing with the Sami of Scandinavia and the Kola Peninsula and the Russian Association of Aboriginal Peoples the formation of a circumpolar Arctic peoples coalition to participate in the global negotiations. In any event, the Canadian team for the global negotiations should be more broadly based than its LRTAP predecessor and co-ordinated by federal representatives with real knowledge of the Aboriginal peoples and other northerners whose rights and interests they are defending.

Canadian media have yet to grasp the transboundary contaminants story. *The Globe and Mail* refused opinion editorials submitted by ICC with the comment that the story was unimportant compared with the collapse of cod and salmon stocks off the east and west coasts. Contaminants are insidious and invisible. There are no quick solutions and the issue is not easily captured in sound bites; yet the public must be informed if only so that politicians will be pressed to devote badly needed financial and intellectual resources to the issue. This suggests the need for briefings and informational sessions with selected media on the nature of the issue and how it must be addressed. Government agencies and Aboriginal peoples surely have complementary roles to play here.

Environmental issues attract environmental groups. Some are highly professional and are used extensively by the media to raise the profile of public-interest issues domestically and internationally. Nevertheless, the Canadian environmental "movement" has not discovered the POPs issue. Nor has the community of foundations that funds many environmental organizations. Very few groups responded to the publication of the *CACAR* and the *AMAP* report. There are likely many reasons for this lapse: lack of money and qualified people, pressing issues elsewhere, and a perception that this is a "northern" issue affecting relatively few people. But would silence shroud this issue if the levels of POPs in Inuit women were being found in mothers resident in southern Ontario and southern Quebec?

All of this points to the need for outreach and alliance and coalition building among organized interests to raise the issue's profile. In particular, it suggests that non-governmental groups with northern interests and knowledge and Aboriginal peoples organizations must seek out strategic alliances with other interests to persuade the federal government to deal with transboundary emission of POPs as a priority.

Terry Fenge, formerly Director of Research, Inuit Circumpolar Conference and CARC ED.

The "Dirty Dozen"

Eighteen pesticides are grouped together in the Dirty Dozen —actually a "baker's dozen" of 13— because of their closely related chemical structures:

Aldicarb (Temik)
Camphechlor (Toxaphene)
Chlordane
Heptachlor
Chlordimeform
DBCP
DDT
The "Drins": Aldrin, Dieldrin, Endrin
EDB
HCH/BHC, Lindane
Paraquat

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Parathion, Methyl Parathion
Pentachlorophenol, 2, 4, 5-T

Abbreviations

BHC—Benzene hexachloride
DBCP—1, 2-Dibromo-3-Chloropropane
DDT—Dichlorodiphenyl trichloroethane
EDB—Ethylene dibromide
HCB—Hexachlorobenzene
HCH—Hexachlorocyclohexane
PAH—Polycyclic aromatic hydrocarbons
PCB—Polychlorinated biphenyls
PCDD—Polychlorinated-dibenzo-p-dioxins
PCDF—Polychlorinated-dibenzo-p-furans
PCP—Pentachlorophenol
SCCP—Short-chain Chlorinated Paraffins

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