Irena Buka, MB, ChB, F.R.C.P.(C)
Associate Clinical Professor of Pediatrics
University of Alberta
Director of Pediatric Environmental Health
Specialty Unit
Misericordia Hospital/University of Alberta
Chair of the Expert Advisory Board on
Children's Environmental Health to the
Commission for Environmental Co-operation

RE: North American Regional Action Plan on Environmental Monitoring and Assessment

Thank you for forwarding this document to me and to the other Expert Advisory Board members.

As a paediatrician and Director of the Paediatric Environmental Health Specialty Unit in Edmonton, Canada, I would like to draw your attention to this opportunity that we have to improve the health of children, not only of this generation but of the next by understanding how children are exposed to environmental hazards. If this program of environmental monitoring and assessment is to be successful, we need to take into account that children are exposed to environmental hazards before birth i.e. in fetal life. Preconception exposures of the parents carry a burden that needs to be understood and taken into account when planning monitoring programs. Studies have shown that follicular fluid or the fluid that bathes the ovum in the ovary may contain substances such as persistent organic pollutants, pesticides and metals. The concentrations of these substances may be at the LD-50 level of fish i.e. the concentration allows for 50% of fish in a river to die. We can only assume that ova that have developed in this environment may be affected significantly. We have ample information that fetal exposure to environmental tobacco smoke can result in poor growth, suboptimal neurodevelopmental, development of asthma, predisposition to Sudden Infant Death Syndrome, etc., etc. Exposure in utero to PCB's (polychlorinated biphenyls) is now recognized as causing neurodevelopmental deficits in children. Exposure to lead prenatally and postnatally likewise affects children's IQ as well as their behaviour leading to aggression, attentional problems and learning problems. Exposures from birth onwards have a bearing on the exacerbations of asthma, development of adult neurological disorders, cancers and immunological and endocrine disorders.

In the plans that we lay out for our Action Plan on Environmental Monitoring and Assessment, we need to pay close reference to these factors as windows of opportunity occur that may subvert the developmental process, predispose to respiratory disorders, neurodevelopmental disorders, congenital abnormalities and defects in reproductive health. Identifying these windows of opportunity are a challenge as are the effects by single chemicals or combinations of chemicals working synergistically.

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During the opportunities we create to protect children from environmental hazards we are also gaining information regarding prevention of adult diseases.

As chair of the Expert Advisory Board on Children's Environmental Health, I very much support the work that has been done by the group involved and would like to offer my services as well as those of the Expert Advisory Board members in proceeding with these projects.

Alan Penn
Cree Regional Authority
Montréal, Québec (Canada)
May, 2002
Grand Council of the Crees (Eeyou Istchee) and the Cree Regional Authority, Québec, Canada

May, 2002

The following text has been prepared in response to the release by the Commission for Environmental Co-operation for public comment of the draft North American Regional Action Plan (NARAP) on Monitoring and Assessment.

The purpose of this text is to provide an aboriginal perspective on the issues addressed by the Monitoring and Assessment NARAP. It should also be noted that the Grand Council of the Crees/Cree Regional Authority was represented on the Monitoring and Assessment Task Force (to represent aboriginal issues), and that the following text therefore takes into account that experience.

1. The overall approach to the M & A NARAP - a caveat

The decision to establish a Monitoring and Assessment NARAP is ultimately derived from public concern about the consequences of human exposure to the persistent chemicals which have been, or will be, the subject of other NARAP's (i.e. PCB's, mercury, dioxins and furans, hexachlorobenzene, DDT, lindane and chlordane). This concern extends also to toxicity to wildlife in general (in particular the potential for genotoxic effects and impacts on reproduction), and therefore to the broader domain of ecotoxicology.

One way of looking at the Monitoring and Assessment NARAP is to ask whether, and to what extent, it addresses pathways of exposure for humans and wildlife and the potential for effects on human and wildlife populations.

Many of the observations in this brief bear on the problems of designing monitoring programmes or policies for monitoring human populations and biota in general, but with particular reference to pathways of exposure.

The public is interested in monitoring because it is assumed that monitoring will provide answers about trends – about rates of change in concentration of a particular contaminant, and therefore about implied rates of change in exposure. One of the tests of the success of a Monitoring and Assessment strategy is the capacity in the participating countries to answer such questions about change. The other side of the equation is 'assessment' – what do those changes mean? How well do we understand them? Are we in practice able to

distinguish trends from the background statistical fluctuations which are a feature of all monitoring data? Does monitoring help us to distinguish between anthropogenic and non-anthropogenic sources of the same contaminant or class of contaminants (an important issue in the case of mercury and of dioxins and furans)? These questions lie at the heart of the public interest in monitoring, and the same questions are just as if not more relevant to aboriginal communities, since their hunting economies are often seen as placing them as particular risk to contaminant exposure.

The text, however, of the proposed NARAP is largely silent on these matters. In view of the importance attached to communications in the SMOC initiative, the text would no doubt be strengthened if these issues were addressed explicitly.

We note that all of the target substances are treated on the same basis and no attempt has been made to distinguish between the substances on the basis of their distinctive physical and chemical properties, histories of usage and residual environmental distribution (geographical and in different media) as these factors might bear on the development of monitoring strategies.

There is also a tendency to assume that we already know what we need to know in order to develop and implement the Monitoring and Assessment NARAP. Such an assumption is implicit in many of the statements which refer to 'capacity building' with specific reference to Mexico.

The case for improved science in support of the development of monitoring programmes is not being made. Nor is the reader in a position to appreciate the influence of changing understanding of the biogeochemical behaviour of individual substances on the kinds of question that can be addressed through monitoring.

This problem applies also, and perhaps to an even greater extent, to the references to 'assessment'. The NARAP is obviously not the place for an extended treatment of geochemistry, biochemistry and toxicology. Nevertheless, there are key issues in each of these broad disciplinary fields which have a direct bearing both on monitoring and on our ability to assess the significance of monitoring data for human populations. It is critically important that monitoring not be dissociated from the science on which it is expected to be based.

The expression 'monitoring and assessment' also has broader relevance to the Commission for Environmental Cooperation – beyond the confines of the SMOC initiative. It is probably fair to say there is an expectation that the Monitoring and Assessment initiative will be used to explore other areas of work where there is a need for collaboration between the three countries in the design of monitoring networks and the interpretation of monitoring data.

2. An illustration using the case of mercury

It may be helpful here if we explain in more detail the nature of our concerns by referring to some tangible examples.

It is commonly assumed that North American populations are exposed to methyl mercury as a result of the consumption of fish and sea food (an assumption which itself may have to be reviewed periodically in the light of emerging information on methyl mercury pathways in terrestrial ecosystems). For most individuals, marine fish and sea food are probably the major route of exposure, and in this case exposure

derives from the operation of geochemical cycles in the open ocean. In some societies, mercury in marine mammals is also a significant route of exposure.

However, it is the presence of mercury in freshwater fish which has been particularly important in stimulating public interest in methyl mercury as an environmental contaminant. The issuance of large numbers of fish consumption advisories, both in the U.S.A. and in Canada, has given mercury singular visibility as a contaminant. Sports fishers and their families, and aboriginal communities, are presumed as a result to be at special risk. So also are the members of other ethnic communities who are engaged actively in fishing for domestic consumption.

It has also been widely assumed that there is a more-or-less direct relationship between methyl mercury in freshwater fish populations and anthropogenic releases of mercury in continental North America. The nature of that relationship, however, has proved particularly elusive; the more the reader probes the recent scientific literature, the less evident that relationship becomes.

The problem lies in part in the effective retention by watersheds of both inorganic and methyl mercury. Increasingly, it seems that the accumulation of both methyl and inorganic mercury in vegetation and in soils is very much larger than can be accounted for by recent estimates of atmospheric deposition. Watersheds release mercury on time scales which are long (i.e. decades or centuries) in relation to the horizons contemplated by the Mercury NARAP. What really counts is the rate of release of mercury in its different forms from the watershed.

A number of lines of evidence now point to land use and terrain disturbance as critical factors in the release of both inorganic and methyl mercury to river and lake systems, and perhaps also in the balance between the production and decomposition of methyl mercury. The creation of hydro-electric reservoirs provided a clear indication of the importance of the soil – vegetation environment in the production and biological availability of methyl mercury. In the last decade, especially, it is becoming apparent that many other factors (of which forestry operations are a good example) affect soil water regimes and the fate of soil organic carbon, and in turn drive the release to the aquatic environment of both methyl and inorganic mercury. There are some current North American research initiatives relevant to these themes (notably in the Everglades, Wisconsin and NW Ontario, as well as in recently cleared forest landscapes in Québec), but they are the exceptions rather than the rule.

Where do these features of the geochemical cycle of mercury enter into the concept of the Monitoring and Assessment NARAP? The trouble is that they do not as the NARAP is now written. To some extent, this problem applies as well to the text of the Mercury NARAP, which also reflects pre-occupation with a paradigm based on the emission of mercury to the atmosphere, followed by transport and subsequent deposition to terrestrial or aquatic systems.

Given the level of public interest in mercury in freshwater fish, one might expect, both in Canada and the U.S.A., that monitoring programmes would be in place to detect changes in mercury levels in fish. After all, the emphasis on controlling stack emissions of mercury in, for example, the electric power industry is predicated on the belief that reductions in emissions will be accompanied, eventually, by reductions in mercury levels in freshwater fish.

But there are, to our knowledge, no such monitoring programmes. Moreover, it is not at all clear what form such monitoring programmes should take. Within fish communities (assemblages of fish species), methyl mercury body burdens are the result of a complex interplay between trophic structure, the bio-energetic and dietary determinants of rates of methyl mercury uptake, as well as between the various factors which

influence the supply of methyl mercury and its biological availability. All of these factors can be expected to vary seasonally and from one year to the next as a function of hydrological conditions, climatic factors such as irradiance and evaporation, and the relative reproductive success and growth performance of individual species within the fish community. Somewhat similar problems of interpretation arise with other species, including waterfowl and marine mammals.

The policy response to this complex problem involving the relationship of fish communities to their watersheds may be to focus on the measurement of atmospheric concentrations and of the deposition of mercury from the atmosphere.

However, we have major problems here as well. At the time of writing these comments, there is no consensus on the measurement of dry deposition of mercury, which becomes increasingly important (in a relative sense) in regions with low precipitation. Patterns of wet deposition tend to be event-specific and will vary from one hydrological year to the next – which implies the need for relatively dense spatial and temporal coverage. Elemental mercury in the atmosphere can be and is being routinely measured, but fluctuates rapidly on time scales of a days or even hours, and on spatial scales of a few square kilometers or even less. Daily evasion and re-capture from terrestrial vegetation is a factor here, as well as transfer across the water:air interface where lakes or rivers are present. Significant evasion is apparently also taking place in mineralized regions in arid regions with little soil development. The chemistry of airborne mercury is also elusive, and its chemical characteristics are still, as a result, being operationally defined. Considerable effort is being devoted now to the measurement of reactive gaseous mercury (RGM), and the phenomenon of spring-time formation and deposition of RGM at high latitudes is attracting attention. However, the geographical extent and geochemical significance of these observations are still unclear, and some work already indicates that reduction of the reactive mercury to the elemental form at the snow surface may mean that the mercury promptly returns to the atmospheric pool and is unavailable for further biological transformation. Meanwhile, it now also appears that methyl mercury (originating probably with the evasion of dimethyl mercury in nearshore upwelling regions) may play an important role in the atmospheric chemistry of mercury – and the delivery of organic mercury to both terrestrial and aquatic systems.

When we do think of mercury in wildlife populations, we think of concentrations or of body burdens of mercury. However, there is a growing interest in the search for evidence of toxicity to wildlife, and for biomarkers which might serve as early indicators of biological effects in the environment. Here also the tide is starting to turn. The refined analytical tools now available are now making it possible to look for and identify effects on reproduction and growth in fish, as well as in vulnerable species of bird, such as the loon. The use of such indicators is also part of the ensemble of strategies available in the planning of monitoring programmes.

We could continue to explore these complexities, but the point being made is quite simple and straightforward. The geochemical cycle of mercury is particularly complex and we are still analytically challenged. There are many basic questions we would like to answer, but cannot. When we speak of monitoring, we think of those components of the mercury cycle where we believe we can generate reasonably accurate and reproducible analytical data. We are inevitably selective in what we chose to do. We do not monitor methyl mercury in biota (the primary route of human exposure), and we apparently have not yet figured out how we would conduct such monitoring.

These considerations are very important constraints on the planning and design of monitoring for mercury in the time-frame of the NARAP process.

Now, with respect to assessment, we should consider at least briefly the status of the epidemiological and toxicological data for human populations. The situation is equally daunting. We do not have consensus about the effects on child development of exposure in the upper limit of the range we are likely to see in human communities (e.g. the Seychelles and Faroes settings). We also do not have consensus about the implications of cumulative, life-time exposure in adults. There is also cross-cutting evidence of the beneficial effects for human health of the consumption of fish – evidence which can yield a paradoxical positive relationship between exposure to methyl mercury and indicators of health status.

In Canada, there is no systematic monitoring of methyl mercury exposure in those populations believed to lie at the higher end of the exposure spectrum (some aboriginal communities and recreational fishers and their dependents). We know very little about fish consumption and therefore exposure patterns in either of these settings, although we have good reason to suspect that there are sharp temporal fluctuations in exposure (on time scales of hours or a few days) following the distribution and consumption of individual piscivorous fish such as pike and lake trout. Reference is often made to the traditional hunting economies of aboriginal communities in sub-arctic and arctic Canada, but here again our knowledge about food production and distribution in these societies is limited to the point that patterns of contaminant exposure (in which we could easily include the suite of organochlorines targeted by the NARAP process) are largely unknown. We also do not monitor (using appropriately designed disease registries) the kind of disease profiles that might help us to evaluate the health status of these communities in relation to contaminant exposure.

The credibility of the NARAP process, we suggest, will depend on the extent to which these problems are acknowledged and efforts are made to address them in the context of the implementation of the NARAP.

3. A further illustration – using dioxins and furans

Dioxins and furans can also be used to illustrate many of the problems described above. The formation of dioxins and furans (and of certain co-planar PCB's) can in many instances be traced to the combustion of organic compounds, particularly in poorly-controlled combustion environments. Existing national inventories tend to focus on stack-based emissions where there is reasonably tight control of the immediate post-combustion environment (and where sampling and measurement is relatively straightforward).

Increasingly, it is becoming apparent both in the United States and in Canada that there exists a variety of diffuse sources of release of dioxins and furans which are not considered in existing inventories and for which it is not clear how to derive even approximate emission factors for the purposes of inventory building.

As an example, fire is widely used as a convenient tool in the management and disposal of municipal and household waste in a multitude of rural and remote settlements and households. We now have, thanks to investigations of barrel-burning by the U.S. EPA, strong evidence that such burning practices could involve emissions on the same scale as (or larger than) well-run incinerators serving large urban populations. On a population-equivalent basis, environmental releases may turn out to be dominated by the five or ten percent of the population living in rural or remote settings where fire is often seen as a beneficial and even indispensable element in waste disposal practices.

At the same time, the boreal forest regions of the Canadian Shield are subject to recurrent fires – fire is an integral feature of the ecosystems themselves. Burning on a scale of thousands to tens of thousands of square kilometers takes place each year, and varies markedly between years and between geographical regions. Natural fires of this nature are probably also significant generators of dioxins and furans, but on a

scale which is so far unquantified (and which will be very difficult to quantify). Fire is also widely employed in agriculture to clear stubble and regenerate soil nutrients. Limited work in the U.S. using lake sediments reveals a significant background of the higher chlorine-number dioxins and furans which are presumably related to fire – both anthropogenic and natural, presumably. What is the situation in Canada? Are soils and lake sediments significant repositories of dioxins and furans, as they are for mercury? Are natural fires or the burning of stubble significant factors in human exposure to dioxins and furans? The simple answer is that we do not know. We also do not know much about the spatial and temporal scales involved in the transport and deposition of dioxins and furans after such combustion events (whether natural or man-made).

The data base available for the evaluation of human exposure to these compounds in Canada is very limited (it is stronger in the U.S.A), and really does not enable us to identify and evaluate populations which might be considered as being at special risk. There is a comparable shortage of information on exposure levels in the wildlife resources (fish and terrestrial game) used in local food production systems in sub-arctic and arctic Canada. From a statistical perspective, we are simply not in a position, therefore, to link emissions to human exposure.

Again, the point we are making here is that we should be in a position to acknowledge, explicitly, the limitations of current science as this relates to the problem of designing appropriate monitoring strategies. Science and monitoring are, in this context, intimately linked and an evolving understanding of emission processes, sources and of transport mechanisms should inform decisions about monitoring strategies. It is the state of the science which determines the kind of questions we can and cannot address with a given monitoring strategy.

4. Recommendations

With respect to the text of the proposed NARAP, we submit the following recommendations:

A) The technical background to the Monitoring & Assessment NARAP

It is recommended that an appendix be included on the theme of 'Characteristics of NARAP-targeted substances relevant to the Monitoring and Assessment Initiative'. Such an appendix could be used to provide, in the space of a few paragraphs for each substance, a brief guide to the reader outlining for each substance information which is needed in order to put the Monitoring and Assessment NARAP into perspective. These few paragraphs might include: (a) a brief commentary on physical and chemical properties relevant to stability, transport and bio-accumulation; (b) a brief history of usage, identifying geographical areas of particular concern where appropriate; (c) a note on existing monitoring/exposure assessment initiatives; (d) identification of any key uncertainties relevant to the implementation of the NARAP. Obviously it is difficult to do justice in a few paragraphs or pages to the complex behaviour of an element such as mercury, but some effort to provide relevant scientific/technical background appears warranted in order to make sure that the context of the NARAP is clear.

B) Need for action item on 'scientific issues relevant to monitoring'

The NARAP list of action items would be significantly strengthened if there were added an acknowledgement of the need for periodic review of scientific issues relevant to the design of monitoring programmes for individual NARAP-targeted substances, as well as emerging knowledge which would influence the design of programmes and/or the interpretation of monitoring data. The development and application of appropriate biostatistical concepts is relevant here. The distinction between science in support of monitoring and the

science of monitoring is important. It should be made clear that the reference is intended to deal with monitoring issues for biota and human populations, as well as environmental media such as air, water and soil/sediments. A possible approach is to advocate a periodic science review, under the SMOC aegis, with the production of a report and some external stakeholder involvement.

C) The case for a separate action item on mercury in North America

The unusually complex geochemical behaviour of mercury, and the persistent uncertainties surrounding the toxicology of mercury, justify special attention to this element. We believe a convincing argument can be made for a distinct action item, the objective of which would be to review scientific issues relevant to monitoring and assessment. Such an occasion would provide an opportunity to examine more closely (for example) the problems of establishing and maintaining monitoring programmes for fish in freshwater ecosystems (as well as the issues involved in interpreting monitoring data). This would also provide an opportunity to review the evolving science of measurement of different species of mercury in air and water, and of deriving fluxes between environmental compartments. Such an exchange should take place early rather than late in the implementation of the NARAP, because of the implications for establishing or strengthening monitoring programmes in this area. We do not believe that this issue is addressed in the Mercury NARAP, and the other reference to an action item in the Monitoring and Assessment NARAP deals uniquely with Mexico. In other words, capacity building, in the case of mercury, is an issue for all three countries.

D) Working with potentially exposed populations

Successful implementation of the Monitoring and Assessment NARAP requires improved data sets for the exposure of potentially vulnerable human populations. This definition should include aboriginal communities as well as recreational fishers and their dependents, and ethnic groups with close involvement in local food fisheries. The NARAP would benefit not only from improved data on patterns of exposure in different groups (age, sex), but from additional information on food production economies – particularly although not exclusively in the case of aboriginal communities. Successful implementation requires a close working relationship with communities, and a willingness to distinguish carefully between monitoring and surveillance – the latter having overtones of intervention. Considerable careful preparatory work would be needed. Such an opening might also provide an opportunity to examine more closely the possibility of establishing one or more disease registries relevant to the NARAP objectives. An Action Item might therefore be developed around the specific theme of developing monitoring strategies for human populations. It would appear that such a community focus is fully consistent with the objectives of the parties in setting up the SMOC initiative.

E) Going beyond the NARAP – targeted substances

The Monitoring and Assessment NARAP initiative has so far been focused on the other chemicals which are or which probably will be subject to NARAP's. This is obviously a rather select group of substances. There are many other pressing issues in the development of monitoring strategies which should not be lost from view. Examples can be drawn from the investigation of trends in biodiversity, and measures of the integrity or sustainability of forest and aquatic ecosystems (different aspects of community structure). It is important, we suggest, to keep open the opportunities for a broader range of exchanges between Canada, Mexico and the United States on other aspects of the monitoring of environmental change. Perhaps the proposed Standing Committee should also be charged with the responsibility for periodically reviewing other monitoring issues which might benefit tangibly from the kind of international co-operation envisaged by the NARAP process.

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We subscribe to the other action items identified in the proposed NARAP, although we have concerns about the level of generality. In particular, we support the idea of a Standing Committee which is open to stakeholder participation and input, and which will periodically report on progress in implementing the NARAP. The concept of integrated indicator sites raises the problems of monitoring and assessment in biota and in human populations, and appears to rely on the assumption that a common approach can be used for the NARAP-targeted substances as a group. If this is indeed the case, the NARAP should be drafted in such a way that it supplies scientific support for such an approach, as well as relevant information on existing monitoring initiatives in the three countries. However, as explained above, the distinctive character of the NARAP-targeted contaminants strongly suggests the need for an adaptive approach, one which takes into account their distinct characteristics and histories and is open to the integration of new scientific findings.

Carlos Santos Burgoa
Director General
Direccion General de Salud Ambiental, SSA
Avenida Mariano Escobedo 366, 3er piso
Col. Nueva Anzures, México, D.F. 11590

OBSERVATIONS ON THE DOCUMENT "NORTH AMERICAN REGIONAL ACTION PLAN ON ENVIRONMENTAL MONITORING AND ASSESSMENT"

Following are some general and specific observations that I think are fundamental to be considered in the proposed regional action plan:

Observation	Comment
General	Highlight the importance, for a country like Mexico, of generating valid and publicly available information in such a way that it may be used both for risk analysis and also to define risk management policies and communications with decision makers and social groups. (This is more important than as mentioned at the beginning of the second paragraph of page 1.)
General	As regards the substances for which information is intended to be generated, as stated in the objectives, it should provide more perspective, that is, with a goal and a direction, and not concentrating only on the persistent substances for which the three countries may already be accountable, but also on substances that cause "persistent damage" and those whose potential inclusion in trilateral work will have to be analyzed in the future.
General	Support for SMOC in the definition of "common problems" requiring solution, through the measurement of substances in the environment, should also be an objective. Specific objective no. 4 should be divided into three subsections, as follows: a) environmental concentrations; b) population exposure routes; and c) existing health risks, either by observational studies or through international literature, accepting the inclusion of heavy metals and other

	metals and substances that may be of interest. Objective no. 5 should be rephrased as a North American regional biomonitoring study of newborns under one year of age and children under five years of age.
Specific	I suggest that action item 3 be expanded into a list of substances causing persistent damage.
General	The inclusion not only of substances but also of the potential health impact thereof is well taken. Given the possibility that this will lead us to one of two routes, either doing environmental epidemiology studies or performing a brief population risk analysis based essentially on documentary information and creating potential study initiatives, I recommend that this second possibility be systematically included.
Specific	With regard to items 7, 8, 9 and 10, I think it is important to make sure that there is agreement as to the substances, studies and publications.
Specific	As for item 11, it would be convenient to determine the criteria for designating integrated index sites.
General	It is noteworthy that six integrated index sites are designated for Canada, three for Mexico and nine for the United States. I believe that Mexico's population size and diversity, area and orography, and unique biodiversity may warrant a greater effort for the country.
Specific	On action item 13, I support the idea of having reference data sets. I suggest that we divide them into two major groups: one for health and environment risk evaluations available to governmental organizations in the three countries and the specialized United Nations organizations, and the other for reference data to update the risk evaluations, especially those more than five years old.
General	With regard to action item 14, the lack of a strategy and capacity building concerns me. Of the five factors to justify international cooperation, two stand out: the joint handling of common problems that we cannot face alone, and capacity building in such a way so as to allow for even progress in joint work. I believe that, given the diversity of agendas, emissions sources, environmental and human health impacts, methodologies and influence over risk management, we can be ambitious with this regional action program and propose an aggressive strategy for human resource development and technical capacity building that may lead to decision-making from high levels of government, to generate joint support. Therefore, while it is interesting to have the workshops mentioned and would not overlook them, I do insist that capacity building be ensured at least through the exchange of staff, residents and interns, while also encouraging physical building opportunities.
General	A major aspect that is lacking is the use of information for the communication of risks, to targeted groups and to the population in general to see how observers, researchers, interest groups and publications in general will access this information and how it will be promoted.

Glenn Wiser
Staff Attorney
CIEL

Thank you for the opportunity to comment on the draft North American Regional Action Plan on Environmental Monitoring and Assessment (hereinafter Draft), dated January 28, 2002, which the CEC released on March 25, 2002. The Center for International Environmental Law (CIEL) is a non-profit organization based in Washington, D.C. that promotes sustainable and equitable development and environmental protection through the development and implementation of international law. CIEL is also a Participating Organization of the International POPs Elimination Network (IPEN), a worldwide network of more than 300 non-governmental organizations committed to the elimination of POPs and other persistent toxic substances. CIEL is submitting these comments to you on our own behalf. They do not necessarily represent the views of other IPEN Participating Organizations.

The purpose of our comments is to suggest that the Draft as it is currently written does not adequately reflect the principles of public participation in environmental decision-making expressed in Principle 10 of the 1992 Rio Declaration, Chapter 23 of Agenda 21, and Directive (h) of Council Resolution 95-05 on the Sound Management of Chemicals. While the Draft concludes by acknowledging that, "[u]ltimately, the success of this unique North American Regional Action Plan will depend on developing and maintaining strong public support" (Draft at 14), the operative sections of the Draft, including Objectives, Definitions, and Actions, contain very little language to ensure that this critical element will be implemented. Similarly, while the Draft claims that it has "broad support among its many stakeholders," and "also has support amongst members of the general public" (Draft at 13), there is presently little in the balance of the text to substantiate these conclusions.

We believe it is the CEC's intent to foster a fully transparent and inclusive NARAP for Environmental Monitoring and Assessment of toxic chemicals. Yet we are reluctant to assume that public participation practices under the NARAP will be adequate if they have not been clearly articulated in the Draft Plan. Accordingly, we offer you the following specific textual recommendations to the Draft that we believe will help address that shortcoming.

Recommendations

(Please note: Our recommendations for textual insertions are indicated in **bold**.)

Page iii (Preface).

Revise paragraph 2 as follows:

> The NARAPs are also intended to help facilitate the meaningful participation of the public, including **public interest and other** nongovernmental organizations; business and industry; native North Americans; provincial, state and municipal governments; academia; and technical and policy experts, in accordance with the spirit of cooperation reflected in the NAAEC and in Council Resolution 95-05 on the Sound Management of Chemicals. Regular ~~public reporting of~~ **consultation with, and reporting to, the**

public on the progress that has occurred with respect to each Action Plan will be important to its eventual success.

Page 3 (General Objectives).

Insert after paragraph 8:

9. To enhance public awareness of, and support for, the activities conducted under this NARAP, and to facilitate the meaningful participation of the public in those activities, through the timely provision of information and access to NARAP decision-making processes.

Page 6 (Definitions: Capacity Building).

Revise last sentence of paragraph as follows:

This may include any process leading to the enhancement or strengthening of a knowledge or skill base through the transfer, reciprocation or exchange of information between organizations **and/**or Parties.

Page 7 (Definitions).

After definition of "Satellite Sites," insert a new definition, "Stakeholders," as follows:

Stakeholders. Those individuals and groups in the public and private sectors who are interested in and/or affected by activities and decisions taken under this NARAP. Stakeholders may include, but are not necessarily limited to, representatives of environmental, health, and other public interest non-governmental organizations; indigenous peoples and local communities; business and industry; academia; and provincial, state, and municipal governments. For the purposes of this NARAP, input from stakeholders should be sought in an open, fair, and accessible process to ensure timely consideration of a broad range of interests.

Pages 8-13 (Action items 2-14).

Revise the first paragraph of each action item by inserting at the beginning of the paragraph:

Working with stakeholders,

Page 13 (Action item 14).

Revise first paragraph, penultimate sentence, as follows:

This may include any process leading to the enhancement or strengthening of a knowledge or skill base through the transfer, reciprocation or exchange of information between organizations **and/**or Parties.

Revise first bulleted paragraph, second sentence, as follows:

The attendees shall include experts and officials involved in the monitoring and assessment of persistent toxic substances, international funding agencies, foundations involved in funding environmental initiatives, spokespersons from universities currently involved in binational and/or trinational cooperative programs, spokespersons from University granting agencies, **spokespersons from environmental,**

health, and other public interest organizations, spokespersons for indigenous peoples and other local communities, and spokespersons from industries and industrial associations with an interest in promoting capacity building related to this NARAP;

Hague Vaughan
Environment Canada

Some suggested text below as per our call. Thought was to include something like this between paragraphs 4 and 5 of the preamble.

While the focus of the NARAP is on the coordinated collection of comparable representative data on target chemical pathways and fates, the Working Group also recognizes that additional aspects require development and integration. Such aspects include:
* Standardization of data and metadata systems to ensure effective coordination, inquiry and access;
* Supplementary monitoring of biota and ecosystem changes to provide timely information on cumulative effects and on the presence of significant non-target contaminants;
* Coordinated communications and development of products which better inform and encourage sound decision-making.

Karen G. Wristen
Executive Director
Canadian Arctic Resources Committee
200-7 Hinton Ave. North
Ottawa, Ontario
K1Y 4P1

Thank you for this opportunity to comment on the North American Regional Action Plan on Environmental Monitoring and Assessment. The Canadian Arctic Resources Committee (CARC) is a non-governmental, not for profit committee dedicated to shape the future of Canada's Arctic through research, publication and advocacy. CARC believes this in an important initiative in the ongoing work towards understanding and monitoring the fate, transport and effect of persistent organic pollutants and heavy metals in the North American environment. CARC would like to take an active role in undertaking this initiative.

CARC was instrumental in achieving a Global Convention on Persistent Organic Pollutants, "The Stockholm Convention". CARC focused the need for a global treaty on persistent organic pollutants to bring attention and action to the health and environmental problems of Arctic contamination. Over the last four years CARC has worked closely with aboriginal organizations, particularity Inuit in strengthening the global need for immediate action on POPs.

CARC also participated in the United Nations Environment Program Global Mercury Assessment. Over the last decade the Arctic region has been the focus of significant monitoring and assessment of POPs, radionuclides and heavy metals. It is clear from the Arctic experience that both monitoring, research and advocacy benefit from a regional approach.

CARC applauds the importance that CEC, SMOC has placed on environmental monitoring and assessment and commends the efforts towards capacity building. CARC would urge the CEC SMOC to engage northern aboriginal organizations in these efforts as they bring to the table a wealth of technical and political experience. As such CARC recommends that the preamble specifically state that aboriginal representation will be sought on the Standing Committee and be involved in the preparation and implementation of the work plan.

We applaud the inclusion of vulnerable populations, as the CEC has always been a leader in children's health. But in the Arctic it is not just seniors, infants, and pregnant women who are at risk although, as elsewhere, they assume a disproportionate level of risk. As a result of long-range transport of POPs to the Arctic and bioaccumulation in the food web, followed by hunting and eating of marine mammals, virtually the whole Inuit population is at risk and should be recognized and referenced as such. Such reference is supported by the conclusion of the Northern Contaminants Program. CARC recommends that Action item 7 include aboriginal populations.

CARC agrees with the many general objectives. CARC recommends that it be clearly articulated that the production of the authoritative assessments of POPs be prepared to inform additional substance applications to the Stockholm POPs Convention (Action Item 6).

The specific objectives #3-7 would be improved by including existing information in the Arctic, particularity action item 5: Synoptic baseline survey of persistent toxic substances in Mexico. This would provide an interesting south - north comparison. Much of this northern information is readily available and easily collated. The specific objective # 4 "To prepare an assessment of the levels of POPs…risk…", would benefit by incorporating a section on the relationship between environmental change, particularly climate change and contaminants. New evidence is emerging that describes the relationship between POPs deposition and exposure rates and climate change. This information would be important in an overall assessment and monitoring program. CARC would recommend that Action item 9: Mercury pilot study is expanded to include the Arctic, again for the reasons articulated above. Further, a regional assessment of the linkages between environment and health would resonate well globally.

CARC looks forward to participating in this important initiative and to the valuable information and direction it will provide. Again, thank you for the opportunity to comment.