AMAP contribution to the preparation of a Rio+10 document.

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Arctic Monitoring and Assessment Programme (AMAP)

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AMAP contribution to the preparation of a Rio+10 document

The Arctic Monitoring and Assessment Programme (AMAP) is mandated “to provide reliable and sufficient information on the status of, and threats to, the Arctic environment, and to provide scientific advice on actions to be taken” in order to support Arctic governments in their efforts to take remedial and preventive actions related to contaminants.

In 1997, AMAP produced its first State of the Arctic Environment Report (SOAER), which was considered by Ministers at the Third AEPS Ministerial Conference in Alta, Norway. Further update information on Pollution Issues of Concern was reported by AMAP to the Second Arctic Council Ministerial Meeting in Barrow, 2000. Some of the main findings that have been reported by AMAP, and the associated Ministerial response to these findings, are summarised below.

A new SOAER is currently being prepared by AMAP and will be delivered to the Arctic Council Ministers at their meeting in October 2002. New information that is appearing in the current AMAP assessments, and which will be highlighted in the AMAP 2002 SOAER, is also mentioned below.

A number of Persistent Organic Pollutants (POPs) are associated with significant concern regarding environmental and health effects. AMAP has clearly documented that these compounds are to be found in all compartments of the Arctic environment and its ecosystems. Some of these substances (such as the insecticide DDT, and the industrial chemical PCB) have been utilized in relatively small quantities in the Arctic. However, the main releases of these chemicals, and other chemicals that have no historical usage within the Arctic, have taken place – and in some cases continue to take place – in areas far removed from the Arctic. AMAP has described the unique pathways and processes that lead firstly to transport (by air and ocean currents, and rivers and ice), and thereafter to accumulation of many POPs in the cold Arctic region. It has further described how the processes of bioaccumulation and biomagnification lead to uptake and accumulation of these contaminants in Arctic biota, ultimately leading to elevated levels, in particular in top predators, which can be associated with risks for adverse health effects. Human inhabitants of the Arctic also occupy a position at the top of the Arctic food-chains. In particular, certain indigenous populations, due to their heavy reliance on subsistence foods that also form an important part of their cultural and spiritual well-being, receive high intakes of POPs through their traditional diets. For POPs this is especially the case for indigenous groups that have a high consumption of marine mammals. As a result of these exposures, indigenous groups have been identified with some of the highest recorded blood and/or breast milk levels of POPs of any people on the planet. Intakes can exceed limits established by WHO, and levels are such as to be of concern for the health of the individuals and their offspring. The potential effects of exposure to environmental contaminants on the newborn and on young children are of special concern. For many indigenous people, their traditional diets are both a source of vital nutritional benefits and an important part of their cultural integrity. Even were alternative foods available, a change in diets could be seriously detrimental to their lifestyle and well-being.
Unlike most POPs, heavy metals have both natural and anthropogenic sources. A number of significant sources of metals are located within or close to the Arctic – notably the smelters on the Kola Peninsula and at Norilsk in Russia. However, AMAP has also described the deposition of metals in the Arctic that occurs following long-range transport from the industrialized source areas of North America, Europe and Asia. With respect to metals, particular attention is being paid to mercury, lead and cadmium.

At each Arctic Ministerial meeting since 1997, Ministers have re-affirmed their agreement ‘to work vigorously for the early ratification and implementation of the Protocols on the elimination or reduction of discharges, emissions and losses of Persistent Organic Pollutants (POPs) and Heavy Metals under the framework of the United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution.’ and to ‘encourage other states to do the same, with the aim to bring the Protocols into force as early as possible’.

They also stongly welcomed ‘the establishment of an Intergovernmental Negotiating Committee under the auspices of United Nations Environment Programme to work towards the conclusion of a global agreement on POPs by the year 2000,’ and encouraged ‘the Arctic States to act together to assist the early conclusion of such a global agreement.’ (Iqaluit Declaration, 1998).

AMAP is, therefore, extremely appreciative of the way its results have been brought forward to UN ECE and UNEP and effectively utilized by these organizations in their efforts – as embodied in the UN ECE Aarhus Protocols on POPs and Heavy Metals, and the Stockholm Agreement on POPs – to strengthen measures that will reduce the contamimation of the Arctic by long-range transported POPs and heavy metals.

So far, the AMAP assessments have concentrated on the group of relatively well-known ‘problem POPs’ (PCBs, DDTs, HCHs, etc.), many of which are already subject to bans and other control measures. However, new organic chemicals are entering the market at a rate of more than 1000 per year, and several of these ‘new POPs’ have already found their way to the Arctic. They include substances such as brominated flame retardants – with characteristics similar to PCBs – and current use pesticides. The AMAP 2002 assessments will describe first results concerning the presence of some of these ‘new POPs’ in the Arctic. It will also highlight new information on biological effects of POPs, as revealed by studies on polar bears and seabirds.

Investigations of biomarkers for human exposure to contaminants are also included in the human health monitoring work conducted under AMAP. The AMAP blood survey of Arctic populations initiated under AMAP phase 1 has now been expanded into a truly circumpolar study, in combination with detailed dietary studies. Initial results concerning all of these aspects of the human health studies will be reported in the AMAP 2002 assessment reports.

Mercury will also receive special attention in the next AMAP assessment. Unlike other metals such as lead, which is transported largely on particulates and where emission controls in the northern hemisphere appear to be reflected by decreasing levels in the Arctic environment, mercury is a semi-volatile chemical. Its environmental behaviour therefore is similar to that of some POPs, and consequently mercury can be transported to the Arctic from source areas far removed from the Arctic. Increasing emissions of mercury in certain parts of Asia are offsetting reductions in emissions achieved in Europe and North America. In its 2000 report to Ministers, AMAP briefly described new findings concerning processes and mechanisms that appear to greatly enhance mercury deposition in the Arctic (polar sunrise mercury depletion event phenomena). The Arctic may constitute a sink for part of the
mercury that is released into the global pool of atmospheric mercury. This preliminary information will be expanded on considerably in the 2002 AMAP assessment, to reflect results coming out of recent monitoring and research. The 2002 assessment will also provide more comprehensive and reliable information on (recent and historical) trends in mercury accumulation in different compartments of the Arctic environment.

In their 1997 Alta Declaration, Ministers agreed to ‘draw the attention of the global community to the content of the AMAP reports in all relevant international fora . . . and . . . make a determined effort to secure support for international action which will reduce Arctic contamination.’ Consequently, on the basis of information reported by AMAP in 2000, Ministers called upon UNEP to initiate a global assessment of mercury that could form the basis for appropriate international action.

At the 21st session of UNEP’s Governing Council, in February 2001, agreement was reached to undertake a global study on the health and environmental impacts of mercury, and to compile and summarize information about prevention and control technologies and practices, and their associated costs and effectiveness.

Once again, AMAP is pleased to see that its messages are being effectively communicated to the relevant bodies, and look forward to being able to provide a much more complete report on issues such as ‘new POPs’ and mercury in their next assessment report to Ministers in fall 2002.

AMAPs radioactivity assessments have identified 3 major historical sources of radioactive contamination that have, and continue to, expose Arctic ecosystems and human populations to radioactivity. The are fallout from atmospheric nuclear weapons testing (conducted between 1950-1980), routine releases from western European reprocessing facilities (most significantly from Sellafield), and the 1986 Chernobyl accident. Bomb fallout is estimated to have contributed to an additional 750 cases of fatal cancer in the Arctic.

Human exposure to radioactivity in the Arctic can occur due to both natural and anthropogenic sources of radioactivity. Consumption of, e.g., caribou/reindeer meat or seal that have gathered naturally-occurring radioactive polonium can lead to elevated doses for some Arctic population groups. The Arctic terrestrial system is more vulnerable to man-made radioactive contamination than temperate areas. The exposure of people in the Arctic and sub-arctic is, for the general population, about five times higher than that expected in a temperate area. However, for part of the population the exposure could be more than 100 times higher than expected for similar fallout in temperate areas.

Other sources of radioactivity located in the Arctic include dumped nuclear waste; civilian and military nuclear installations, facilities and vessels; accidents; nuclear weapons tests and past explosions of nuclear devices for ‘peaceful’ purposes (e.g., civil engineering projects). So far, these sources are responsible for only local radioactive contamination. However, AMAP has clearly identified that major risks of radiological exposures are associated with potential accidents at nuclear power plants, during the handling, transport and storage of nuclear weapons, during the maintenance and decommissioning of nuclear-powered vessels and the handling, storage and disposal of spent nuclear fuel. Given these concerns over nuclear operations in, and close to the Arctic, and the greater vulnerability of Arctic populations due to their dependence on traditional foods, nuclear safety is a key focus of the work of AMAP.

In addition, there are concerns about the potential for the transport of radionuclides into the Arctic following releases from nuclear installations. Recent increased discharges of
Technetium from Sellafield in 1994-1995 have already been detected in increased activity levels in biota and seawater in Norwegian coastal environments by 1997.

Ministers have consequently ‘called for full implementation of the International Atomic Energy Agency (IAEA) Convention on Nuclear Safety; the rapid finalisation of the IAEA Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the application of the current IMO Irradiated Nuclear Fuel Code’ and ‘recognized the importance of the on-going co-operation to provide for the early completion of the facilities needed for the implementation of the ban on dumping of radioactive waste at sea adopted by the London Convention of 1972.’ (Alta Declaration, 1997). Ministers also support ‘initiate action to prevent further increase in activity levels of anthropogenically-derived radionuclides, irrespective of sources, and to reduce such levels, in order to keep the contamination as low as reasonably achievable’. Finally, they have declared their intention to ‘encourage actions to reduce the risks of releases of radioactivity to the Arctic, and further encourage non-Arctic States to continue with their plans for substantially reducing releases of radioactivity from reprocessing facilities.’ (Barrow Declaration, 2000).

Within the Arctic regional context, Ministers have committed ‘to take [the AMAP] findings and recommendations into consideration in [their] policies and programmes.’ and ‘to increase . . . efforts to limit and reduce emissions of contaminants into the environment and to promote international co-operation in order to address the serious pollution risks reported by AMAP’. They have also accepted to ‘fully support regional cooperation to facilitate the delivery of the measures that are needed to meet the obligations of …Protocols.’ (Iqaluit Declaration, 1998), and agreed to ‘promote legislation required for the protection of the Arctic environment’.

Conclusions and Recommendations from AMAP’s assessments have therefore been taken up in a number of projects currently run under the Arctic Council Action Plan (ACAP). Attention under ACAP is being focused on a number of specific issues including:

- The significant local sources of metals (and acidifying substances), including Norilsk and the Kola smelters, that have led to significant environmental damage in areas up to a few hundred kilometers from the sources.
- Phase-out of PCB Use, and Management of PCB-contaminated Wastes in the Russian Federation
- Dioxins & Furans.
- Reduction of atmospheric emissions of mercury.
- Obsolete Pesticides.

AMAP information on sources of pollution has also been used in the development of the Arctic Regional Plan of Action for Protection of the Marine Environment from Land-based Sources of Pollution.

Radioactivity is being given special attention in the Arctic regional context. The large number of radioactive sources that are located within and close to the Arctic now pose the major potential threat for future radioactive contamination of the Arctic. The 2002 AMAP assessment will address risk management issues and extend the work on doses to humans presented in the previous assessment to include more focus on effects of radioactivity on the Arctic environment and its ecosystems.

Concerning regional radioactivity issues, Ministers have recognized that ‘effective domestic environmental legislation is a prerequisite to the protection of the environment’.
Consequently, they have agreed that ‘their respective Governments within their jurisdiction will:

- ‘support regional cooperation between two or more Arctic States, as well as multilateral efforts, to enhance nuclear reactor safety and to increase and promote the safe management, storage and disposal of spent nuclear fuel and radioactive waste.’

- ‘ensure that nuclear installations that may affect the Arctic meet international nuclear and radiological safety standards established by the International Atomic Energy Agency (IAEA),’

- ‘ensure that no disposal of radioactive waste or material will be made in Arctic waters in violation of provisions of the London Convention (1972)’

- ‘initiate clean-up programs for contaminated areas, as appropriate.’

The final aspect that AMAP hope to highlight in its 2002 assessments are ‘scenarios’, specifically through consideration of plausible future developments in releases of contaminants (e.g., following implementation of measures agreed under UN ECE and UNEP, etc.) and the development of these into projections of possible future temporal trends.

In the 1998 AMAP Assessment report it was concluded that the climate of the Arctic affects both the inhabitants of the Arctic and the global climate system. Anthropogenically-driven climate change is likely to be most severe in the Arctic because of strong feedback mechanisms. Since then the Arctic Council has initiated the Arctic Climate Impact Assessment (ACIA) that will provide an extensive contribution to the global assessment of potential effects due to changes in climate and UV. A more detailed input to the Rio+10 report regarding climate change and the Arctic can be made by the ACIA.