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International Cooperation to Reduce and Eliminate Obsolete Persistent Organic Pollutants in Russia

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1. Background on Arctic Council Action Plan Program

Studies by the Arctic Monitoring and Assessment Program (AMAP) have demonstrated striking increases in levels of certain contaminants in the environment (AMAP 2002). Of particular concern is a class of pollutants that persist in the environment and have been transported far from the industrial and agricultural areas where they were released. Referred to as persistent organic pollutants (POPs), these include certain halogenated hydrocarbons found in obsolete pesticides and polychlorinated biphenyls (PCBs), which have been linked to adverse health effects.

In response, a high-level eight-nation intergovernmental Arctic Council was established in 1996 to address sustainable development and environmental protection issues in the Arctic. Its members are Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States. All are signatories to the Stockholm Convention on POPs elimination, which was ratified in May 2004, and are committed to implement actions to reduce levels of POPs in the environment. These actions include banning the production and use of selected pesticides; banning the production and new use of PCBs; reducing certain byproducts of combustion, including dioxins and furans; and requiring use of best available technologies to control new sources of POPs. While the Stockholm Convention covers twelve priority POPs, a science-based process was also put in place to consider whether other chemicals should be added. An additional crucial agreement was to establish a flexible framework to provide technical and financial mechanisms to help both developed and developing countries implement these commitments.

Consistent with commitments discussed as the Stockholm Convention was being developed in 2000, senior ministers of the Arctic Council established an intensified Arctic Council Action Plan to Eliminate Pollution of the Arctic (ACAP). The prin-

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ciple goal is to be a mechanism for practical solutions to real problems of POPs and heavy metal contamination through multilateral cooperative actions that implement international agreements. The U.S. Environmental Protection Agency (EPA), Office of International Affairs, is an active partner in such international efforts to address these environmental concerns.

2. ACAP Projects

Six major ACAP projects are summarized below, four of which focus specifically on Russia, a main source of key pollutants in the Arctic. These are: (1) reduce/eliminate dioxin and furan emissions in regions of Russia that impact the Arctic; (2) manage obsolete pesticide stockpiles in areas of Russia impacting the Arctic; (3) phase out PCB uses, and manage or eliminate PCB-contaminated wastes in Russia; (4) promote cleaner production, pollution prevention, and waste minimization for key Russian industries; (5) reduce atmospheric mercury releases from Arctic states; and (6) reduce release of brominated flame retardants to the Arctic.

2.1 Eliminating or reducing dioxin and furan emissions

The initial focus of this project was to harmonize Russian measurement techniques with those of the international community, including QA/QC, and quantify emission factors for key industries. The current activities will establish, by 2006, a Cleaner Production Program that will focus on reducing emissions of dioxins and furans at three pulp and paper industrial facilities in the Arctic region of Arkhangelsk in Russian. One facility will be selected to conduct two prototype technical demonstration projects that are expected to have rapid cost recovery (1.5-2 years). The demonstration projects will then be replicated at other pulp and paper facilities impacting the Arctic.

2.2 Reducing atmospheric mercury releases and transport

The first phase of this project was to develop an assessment of mercury releases to the Arctic including a specific assessment for Russia. A draft report suggested that:

- The largest atmospheric mercury releases are combustion of carbon fuels (mainly coal), metal extraction and processing, and waste treatment (particularly municipal waste incineration).
- The highest total mercury emissions are from the U.S., followed by the Russian Federation.
- A significant source of mercury release in Russia is from gold extraction.

The second phase of this project will focus on selecting pilot demonstration projects at prioritized sites. The source categories under consideration include coal power plants, zinc extraction and processing, gold extraction, and copper smelting.

2.3 Managing stockpiles of obsolete and prohibited pesticides

Ten of the twelve priority pollutants identified by the Stockholm Convention are herbicides or insecticides. As a legacy of past practices on Russian collective farms and forests, an estimated 25,000-30,000 tonnes of obsolete pesticides are stored in environmentally unsafe conditions throughout Russia. These pesticides can move long distances, including through rivers flowing mainly northward through Russia, and because of their persistence they pose a threat as far north as the Arctic Seas.
Phase 1 activities include: (1) develop a comprehensive inventory for obsolete pesticides in the 11 priority regions impacting the Arctic, (2) complete screening analyses to identify mercury, arsenic and chlorinated compounds in the unidentified stockpiles, (3) repackage the obsolete pesticides, and (4) develop a pilot demonstration to stabilize one "hot-spot" that has released pesticides in a region impacting the Arctic (NEFCO-AMAP-BEAC, 2003).

Phase 2 activities will develop a collection and storage strategy for the obsolete pesticides for the 11 priority regions and demonstrate a temporary safe storage system for the repackaged pesticides prior to destruction. Lessons learned will be transferred to priority regions for further verification of the project "model," and if applicable, a pilot demonstration program will be implemented for the environmentally safe destruction of 100 tonnes of obsolete pesticides in Russia.

Currently a "hot spot" has been identified and a pilot demonstration project completed in the Arkhangelsk Region. As a result of this project, all stocks of obsolete and prohibited pesticides in the Arkhangelsk Region (56 tonnes) have been placed in safe storage and are awaiting destruction. The Arkhangelsk model is being implemented in Murmansk, Komi, Magadan, Tyumen and Kurgan Regions.

2.4 Phasing out PCB uses and managing or eliminating wastes

Under the project to address PCB uses and PCB-contaminated wastes, the ACAP has prioritized the phase-out and management of equipment containing PCBs in Russia. Following development of a PCB inventory and evaluation of treatment options, this project is entering its third phase, which involves demonstrating technologies in Russia to destroy PCB liquids from transformers and PCB-containing capacitors. A Russian (cyclone) technology that can achieve high temperatures and residence times is being developed to destroy free PCB liquids from transformers. Destruction of PCBs in Russian capacitors, where separating PCBs from the container material is not feasible, will be achieved using a U.S. plasma arc thermal de-

struction system. This technology has the potential to accept entire capacitors as feed, with the metal and other inorganic material recovered as slag. Issues under review include siting, infrastructure, changing regulations, and possible application to other wastes in Russia, such as obsolete pesticides. Both projects are under development for demonstration in 2005-2006.

2.5 Promoting cleaner production, pollution prevention, and waste minimization

The overarching goal of this activity is to minimize toxic and hazardous wastes generated by industrial activities in Russia. Objectives are to: (1) implement pilot cleaner production demonstrations, (2) develop a model business plan to facilitate financial arrangements, (3) apply the technology implemented and lessons learned to related industries in other regions, and (4) create enhanced technical capability for Russia to meet its targeted environmental objectives. In implementing this project, attention will be given to an integrated approach for managing key data and information. The first Cleaner Production Program was implemented at the Norilsk Nickel Facility in the Arctic. A total of 224 low-cost environmental technical projects were developed, of which 87 were implemented, reducing 7 million cubic meters of fresh water consumption, 2 million cubic meters of waste discharged, and 14 million kWh of electrical power consumption. The next Cleaner Production Projects will focus on the Arkhangelsk, Murmansk, and Krasnoyarsk Regions.

2.6 Reducing brominated flame retardants

An ACAP project targeting the reduction of brominated flame retardants (BFRs) and their impacts in Arctic regions is currently being formulated. Objectives include:
Reduce or eliminate sources and releases of BFRs of concern to the Arctic environment (e.g., polybrominated diphenyl ethers).

Identify and develop safe waste-handling and recycling practices for BFR containing products.

Identify alternative flame-retardant chemicals and technologies.

This project awaits formal approval by the Arctic Council Ministers in late 2004.

3. Summary

In promoting health and environmental protection, the ACAP program has established and implemented an aggressive program to address reduction and elimination of releases and transboundary transport of POPs. A current emphasis is technical and management assistance to Russia. Sustained ACAP collaboration among the

Arctic nations as well as observer countries and interested international organizations, coupled with integrated data collection and evaluation, are crucial to program success.

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