NERAM IV COLLOQUIUM STATEMENT

International Perspectives on Air Quality: Risk Management Principles for Policy Development

National Institute for Public Health - Cuernavaca, Mexico

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This Statement is the result of discussions held at the 2005 NERAM IV Colloquium *"International Perspectives on Air Quality: Risk Management Principles for Policy Development",* and represents the collective views of 35 delegates including international air quality policy analysts, academics, non-governmental organizations, industry representatives, and decision-makers from Mexico, Canada, the U.S., the United Kingdom, Brazil, Hong Kong and the Netherlands on principles for global air quality management.[1] The objective of the Colloquium was to *"establish principles for air quality management based on the identification of international best practice in air quality policy development and implementation".* This Statement represents the main findings of a breakout group discussion session, presentations of an international panel of speakers from Canada, US, Mexico, and Hong Kong and views of the delegates expressed in plenary discussions. NERAM undertook a transparent process to try to ensure that the Statement would accurately reflect the conference discussions, including documenting the proceedings and inviting delegates' comments on draft versions of the Statement.

The Statement does not necessarily represent the views of the participants' organizations. All comments submitted by delegates on draft versions of the statement and responses to comments are provided in an Appendix.

Best Practice for Global Air Quality Management

Statement Summary

Objectives of Air Quality Management

1 Air quality management policies and strategies should be set to maximize net benefits to society, consistent with maintaining a reasonable degree of fairness.

2 Ongoing systematic efforts to reduce exposures should be taken until further reductions are not justifiable and efficient for cost-benefit reasons and societal support. Hot spots and geographical differences in air quality need to be identified and taken into account in exposure reduction strategies.

Approaches to Global Air Quality Management

3 To achieve national level air quality targets, air quality management activities at the local, regional, and national level need to be integrated in order to achieve maximum effectiveness.

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[1] See last page for list of participants.

4 **A long term strategic international perspective on air quality management, with technical capacity and policy development support, is essential to achieve success at the global level.**

5 **Policy tools and strategies exist to reduce high levels of air pollution and health impacts. Demonstrations of success can be found in various regions of the world. Nevertheless, the problems, particularly in developing countries, are sufficiently formidable that continuing efforts are needed to identify and demonstrate innovative approaches while at the same time solidifying the application of sound decision principles and best practice.**

Decision-making Principles

6 **In locations where air quality is poor and studies to characterize sources and impacts are in their infancy, uncertainties in the science should not delay the implementation of strategies to improve air quality.**

7 **All policy options (emission fees, emissions trading, voluntary programs, mandatory standards, etc.) should be considered, including technological approaches and non-technological community-based behavioral solutions. There is a need for an international database of policy intervention case studies, including policy successes and failures.**

Tools and Capacities for Decision-making

8 **Communication and consultation through an open and transparent multi-stakeholder process are important for establishing trust and support for air quality management decisions.**

9 **Emissions inventories and monitoring networks need to be maintained and expanded as a basis for evaluating air quality on an ongoing basis. Emissions and monitoring data should be made publicly available.**

10 **While improvements in institutional capacity in developing countries are undeniable, further improvements are needed to enhance the institutional capacity to carry out and enforce air quality policy.**

Objectives of Air Quality Management

1 Air quality management policies and strategies should be set to maximize net benefits to society, consistent with maintaining a reasonable degree of fairness.

Air quality management requires a careful balancing of risks, costs, and benefits. To the extent practicable, continuous progress towards cleaner air should be the goal, recognizing that attainment of zero risk is not possible. This requires decision-makers to balance the costs of air quality management against health, environmental and economic benefits. The net benefit framework includes intergenerational and distributional equity considerations and the broader context of social, cultural and political factors. Community equity and environmental justice issues need to be included when developing air quality risk management strategies and assessing their benefits and costs.

Air quality management issues should be prioritized within the context of other local influences on public health. For example, in China, India, and the sub-Saharan Africa, the contribution of indoor air pollution associated with biomass burning for heat and cooking to cancer risk and poor respiratory health needs to be considered. Particularly in developing countries, decisions on allocation of resources for improved urban air quality need to be considered within the context of the burden of disease related to other environmental factors such as unsafe water, poor sanitation, and infectious diseases such as HIV/AIDS.

Co-benefits related to mitigation of climate change are expected to be significant, and need to be considered as part of an overall air quality management strategy.

"In developing countries the biggest risk is due to indoor air pollution from burning biomass and wood stoves."

"On priority setting… air quality problems are not the most important problem. We ought to keep this in mind. Indoor air quality is more important certainly, water quality issues around the world are much more important and if I look at global burden of disease, environmental problems comes in fairly low except for maybe China relative to other problems like HIV, Aids and so on."

"You need to understand the root causes of variation in public health and prioritize reduction efforts based on cost-effectiveness."

2 Ongoing systematic efforts to reduce exposures should be taken until further reductions are not justifiable and efficient for cost-benefit reasons and societal support. Hot spots and geographical differences in air quality need to be identified and taken into account in exposure reduction strategies.

Although recent improvements in air quality have been made in regions such as Mexico and Eastern Europe where air quality is still poor, the costs and time needed to achieve ambitious air quality standards may be deterrents to taking action. Under these circumstances, air quality standards need to be reframed, with attainable shorter term goals set based on practicably achievable targets that balance costs and benefits.

In certain situations, including so called "hot spots", the estimated costs of additional abatement strategies required to achieve incrementally smaller reductions to meet ambient air quality standards may outweigh any related public health benefits. For example, billions of dollars could often be spent on emission abatement without appreciable health gains. For such cases, cost benefit analyses and other policy analysis tools need to be adopted to form the basis of "stopping rules".

Upper and lower bounds on exposures and risks should be considered in setting priorities for action. Limits should be determined through a multi-stakeholder consensus building process. Areas exceeding upper bound limits should be the priority for action. Resources should be provided for air quality management in cases where lack of capacity (financial, expertise, infrastructure i.e. emissions inventory, monitoring) is a barrier. Joint funding of capacity building projects in the People's Republic of China by the Asian Development Bank and U.S. Environmental Protection Agency (EPA) illustrates how developed countries can contribute to air quality management capacity building at the international level. The California Air Resources Board has prepared a guidance document on "Policies and Actions for Environmental Justice"[2] in coordination with local land use and air agencies, community interest groups, environmental justice organizations, academia, and businesses. This may provide a model approach for addressing environmental justice issues, hot spots, and geographical differences, that other jurisdictions might consider.

For pollutants for which there is no apparent threshold level for the induction of adverse health effects, greater overall population health benefits will be achieved by reducing concentrations globally, even where the standards are being

"Each country or region should develop its own cost effectiveness path. We may be thinking too much on a developed world approach."

"For non-threshold pollutants we need to reduce exposure worldwide…to slide down the risk function curve."

"How do you justify cleaning up areas where public health gains are small and costs are high. The pressure of air quality legislation is driving in the direction of inefficiencies."

[2]California Air Resources Board. 2001. Policies and Actions for Environmental Justice. http://www.arb.ca.gov/ch/programs/ej/ejpolicies.pdf.

achieved. The Canada-wide standards (CWS) for PM and ozone provide an example of such a strategy, by including a provision to encourage continued environmental management in areas where the levels set out in the standards have been achieved or are lower than the standard[3]. The notions of *continuous improvement* and *keeping clean areas clean* are enshrined within the CWS to encourage preventative actions to further reduce emissions to the extent practicable, including the use of the best available economically feasible technologies to reduce PM and ozone levels. For example, in British Columbia's Georgia Basin and Washington's Puget Sound transboundary airshed region, efforts to further reduce emissions have largely been driven by public concern about continuing to meet air quality goals and standards on a long term and sustainable basis in the face of population and economic growth.

"Give consideration to the notion of continuous improvement. It sounds logical but we are developing a guidance document to develop plans to continuously improve air quality and keep clean areas clean. This avoids the problems with attainment/ nonattainment. It doesn't eliminate the need for standards but it gives guidance for those areas that have relatively clean air."

Approaches to Global Air Quality Management

3 To achieve national level air quality targets, air quality management activities at the local, regional, and national level need to be integrated in order to achieve maximum effectiveness.

"If we clean up our own act we will have more leverage for international action. I don't see enough connection between global issues and local actions whether its for climate change or air quality."

Risk management should involve various levels of government and should ensure that there is capacity to implement decisions at all levels. Given the contribution and importance that large urban centres have to regional airsheds as well as to national emissions inventories, it is critical that urban areas are integrated into national clean air strategies. In the US, for example, the need for greater powers of authority for regional bodies to address regional airshed issues has been recognized. There needs to be a greater capacity at the national level to identify and promote local opportunities to improve air quality. The growing recognition that the involvement of stakeholders is critical to the development of successful air quality management strategies points to the need for mechanisms to achieve greater intergovernmental and intersectoral co-operation involving government, NGOs, academia, and industry.

"Given the contribution and importance that cities have to regional airsheds, as well as to national emissions inventories, it is critical to have them linked into the policy process. What happens globally will be largely determined by what happens in major cities."

[3] CCME. 2004. Guidance Document for Achievement Determination. Canada-wide Standards for PM and Ozone. http://www.ccme.ca/assets/pdf/gdad_eng_oct4.pdf

4 A long term strategic international perspective on air quality management, with technical capacity and policy development support, is essential to achieve success at the global level.

Air quality policymakers have recognized that global air quality management requires a hemispheric approach focusing on achieving air quality improvements in common airsheds. This requires mechanisms for bringing international decision-makers together to develop global strategies for emission reductions through an international process. WHO has led this process in Europe through the development of air quality guidelines. The UN ECE Convention on Long-Range Transboundary Air Pollution (LRTAP) is an example of an effective, region-wide international approach. International forums for air quality management should work towards ensuring technical and institutional capacity for emission reduction and achieving harmonization of hazard assessment and pollution control protocols as a basis for the development of clean air strategies. Multi-pollutant, integrated assessment and management approaches that have guided air quality management in Europe provide an example that can be considered in other jurisdictions. The Clean Air Initiatives for Asian Cities program provides a good example of a voluntary approach to international cooperation in a geographic region encompassing about 1/3 of the world's population.

"The spatial scale of the ozone problem raises significant issues for control strategies.

The next generation of air quality strategies in Europe will need to be even more explicit on the hemispheric contribution."

The international strategy for standardization must consider all aspects of air quality risk management from a process to seek commitments, setting of standards, enforcement of controls, and monitoring of benefits and costs. Institutional and technical capacity for planning, implementation and monitoring, based on sound science, is particularly important.

"There is a need for bi-lateral management in shared airsheds. Look at regional realities and set goals based on what can be accomplished rather than on national or international standards."

Transboundary air quality management strategies are essential when air pollutants are transported across political borders. In addition to the LRTAP involving 51 signatories from Europe, Central Asia and North America, the 1991 Canada-United States Air Quality Agreement is an example of such an international approach. The Agreement was negotiated as an international framework to reduce the transboundary movement of smog-causing pollutants to better protect human health and the environment. Canada and the US have recently established pilot projects to develop joint management strategies to improve air quality in the Great Lakes basin (SE Michigan/SW Ontario) and Georgia Basin/Puget Sound border regions. The challenge of meeting air quality standards for PM and ozone in regions influence by transboundary pollution flows has been recognized in the Canada-wide standards process. Guidelines have been established for

determining the extent of influence of transboundary flows and criteria for demonstration of best efforts to contributions from within the jurisdiction. The International Joint Commission is tracking emission reductions and assessing the effectiveness of Canada-US joint air quality management strategies.

5 Policy tools and strategies exist to reduce high levels of air pollution and health impacts. Demonstrations of success can be found in various regions of the world. Nevertheless, the problems, particularly in developing countries, are sufficiently formidable that continuing efforts are needed to identify and demonstrate innovative approaches while at the same time solidifying the application of sound decision principles and best practice.

Air quality management programs and policies focused on achieving emission reductions from mobile and stationary sources have resulted in ambient air quality improvements throughout the world. For example, California's stringent vehicle emissions controls, reformulated gasoline and diesel fuels, and stationary source pollution controls have resulted in improvements in ambient air quality by 50% in peak ozone levels over the past twenty years and 37% in annual average PM_{10} over the past twelve years. However, levels of PM and ozone continue to exceed the ambient air quality standards. In Mexico, reductions in concentrations of lead, SO_2 and CO and ozone peaks have been achieved due to the successful implementation of various policies including the phase out of lead in gasoline, reduction of sulfur in diesel fuels, and the introduction of TIER 1 standards. The ban on the distribution of bituminous coal in the city of Dublin, Ireland has resulted in a sharp decrease of pollution and death rates in the city. Severe air quality problems remain, however, in several major Mexican cities. Challenges remain in raising awareness among politicians and the public of the need to implement further measures. Similarly in Asia, the removal of lead in gasoline has drastically reduced lead emissions per vehicle. Switching from coal to natural gas has contributed to lower SO_2 emissions in urban areas of China. The introduction of cleaner engines and fuels has slowed the overall growth in vehicle emissions. Asia, however continues to experience air pollution problems related to heavy reliance on coal combustion and limited pollution controls on manufacturing plants. Increasing urbanization and energy use add to the pressure to seek innovative solutions to air quality problems. Strategies such as economic incentive approaches and Clean Development Mechanism in which developed countries pay developing countries to reduce their emissions of

"There are crucial linkages between air quality and climate. Where we will be in 2020 is informed by current policy. Let's get policy initiatives, research and incentives in place now for 2020."

"There are technological measures to improve air quality. It's a matter of cost, availability and political will. With climate change there are technologies that have to be pushed further."

carbon may make sense from an efficiency and global point of view. Integrative policy approaches to achieve both air quality management and greenhouse gas reductions are needed. The fundamental challenge of coupling energy usage and air quality should continue to be explored. For example, climate change and air quality concerns in developing countries should be the driver for further development of biomass energy technology.

Decision-making Principles

6 In locations where air quality is poor and local/urban/regional studies to characterize emission sources and impacts are in their infancy, lack of scientific information should not delay the implementation of strategies to improve air quality.

In the management of pollutants for which there is no threshold for health effects, the lack of location specific information to characterize ambient air quality, emissions sources and health risks should not be considered an excuse for inaction. Control measures should be undertaken with the objective of achieving a basic level of air quality, taking into consideration realistic emission reduction scenarios and cost-effectiveness ratios. Uncertainties in the estimates of future ambient air quality levels and quantification of health benefits and economic costs should be characterized as fully as possible to assist the decision process.

"Scientific information is important but the availability of location specific information is not always a precondition to decide on specific air quality measures in Asian cities. We do not have the luxury to sit back and wait for the information".

7 All policy options (emission fees, emissions trading, voluntary programs, mandatory standards, etc.) should be considered, including technological approaches and non-technological community-based behavioral solutions. There is a need for an international database of policy intervention case studies, including policy successes and failures.

There is a broad range of technological and non-technological air quality policy approaches available, all of which have been used with varying degrees of success. In a non-regulatory environment, economic incentives and disincentives are important for promoting actions to achieve reduction targets and for building support for energy efficiency and technological innovation. Non-technological community-based behavioural solutions should also be part of the overall risk management portfolio (for example, through transportation demand management strategies, including changes in urban form and promotion of energy efficient behavior). More attention should be given to economic incentives for transportation demand management, including gas taxes to influence long term vehicle purchasing decisions. Cleaner fuels can also make a significant contribution to emission reduction. Energy choices should be made on a life cycle basis. Research should continue to explore the development of alternative fuels.

"We need to draw on local, regional and international experiences in setting effective implementation strategies."

"We need a better balance between prevention and command and control strategies."

Air quality management policy options should consider linkages with strategies for greenhouse gas emission reduction and the associated co-benefits of joint air pollution/climate change control strategies for population health. Policy strategies to reduce emissions from the transportation sector by promoting behaviour change should consider the broader population health benefits that may accrue, such as improved physical fitness, obesity reduction, asthma reduction, reduced motor vehicle accidents and diabetes prevention.

"We need more attention to economic incentive approaches applied to transportation emissions. The best tax is directly on emissions but the technology is not ready for prime time."

"We have to stop thinking and relying purely on technological, end of pipe solutions and consider the importance of changing urban form, including public transit interventions that will lead to behavioural change and hence reduce emissions."

Knowledge transfer across continents is essential to enhancing the capacity for air quality management at the global level. Sharing of information and experiences could be facilitated through the establishment of a database of international air quality management case studies to share lessons learned from policy successes and failures, including cost and benefit analyses where available. It is recognized that lessons learned in developed countries may not be directly transferable to the cultural and economic context of developing countries. Model approaches for jurisdictions to consider based on experiences in similar areas would provide "good stories" to build public and political support for further work. The Mexico City experience, for example, could serve as a model for other Latin American cities. The

North American approach to managing the acid rain issue would provide a comprehensive case study of a science-driven approach to air quality management.

Tools and Capacities for Decision-making

8 Communication and consultation through an open and transparent multi-stakeholder process are important for establishing trust and support for air quality management decisions.

Community ownership of the air quality issue and stakeholder participation are critical for building political momentum for policy actions to improve air quality. This requires public education and outreach activities to raise community awareness and mechanisms and resources to enable stakeholders to meaningfully participate in air pollution policy and planning processes. Issues of language and terminology are important in efforts to accurately translate and communicate scientific evidence on air pollution health and environmental risks with the public and decision-makers. Air pollution action days during air pollution episodes appear to be a promising means of calling public and political attention to the air pollution issue.

"You need an interdisciplinary approach but need to work with government decisionmakers, need support of industry and the academic community. Public visibility of the issue is important to put pressure on the government to take on the issue".

"Acid rain taught us that when there is unified public sensitivity to an issue, you get action."

9 Emissions inventories and monitoring networks need to be maintained and expanded as a basis for evaluating air quality on an ongoing basis. Emissions and monitoring data should be made publicly available.

Emission inventories and monitoring networks provide essential data for the development and evaluation of air quality management strategies. It is critical that this infrastructure be expanded to the global level and made easily accessible to policymakers and the public to support effective policy decisions. Air quality indices that convey both exposure and health effects information need to be developed and tested.

"Need more emphasis on conducting emission inventories and source apportionment. Cities need to measure emissions and enforce limits on key pollutant sources."

10 While improvements in institutional capacity in developing countries are undeniable, further improvements are needed to enhance the institutional capacity to carry out and enforce air quality policy.

While regions such as Mexico, Asia and Latin America have made progress in establishing an infrastructure to support the development and implementation of air quality management programs, one of the main challenges to be overcome is to convince governments of the need to allocate financial resources to build local air quality management capacity. Scientific, technical and management capacity building in the form of technical and management training and software and equipment for air quality monitoring, modeling, and exposure assessment is necessary to develop, evaluate and enforce air quality management management policies.

"More effective policies in Asia require institutional capacity in the form of monitoring equipment, staff and operating budgets, data assessment capacity and sustainable funding."

"Science helps move the issue to the public radar screen."

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