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A SUMMARY REPORT OF THE MONTREAL PROTOCOL 10TH ANNIVERSARY COLLOQUIUM

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13 SEPTEMBER 1997

The Montreal Protocol 10th Anniversary Colloquium took place on 13 September 1997 in Montreal, Canada, just prior to the Ninth Meeting of Parties to the Montreal Protocol. The Colloquium, sponsored by Environment Canada, 3M and Nortel Inc., brought together more than 300 individuals, including delegates to the Ninth Meeting of Parties, natural and social scientists, policy makers, business people and NGOs. Colloquium participants reviewed progress made since the signing of the Protocol in 1987 and highlighted the lessons this process holds for the continued implementation of the Protocol and for addressing other global environmental issues.

Based on the outcomes of the Colloquium, a statement was prepared and presented to the Ninth Meeting of Parties on 15 September 1997. The statement, entitled "Lessons from the Montreal Protocol," highlights: the vital role of scientific contributions in establishing the reality of the ozone threat and drawing attention to the need for action; the importance of realistic measures and cooperative elements in implementing the Protocol; the necessity for technological innovation in providing solutions; and the value of objective assessment of scientific, environmental, technological and economic factors in fostering consensus.

REPORT OF THE MEETING

During the one-day Colloquium, delegates heard keynote speeches in an opening Plenary, convened in three parallel sessions, on natural sciences, social sciences and technology, and participated in a Plenary round table debate on the interdependent roles of science, policy and technology in responding to global environmental change.

OPENING PLENARY

Chair Clifford Lincoln, Canadian Member of Parliament, opened the Colloquium and stated that the Montreal Protocol (MP) is a model of effective partnership between policy makers, industry, the scientific community and NGOs that has raised global awareness. He called for an evaluation and synthesis of lessons learned from the MP process.

Paule Leduc, Université de Québec à Montréal, highlighted the MP as an international model for implementation of protocols, science development in tandem with policy making, the complementarity of private and national interests, and positive media contributions. She stressed that universities are not ivory towers and that no one science can consider itself complete; both the natural and social sciences must cooperate to further understanding of social, political and scientific problems such as ozone depletion.

Mario Molina, Massachusetts Institute of Technology, spoke on stratospheric ozone chemistry and reviewed the accomplishments of the scientific community in facilitating the negotiation of the MP. He described the development of chlorofluorocarbon (CFC) ozone depletion theory. Competing scientific theories were developed to explain observed ozone depletion, but the scientific community came together and proved that this was not a natural phenomenon but was caused by the release of CFCs into the atmosphere.

Citing recent developments, Molina discussed some of the commonly asked questions contained in the most recent (1994) MP scientific assessment. He noted that recent satellite data leave no doubt that CFCs are the dominant source of chlorine to the atmosphere. He also noted that now that baseline measurements of UV radiation at the earth's surface are available, the correlation between ozone depletion and increased UV radiation is now certain. Molina said it is expected that the ozone hole will disappear in the future, but not immediately. Ozone is still being depleted, though the concentrations of CFCs at the global level are actually leveling off or decreasing. He noted the trends in the various ozone-depleting substances (ODS), such as the decrease in chlorine but the worrisome and continued increase in bromine.

He concluded by stating that while the scientific community made a strong case in the MP process, many uncertainties remain, particularly regarding the biological effects and the effect of clouds. Fortunately action was taken despite uncertainties. While we face future challenges, the MP provides one example of how global environmental problems can be tackled if different sectors of society work together.

Mostafa Tolba, International Center for Environment and Development, addressed innovations and lessons learned in the MP process. Innovations included, *inter alia*: the ability to adjust to control measures in the MP by decision of a two-thirds majority; confidentiality of data and definition of key terms; agreement by consensus, rather than formal amendment, on issues such as prohibiting export of increased CFC production by some Parties to non-Parties; acceptance of amendments to the MP with only twenty ratifications; establishment of a Multilateral Fund to support developing country participation without legal basis to do so in either the Vienna Convention or the MP; and adoption of non-compliance procedures which, though still weak, were the first such measures to be included within an international environmental agreement.

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The key ingredients in the success of the MP process included, *inter alia*: the presence of a core group of countries that were committed to both ODS phase-outs and establishment of a Multilateral Fund; scientific and technological know-how that facilitated consensus on what could be accomplished; willingness to cooperate and take small steps; the crucial role of public opinion; the existence of a neutral mediator such as UNEP; the use of informal negotiations throughout the proceedings; and a loosening of the "stiff" position on sovereignty to allow inclusion of a compliance mechanism in the MP.

Other key ingredients for success included: the adherence to the principle of common but differentiated responsibilities, whereby developing countries were allowed greater flexibility to phase out ODS; the equal voice given to developing and developed countries in management of the Multilateral Fund; the role of industry in phasing out ODS and seeking substitutes; and the presence of strong personalities who helped move the negotiations forward at crucial junctures. Tolba emphasized, in conclusion, that the innovations and lessons of the MP could guide future international environmental negotiations.

PARALLEL SESSIONS

The Colloquium held three parallel sessions, on natural sciences, social sciences and technology, each convening in three consecutive panels.

NATURAL SCIENCES SESSION

The objectives of the natural sciences session were to synthesize the state of knowledge about the impacts of increased UV-B radiation on ecosystems and human health and adaptation and mitigation responses and to review the role of science assessment in implementing the MP.

Ecosystem Effects: The first natural sciences panel was chaired by John Carey, Canadian Water Research Institute.

James Kerr, Canadian Stratospheric Ozone Research and Monitoring Program, spoke on the "evolving UV climate." He said recent satellite research confirms that ozone depletion has caused increases in peak and average UV radiation between 1979-1992. It has also dramatically raised UV-B radiation intensity but has no effect on longer wave UV-A radiation. He concluded that long-term measurements and an expanding global network of data centres support the MP and can enhance understanding of surface UV as a key variable in monitoring the effects of ozone depletion.

Robert Worrest, Consortium for International Earth Science Information Network, summarized the effects of UV-B radiation on aquatic systems. He noted the critical role of marine systems in carbon cycling and high latitude phytoplankton fixation of half the world's carbon dioxide. Any reduction in ocean carbon uptake due to ozone declines could result in global warming. Qualitative research indicates that UV-B is a stressor to many aquatic ecosystems and may reduce food yields, nitrogen-fixation by blue-green algae and biomass production, despite organismal capacity to repair UV-B damage.

Menfrid Tevini, Karlsruhe University, discussed UV-B effects on plants and terrestrial ecosystems. He noted that UV-B radiation damages plant molecules such as DNA and growth regulators. He described ongoing experimental designs using growth chambers, greenhouses and field plots that simulate solar light and increased UV-B radiation. Results thus far show that UV-B enhancement does not impact all plant and cultivar species alike and may induce repair mechanisms such as protective pigmentation. UV-B does not appear to decrease maize or rice yields. UV-B effects changes in plant form, timing of flowering and seed production and secondary chemical reactions, which in turn affect the competitive balance between species, biodiversity, herbivory, diseases, nutrient cycling, food yield and food quality.

Mohammad Ilyas, University of Science of Malaysia, considered whether tropical countries will be affected and asked who should bear economic burdens. He suggested that the predicted increase in tropical UV levels will likely exceed current overall levels at higher latitudes.

Panel participants discussed the erroneous policy logic that the MP has regulated CFCs and thus solved the ozone hole problem. All agreed that funded research on trends in biological effects is still required.

Human Health Effects: William Coynem, 3M, chaired this panel. Edward DeFabo, George Washington University Medical Center, described the implications of UV-induced immune suppression on human health in light of expected UV-B radiation increases in the coming decades. He said that experiments on mice show that UV-B dosage will likely trigger T-cell and immune system suppression in humans.

Jan van de Leun, Utrecht University Hospital, highlighted the effects of UV-B radiation on skin and eyes. He noted the complexity of UV-B effects on humans, involving adaptation, defense, repair and removal processes. The best available research suggests that UV-B will, *inter alia*: decrease vitamin D deficiencies; increase non-melanoma skin cancer, skin aging and snowblindness; not affect pigmentation or sunburning; and have uncertain effects on skin cancer, cataracts and infectious diseases.

Ann O'Toole, Environment Canada, presented Canada's UV Index as a tool for public response to rising surface UV-B radiation. Developed in 1992, the UV Index was conceived to measure, monitor and predict surface UV-B radiation and to relate this scientific knowledge to the public to facilitate understanding and adaptation to ozone depletion and related health risks. It is included in daily weather forecasts and the UV Index Bulletin, which explain risks associated with particular UV Index intensities and provides tips on how to be safe in the sun. Public surveys show that more than 75% of the Canadian public is aware of the UV Index and more than 50% are influenced by it by choosing to take extra protection measures. She concluded that the UV Index could be used by other countries and international organizations.

In ensuing discussion, participants agreed that the UV-B problem is not adequately addressed by the MP and that more risk assessment, surface UV monitoring and effects research is essential. One participant stressed the need to educate the public about their responsibilities as consumers of products containing CFCs.

Lessons for Successful Science Assessment: This panel was chaired by Pieter Aucamp, Ptersa. Daniel Albritton, US National Oceanic and Atmospheric Administration, discussed assessments of the scientific understanding of stratospheric ozone and how they shaped the MP process. He stressed that assessments are: dependent on scientific rather than decision maker expertise; peer reviewed; and prepared for government, the public and industry. The 1987, 1989, 1991 and 1994 assessments raised awareness of ozone depletion, the extent of the CFC-caused Antarctic ozone hole, the declining global ozone trend and the increase in harmful UV-B radiation, which led, respectively, to negotiation of the MP, the London amendment for CFC phase-out, the Copenhagen agreement for faster phase-outs, and the Vienna Convention adjustment caps on other ODS. The MP experience suggests that the various global environmental issues have significantly different time horizons that necessitate different policy responses. He said there are three phases in addressing an environmental issue: credibility of scientific assessment; management of alternatives; and

accountability between science and policy. He suggested that global warming negotiations can learn from the MP process by recognizing that both science and policy are iterative and complementary processes that provide no final answers or actions. He noted that global warming negotiations are faced with larger-scale economic and industrial factors and far more complex problems in finding carbon substitutes.

Gordon McBean, Canadian Atmospheric Environment Service, commented that the credibility and consensus of international science and the assessment summaries for policy makers were key to the MP process. He stressed that ozone depletion and climate change cannot be seen as separate issues, and ozone monitoring and atmospheric chemistry can improve the understanding of global warming.

Rumen Bojkov, World Meteorological Organization, noted that despite the peak and subsequent decline of global CFC levels, ozone has and will continue to decline. Recent scientific assessments show a significant polar ozone decline that peaked in the winter of 1997 and may have been caused by climate change.

In the concluding discussion, participants agreed that the ozone and UV-B problems are far from solved and that the current MP accountability phase necessitates a 1998 assessment that will examine CFC trends and the possibilities for recovery given ozone layer and climate change dynamics.

SOCIAL SCIENCES SESSION

The goals of the social sciences session were to assess the usefulness of the MP adoption and evolution process as a model for other international environmental agreements and to reflect on the content and implementation of the MP to ensure its continued success and improvement.

A New Legal Model?: Winfried Lang, Austrian Ambassador to Belgium, chaired the first panel. He noted that the MP was one of the building blocks of international environmental law, with key features such as flexibility, a compliance mechanism, recognition of differentiated responsibilities, and trade measures as incentives for participation.

Patrick Szell, UK Department of the Environment, discussed compliance with the MP, and stated that Article 8, with its potentially intrusive scrutiny of compliance, was unlike any other in international environmental law. He noted, however, that ensuring adequate data submissions by Parties is necessary but not sufficient to ensure true compliance. He added that, while the MP model of compliance is structurally sound, it may not be appropriate for other international environmental regimes, such as climate change, where the need appears to be for an advisory rather than a supervisory multilateral consultative process.

Duncan Brack, UK Royal Institute of International Affairs, discussed the trade provisions of the MP. He noted that, unlike other key multilateral environmental agreements (MEAs) such as CITES and the Basel Convention, which utilized trade measures to control trade in environmentally hazardous substances, trade restrictions in the MP aimed to prevent free-riding and ensure regime effectiveness. The MP's trade provisions prohibit trade between Parties and non-Parties in three categories of products: ODS; products containing ODS; and products made with but not containing ODS. Restricting trade of goods in this last category has proved particularly difficult. Brack noted that before trade measures similar to those in the MP can be used in other regimes, questions of their feasibility, fairness and relationship with the multilateral trading system must be considered.

Peter Sand, University of Munich, noted that the MP regime had evolved both carrots and sticks to encourage compliance, the stick being the formal compliance procedure, and the carrot being the incremental cost subsidies provided through the Multilateral Fund. He also pointed out that the traditional doctrine of the sovereign equality of states was now tempered by that of common but differentiated responsibilities, which “allow some countries to pay for others to comply.” He expressed concern with the MP Implementation Committee's recent practice of finding certain countries in compliance just so they can remain eligible to receive incremental cost subsidies through the Multilateral Fund. Sand noted that such "consensual redefinition of treaty standards" could weaken its effectiveness.

In ensuing discussion, participants considered the potential role of carrots and sticks in enforcing the climate change regime, the burgeoning black markets in ODS in some developed countries and the WTO dispute settlement mechanism as a potential model for compliance within MEAs.

A New Model for Cooperation Between Developing and Industrialized Countries?: The second social sciences panel was chaired by Omar El-Arini, Multilateral Fund Secretariat. Juan Antonio Mateos, Mexican Department of Foreign Affairs, highlighted the factors contributing to the success of the MP. He noted that previously unthinkable compromises were made during MP negotiations, such as the decisions to set up the Multilateral Fund, accept the principle of "one state, one vote" in decisions regarding it, and have equal representation of developed and developing countries in the Executive Council set up to manage the Fund.

Ashok Khosla, Development Alternatives, noted that genuine cooperation should entail a win-win situation for all parties, rather than becoming a losing proposition for the South. He noted that while the MP did reflect a degree of genuine cooperation, it has limited value as a model for other negotiations, because the MP deals with a relatively well-defined problem area in which technical solutions rather than major lifestyle changes are sufficient. This is not necessarily the case with climate change or biodiversity. In discussing cooperation, Khosla likened the global negotiation process to a game in a casino, where the South can neither win nor break even, where the winners continually change the rules of the game even as it is being played and where no player has the option not to play. Khosla noted that, instead, an ideal cooperation regime would be one where the South could participate in setting the agenda.

Victor Buxton, Environment Canada, noted that the MP could be viewed from many perspectives, but that it is misleading to imply that the problems were easily addressed. Given the lack of scientific or economic consensus on the key issues surrounding ozone depletion at the time of the MP negotiation, and given differences within and among the EU, the US and the developing world, agreement was a hard-won battle. He also noted that "consensus" did not mean adherence to a single viewpoint, but rather that countries were willing to compromise and build partnerships.

In the ensuing discussion, participants addressed, *inter alia*, the role of industry in an ideal multilateral system and the need to move beyond bipolar North-South characterizations in environmental cooperation.

A New Model for the Negotiation and Operation of International Regimes?: This panel was chaired by David Runnalls, International Institute for Sustainable Development.

Richard Benedick, World Wildlife Fund, outlined the elements that make the MP influential in an evolving system of global environmental governance. These include, *inter alia*: innovative elements within the

negotiation process, such as the use of informal consultations; the pivotal role of science; the dynamic nature of the regime; the elaborate institutional framework that has developed around the MP, including the executive working groups, technical assessment panels, the Implementation Committee and annual Meetings of Parties; the faith in market mechanisms inherent in the treaty; its sensitivity to equity issues; and the stimulus it provided to the development of a worldwide network of NGOs.

Edward Parson, Harvard University, referred to the MP as the world's first adaptive international environmental regime, and highlighted lessons learned from the MP experience. These included the need for a process that would not be derailed by difficulties encountered by individual countries, a recognition that early estimates of costs and damages are typically unreliable, and an acknowledgement that the first few regulatory steps are the easiest to take. He noted the need for judiciously selected interim regulatory targets, which generate attention yet require Parties to strive to meet them. A final lesson, he suggested, is that total compliance with a regime is unlikely and that an adaptive regime should be able to persist through failures and lapses.

Marvin Soroos, North Carolina State University, discussed whether the upcoming Fourth Conference of Parties to the Framework Convention on Climate Change in Kyoto would be to the climate change regime what Montreal was to the ozone depletion regime. He registered skepticism that this would not be the case for a number of reasons, including the position taken by the US. Unlike its commitment to regulate ODS in the MP, the US appears unwilling to agree to a strict timetable for reduction of greenhouse gas emissions. Second, the ozone regime by its very nature required preventive action, whereas other approaches such as avoidance, defensive action or mitigation of harm are more likely in the climate change regime, since they appear economically and technologically more appealing than prevention.

In the discussion that followed, participants addressed the role of multinationals in the MP process, the question of whether the MP encourages market mechanisms, and what one participant described as a dangerous precedent established by the ozone regime, whereby alternatives to CFCs have the potential to exacerbate climate change and to have potential adverse human health effects.

TECHNOLOGY SESSION

The objective of the technology session was to assess the role of industry, technologies and economics in the progress to protect the ozone layer and their importance to the MP's success in developed and developing countries.

Lessons of Successful Technology Development: The first technology panel was chaired by Lambert Kuijpers of the Dutch Technical University Eindhoven.

Suely Carvalho, UNDP MP Unit, stressed the importance of technology assessment for the MP, and addressed the relationship of the Technological and Economic Assessment Panel (TEAP) and its seven Technical Options Committees (TOCs) to the MP. She attributed TEAP's effectiveness to an era of corporate environmental responsibility, the objectivity of its volunteer experts and its global scope. She listed TEAP's achievements, which include sustainable technologies, industry innovation and industry and government leadership. Lessons learned from TEAP highlight the importance of teamwork, mutual respect, motivation and stimulus, and suggest that simple solutions should be pursued first.

Robert Van Slooten, UK Department of the Environment, addressed TEAP's structure, underlying principles and results. He explained that TEAP prepares policy relevant technical reports for MP Parties, and highlighted TEAP's technical expertise, global composition, independence and objectivity as key ingredients to its effectiveness.

Radhey Agarwal, Indian Institute of Technology, described the TOC on Refrigeration, Air-Conditioning and Heat Pumps, and attributed its success to its objectivity, consensus-based decision making structure and focus on effective and implementable technology.

Lászlo Dobó, Hungarian Ministry for Environment and Regional Policy, discussed the TEAP task force on Countries with Economies in Transition (CEIT). The task force provided CEITs with ODS production and consumption data, estimates of incremental phase-out costs, realistic phase-out dates, methods to address non-compliance, and assistance, which they also extended to non-Party CEITs.

Sally Rand, US Environmental Protection Agency, discussed the importance of TEAP in technology cooperation, and emphasized the importance of TEAP's network of "technical ambassadors" who have fostered cooperation, technology transition and synergistic solutions. These experts are influential because they participate in technical and policy committees, advise governments, are corporate decision makers, and champion technological change.

Helen Tope, Australian Environmental Protection Authority, underscored that the MP relies on the objectivity of TEAP reports, which provide policy relevant technical information, have significant industry participation, and separate technological from commercial and political considerations.

Jonathon Banks, Commonwealth Scientific and Industrial Research Organization, described the methyl bromide TOC and the particular problems posed by methyl bromide, including: its widespread use in agriculture and the conservative, risk-averse character of this sector; the absence of an industry stake in developing alternatives; and the polarized opinions of the TOC members, which has destabilized the ODS control process.

Ashley Woodcock, Wythenshawe Hospital, described the Aerosols TOC, and discussed the tension between the need for non-aerosol alternatives for metered-dose inhalers (for asthma patients) and the importance of protecting patients' safety.

Walter Brunner, Envico AG, identified the factors contributing to the rapid phase-out of halons, including: the adaptability of the fire protection sector due to its service- rather than product-orientation; new market opportunities for manufacturers; and exemptions for essential uses.

In the ensuing discussion, participants: highlighted the limitations posed by inadequate funding for developing countries; stressed the need to improve upon the MP model for other processes; and emphasized the importance of sector-specific responses for MP implementation and the potential benefits of this approach for addressing biodiversity and climate change.

Economic and Industrial Measures of Protocol Success: This panel was chaired by Robert Van Slooten, UK Department of Environment.

Jim Armstrong, Environment Canada, gave a brief overview of a study conducted by Environment Canada on the benefits and costs associated with the MP between 1987-2060. The calculated benefits include the avoidance of various negative health impacts and economic benefits associated with reduced damage to forest and agricultural resources and aquatic ecosystems. The costs include research and development costs to develop alternatives, capital costs to change

processes and facilities, and additional environmental, labor, energy and material costs associated with the use of alternatives. Costs were initially overestimated and were lower than expected, as flexible implementation, technology transfer and industry cooperation kept adjustment costs down. The study concluded that society will realize significant benefits from the MP, and that Protocol success was due to, *inter alia*: growing agreement on the benefits; the scientific and technological basis; focus on targets rather than instruments; accommodation of country differences; and cooperation and technology transfer.

Elizabeth Cook, World Resources Institute, outlined lessons learned from the CFC phase-out in the US. Using chillers and solvents as examples, she noted that technological adaptation was faster and cheaper than initially expected and ended up creating significant efficiency gains. The lessons from these cases instruct that: adjustable environmental goals are crucial; the use of economic instruments allow greater flexibility and lower cost; innovative government initiatives can remove barriers to cost-effective solutions; industry will innovate in the face of competitive advantage gains; and pre-regulatory estimates often overstate actual costs.

Jorge Corona, Mexican Environmental Commission, and José Pons, Spray Química CA, discussed ozone protection leadership by industry in developing countries. They stressed that the heterogeneity of developing countries, the varying uses of ODS, and the differing size and market share of particular industries between countries and sectors make it impossible to delineate a single effective strategy for ODS phase-out in all developing countries and industrial sectors. However, ten years of experience with the MP have taught that: governments, NGOs and industries can act as innovators and motivators; savings can be made in many cases; companies are stimulated to innovate due to consumer pressure and/or market competition; and funding is available for phase-out of ODS. They emphasized the importance of not waiting another ten years for developing countries to phase out ODS, as the increased emissions associated with continued growth will offset the benefits already accomplished in ozone protection.

Corporate Leadership by Multinational Companies: The final technology panel was chaired by David Catchpole, British Petroleum Exploration Alaska, Inc.

Margaret Kerr, Nortel Inc., spoke on competitive advantage through corporate environmental leadership. She emphasized that environmental protection is not just the right thing to do but translates into competitive advantage in the areas of lower operating costs, product and service differentiation and improved corporate image, and, most importantly, creates customer value. She outlined a progression in thinking about environmental management from end-of-pipe control to upstream prevention that is based on quality management principles. She stressed that international cooperation between governments and industry is a practical means of resolving shared environmental problems. She noted that technology cooperation has been an important marketing tool for Nortel, building goodwill and strong relationships with customers in emerging markets.

Yuichi Fujimoto, Japan Industrial Conference for Ozone Layer Protection, described the achievements of the Thailand Leadership Initiative, the Vietnam Corporate Pledge and the Global Semiconductor Agreement, and highlighted lessons learned from these initiatives: global leadership and cooperation is vital in implementing environmental accords; early action plans from industry are essential and fruitful; and cooperation between government and industry is critical.

Stephen Andersen, US Environmental Protection Agency (EPA), stated that the success of the MP depended on the work of "champions" of ozone layer protection. The EPA has selected 71 champions honored with "Best of the Best Stratospheric Protection Awards."

Thomas Morehouse, Institute for Defense Analysis, and Gary Taylor, Taylor/Wagner Inc., summarized the panel's discussions, highlighting the importance of efforts by exceptional individuals and corporations and the ability to transcend geographical boundaries through cooperation. The challenge is to bring these parties together to forge innovative solutions to global environmental problems.

ROUND TABLE DEBATE

Following the parallel sessions, participants engaged in a Plenary round table debate on the interdependent roles of science, policy and technology in global environmental issues. Elizabeth Dowdeswell, Executive Director of UNEP, animated the debate, and she opened by asking whether the interdependence of scientific, technological, social and economic issues was realized in the MP process, and what lessons could be transferred to other global environmental problems. Three panelists then made introductory remarks.

Robert Watson, World Bank, stated that while science, technology and the economy play critical roles in the ozone, climate and biodiversity debates, politics and political will be the dominant force in negotiating global environmental accords. Scientific evidence of ozone depletion was pivotal in generating public concern in the ozone process, but there is no equivalent public concern for climate change and biodiversity. He said the MP process has been a qualified success. No action was taken until cause and effect had been established, so the precautionary principle was only marginally applied. The MP experience demonstrated that if the time horizon for reversing damage is long, as it is for climate change and biodiversity, the precautionary principle should be applied. He said there is no reason to be complacent about global warming, particularly because cost-effective solutions are currently available.

Maneka Ghandi, former Indian Minister of Environment and Forestry, proposed that the MP Secretariat proactively nurture policy research, and called for measures to support small and medium-sized enterprises to counter marginalization of Article 5 countries. She said that bargains for the equitable sharing of cost burdens have not been fulfilled, partly due to the cumbersome procedures of the Multilateral Fund and the ways in which the concepts of incremental costs, capacity-building and technology transfer are being applied. Extra costs for CFC phase-out, field trials and new local conversion industries should be considered as incremental costs. Capacity-building should strengthen developing country abilities to scientifically identify and negotiate fair solutions. She added that technology transfer options need to be widened for HCFC and aerosol alternatives.

Steven Anderson, Association of Fluorocarbon Consumers and Manufacturers, discussed the lessons that he, as an industry representative, had learned from the MP process, the most important being joint ownership of a negotiation process. He recalled the first few ozone meetings, where countries and groups were lined up in a number of separate "camps." The MP negotiations revealed the importance of moving slowly, rather than attempting to build a perfect system from the start. Notwithstanding these lessons, however, Anderson agreed that the MP was a qualified success.

Dowdeswell asked what the MP and Parties could do to improve the MP process now. Panelists and participants emphasized: capacity-building; the importance of equity; the need to act more quickly; the

need for greater attention to production phase-out and to simultaneous phase-out of ODS production and consumption in developing countries to prevent black markets; and the need to redesign how funding is implemented.

One participant expressed concern at the lack of support for coordinated UV effects research, and called for greater investment in studying the economic and social implications of climate change. It was noted that a learning process is underway in methods and strategies for research on different global environmental issues, but now the interlinkages between the various sectors (e.g., water, biodiversity and climate) must be recognized and policies, technologies and practices that address these interlinkages implemented.

One observer stated that it is difficult to make progress on ozone and other global environmental issues because society has not yet internalized the understanding that we are all part of a finite world system. The scientific and technical knowledge must be communicated to the public and to policy makers, and the links to poverty and the need for education and empowerment of women must be made.

Another participant noted that despite resistance to CFC phase-out by industry a decade ago, companies have realized efficiency gains and improved relations with the public, and asked what is required to get business to realize these potential gains in relation to climate change.

The idea of applying an eco-tax on CFC-producing industries in order to increase monies available in the Multilateral Fund was raised, and one panelist responded that the costs would ultimately be passed on to consumers. It was also suggested that these industries be retroactively penalized for damages to human health and the environment caused by CFC production. Panelists stated that business may make mistakes, but at the end of the day they must be part of the solution. Another panelist said companies should be penalized for selling outdated technologies to some developing countries knowing they would soon become obsolete under the Protocol.

One participant stated that while the MP is successful on a macro scale, it has been less so on a micro management level. There must be greater attention to the behavior of the end-user and to the collection of waste. He highlighted a substance ban, early phase-out of HCFCs, and means of destroying CFCs as important policy issues.

The question of how to strengthen the Protocol's non-compliance mechanism was raised. One panelist noted that no non-compliance in Article 5 countries is evident, and these countries have been eager to do their part. However, methyl bromide is dangerous and is being used equally by developed and developing countries, and agreement on restrictions is urgently needed.

Participants discussed how the experiences of the MP could be extended into the more complicated areas of biodiversity and climate change. One panelist stressed that the key is political will. If governments decide to move forward on climate change in Kyoto, they will need flexible and innovative instruments that incorporate equity concerns and considerably greater amounts of money, much of which must come from the private sector. If carbon were to become a commodity traded in the global market, a carbon fund could be established to channel funding to developing countries. Regarding biodiversity, since the market does not recognize the value of biodiversity and environmental services, innovative financial mechanisms are needed that provide economic incentives to resource users at all levels to conserve rather than destroy biodiversity.

Dowdeswell summarized the debate and the lessons learned from the Protocol. Political will and ingenuity are required to address the other global challenges we face. A large part of the solution lies in cooperation and understanding of the interdependence of the various actors and of the global system. These other issues must be approached with the same intensive global cooperation that marked the MP.

John Hollins thanked the panelists, participants and financial sponsors and officially called the Colloquium to a close.

COLLOQUIUM STATEMENT

A draft statement outlining the anticipated outcomes of the Colloquium was distributed to participants at the beginning of the meeting. On the following day, interested participants met informally to comment on and finalize the text. The final statement is summarized below.

The statement of findings from the Colloquium is entitled "Lessons from the Montreal Protocol." An introductory section states that the 10th anniversary of the Protocol is cause for celebration as it demonstrates that international environmental agreements can work. The statement provides background information on the Colloquium and gives an overview of the success and innovations of the MP process and the challenges ahead.

A section on “Natural Sciences: What We Have Learned” emphasizes the vital contributions of science to the success of the MP, namely in the areas of atmospheric monitoring and improved understanding of UV radiation. It expresses concern regarding the uncertainty of effects of increased UV radiation on ecosystem and human health.

A section on “Social Sciences: the Success of the Protocol Policy” notes that other international environmental agreements can benefit from the MP's innovations, which include: partnership based on common but differentiated responsibility; dynamic and flexible arrangements; integration of science into policy; creation of new institutions such as the Multilateral Fund; and financial and technological transfers along with the potential for trade restrictions.

A section on “Technology: the Need to Innovate” highlights the MP's role in spawning innovation and business opportunities and stimulating the development of technology alternatives. It identifies implementation in developing countries as a pressing challenge.

The final section of the document, “The Importance of Assessment: Keeping Politics at Arm's Length,” emphasizes that the MP's scientific, environmental, technical and economic assessments have facilitated the evolution of the Protocol, and notes the importance of their separation from political and economic considerations. It identifies communication of assessment results that are understandable to all stakeholders as a remaining challenge.

This statement of findings from the Colloquium was presented to the Ninth Meeting of Parties to the Montreal Protocol on the following Monday, 15 September 1997.