World Ecology Report

Critical Issues in Health and the Environment

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SPECIAL FOCUS

Tenth International Conference on *Health and Environment: Global Partners for Global Solutions*

Double Issue

Summer/Fall 2001

Vol. XIII, No. 2 & 3

$15.00

Available in:
Arabic, English, Russian, Spanish and Ukrainian

In this issue:

The WIT Report is printed on recycled paper.

From our perspective, human health is the bottom line for sustainable development. Physically and mentally healthy citizens who create capital and sustain its growth are a nations most valuable commodity, and also its main source of long term economic growth. The theme of World Information Transfer's WIT's 10th International Conference, *Health and Environment: Global Partners for Global Solutions* focused on the Economics of Health and Environment. This special volume of the *World Ecology Report* contains the presentations of our speakers either as a summary or in full.

For 10 years WIT has brought together experts from the domains of medicine and science, business, the media, government, and not-for-profit organizations to examine the consequences to human health of environmental change. Our conferences are sponsored by UN member states and supported by the UN Commission on Sustainable Development, the UN Department of Economic Affairs (DESA), UNEP, WHO and Department of Public Information.

Dr. Richard Morgenstern, Dr. Christine Durbak, Dr. William Rom, and Dr. R. J. Radermacher at the Tenth International Conference on Health and Environment

The overall purpose of the conference is to educate governments and interested citizens about this critical connection between health and the environment. WIT convened its 10th conference from April 25 to 27, 2001, to coincide with the 15th anniversary of the Chernobyl nuclear explosion in Ukraine. The Government of Greece and the Government of Ukraine co-sponsored the conference. The Children of Chernobyl Relief Fund was a co-chair. Chernobyl's health effects worsened because of the lack of public information immediately following the nuclear disaster and the limited public awareness of the effects to future generations from the long term environmental contamination.

In response, our mission has been to bring environmental health research into the public arena in order to increase knowledge about the inter-connections between human health and environmental degradation. WIT's annual conference at the United Nations, our quarterly publication, *The World Ecology Report,* and our CD ROMs serve as our main communication vehicles. *The World Ecology Reports* and our conference papers are available on our web site.

We divided the conference theme into three topics: **I. Globalization and Health; II. Commemoration of the 15th Anniversary of the Chernobyl Nuclear Disaster; and III. Education and New Media.** The papers presented follow the conference format.

I. Globalization and Health

April 25, 2001

Welcome and Introduction to the Conference Theme: Economics of Health and Environment.

Dr. Christine K. Durbak
Chair and Founder,
World Information Transfer

Your Excellencies, Distinguished Delegates, Colleagues, Ladies and Gentlemen, On behalf of World Information Transfer I would like to thank the Governments of Greece and Ukraine for their sponsorship of the Tenth International Conference on Health and Environment: Global Partners for Global Solutions. I would also like to thank the Deputy Minister of Health of Greece, Ms. Christina Spyrakis for coming and sharing her knowledge with us, and the UN Department of Public Information and Children of Chornobyl* Relief Foundation for their support.

As you look around this room you will see international thought leaders from the worlds of medicine, environmental science, diplomacy, economics and business, who have gathered here for the next three days to share information about the intimate relationship between our health and the health of our planet. It has been our experience, and it remains our hope, that this annual forum will continue to provide information, exchange, contacts and ultimately, solutions, for what is one of humanity's greatest and least publicized, challenge.

Our organization, **World Information Transfer,** was founded fourteen years ago after the occurrence of the Chernobyl* nuclear tragedy. This nuclear accident which occurred in April 26, 1986, sent a very large amount of radioactive material into the atmosphere…poisoning land, air and water, that ultimately extended around the world with devastating environmental, economic and medical consequences.

It is hard to know, even approximately, how many people have already died as a result of the accident. Populations have been greatly disrupted, and children have been sent away from some areas. By comparing mortality rates before and after the accident, the environmental organization, Greenpeace, Ukraine , has estimated a total of 32,000 deaths. Some, perhaps many, of these deaths may be the result of the immense psychological stress experienced by those living in the contaminated region.

While the short term economic, environmental and medical impacts are enormous (the Ukrainian government alone is spending 5% of annual budget dealing with the aftermath of Chernobyl), the long-term effects will be worse.

Chernobyl was not simply another disaster of the sort that humankind has experienced throughout history, like a fire or an earthquake or a flood. It is a global environmental event of a new kind. It is characterized by the presence of thousands of environmental refugees; long-term contamination of land, water and air; and possibly irreparable damage to ecosystems. Chernobyl demonstrates the ever-growing threat of the power of unharnessed technology.

Hundreds of organizations like, the Children of Chernobyl Relief Fund and Chernobyl Children's Project, are hard at work trying to support the health of current and future generations of children whose health has been irreparably compromised by this so-called "accident".

But environmental threats to our children's health are by no means limited to the unsafe use of nuclear power. Devastating as Chernobyl was, there are even larger environmental disasters in the making.

For example, President Bush has made it clear he will abandon his campaign pledge to curb CO_2 emissions and the global warming for which such emissions are clearly responsible.

Scientists no longer doubt that global warming is happening, and almost nobody questions the fact that humans are mostly responsible. Nor are the changes over. Already, humans have increased the concentration of carbon dioxide, the most abundant heat-trapping gas in the atmosphere, to 30% above pre-industrial levels–and each year the rate of increase gets faster. The obvious conclusion: temperatures will keep going up.

Unfortunately, they may be rising faster and heading higher than anyone expected. By 2100, says the IPCC**, average temperatures will increase between 2.5˚F and 10.4˚F–more than 50% higher than predictions of just a half-decade ago. That may not seem like much, but consider that it took only a 9˚F shift to end the last ice age. Even at the low end, the changes could be problematic enough, with storms getting more frequent and intense, droughts more pronounced, coastal areas ever more severally eroded by rising seas, rainfall scarcer on agricultural land and ecosystems thrown out of balance. But if the rise is significantly larger, the result could be disastrous.

Public health will suffer. Rising seas will contaminate water supplies with salt. Higher levels of urban ozone, the result of stronger sunlight and warmer temperatures, will worsen respiratory illnesses. More frequent hot spells will lead to a rise in heat-related deaths. Warmer temperatures will widen the range of disease-carrying insects, such as mosquitoes and ticks and rodents, increasing the incidence of dengue fever, malaria, encephalitis, Lyme disease, West Nile virus, bubonic plague and other afflictions. Worst of all, this increase in temperatures is happening at a pace that outstrips any thing the earth has seen in the past 100 million years. Humans will have a hard enough time adjusting, especially in poorer countries, but for wildlife, the changes will be devastating.

Clearly, this and other environmental threats to our health and to our children's health are proliferating. These are threats that we have collectively created and the burden of

eliminating them lies within our collective control and is our collective responsibility. The health of our ecosystems, and the health of us humans that inhabit it, depend on creative solutions for sustainability. We are both pleased and proud to offer this forum in which such solutions can, hopefully, be found. All of us are aware that the steps we take today can prevent the disasters of tomorrow.

I would like to end with a quote from Albert Einstein who underlines the need for wisdom as a preventive measure, *"The release of atom power has changed everything except our way of thinking. The solution to this problem lies in the heart of mankind. If only I had known, I should have become a watch-maker."* Thank you.

**Chornobyl—Ukrainian spelling*
**Chernobyl—United Nations spelling*
***IPCC—Intergovernmental Panel on Climate Change*

Opening Statement

H. E. Mr. Elias Gounaris
Permanent Representative of
Greece to the United Nations

Madame Chair, Ladies and Gentlemen, It is a great pleasure to be here today addressing you at the opening of the "10th International Conference on Health and Environment: Global Partners for Global Solutions" and it is my privilege to introduce our keynote speaker for the day Her Excellency Mrs. Christina Spyraki, Deputy Minister for Health and Welfare of Greece.

Let me first of all thank the organisers, the World International Transfer, and more particularly Ms. Christine Durbak whose efforts in promoting environmental health give strength to many other individuals and organisations to engage in similar efforts to this end. This year, we are happy to support them, along with another member of the United Nations, Ukraine whose tragedy, the Chernobyl accident 15 years ago we are commemorating tomorrow, April 26th.

Concern with human health has been one of the key factors motivating environmental activism due to the profound impact environmental degradation has on human health and well-being. The human race may become in the future an endangered species if the environmental challenge is not mastered; the responsibility of diminishing such a danger burdens the present generation with an unprecedented urgency. However, when dealing with environmental problems our first thoughts do not automatically go to the health sector; we still prioritize environmental Ministries and Planning Offices as initiators, slightly overlooking Health Ministries as our point of entry. Therefore, it is my pleasure to present today the Deputy Minister for Health of Greece, H.E. Mrs. Christina Spyraki.

Ms Spyraki has studied Medicine at the University of Athens where she is Professor of Pharmacology.

She has been elected to the Greek Parliament and she was appointed Deputy Minister for Health and Welfare in April 2000.

Christina Spyraki has served as Vice Rector for Planning and Economic Development (1993–1996) as well as Rector (1996–1999) at the University of Crete She has held various academic positions continuously since 1972, in several institutions, including the University of Athens, the University of Crete, the Pasteur Institute (France), the University of British Columbia (Canada), Mount Sinai Medical School (USA), Karolinskq Institute (Sweden) and Princeton University (USA).

Christina Spyraki's major scientific interest focuses on the brain mechanisms associated with drug addiction. Her research work, which is acknowledged internationally, focuses on the mechanisms of action of drugs on the brain, of addictive substances and of antidepressants. Her publication record includes books, review articles and original publications of experimental research in International Scientific Journals.

I am very pleased to ask her to take the floor.

Keynote Address

Christina Spyrakis, M.D., Ph.D.
Parliamentary Undersecretary
of State for Health
Hellenic Republic

I first of all want to thank WIT for organising this meeting. The Chernobyl disaster of fifteen years ago has been a landmark in our time. It may, however, be that it is still part of the "present", rather than a historical event.

It has always been difficult to understand the importance of events and changes at the time when they unfold. It has always been difficult to put current circumstances and situations into perspective and adapt to them or exploit them to one's advantage.

It has always been difficult to understand the present.

The Chernobyl disaster fifteen years ago today sent a very clear message that we live on a very small planet indeed. But how long has globalisation been going on? There has always been a process of human interaction across the various spheres of endeavour, be it the economic, social political, technological, cultural or environmental.

But when exactly was there a steep increase in the pace of change of this interaction or when was it that the traditional or long-standing boundaries separating individuals and societies got significantly eroded or collapsed worldwide?

This remains, and I suspect will remain, a matter of speculation and debate for time.

There is no dispute, however, that we are experiencing the world increasingly as a single space as a result of increased and faster travel, communications and trade at the same time as witnessing the creation of new divisions within and across countries.

I believe that physical space does not become irrelevant, but rather it acquires new significance and is being redefined

along different parameters than before. This is why Conflict and war, with their terrible consequences on life, limb and livelihoods continue to plague humanity.

On another level, timeframes of human interaction have shortened. Information and communications technology allow contact, message delivery and knowledge transmission in split seconds.

I would suggest that the communications and information technology industries which have brought about the "new economy" are basically taking us through similar changes as those induced in the past by the growth of agricultural technology. Because, like agricultural technology, although they eliminate jobs in some sectors, they make possible new employment growth in others, such as education, the leisure industry, the voluntary sector and, most notably, the health services sector.

However,, the challenge with the "new economy" is not likely to be the "digital divide" which would separate the US and Europe with high IT penetration and cheap internet access to most of the world, which has little of either and also has little chance of catching up in the near future.

Rather, it is the old problems of basic literacy and the quest for sound government, scarce physical resources such as water and fertile land, and poverty, that present the real challenge and represent the big divide.

This is being compounded by additional problems such as the problems of congestion in cities, the degradation of the environment, and the breakdown of traditional social structures such as families and rural communities.

Sadly, the omens for bridging the divide in healthcare do not look any brighter, despite the advances in infrastructure and sanitation. Healthcare demands will grow relentlessly. Productivity improvements based on information and communication technologies and even new therapies are unlikely to deliver falling prices.

Communicable and non-communicable diseases alike may change patterns but continue to present formidable challenges to health world-wide. New diseases and new forms of old ones are testing our health systems, our science, and our societies.

There is now widespread recognition, I believe, that globalising forces permit certain diseases such as tuberculosis, malaria, AIDS and cholera to reach calamitous proportions. Forty-two percent of deaths in South-east Asia and Africa are due to infectious diseases.

But, non-communicable diseases, predominant in the high-income countries where they account for eighty-seven percent of deaths, are on the ascend in low income countries as well. Tobacco smoking is and will remain the main culprit for these deaths and the costs related to its mortality and morbidity far outweigh any economic gain from employment and taxation.

We should not forget that other globalising factors, such as the multi-billion euro marketing of particular consumer lifestyles via the mass media, have been related to poor nutrition and sedentary lifestyles and hence to rising incidence of heart disease, cancer and diabetes. Nor should we be insensitive to studies that show that changing work patterns and unemployment leading to stress, depression, substance abuse, especially increased alcohol consumption, are also linked to the new global division of labour.

A major problem, which has led to several crises and emergencies, is of course, the global dimension of food. The transformation of food production and preparation to a global industry has undoubtedly led to benefits for public health but also led to a degradation of the environment and gave rise to severe difficulties in controlling related hazards and even created new ones. Food-borne disease has become the nightmare of the public, of the farmers and of the authorities in Europe and it will take enormous efforts to bring matters under control, both in terms of prevention as well as in restoring public confidence and trust.

Finally, environmental health remains one of out chief concerns. It has been long recognized that the links between the natural environment and human health are a global issue. We do accept that global environmental conditions can have short-term and local effects, such as those from natural or man-made disasters, or long-term effects on public health. Examples of the latter are the Bhopal and Seveso chemical industry accidents in India and Italy respectively, and, of course once again, the disaster whose anniversary we sadly commemorate today, namely the Chernobyl nuclear accident in the Ukraine in 1986.

In addition to its immediate health effects on workers and the local communities, the accident produced widespread land contamination in Europe mainly by Caesium-1 37 and led to the interdiction of substantial quantities of foodstuffs. It is also suspected in several countries, including my own, to have resulted in an increase in artificially-induced abortions. We did observe a 23% drop in the number of births in the month of January following the April 1986 disaster and a subsequent return to normal birth rates. At the time of the accident the mass media had created an ambience of imminent danger of birth defects and, regardless of whether it was justified or not, the fact remains that there is statistical indication that in April 1986 about one in four early pregnancies in Greece were artificially terminated.

I will leave it to others to speak about the ramifications on health from the accident which I know are being monitored by UNSCEAR (the United Nations Scientific Committee on the Effects of Atomic Radiation).

I will turn instead to the implications for policy suggested from my reading of the situation as regards globalisation.

We have no choice but to adapt our defences to face up to the challenge of globalisation and its impact on health. There is no alternative, in our closely interdependent countries, to a strategy designed to attack disease and the agents of disease at source. It is opposite here to the cliché? of "think globally and act locally". Local reliance on quarantines and barriers or greater controls over human mobility has become untenable, if not impossible in practice.

We have no other option, in my view, but to tackle the root causes of ill-health which are poverty and degraded natural, social and political environments. We must fight

outbreaks, whether linked to poor sanitation and hygiene, breakdowns in family and social structures, defective or ineffective health systems and health programmes, or unhealthy lifestyles.

We must also, of course, stem, through modern and effective means, the spread of infectious diseases, whether such spread proceeds by the movement of goods and people or by the consumption of water and foodstuffs.

Recent initiatives, which seek to reduce poverty, help build supporting social, economic and cultural environments, enhance our capacity to monitor, prevent, treat and rehabilitate, would go a long way in alleviating the suffering and meeting the challenge of containing and finally reducing the incidence of the scourges that still afflict many in our global village.

Greece is working with the fourteen other Member States of the European Union and with the WHO to develop effective warning systems and a response network for communicable diseases.

It is also fully behind the efforts of the WHO, as are the other fourteen Member States of the European Union. to develop and agree to the International Framework Convention on Tobacco Control, as well as efforts to enhance food safety and wholesomeness through stricter rules at the CODEX Alimentarius and the application of the precautionary principle in food and environmental safety.

As regards health system development, Greece supports efforts at the European Union, the OECD and the World Bank to make the general improvement of health conditions and the alleviation of poverty the primary objectives of policy.

We do support efforts to enhance access to healthcare with special emphasis to drugs for HIV/AIDS, malaria and tuberculosis. We are convinced that the international community needs to step up its efforts, both at the public and private levels, to find the appropriate solution to the intolerable situation of 25 million of sufferers in Africa alone.

I think we have now reached a consensus in particular on the need to increase the affordability of key pharmaceuticals. There has also been a clear acknowledgement that progress would be faster through a comprehensive global approach including streamlined efforts of development aid and increased focus of public and private research and development activities on these diseases.

Finally, we do pay increasing attention to the regulatory framework applied to the trade of health services under the World Trade Organisation system, and in particular under the GATS (General Agreement on Trade in Services) which establishes a set of rules for trade in health services and allows WTO members to undertake commitments for the opening of their market to foreign suppliers.

As part of the European Union, within the framework of the Uruguay Round negotiations, we have undertaken commitments with regard to health services, in particular with regard to the provision of hospital services by foreign suppliers in the territory of the European Union. In practice, this means that foreign operators can establish private hospitals in the Union and that such hospitals will be treated as if they were owned by EU nationals,. This having been said, the EU has. reserved its right to subsidise its public sector without any commitment to extend this benefit to private operators.

For the GATS 2000 negotiations, the main focus will most probably be movement of consumers and development in the field of e-health. E-health or tele-medicine already accounts for an estimated 6% of the European Information Technology market and 2% of the European healthcare market. Its development is intended to improve the quality of healthcare, in particular in cases where a doctor, generalist or specialist, will request a specialist, who can be located in a foreign country to give a second opinion on his or her diagnosis.

This will be most helpful in areas, such as several Greek islands, which are remote and/or where population is scarce, that is where hospitals cannot offer to maintain a full range of specialists.

It must be underlined that all the above has not and will not impede EU countries to determine safety and quality requirements in their health sector in the manner that they consider the most adequate for their particular set of circumstances, As you know, all WTO members, even for areas which have been opened to foreign suppliers, maintain their sovereign right to regulate the activities within their territory and to guarantee the achievement of legitimate public objectives.

The right of each European country to define a specific and appropriate regulatory system of the health sector includes also the sovereign right to determine a suitable system for subsidising the public health sector. This may be necessary in order to maintain or increase the quality standards and social objectives which are at the basis of their health system.

I believe that this rationale developed to reconcile the public health requirements of the European Union as a whole with the health systems of the individual member states to enjoy full support in a more global context. It is indeed such a platform from which we can reach out and join other countries, other societies, other peoples, in turning globalisation into a positive experience and securing for our children a better future.

Multilateral Environmental Agreements as a Policy Response to International Environmental and Health Problems

Mr. Adnan Z. Amin
Director, New York Office
United Nations Environment Programme

Mr. Chairman, distinguished participants, ladies and gentlemen, It is a pleasure to have the opportunity to

continue the tradition of UNEP addressing this annual Health and Environment conference. I would like to convey my congratulations to World Information Transfer on this, the 10th anniversary of the First International Conference on Health and Environment. Each year the conference has garnered wide acclaim for the quality of presentations and participants and for the fruitful deliberations on the important inter-linkages between human health and the health of our environment. I have no doubt that this year's conference will be no exception, as it addresses the important topic of the economics of health and the environment.

In our panel discussion today, as we consider Globalization and Health, I would like to concentrate my remarks on multilateral environmental agreements (MEAS) as a policy response to environment and health problems, and UNEP's role in this regard.

Despite far reaching improvements in human health globally over the past decades, with people living longer and healthier lives, environmental degradation, aptly referred to as "today's silent emergency" continues to contribute heavily to many of today's most pressing global health threats. It is estimated by the World Health Organization (WHO) that nearly a quarter of the global burden of disease and injury is related to environmental disruption and decline. High on this list are polluted air, dirty water, poor sanitation and insect-transmitted diseases such as malaria. Tragically, children are the victims in as many as two-thirds of all environmentally-related deaths.

The vulnerability of children to environmental health threats was highlighted just last month by the Group of Eight (G8) Environment Ministers, at their–annual meeting held in Trieste, Italy. The G8 discussed Environment and Health as one of their three main topics and in their communique´ expressed, as they have in past years, a fervent commitment to protecting human health from environmental degradation of all forms and to base policy measures on the precautionary approach as outlined in the 1992 Rio Declaration on Environment and Development.

UNEP is also continuing to focus on protecting the health of children from environment-related threats. In partnership with UNICEF and also with WHO, we are working to help elevate the inter-linkages between children's health and the sustainable management of the environment on the international agenda, by forging links between two intergovernmental events, the Special Session of the General Assembly on Children which will be held in September 2001 and subsequently the World Summit on Sustainable Development, which will be held in 2002. These events provide unique opportunities to stress the mutually reinforcing goals of meeting the needs of children and managing the environmental challenges of the 21st century, specifically by calling attention to how environmental factors affect child health.

Let me know turn to MEAS and their role as a key policy response required to protect not only the environment, but also human health. To date, it is estimated that there are more than 500 international treaties and agreements related to the environment. The existence of such legally binding agreements is a remarkable feat of the global community, clearly indicating a collective will and commitment to protecting the environment and, by extension, human health. UNEP has been facilitating the development of this body of environmental law for nearly 30 years, helping to craft innovative responses, and build and enhance processes to address the most pressing environmental challenges which threaten human health. This afternoon, I would like to highlight recent progress that has been made in key MEAs related to the protection of human health,

A major achievement over the last year was the completion in December 2000 of a series of intensive negotiations, held under the auspices of UNEP, to minimize and eliminate some of the most toxic chemicals ever created, Persistent Organic Pollutants (POPS) such as PCBs, dioxins and DDT. Recognizing that POPs endanger human health globally and the environment from one generation to the next, countries were compelled to negotiate a treaty able to withstand the test of time, so as to secure the health of future generations and the integrity of the chain of life.

The treaty sets out control measures covering the production, import, export, disposal and use of POPS. Governments commit to promoting the best available technologies and practices before replacing existing POPS, while preventing the development of new substances. They will draw up national legislation and develop action plans for carrying out their commitments, relating to reporting, research, development, monitoring, public information and education. The control measures will apply to an initial list of the so-called "dirty dozen" chemicals and industrial by-products, but a Review Committee will consider additional candidates for the POPs list on a regular basis. This will ensure that the treaty remains dynamic and responsive to new scientific findings. Most of the 12 chemicals are subject to an immediate ban with the exception of a health-related exemption of DDT, which is still needed in many countries to control malarial mosquitoes.

The treaty will be formally adopted and signed by ministers and other plenipotentiaries at a Diplomatic Conference in Stockholm next month, and will enter into force when 50 Governments have signed and ratified it.

Beyond POPS, the potential threats that other chemicals pose to human health and the environment also continue to be addressed. In this regard, UNEP's Governing Council decided at its 21st Session in February this year that a global study on the health and environmental impacts of mercury should be undertaken by UNEP. The study will, inter alia, undertake an assessment of the cost effectiveness of current mercury anti-pollution measures and technologies.

Another major milestone–and another key policy response to environment and health threats–was the opening for signature of the Cartagena Protocol on Biodiversity to Convention on Biological Diversity (CBD), at UNEP's headquarters in Nairobi in May 2000. To date, 89 countries have signed the Protocol, and it will enter into force once 50 countries have ratified it, a step already taken

by 2 countries, Bulgaria and Trinidad and Tobago. The Protocol, which reflects growing public concern about the potential risks brought on by biotechnology to human health and the environment, seeks to protect the planet's species and ecosystems from the potential risks posed by living modified organisms (LMOs). The Protocol establishes an advanced informed agreement procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of such organisms. The Protocol has been hailed as a breakthrough from a health and environment perspective in that it is the first global treaty that enshrines the "precautionary approach" as a principle of international environmental law.

Agreements to protect the environment and human health are also vital at the regional level. For example, last month in Kuala Lumpur, South-East Asian Nations met to negotiate an agreement designed to prevent a repeat of the devastating haze from forest fires that plagued the region in 1997 and 1998. UNEP, in collaboration with the Association of South East Asian Nations (ASEAN) Secretariat prepared an outline of elements that could be included by Government negotiators in an ASEAN trans-boundary haze pollution agreement. In the 1997-98 fires, which were estimated to have caused losses of about US $9.3 billion, destroying approximately 10 million hectares of Indonesia's forests, more than 20 million people were exposed to extremely high levels of pollutants known to cause both acute and long-term health effects.

Another important environmental health related activity that UNEP undertook over the past year, culminated in the release last month of UNEP's final report on the environmental impact of depleted uranium (DU) ammunition used during the 1999 Kosovo conflict. In November of 2000, a UNEP field mission visited 11 of the 112 sites that were identified by NATO as being targeted by ordnance containing, DU. The UNEP team, consisting of 14 scientists from several countries, collected soil, water and vegetation samples and conducted smear tests. Although the mission findings show no cause for alarm, the report describes specific situations where risks could be significant to human health and the environment. Some precautionary action recommended by UNEP especially regarding impacts to groundwater, includes visiting all DU sites in Kosovo, removing slightly radioactive penetrators, decontaminating areas where feasible and providing information to local populations on precautions to be taken if DU is found.

MEAS are a key component in the international communities' arsenal of policy responses to environment and health threats. They help to weave a web of safeguards to protect the physical environment, and by extension, human health. However, real and sustained progress can only be made if we strive together, the UN system, the non-governmental community and the private sector, to foster intersectoral cooperation at the local, national, regional and international levels to promote environmental health. In this regard, I wish to conclude with a thought and a challenge that was expressed by Environment Ministers in the Malmo Declaration, adopted at the first Global Ministerial Environment Forum last year, namely that "at the dawn of this new century, we have at our disposal the human and material resources to achieve sustainable development not as an abstract concept but as a concrete reality. Ladies and gentleman let us harness those resources to lift the unacceptably high–and preventable–environmental health burden, and move towards a development that is truly sustainable.

Thank you.

Globalization: Corporate or Civil?

Dr. David Korten, President
Positive Futures Network
Bainbridge Island, WA

It's a great privilege to address this distinguished gathering exploring the relationship between globalization and health. And of course, in this forum, health is being defined in the broadest of terms to cover the whole of the health of the people and planet. There is certainly no more basic or important theme for our time.

For some years my own attention has been focused on the political dimensions of globalization, specifically on global governance and a very basic question: in an increasingly interdependent world, who will determine human priorities and to what end? It's a question central to the concerns of this conference and to the issues raised by our previous speakers because it is all too clear that the forces shaping the priorities of our global society, and particularly the global economy, place greater value on money than on the health of human and planetary life. We need only note the powerful interests seeking to block essential action on global warming, or block access by Africans to low cost drugs for the treatment of AIDS.

I was drawn to these issues of governance by my thirty years of experience in development work in Africa, Latin America, and Asia. For over the period from the mid 1960's to the mid 1990's, I witnessed the growing gap between rich and poor, the decent of millions of people into ever deeper and more dehumanizing forms of poverty and deprivation, the disintegration of once strong cultures, and the devastation of the lands, forests, waters, and fisheries on which all life ultimately depends. And deeply troubled, I turned my attention to a simple question: why? The results of this inquiry are documented in the book *When Corporations Rule the World.* The second edition updates the analysis of the economy. It also brings in an examination of the growing citizen resistance to corporate globalization.

The processes of economic and corporate globalization that have accelerated over the past 20 years are shifting ever more power of decision making away from people, away from communities, and away from nation states, and to global financial markets and corporations. This transfer of

power has important implications because people, communities, and nation states have a natural long-term interest in human and planetary health. Global financial markets and the corporations that serve them, however, are driven by short-term financial imperatives.

We've all been encouraged to believe that the market has an invisible hand that faithfully translates the pursuit of short-term financial gain into long-term human and planetary well-being. We need only look, however, at the experience of the past 20 years to see that this is a false hope with little foundation in reality. We are dealing here with the most simple and self-evident of truths. If life is to be our priority, then we must make it the focus of our attention, and root the powers of governance in institutions that value life more than they value money.

Although seldom acknowledged, the most powerful institution of global governance is in fact a globalized financial market that holds both the world's most powerful governments and most powerful corporations captive to its incessant demand for ever greater returns to money. If a government advances policies that global financiers believe contrary to their interests, they attack its currency, its economy collapses, and the government falls. Governments respond to these pressures by cutting taxes on the wealthy, rolling back social and environmental regulations, increasing corporate welfare, keeping unions in check, decreasing wages, privatizing public resources and services, and increasing police and military budgets to keep the disenfranchised in check. Similarly, if corporate management is not giving single-minded attention to shareholder return, the share markets trash its stock, it is bought out, and its management is replaced. Corporations respond to this pressure by union-busting, using sweatshop labor, skirting environmental regulations, homogenizing cultures, monopolizing intellectual property rights, bribing politicians to increase public subsidies, tax breaks and regulatory relief, and by seeking to increase their monopoly power through mergers and acquisitions, forming price fixing cartels, intellectual property rights monopolies, and circumventing the law.

I presume most of you may remember the story about King Midas. Granted a wish, King Midas asked that all he touched turned to gold. When his golden touch turned his food, his drink, and even his beloved daughter to gold, he realized that his presumed blessing was in fact a curse. Trading life for money has always been a bad bargain, but that is unfortunately exactly what our global economic system is programmed to do.

The institutions of the global economy turn the natural living capital of the earth into money when they strip mine forests, fisheries, and mineral deposits, produce toxic chemicals and dump hazardous waste. They turn human capital into money when they employ workers under substandard working conditions that leave them physically handicapped. They turn the social capital of society into money when they pay substandard wages that destroy workers emotionally and lead to family/community breakdown and violence. And they further destroy social capital when through mass advertising they create a homogenized, materialistic global culture. They similarly turn the living trust of our public institutions into money when they bribe politicians with campaign contributions to convert the taxes of working people into inflated corporate profits through subsidies, bailouts, and tax exemptions.

The result of all of this is a vast inflation of financial assets, juxtaposed with the reality of a dying planet. We've become so conditioned to the idea that money is wealth that we've come to see increases in stock market indexes as an indication that the world is getting richer, when in reality, we are all getting poorer because we are destroying the environmental and the social foundations of life, health, and civilization for the primary purpose of creating stock bubbles.

The reality is revealed in two simple indicators: from 1982 to 1999, the total market value of the stocks traded in the world's financial markets grew from two trillion dollars to 28 trillion dollars. That reflects primarily a growth in the financial assets of the wealthy, the people who already have a great deal of money. This in turn represents the growth in the wholly disproportionate claims of the wealthy against the real wealth of the whole of society. Those are claims of the very wealthy relative to the claims of the nearly half of the world's population who still live on less than two dollars a day and the 1.3 billion people who live on less than one dollar a day. You see the anomaly here when money is our instrument of allocation. When you have these extraordinary differences in income, it results in extraordinary differences in purchasing power and access to all of those things that are in fact the foundations of real health.

So what's happening to real wealth? The World Wildlife Fund for Nature has constructed a living planet index to show the rate at which we are depleting the regenerative capacities, the natural wealth production capabilities, of the earth's forest, fresh water and marine environments. Their calculated index fell by approximately 30% between 1970 and 1995. That means that we have depleted 30% of the world's natural regenerative wealth capacity, the natural capital of the planet, in one generation.

As money indicators have been heading for the sky, life indicators have been crashing. Forests are shrinking, water tables are falling, soils are eroding, wetlands are disappearing, fisheries are collapsing, rangelands are deteriorating, rivers are running dry, temperatures are rising, coral reefs are dying, plant and animal species are disappearing, and the climate is become more unstable. And yet the focus of the world's power holders has been on pushing forward trade agreements that in the name of freeing trade are in fact freeing financial speculators and global corporations to more rapidly draw down the world's human social and natural capital in order to keep the world's stock bubbles inflated.

Overall, we have a growing world population, divided between the few whose rapidly growing financial wealth gives them a claim to an ever larger share of a declining base of real wealth, and those whose static or declining incomes leave them increasing in desperate circumstances.

This is but one of the many reasons why rapidly growing inequality within and between nations is a fundamental health issue. And why equity is an essential foundation of human community and planetary health.

Current research tells us that the greater the income differences within a country, within a city, or within a geographic region, the worse the health of their populations and the lower the life expectancy. Greater income disparities are also associated with higher rates of homicide and violent crime, suggesting that they are related to a decline in social cohesion. We also know that more democratic nations are likely to be more equitable. And I would note in this regard specifically that the income differences between rich and poor are greater in the United States than in any other developed nation.

Increasing inequality, the destruction of living wealth, and the weakening of democracy are among the major legacies of corporate globalization, also known to some as the "Americanization" of the planet. Growing popular consciousness of these consequences of corporate globalization is now bringing millions of people to the streets in protest the world over. We're now at a point where the mere mention of Seattle, Washington DC, Prague, Davos, LaPaz, and as of last week, Quebec City, evoke visions of tens of thousands of citizens acting in defense of life and democracy in the face of the tear gas, pepper spray, rubber bullets, bean bags, and batons of heavily armed police battalions.

The deepening struggle between the forces of corporate globalization and the forces of a globalizing civil society has brought to light the defining issues of our time. Pundits of the corporate press dismiss the protesters as spoiled children of privilege, selfish, ill informed malcontents who would close national borders and trade and consign the poor to perpetual misery in their pursuit of extremist and special interest agendas. These pundits of the corporate press failed to mention that those who are engaged in protest are in fact forming the most truly international and inclusive social movement in history. Those who protest are committed to strengthening global cooperation, community, equity, cultural diversity, popular sovereignty, economic and political democracy, locally rooted rule-based market economies, the practice of ethical principles, and the protection of the web of planetary life. The protesters call for global action to establish the democratic rights of people everywhere to determine their own economic destinies. They call for the elimination of third world debt, the rollback of IMF structural adjustment prescriptions, and structural reform of the United Nations and the Bretton Woods institution to strengthen democracy at local and national levels, to restore economic resources and priorities to people and communities, and to place the human and environmental interests of every person on the planet ahead of the financial interests of the few.

I would suggest that this is not an extremist, nor a special interest agenda. On the other side of this struggle, acting under the guise of so called "free trade agreements," the corporate globalists would by contrast replace democracies of people with democracies of money, replace self-organizing markets with centrally planned corporate economies, and replace spiritually grounded, ethical cultures with cultures of greed and materialism. The corporate globalists chart a course to a world in which a dozen or so mega-corporations, accountable only to their shareholders, will control our access to food, to money, to water and to healthcare, write our laws, run our prisons, decide what our children will be taught in school, and control our access to news and information. This is, I would suggest, a truly extremist, special interest agenda.

And here's where I come to the most difficult part. The government of my country, the United States of America, has been the foremost proponent of this extremist, special interest agenda. It is the sad truth that this government represents corporate interests over human interests. And although this extremist, special interest corporate agenda is advanced in the name of freedom and democracy, there is nothing free or democratic about it, as the events last week in Quebec City made so abundantly clear. The United States itself suffers from a crisis of democracy. The corporate press in the United States has so abandoned its role as watchdog for democracy that the average European is probably better informed regarding the irregularities of the most recent US presidential election than are most Americans. We will probably never know for certain who was the actual lawful winner of that last election, but we do know with substantial certainty that the president occupant of the US White House received a minority of the votes. We also know that his agenda to undermine international action on global warming, to dismantle human rights and environmental protections, and to militarize space does not reflect either the political will of the American electorate or the interests of the people of the world. It is a wake up call to all of us. People in governments the world over who believe in life and democracy must mobilize in solidarity to isolate the present US administration and to counter the threat that it poses to global human and planetary health and security.

We must also act together to strengthen the United Nations and to guard it against the threat to its credibility and legitimacy posed by its courtship though the Global Compact with global mega-corporations whose goals and imperatives are sharply at odds with the values and mandate the United Nations was created to serve.

These are difficult times that not only endanger the health of people and planet, but as well call into question the survival of human civilization and even our species. We are being taken in a direction no sane people should want to go by institutions that value money more than life. The threat presents us, in fact, with an exciting opportunity because it calls us to engage 6 billion plus people the world over in the enterprise of fundamentally rethinking human purpose and institutions. We are faced with the need; we fortunately also have the means in terms of communication and knowledge to do so. The unanswered question is whether we can muster the wisdom and the will.

Thank you.

The Global Public Health Crisis

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Good afternoon ladies and gentlemen. The noted British health expert Thomas McKeown spent years analyzing the morbidity and mortality records of England, Whales, and Sweden for the period 1700 to 1971. He picked these regions because they were very good records at hand that could be analyzed. And from them, he was able to infer that the average male life expectancy in all three areas in 1700 was a mere 27 years. By 1971, male expectancy in the same three places had reached 75 years and it is of course still climbing. Obviously, that constitutes striking improvement and it has been mirrored in varying degrees in other wealthy parts of the world, in Canada, United States, Japan and the rest of Western Europe.

There has been an assumption that has driven the United Nations pretty much for its entire history to varying degrees within various UN agencies that all the world's population would eventually follow this course and that given enough time and enough economic development, life expectancy all over the world will reach the same levels. In fact, the World Health Organization and the World Bank jointly issued a cheery report in 1995, forecasting that average global life expectancy, male/female combined, which in 1955 was a mere 48 years, would by 2025 reach 73 years.

I think today we have to admit to an enormous collective hubris problem. Not only will the world fail to meet its rosy life expectancy projections but many parts of the global community are actually now witnessing life expectancy reversals, notably countries in sub-Saharan Africa, central Asia and the [former Soviet Union].

First, we have to ask why did life expectancy increase by 48 years among northern European country populations during the period 1700 to 1971. McKeown tells that his records and similar records bear up to the same thesis in the United States and Canada that more than half of that improvement occurred before 1900. And nearly 90% of it occurred prior the invention of a single antibiotic. Even tuberculosis, which today we think of as a disease only controllable through the use of antibiotics had witnessed a bulk of its decline in the northern European region well before the invention of antibiotics. In the UK, 87% of the decline in tuberculosis rates was achieved between 1838 and 1949.

In the wealthy world, modern medicine whether you are talking about CAT scans, MRIs, open-heart surgery, anti-psychotic drugs, intensive care units have only been responsible for incremental improvements in average life expectancy. In my country here in the United States, experts estimate fewer than 8 years of total increased 20th century life expectancy can be credited to medical intervention.

So what did make the difference? It was a combination of essential public health efforts, improved housing and quality of life, decreased air pollution, construction of water and sewer systems, air conditioning, refrigeration, heating systems, draining mosquito infested swamps, and transportation that allowed the delivery of fresh and highly varied food options at affordable prices to a mass population base. The most dramatic improvements in life expectancy were realized when scientists in Europe and in North America 110 years ago began to apply basic germ theory to large scale interventions aimed at protecting children from typhus, typhoid fever, scarlet fever, measles, chicken pox, vitamin deficiencies and so on. By reducing child mortality from New York City's abominable 40% rate in 1870 to a current less than 1% rate, health officials pushed overall life expectancy statistics through the roof.

That was then, this is now. The US Center for Disease Control (CDC) recently determined that between 1980 and 2000, the numbers of Americans who died of infectious diseases annually doubled, now topping 170,000 a year. When the upswing was noticed a decade ago, officials blamed our AIDS epidemic. And at that time, HIV was the number one cause of premature death for Americans. But since 1996, and the introduction of HART, the death rate for individuals suffering HIV disease in North America has plummeted. Nevertheless, the overall burden of death due to infectious diseases has continued to climb.

Most industrialized nations now report a very similar trend. What's going on? It's the downside of globalization. It's payback if you will, for decades of shutting out the desperate health needs of the poor world. It's the boomerang from a 20th Century in which 20 % of the world populations stopped having to worry about measles, malaria, yellow fever, tuberculosis, and so on, but the remaining 80% struggled for access to the most basic antibiotics, clean water, waste disposal, clinics with safe syringes and anti-malarial drugs.

The world is now a fluid place in which borders and territorial expanses have ever the less significance. Food production is globalized. That tomato that you had for lunch today may have grown just about anywhere. Livestock is globalized. And just look at how hard it is to control food diseases and BSE globally. The human workforce is globalized. 12% of the labor force now in the United States is foreign born, in the New York City, a much higher percentage. And the wealthy world companies are increasingly locating their production facilities in the poor world. This fluidity makes sense economically, politically, it may even make sense culturally and socially, but it has risks particularly in the form of the spread of microbial disease.

Let's consider a few examples. Malaria was virtually eradicated from North America by 1950 but the numbers of malaria cases in the US have risen steadily since 1985. Between 1996 and 1997, a single year, the number of malaria cases in this country rose 11%. This merely reflects what is happening globally. Last year, according to the WHO, more people died of malaria than ever before in human history. 3000 children died everyday in the year 2000, and more

than one and a half million people globally died of malaria. The mosquitoes have become resistant to the pesticide and the parasites are resistant to the drugs. Cloroquin, which was 100% effective in 1950, is now all but useless and most of the key malaria belts are the Amazons, central Africa, and Southeast Asia.

Hepatitis C is now a global catastrophe. Here in the US, 90% of our intravenous drug users are hepatitis C positive. Our health authorities estimate that 25 % of those now infected with hepatitis C will eventually succumb to liver disease or cancer. This again reflects what is going on globally and it's directly linked to medicinal use of non-sterile syringes. It's now estimated that 170 million people globally are infected with hepatitis C, 42 million of them will die as a result. In some countries, notably Egypt and Pakistan, the hepatitis C prevalence is astronomical.

Dysenterial parasitic diseases are on the upswing in many parts of the world, ailments that can be completely prevented with simple water interventions that were learned 100 years ago. In March of this year, WHO estimated that 1 billion people globally drink unsafe water each day and 2.4 billion lack proper water sanitation and sewage capacity. Water-born disease killed last year according to WHO killed 3.4 million people.

We reached another landmark with tuberculosis, which killed a record number of members of our species more than ever before in history. Some two million of us died of TB last year and 8.5 million of us had active TB. This week, WHO and the US Center for Disease Control are jointly releasing a report on the drug resistant rates for TB in 58 nations. It's a report that will make your blood curdle. Comparing rates of multi-drug resistance, that's resistance to 2 or more of the 10 basic drugs used to treat TB. The report concludes that we are witnessing a horrendous increase in multi-drug resistance. Between 1995 and 1999, every single country examined saw an increase in multi-drug resistance. In the rich world here, we saw more than 4 fold increases in that brief 4-year time period. Here in the United Sates, we went from 1.2 % rate of multi-drug resistance, to a 5.6 % rate. In Germany, from a 1% to 6.3%. In Switzerland, from no detectable multi-drug resistance TB in '95 to a 12.5% rate in '99.

But of course, as with all things, the most disturbing trends are in the poorer parts of the world. Mexico jumped from a 2.5 % rate of multi-drug resistant TB to 22%. Cuba, from no resistance to 7%. Russia, from a 6.5% to a 26%. And in India, from a mere 8% rate of multi-drug resistant TB in 1995, nearly 50% by '99. We could very well ask ourselves just how long we have before TB is an incurable disease. If the trends continue on the current trajectories, many nations will have fully incurable TB in circulation before the end of this decade.

Drug resistance is affecting a whole host of bacterial diseases. We have watched this trend for five decades, and the way the global community has responded to the ever-increasing rates of drug resistance in the bacterial populations is to say well, certainly the pharmaceutical companies will invent a new drug, we will have to pay more for it, but at least it will be there, and then the problem goes away.

Well, that is not a viable solution. It is not viable because first of all, we are creating financially incurable diseases in the poor world, where the new drug is consistently more expensive than their predecessors and unaffordable. It's also an unattainable approach, because basically of 250 drugs available, all of them attack the microbes using 6 basic biological mechanisms. If the microbes develop resistance to one of those mechanisms, they develop resistance to an entire list of anti bacterials. We now see microbes that are resistant to all 6 basic methods of attack. Finally, it's an untenable option because resistant strains are more difficult to treat. In fact, hospitalization costs an average 50 % greater for victims of even mildly drug resistant forms of bacterial disease, and death rates are higher. So again, we should be asking as we do with malaria and TB, just how long do we have before our vital armament of antibiotics will be rendered useless?

As a corollary of that, we should be asking what can we do to curb the massive black market, a black market I have witnessed vastly increasing all over the world in antibiotics, and what can we do to eliminate their inappropriate use in livestock. Because of these bacterial threats, hospitals are becoming more dangerous environments especially in the wealthy world. During the 1990's in the US for example, some 40 million people each year acquired infections inside hospitals, about 2 million of which were drug resistant according to our CDC. Those infections killed nearly 100,000 a year and increased treatment cost by an overall 4.5 billion dollars a year.

Of the last five years, we have witnessed 2 outbreaks of the dreaded Ebola virus. In Kikwit, Zaire and Gulu Uganda. I was in the Kikwit outbreak. It was obvious to me and to all those who were there, the sorts of failures in clinical infection control, that are permitting the spread of bacterial infection inside American hospitals, are driving far more dangerous epidemics and outbreaks in resource-scarce poor countries. Ebola, like so many feared microbes, takes advantage of ecologies in which contagious patients come in contact with healthcare providers who lack protective gloves, masks, and clothing, who have no fuels for their generators, so cannot run their clays to sterilize their equipments, who have no water filters with which to provide patients with safe fluids, and who must by necessity reuse contaminated syringes on one patient after another, after another, after another. Dr. Keith Sabin of the US CDC recently estimated that last year twelve billion injections were given worldwide for medicinal purposes, and 90% of them were medically unnecessary. Most alarming, 70% of those injections delivered in hospitals and clinics in the NIS and CIS were non-sterile. 79% of the medicinal injections in sub-Saharan Africa were non-sterile last year and 80% in Southeast Asia were non-sterile.

Physicians do no harm. How is it possible in the age of hepatitis C and HIV, that doctors, nurses, and other health providers are routinely reusing non-sterilized needle and syringes? One could especially ask the wisdom of this continue practice in countries where HIV prevalence exceeds 5 % of the population. I have witnessed with my own eyes

children in African villages lined up receiving their UNICEF vaccinations all with one syringe. I have witnessed health providers in Ukraine using one syringe in a room full of pregnant women. I have seen it with my own eyes. The UN should ask itself just how much longer it intends to support global child vaccination efforts that may actually be spreading HIV. There is a simple solution of course–package all injectable drugs and vaccines with auto-destruct sterile single use syringes.

I want to close with some remarks about the greatest epidemic in the history of the human race, HIV or AIDS. I won't review the numbers, you have heard them before and you know that AIDS has now eclipsed the 1918 influenza pandemic's toll. Within less than 4 years, it will have killed more people than it is estimated perished in the 14th century black-death plague. The UN, the GA, heads of state of the wealthy world, and some of the planet's most powerful political figures have finally awaken to the reality of the catastrophe unfolding before our eyes. Today, the leaders of Africa are gathered in Abuja for their annual OAU summit. AIDS is on the top of the agenda. Secretary General Annan delivered an extraordinary speech on this subject this morning at the meeting.

Some very smart people from all over the world have in recent weeks thrown out multi-billion dollar ideas and schemes to solve or at least treat people who are victims in this crisis, particularly in Africa. All these ideas merit close attention and will undoubtedly be discussed at the upcoming special session of the UN General Assembly. Missing in the discussion, I fear, is a sense of what's really happening in the hardest hit countries of the world particularly in Africa.

I have been following this epidemic since it began 20 years ago, devoting much of my life to its impact in Africa. The numbers, horrific as they are, cannot capture public health reality. It is a reality in which an 81 year old grandmother in the village of Chebe, Uganda takes me on a stroll of her tiny banana grove, pointing out mounts of stones under which lie the AIDS victims that once were her husband, 10 out of 12 of her children, and 18 of 32 of her grandchildren. With nothing to trade or eat but bananas, she is now raising 23 orphaned grandchildren all by herself. And she is no exception. From house to house in her village and in hundred of villages like it, it is the same.

Africa, which never before in its history had trouble absorbing its occasional orphans into larger clans or coping with the dire straights of individuals in its midst, is following apart. Today, orphan girls of 9 or 10 years of age in Bunazi, Tanzania, are raising 4 or 5 younger orphans some of whom are not even distantly related to them. These girls cannot afford to pay for schooling, not their own and not the schooling of these children. They are themselves functionally illiterate. They cannot pay to transport the youngsters to clinics for immunizations nor do they understand fully why these injections necessary. Let's watch for the great measles epidemic to return to Africa. Most important, they cannot explain to the young ones, who are the Ndebele people, the Shona people. They cannot tell them stories of their ancestors, the spiritual meaning of things, the hopes and the legacies of their people.

It's more than just individuals who are dying; it's entire cultures perishing, right before our eyes, while we sit comfortably here in this chamber. The scale of it far exceeds the World War II Holocaust or any of the great human slaughters of recent history. It is without a doubt the singularly most devastating event in human history. The forecast: no, there will not a cure or a vaccine anytime soon. Barring some dramatic intervention. we can see a grim, terrifying future. In Africa, half of the sub-Saharan nations now have HIV prevalence that exceeded 8% of their populations and at least 10 nations have rates above 20%.

Where is the belt shaped curve in this epidemic? The natural plateau and then that downturn event that is typically seen with infectious diseases? So far, we see no sign of it. Even in areas of Africa, where in excess of 40% of the population is now infected. Could this actually continue to grow further? Could some African nations experience 90% infection rates in 2 or 3 decades of the future? India and China, with their billion plus populations could well outnumber Africa's carnage within a decade. So prevalence rates in those Asia nations might well remain below 5%. The Russian Ministry of Health has forecasted between 2005 and 2010, some 10 million Russians will die of AIDS, most of them under 29 years of age. And the prevalence in Russia they say by 2015, will exceed 12% of the total population. That's equivalent to Uganda's current estimated prevalence.

Earlier this year, the CIA released its forecast for 2015. AIDS, the CIA says, will decrease the GDP of most African nations by 30 %. For countries that will have HIV prevalence rates in 2015 that exceed 10% of their populations, AIDS care and control cost will eat up in excess of half of their national health budgets. And life expectancy, the subject with which I opened my remarks today, in hardest hit countries falls by some 30 to 40 years compare to 1988 levels. That is the CIA forecast. It won't be just the virus that shortens their lives. It will be the complete collapse of all public health systems, starvation due to the destruction of the agriculture sector and secondary epidemics of TB and childhood preventable diseases.

What are we going to do about it?

Thank you.

Environment and Health in the 21st Century: Meeting the Challenges of a "Globalized" World

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How can current environment and health professionals

deal with a rapidly changing world, where humans can now circle the globe in two days and transfer computerized information in nanoseconds, where vast riches exist beside abject poverty, where "modern" diseases like heart disease, cancer and stress are increasing before the age-old diseases like diarrheas and respiratory infections have been conquered, and where 90% of health research is directed toward 10% of the world's population? All of these extremes are more pronounced in the developing countries where the bulk of today's populations still lives. How can information transfer help bridge these gaps?

Top Ten Diseases and Conditions (1998) By DALYs

	World			Developing	
Cause	DALYs (1,000s)	Deaths[b] (1,000s)	Rank	DALYs (1,000s)	Deaths[b] (1,000s)
1. Acute lower resp. infections	82,344	3,452	1	80,990	3,146
2. Perinatal conditions	80,564	2,155	2	78,544	2,102
3. Diarrheal diseases	73,100	2,219	3	72,742	2,212
4. HIV/AIDS	70,930	2,285	4	69,907	2,253
5. Unipolar major depression	58,246	0	5	51,217	0
6. Ischemic heart disease	51,948	7,375	6	42,447	5,492
7. Cerebrovascular disease	41,626	5,106	8	36,407	4,213
8. Malaria	39,267	1,110	7	39,267	1,110
9. Road traffic accidents	38,849	1,171	9	34,293	1,029
10. Measles	30,255	888	10	30,067	882
Total of Top Ten	567,129	25,761		535,881	22,439
Grand Totals[a]	1,382,564	53,929		1,274,259	45,897

[a]Top ten and remainder. Totals may not add up due to rounding
[b]In this table, refers to premature deaths

SOURCE: *WHO (1999b), pp. 85-115.*

Many solutions to health problems exist outside the health care system and are currently being missed because we tend to deal with single diseases or apply single sector solutions to multi-sectoral problems. A look at Acute Respiratory Infections (ARI), currently the top cause of death, disease and disability in the world, can help put this into perspective, in particular how the energy sector can complement the health sector. A literature review on air pollution suggests that the bulk of the literature helps deal with ambient (outdoor) air pollution, whereas the bulk of human exposure occurs indoors. Despite impressive progress in addressing Indoor Air Pollution (IAP), considerable gaps and challenges still exist; two are key:

Energy-Environment-Health Links

Main Energy-Environment-Health Benefits and Pertinent Sectors

Health Problems that can be reduced *High Risk Groups*	Energy Sector	Secondary Sector
Main health problems globally		
(a) Respiratory disease from indoor air pollution (established), plus (b) TB, cataracts, lung cancer, heart disease (evidence not yet confirmed) *Children at most risk of mortality; women, elderly and men of morbidity*	Improved stoves to reduce health risks; shift to less harmful fuels; health education	**Housing:** ventilation; **Health:** health care; **Transport/Solid Waste:** air pollution mgt. for outdoor sources going indoors
Diarrheal diseases from poor quality water and insufficient water for personal hygiene *Children, most risk of mortality; others of morbidity*	Energy to pump water; fuel to boil water	**Water:** water supply and waste management; **Health:** health care
Plus main health problems in SSA		
HIV/AIDS: Implementation of SSA strategy to combat AIDS *Project workers, especially work crews away from home, are at greatest risk of contracting and spreading AIDS*	Facilitate health sector efforts to reach high risk groups, esp. work crews.	**Health:** outreach to key audiences to help energy companies with no in-house competence for prevention
Vector-related diseases from production, distribution and use of energy from dams *(a) Malaria: General population at risk; (b) schistosomiasis: occupational from fishing (mainly men), laundry (mainly women and girls); bathing (all), and recreational (mainly children and teens)*	Dam and water management; health education	**Health:** preventative (spraying) and curative measures; **Infrastructure:** water and drainage management; **Agriculture:** dams, irrigation management
Plus potential for unknowns		
(a) Physical stress, injuries, accidents from fetching biomass fuels; (b) burns from using them *(a) Burns: Children at greatest risk; (b) injury: women at greatest risk (incl. miscarriages), followed by men and children; (c) malnutrition: possible risk to children and elderly from absence of cooked meals*	Improved access; better stoves; shift to non-biomass fuels; health education	**Health:** curative and preventive measures; **Housing:** better stove construction, ventilation and siting

• Diseases and conditions related to IAP are underestimated, as well as their economic effects, especially for women and children (and the elderly, which are not addressed in the literature). Preliminary calculations show that by looking beyond ARI, the basis for many health and economics statistics, we could virtually double potential health benefits by calculating the effects of other diseases of the lung that would be reduced simultaneously by the cutting exposures to smoke, e.g., TB, asthma, bronchitis, lung cancer, etc. Other conditions which result from gathering and using wood fuels, such as cataracts, injuries and burns, and exposure to vector-related diseases (e.g. malaria due to dams), could increase the benefits accordingly but they have not been related statistically to improved energy, IAP and ARI.

• Many potential solutions have been neglected because of a stress on technology. These cover a wide array, from cooking procedures to consuming less energy (e.g., soaking beans overnight) to consumer preferences (cooking, heating,

Focus on Individual Diseases Can Underestimate Burden of Disease

Diseases Linked to Indoor Air Pollution

Disease	Level of Evidence
Acute respiratory infections (ARI)	Strong
Chronic respiratory disease	Strong
Lung cancer	Strong
Blindness	Moderate
Tuberculosis	Moderate
Cardiovascular disease	Suggestive
Asthma	Suggestive
Peri-natal effects	Insufficient

SOURCE: *Kirk R. Smith and Sumi Mehta, "The Burden of Disease from Indoor Air Pollution in Developing Countries;" May 2000; pp. 12-13, and Annex E for % Est. of BOD.*

Top 5 Diseases and Conditions for Sub Saharan Africa (SSA)

Rank and Share of the Burden of Disease in SSA (1990-98)

Rank and Share of the Burden of Disease	Percentage 1990[a]	Percentage 1998[b]
1. AIDS	2.8	16.6
2. Malaria	9.2	10.6
3. Diarrheal diseases	10.9	7.5
4. Acute lower resp. infections	10.2	7.0
5. Perinatal conditions	6.5	6.2
Subtotal of top five	39.6	47.9

SOURCE: *[a]Murray and Lopez (1996), pp. 561-64. [b]WHO (1999b), p. 115*

Focus on Health Care System, Not Necessarily Source of Problem

Infrastructure Measures for Top Five Burdens of Disease in SSA

Disease/Condition	Type of Infrastructure Remedial Measure
1. AIDS	Outreach to high-risk groups, such as truckers, work crews, and market-related groups
2. Malaria	Vector control, and sanitation and drainage
3. Diarrheal diseases	Improved drinking water supply and waste management
4. Respiratory disease	Improved housing and air pollution abatement of indoor and outdoor sources
5. Perinatal conditions	(Remedial measures handled primarily through the health ministry. Some hygiene education possible through outreach to infrastructure groups.)

Focus on Health Care System and Individual Diseases Can Miss Many High Risk Groups

Occupational, High Risk & Vulnerable Groups for Energy

Activity	Potential Health Risk
Gathering traditional (biomass) fuels	Accidents, exposure to disease vectors, physical stress for women, children and men
Fuel use, e.g., cooking, heating, lighting	**Cooking:** Exposure to indoor air pollutants (e.g., upper respiratory diseases, cataracts, TB, lung cancer); risk mainly women for cooking, incl. children with their mothers; accidents (mainly burns) risks to children and the elderly; **Heating and Lighting:** exposure to air pollutants (see above), household fires; risks to whole family
Traditional energy, e.g., charcoal preparation and sales	Extremely high occupational exposure to charcoal dust from bagging and sales (e.g., upper respiratory diseases and lung cancer)
Modern energy (LPG)	Accidents, explosions (e.g., mainly burns)
Modern energy transport	Truck calamities

Neglected Social Aspects Include

- about half the world's population still cooks with biomass fuels, often in poorly-ventilated houses.
- whereas cooking is a relatively minor end-use of energy consumption in industrialized countries and E. Europe, it is the largest home energy use in developing countries,
- in SSA 70-85% people depend on biomass (80% firewood, 20% charcoal)
- about 85% of the population has access to electricity
- main cooking fuels are: liquid petroleum gas (LPG), biogas, kerosene, efficient charcoal, charcoal, household coal, wood, crop residues, and animal dung.
- as people move up the economic ladder, they change heating and lighting fuels, but not necessarily cooking fuels, which follow later, by as much as 10 years
- major consideration is low conversion efficiency of biomass stoves; traditional stoves convert energy at about 12-18% efficiency rate, producing high levels of pollution
- indoor pollution from biomass combustion in eight countries studied ranged from 4-90 times the WHO standard pollution guidelines
- building fires in sheltered areas
- making smaller fires
- dowsing them, instead of letting smolder, reusing fuel
- keep wood dry (burns cleaner)
- change cooking habits, e.g., soak beans overnight

lighting, entertainment, refrigeration, water heating, etc.), to possible malnutrition (from not boiling water or preparing hot meals) . Although a handful of studies discuss household responses to energy shortages, relatively little exists on promotion of behavioral change at the community level.

These comments refer to the energy sector and are drawn from broader work at the World Bank, *Environment and Health: Bridging the Gaps,* but could be applied to other diseases and sectors as well. Many of these potential health problems could be drastically reduced merely by better information exchange to foster collaboration among agencies.

Definitions used in this paper:
SECTOR: discipline, area of economic activity
ENERGY: provision of clean burning fuels for cooking, heating and lighting from household to national levels
DALY: "disability adjusted life year" (1 DALY = 1 lost year of health life)

Reducing Cost Uncertainty and Encouraging Ratification of the Kyoto Protocol

Dr. Richard Morgenstern
Senior Fellow, Resources for the Future
Washington, D.C.

Thank you very much. I'd like to thank the World Information Transfer and the governments of Greece and Ukraine for sponsoring this important event.

I'd like to begin with a short story about an American businessman, whom some of you may know of. His name is Sam Walton and he is the founder of the large chain of stores referred to as the Wal-Mart chain. And at one time he

Poor Representation on Health, Possible Consequences from the Absence of Health in Decision Making

Event or Document	Sample Health Issues	Responsible Agencies	Agencies Not Consulted or with Minor Input	*Possible* Health Consequences
Health excluded by other sectors				
203 World Bank infrastructure projects	Contaminated water, indoor air pollution, vector-related diseases, and injuries	Infrastructure (water, sanitation, housing, transport, waste management, urban management, and telecommunications)	Health	Diarrheal diseases, respiratory diseases, vector-related diseases, injuries, and so on
World Bank "Green Top Ten," lead by phase out of lead in gasoline in 5 years	Lead pollution, false sense of security in dealing with part of lead problem, and no health input into funding lead substitutes	Environment, urban development, and transport.	Health	Lead "replacements" can cause equal or worse health damage. Focus on gas can overshadow other more serious lead problems
Kyoto Climate Change Conference	Several indirect effects, e.g., respiratory and vector-related diseases	National governments, environment, and the private sector	Health was not part of the official agenda	Fuel price changes: (a) use of cheaper fuels could negatively affect respiratory disease and (b) economic analysis of dams could expand dam construction increasing schistosomiasis (and possibly malaria)
Other sectors excluded by health				
203 World Bank Insurance industry hurricane analyses	Injuries and deaths from storms, physical and mental stress from loss of home or job, and so on	Private sector, national and local government, infrastructure (water, housing, transport, and telecommunications), and emergency services	Health	Insurance industry calculates property damage, but not health factors covering a wide range of conditions, e.g., sickness to suicide
WHO Malaria Rollback Initiative	Help confront drug resistance, changes in breeding patterns, and spread of habitat	Health	Infrastructure (transport, housing, water, waste management), and agriculture	Missed opportunity to diminish malaria even more
The Pan-American Health Organization Disaster Preparedness Conference		Health and disaster	Infrastructure (transport, housing, water, and waste management)	Poor maintenance makes public infrastructure more vulnerable to severe weather.

SOURCE: *Authors' data and Listorti (1996)*

was thought to be the richest person on earth. Before his death some years ago, he was asked the secret of his great financial success and being a man of few words, he thought for a moment and then said, "Good decisions." And of course the interviewer felt that that was too brief an answer, so the interviewer came back and said, "Well, Mr. Walton, how did you come to make these good decisions?" And his answer was, "Experience." And again the interviewer felt that this was really not quite a fulsome response, so the interviewer persisted and said, "Well, where did you get the experience to make the good decisions?" And of course the answer was, "Bad decisions." And in the field of environmental policy, we have many years of success, many years of good decisions, and we also have a few mistakes to our credit. And I think we have to recognize that as we continue to press on for new solutions to important problems.

My remarks today focus on climate change and in particular on the Kyoto Protocol, but what may come next after the Kyoto Protocol. We have heard today from a number of speakers, Dr. Durbak, Ms. Spyraki, both touched on the health aspects associated with climate change. They are well known to this audience, the long-term consequences as well as many of the short-term gains that may accrue from reducing greenhouse gas emissions. I'm not going to dwell on the health side. I'm an economist, and I'm going to focus on the mechanism of the Kyoto Protocol and in fact, what might as I say, what might follow it.

Now, the Protocol has been an effort, as we all know, that has involved about 180 nations of the world. This has been an endeavor that has taken many, many, many years of effort, of person years of time and effort, attending many meetings, developing many concepts, and trying to come to a workable solution. The truth is, at The Hague last year, we learned that the Kyoto Protocol was in trouble. And certainly President Bush's remarks in the recent weeks have only further cemented the fears of many of us who have worked hard to try to make this a workable solution. At this point, it is unclear what will happen. President Bush was quoted in today's *New York Times* actually as saying that he is taking the problem very seriously and that he is developing a serious plan. Now, I don't know the content of that plan, and I suspect that no one in this room knows the content of that plan. But, if we were to take him at his word, what would a serious plan that was not the Kyoto Protocol, what would it look like? And I'm going to try to sketch a little bit out for you what I've been thinking and what some of my colleges at Resources for the Future are on this question.

First of all, a little perspective. We have to recognize that the Kyoto Protocol at its best was an international agreement that was not, I repeat not, backed up by specific, credible domestic policies. And that statement certainly applies to the United States and in truth, it applies to just about every other nation of the world. This was an agreement that was forged at the international level but there was not a clear, concrete specific understanding of what steps countries would take to genuinely meet the targets that were laid out in the Protocol. And I think in the end, if any one factor contributed to its demise, it was probably the fact that there was not a concrete domestic component and politicians fundamentally didn't know what they were going to do when pressed into action. Now, the alternative to an international agreement which is backed up, or not backed up I should say, with specific domestic policies, is to have specific domestic policies go first and then try to develop an international approach based on these specific domestic policies. Such an approach has been referred to as "pledge and review." It has also been referred to in certain other contexts as a "policies and measures" approach. Whatever lingo you use, what ever label you put on it, the fundamental point is that it starts with a specific domestic policy.

Now, what I'd like to do, and I've got a few slides to illustrate, is to lay out an idea that several of my colleges and I have been working on, that would enable the United States and any other country that was interested in it, to proceed with a domestic approach that would start us down the long road of emissions reduction. As you can see my colleges are listed there as Ray Copp, William Pfizer and Michael Tomen, all of us are at Resources for the Future.

The first point is simply that as we continue to meet, as we have international conferences on the question of climate change, emissions continue to grow. The question is, what can we do to actually begin the process of reducing those emissions? In the case of the United States, our emissions in 1998, the latest year in which we he have data, are more than 10% above the 1990 level. Other countries have a somewhat similar story.

What we are proposing is an emission permit program. And the US, or any other nation that were so motivated, could require that permits for the release of carbon into the atmosphere be required. And we could begin this fairly quickly, and there would be three key features of this approach. Number one, it would have broad coverage, and I will come back to explain what I mean by that. Second, it will be a modest goal, not a goal that is frightening to people. We need to start. This is a long-term problem and we need to have a modest beginning. And third, that there is an equitable, and I emphasize the word "equitable," burden sharing among people within a society who are making the sacrifices to reduce emissions.

The way to have broad coverage is to impose a permit scheme upstream. Upstream means at the point where carbon enters commerce. It means at the wellhead for oil, it means at the mine mouth for coal, and it means also at the wellhead for natural gas. And we would propose that anybody who endeavors to sell any of these products, which are ultimately the source of all carbon dioxide released into the atmosphere, be required to obtain a permit at this upstream point. This is the very first point that these fuels enter commerce.

These permits would be based on the carbon content of the fuel. And as is well known to this audience, coal is the most carbon intensive fuel that we have. It's approximately twice as carbon intensive as natural gas, for example. And oil lies about halfway in between. So these permits would be

based not on the number of tons or the number of gallons, but they would be based on the actual units of carbon contained in each quantity of fuel.

Next we would develop a target. And to start off with, we would propose that we set a target equal to the 1990 level of emissions. As I've said, in the case of the United States we're more than 10% above that at the moment, but we set the 1990 level, and curiously, that is the number that is embodied in the Framework Convention on Climate Change that was ratified by just about every country of the world, including the United States. So this is something that has already been accepted by leaders of the world. Now, the problem with putting a permit on something that is as important as carbon to the functioning of our everyday economy is of course that the value of this permit will rise. It will become a scarce item. In the United States it will become extremely scarce. And there is concern among many people, consumer groups, industrial groups, that a rapid rise in prices would be very dangerous and damaging to the economy and to the society. So, what we are proposing is that we cap this price in order to prevent these permits from becoming too expensive. And our idea is to cap it at 25 dollars per ton of carbon, beginning in 2002, that's next year, and we would see it rising, this cap price would rise, at 7% a year in real terms. So if you play that out for about 10 years, the price would double to about 50 dollars per ton of carbon. 50 dollars per ton of carbon, by the way, is equal to about 12 cents a gallon of gasoline, just as a frame of reference.

Now, the question is, these permits that are going now to have considerable value, 25 dollars, or more than that as they augment over time, how do we hand them out? Do we just give them away to people? Well, our proposal is not to give them away because they have genuine value. Our proposal is to sell them. And we would propose that the US Treasury conduct an auction, and they make these permits available in a standard market framework and the people who would need them in order to conduct their business, which would be of course coal producers, oil producers, and natural gas producers, that they would buy then at auction. Now of course, since we've set a maximum price of 25 dollars, and then that would rise as I indicated, we know that the auction price will not be above 25 dollars because no one will pay more at auction than they would pay at the cap level. Now you say, how do we implement the cap level?

Actually, the way we would implement it most simply stated, is that we would allow additional permits to be sold at 25 dollars. So the initial level of 1990 would be auctioned off, and then additional permits could be sold. They would have that maximum price of 25 dollars plus the escalator.

Now, the auction would generate revenues. A considerable amount of revenues. We estimate on the order of about 30 billion dollars in the case of just the United States. And we would anticipate refunding these revenues to people, like you and me. We would hand them back to households largely, on the basis of an individual basis. That is to say a household would be entitled to a pro-rata share of these revenues. There are a few other details but I'll skip over that for now.

If you'd like additional information on this proposal, the specifics, a few more of the details, it is available at our website. *Weathervane* is an electronic journal that we publish, and so the address is www. weathervane.rff.org.

Now, just to tie this together, what we would do is, we would imagine a country like the United States, potentially, starting such a scheme. And other countries would be welcome to start such a scheme too. Over time, we would observe how different countries do. Some countries may take a different approach. They may pledge some other set of policies. But we would observe how much emissions were reduced, we would observe what the costs of emissions reductions are, and over time, countries could evolve towards a worldwide agreement based upon genuine experience. In my view, this approach has a lot of appeal. It seems like these are difficult decisions for countries to make, and they are more likely to make them if they can design a system that is compatible with their own domestic economic and political concerns.

So I conclude by saying that I hope President Bush is serious when he says that he is taking this problem seriously. And I think that there are many ideas out there, this is one of them, that could be followed, that could start the world down the long road of reducing its greenhouse gas emissions. Thank you.

Globalization, Population Growth and Sustainability: Challenges For Society and Rotary's Role

Prof. Dr. R. J. Radermacher
Ulm, Germany

The author of this paper describes development trends, opportunities and risks for future international development, drawing on his experience in doing consulting work for European policymakers and in carrying out high-tech projects in the field of information and communication technology. One central observation is the assertion that the current worldwide processes are not sustainable, despite the enormous, new technical potential involved. This applies primarily to the topic of ecological and social stability in times of economic globalization under the conditions of a worldwide free-trade regime. Critical areas are primarily the overuse of important natural resources, mounting environmental problems and social exclusion associated with continued economic growth and a growing world population. The aspect of population growth is regarded as an especially serious topic.

This paper argues that sustainability requires in this context social innovations in addition to technical innovations. In particular, we need a better world order in the framework of a global contract, which would address the

social, cultural and ecological aspects of sustainability–including ways to co-finance international development–in addition to the usual economic aspects. The involvement of international civil society, in particular, the major non-governmental organizations, will be absolutely necessary for achieving progress in this direction.

The paper then tries to organize all these thoughts into a balanced perspective for sustainability.

II. Commemoration of the 15th Anniversary of the Chernobyl Nuclear Disaster April 26, 2001

Message from H.E. Mr. Harri Holkeri

President of the Millennium Assembly, 55th Session of the United Nations General Assembly for World Information Transfer on the Occasion of the 15th Anniversary of the Chernobyl Nuclear Disaster

On this occasion of the 15th anniversary of the Chernobyl disaster the international community commemorates the explosion of the nuclear power plant, which was finally closed less than six months ago, in December 2000. By far the worst disaster in the history of nuclear power, the accident had many dimensions and consequences. It resulted not only in severe environmental and health impacts, but also in social, psychological, and economic emergencies.

Total effects of the accident may still not be known, even 15 years after the event. Follow-up surveys on the long-term effects of the magnitude of Chernobyl require formidable financial and human resources. Therefore, pooling of expertise through cooperation is essential. The role of the UN in assisting the international community through its agencies has been an important one in provision of safe agricultural land, on mitigating the psychological effects of the accident and in many other aspects. Fifteen years after Chernobyl, we realize that more needs to be done.

Looking at the future, beyond this anniversary, we should prioritize our actions in researching, monitoring and securing the safety of older nuclear plants currently in operation. For the future of our global village, we should be able to answer its call for stringent disaster-prevention measures, and functioning emergency crisis management systems, where radioactive materials are being, or will be, processed. Regulations on illicit trafficking of hazardous materials, and securing the safety of nuclear material transport are also of high importance.

Close to Earth Day celebrations on 22 April, we recognize the lessons of Chernobyl. Therefore, it is my sincere hope that the international community will succeed in its efforts in preventing similar accidents from happening again–anywhere in the world.

Statement

Mr. Kenzo Oshima
Under-Secretary-General for Humanitarian Affairs,
United Nations Coordinator of International Cooperation on Chernobyl

Distinguished Chairman, Excellencies, Ladies and Gentlemen. It is a great honour for me to be here with you today. As the United Nations Coordinator of International Cooperation on Chernobyl, I would like to thank World Information Transfer (WIT) as well as the Government of Greece and the Government of Ukraine and the organizing committee, for convening this very important event.

As a child of Hiroshima, I am particularly interested in the subject which will be discussed at the WIT conference. Today, we commemorate the 15th Anniversary of the worst nuclear accident that ever happened to humankind, and I would like to invite you to observe a minute of silence for those who lost their life as a result of this tragic accident.

Over the past 15 years, many Belarussian, Russian and Ukrainian citizens have endured the hardships of living in a contaminated land. In the face of an invisible danger, they persevered in their efforts to return their families and communities to a state of normalcy. Many of the victims were not even born at the time of the accident, but still face the physical, psychological, environmental and socio-economic consequences. They have shown admirable courage in their efforts to mitigate the Chernobyl impact and save their children. But only an international response can address the far-reaching consequences of such a trans-boundary disaster.

Let us recall the most recent developments related to Chernobyl. It entailed serious sacrifice for Ukraine to decide on the closure of the Chernobyl plant last December. Not only did Ukraine lose part of its energy production but also hundreds of Ukrainians lost their livelihoods. In addition, the country needs to spend large sums on the reconstruction of the structure that encases the shattered No. 4 reactor and the radioactive fuel inside. By closing the Chernobyl plant, Ukraine has made the reduction of nuclear risk a priority, accepting the financial consequences.

As we think about the economics of the Chernobyl catastrophe, we must remember that technology is a double-edged sword; it has vastly enriched human life but also holds the potential for massive destruction. The public should be made aware of the inherent danger of new technologies, which should be weighted against economic benefit. Safeguards against technological hazards, emergency preparedness and radiation containment are expensive tools that some countries cannot afford to develop on their own. I wish to emphasize the importance of both technology transfer and technological hazards preparedness. Protecting our environment has a price. In order to reduce the vulnerability of the population to future accidents, Governments and communities must continue to commit resources to emergency preparedness. Governments must invest in sensi-

tizing their constituencies to the preparedness measures. In this context, I would like to pay tribute to the International Atomic Energy Agency, which has played a valuable role in the Chernobyl situation. Countries must support IAEA's work to promote the international safety regime and to enhance nuclear preparedness.

While containing the problem and preventing any further leakage, the international community has not fully addressed the challenges of the disaster in the human dimension. Enormous resources are still required to address the social, economic, health, environmental and psychosocial effects of the Chernobyl accident if the human cost of the accident is to be mitigated. Thanks to the generosity of many countries, the construction of the Sarcophagus should be entirely completed by 2005.

The socio-economic rehabilitation of the Chernobyl-affected areas has long been a priority of the United Nations, but these needs have become more pronounced in recent years. To better address them, development agencies, such as UNDP have agreed to become more involved in the rehabilitation of the local economies. An inter-agency assessment in the coming months is planned to provide the necessary facts for agencies to develop programmes tailored to the current needs of the affected communities. I intend to convene a donor meeting as soon as the new programmes are formulated. While in Ukraine last week, I met with the Ministers of Emergencies from Belarus, the Russian Federation and Ukraine who agree that the United Nations should adopt a more developmental approach in dealing with the Chernobyl issue.

I want to take this opportunity to stress again the absolutely crucial role of non-governmental organizations in this work. Of those NGOs that bring tangible assistance to the affected areas and of those NGOs that help to mobilize and advocate for this assistance. Without your help and without your deep involvement, any assistance provided will not be adequate.

I will continue to do all I can from the UN side to advocate for Chernobyl victims and mobilize resources to implement the priority projects which were presented in 1999 to the donor community. A few donors have made donations to the Chernobyl Trust Fund and I will try to ensure that more is done to empower the people of Chernobyl and to make their villages beautiful places again.

Together we must struggle to keep Chernobyl on the international agenda until the health, environmental, economic and social effects of the catastrophe are adequately addressed. To this effect, my office has organized a number of commemorative events in Geneva and New York. This morning, the UN Peace Bell rang for the Chernobyl victims. Tonight, the Deputy-Secretary-General will open an art exhibit "Black Wind, White Land–Living with Chernobyl" which through photos and artwork will serve as a reminder of the continuing suffering in the affected areas of the Belarus, the Russian Federation and Ukraine. And your conference and its focus on Chernobyl provides the intellectual and substantive contents of our efforts to mark the 15th anniversary of this accident. To mark it not as an event that shattered our lives, but has receded into our collective memory, but as an event which still need to be addressed and which continues to call us to action. Only through joint action will we be in a position to say that we have done our best and that perhaps some tangible assistance has reached the people still suffering from Chernobyl.

Thank you.

Keynote Address

H.E. Mr. Valeriy Kuchinsky,
Permanent Representative of
Ukraine to the United Nations

At the outset I would like to extend my warmest greetings to all those who have gathered here in New York, and to express our sincere appreciation to the co-organizers of the conference, the Government of Greece, World Information Transfer, Children of Chornobyl Relief Fund and the DPI, whose joint efforts made this event possible.

Since ancient times the spring has been a symbol of hope and optimism, anticipation of the prime of life, the season of merry holidays and joyful events. Regretfully, for people of Ukraine the month of April is associated with the event, which remains a heavy burden in the hearts of all its citizens. I am recalling the accident at Chornobyl nuclear power plant, which left its relentless mark not only on the present generation, but also on the future ones.

More than 50 million Ku of radioactive substances were released into the environment. The area contaminated in the result of the accident covers 50,000 square km. in Ukraine alone. The total surface of contaminated agricultural lands reached 3.5 million ha, over 1 million ha of forests were exposed to radioactive contamination. The real threat of long-term pollution of the Dnipro river, which is the main source of water supply for more than 35 million of residents of Ukraine, is still looming over the nation.

The disaster affected about 3.5 million inhabitants of Ukraine who have been subsequently taken under the state social protection, more than 1 million children among them. More than 75,000 people have become invalids.

The assessment of medical and biological consequences of the disaster is one of the most complicated tasks. It is connected with versatility of its impact including, on the one hand, objectively measurable radiation doses and levels of environmental pollution and, on the other hand, socio-psychological factors, which are not a subject for quantitative analysis.

The real growth of sickness rates and worsening of the psychophysical state of the population of the country become more and more conspicuous year by year. The most disturbing is the fact that the number of cases of thyroid gland cancer among children has increased more

than ten times versus the pre-disaster period.

It is still unclear how the consequences of the Chornobyl disaster will affect the genetic and immunity status.

Even today, 15 years after the catastrophe, it is hardly possible to evaluate full range of its long-lasting impacts. This disaster continues to cause radiation damage, significant material and financial losses. Probably the most tragic effect is the constant fear of the people for their lives and health, for the fate of their children and grandchildren, for the ecology of the lands and forests, seas and rivers, subterranean waters. Past experience of accidents, even unrelated to radiation, has shown that the psychological impact may persist for a long period. It can be expected that its importance will decrease over the time, but I doubt that we could register any significant changes in the nearer future.

The President and the Government of Ukraine are taking consistent steps towards minimizing and mitigating the consequences of the Chernobyl catastrophe. The historical significance of the closure of the Chernobyl nuclear plant on 15 December 2000 was widely recognized internationally and reaffirmed by the Secretary-General's statement and unanimously adopted resolution of the General Assembly. By taking this important, though economically and socially difficult decision, my country demonstrated its strong commitment both to the Ottawa Memorandum on the closure of the plant, and made the substantial contribution towards achieving global nuclear safety.

It was a difficult decision both from in view of the condition of the national economy, especially of the energy sector, and in view of social consequences of the power plant's closure for its personnel and people whose lives are closely linked to Chernobyl. The closure of the power plant is not the conclusion of the Chernobyl item on the global agenda, it is rather the beginning of a qualitatively new stage of addressing the Chernobyl-related problems.

Further implementation of the G-7/Ukraine Comprehensive Program for the Closure of Chernobyl, which is the attachment to the Ottawa Memorandum, will require substantial financial resources estimated to be more than 2.3 billion US dollars for its next 10-years stage. To address the problems, arising from the closure of the Chernobyl nuclear power plant, Ukraine needs substantial resources, which it is incapable of mobilizing alone. These problems can only be addressed through joint efforts of Ukraine and the international community as a whole for transforming the Chornobyl NPP into an ecologically safe system.

Unfortunately, a very serious problem with the nuclear fuel (about 180 tons) and fuel-containing material concentrated in the "Shelter" facility has not been solved yet. No easier heritage is more than 800 radioactive wastes burial spots. Their transformation from temporary facilities into long-term system for radioactive wastes storage is a technically and ecologically complex task to be accomplished on an urgent basis.

We have to acknowledge that today we cannot definitely answer some questions of vital importance. Is it possible in principle to mitigate the aftermath of the Chornobyl disaster? What time do we have for this? How much will it cost? What will happen if we do nothing or postpone the solution of these problems till indefinite future? We can assert that the scope of the catastrophe, its uniqueness and versatility have become a real challenge for mankind. Realizing the need for drawing considerable material, financial and labour resources, we believe that the key factor should be the strengthening of international cooperation, attraction of a number of high-skilled specialists and new technologies for resolving these problems.

The Chornobyl accident created unique opportunities for comprehensive scientific researches of nuclear and radiation disasters in natural conditions. The unique experience of the efforts for minimizing the consequences of the Chornobyl catastrophe is the asset of the entire humankind. Recognizing its responsibility for maintaining and most effective utilization of the Chornobyl NPP, the Government of Ukraine is rendering maximum support to the international community in studying, generalizing and utilizing this unique expertise.

To this end, five years ago the Government of Ukraine initiated the establishment of the International Chornobyl Center on the problems of nuclear safety, radio-active waste and radiation ecology (ICC), which on the basis of the relevant international agreements serves as a focal point for cooperation with other countries, in particular, the United States, the United Kingdom, Japan, France and Germany.

The standing partners of the ICC include leading scientific centers and laboratories of the G-7 countries, the Russian Federation and the Republic of Belarus. Participating in the activities of the ICC they have elaborated and employ transparent and effective mechanisms of international interaction in studying and solving the Chornobyl problems, utilizing the available funds. The Government of Ukraine will continue to promote favourable working environment for the Center, in particular by providing tax benefits.

The ICC played a substantial role in providing scientific and technical support for the decommissioning of the NPP. The Center is the most powerful research institution in Slavutich and it creates new jobs for the former Plant's engineers.

The Government of Ukraine is grateful to the Governments of all the countries–partners of the ICC, which put their efforts into the creation of the Center, continue to take part in its activities and to promote its further development. However, the successful and comprehensive solution of the whole set of the problems of Chornobyl requires the ever more focused attention of the international community and all-round strengthening of the international cooperation on Chornobyl.

On our part, we are ready to share although very bitter, experience, gained over these years and I would like to take this opportunity, on behalf of the Government of Ukraine, to call upon the Governments of other countries of the world, international organizations, financial and research institutions, all individuals who are not indifferent to the global problem of overcoming the consequences of the largest technological catastrophe in the world's history, to render their support to the activities of the International

Chornobyl Center with a view to enable it to continue to fulfill its important mission for the benefit of the whole international community.

Finally, I would like underline that we cannot afford weakening our joint efforts aimed at combating long-lasting consequences of the Chernobyl, not only for the sake of the victims of the catastrophe, but also for the sake of future generations, to whom we should leave the world, free from the risk of new nuclear disasters.

That is why we hope that our consideration of the issues of interdependence of health and environment, which are of vital importance to our country, will encourage the international community to make one more step towards turning the Earth into environmentally-sound planet inhabited by healthy people.

I would like to thank the organizers of the Tenth International Conference "Health and Environment: Global Partners for Global Solutions" and express confidence that this representative forum will be instrumental in solving vital issues on its agenda.

Thank you.

Statement

H.E. Mr. Sergey Lavrov
Permanent Representative of the Russian Federation to the United Nations

Madame Chair, Mr. Under-Secretary General, Ladies and Gentlemen. Let me express my deep appreciation to the organizers of the Conference for their efforts to commemorate the 15th anniversary of the worst technological disaster of the 20th century–the Chernobyl nuclear power plant accident which affected many countries, but mostly–Ukraine, Belarus and Russia.

The magnitude of the catastrophe, as it affected the Russian Federation, is illustrated by the following figures. More than 1.8 million people, including 300 000 children, still live on contaminated territories in the Russian regions of Bryansk, Kaluga, Orel and Tula. More than 350,000 Russian citizens took part in the clean-up operations and elimination of the consequences of the disaster at the Chernobyl nuclear power plant and 40,000 of them became disabled afterwards. More than 50,000 people were displaced. More than 20,000 hectares of arable lands and more than 60,000 hectares of forests are still unsafe for use.

The number of people with thyroid cancer began to increase about five years after the accident and continues to rise at a rate, which exceeds scientists' forecasts. Very little is known about the long-term health effects of exposure to radiation. The full consequences may be revealed after a lengthy period of time. Thyroid cancer and most other forms of cancer would not start to show up for at least 10 years after the accident, and might well take another 15-20 years to materialize.

We should not also forget about other aspects of the problem, such as environmental, psychological and social effects of the accident on the leaving in the affected regions population, which are no less important to the health and well being of its residents.

Despite complicated social and economic situation especially in the early 90-s the Government of the Russian Federation has been doing its utmost to cope with the aftermath of the tragedy. Within the framework of large scale rehabilitation efforts more than two million square meters of new housing were built, hundreds of schools, hospitals, clinics, thousands of kilometers of roads and gas pipe-lines as well as a number of industrial units, mainly for the processing of agricultural products, were constructed.

Considerable work has been carried out to decrease irradiation of the population. Within the framework of the assistance programmes for the people exposed to radiation carried out in 14 regions of Russia various measures of medical, radiological and social protection are being implemented. Rehabilitation and recreation of safe living conditions in the contaminated areas continues to be a top priority.

A number of Federal programmes has been put to work in order to protect people affected by radiation, especially the most vulnerable groups such as children and so called "liquidators" who risked their lives during the first days after the accident trying to reduce the magnitude of the disaster. The total federal budget allocations for Chernobyl programmes for the period of 1992-2000 exceed 6 billion US dollars.

We are sincerely grateful to the world community for its continued efforts in providing relief assistance for the three affected countries, which is no less urgent today than 15 years ago. Tangible work has been done through a number of relief projects complementing our own efforts and seriously contributing to the solution of these problems.

As for the specific today's needs for the affected regions of Russia, first of all it is modern medical equipment, medical supplies for rehabilitation centers for "liquidators" and affected population, assistance in conducting thyroid gland screening of the population etc.

It is worth mentioning that all projects specified in the Interagency Chernobyl Appeal and Programme complement the on-going Russian federal programmes and thus can be implemented through co-financing schemes.

Statement

H.E. Mrs. Madina B. Jarbussynova,
Permanent Representative of the Republic of Kazakhstan to the UN

Madame Chairman, The tenth International Conference on Health and

Environment has special significance, since this event coincides with the 15th anniversary of the Chernobyl tragedy. 15 years ago the severe accident happened at the Chernobyl nuclear power plant which was a major technological disaster in terms of the magnitude of humanitarian, environmental, socio-economic consequences and problems of common concern. This catastrophe has had a negative impact on the lives of people of Ukraine, Belarus and the Russian Federation, as well as numerous members of the rescue teams from the Republics of the former Soviet Union including Kazakhstan, who came to Ukraine to participate in the elimination of the consequences of that accident.

For all these years, the UN system, donor States, multilateral financial institutions and non-governmental organizations have been constantly supporting the efforts made by the three states to mitigate and minimize the consequences of the catastrophe. In cooperation with the Governments of Ukraine, Belarus and the Russian Federation, the United Nations has promoted the interagency programme of international assistance to the affected areas. In April 1999, it launched the United Nations Appeal for International Cooperation on Chernobyl, recognizing the long-term nature of the consequences of the disaster. The donor States, the Group of Seven and the European Union in particular, contributed to the Shelter Implementation Plan aimed at securing the environmental safety of the sarcophagus covering the destroyed reactor. It goes without saying that the activities of the International Chernobyl Centre have played a key role in enhancement of the capabilities of the international community to study the consequences of such accidents.

Joint efforts of the international community and the Governments of Ukraine, Belarus and the Russian Federation have promoted certain improvement of the situation in the affected area. Their fruitful activities have resulted in adoption by the UN General Assembly of numerous resolutions on this issue, including the last GA resolution, entitled "Closure of the Chernobyl nuclear power plant", which welcomes the decision of Ukraine to close the Chernobyl nuclear power plant on 15 December 2000.

I think that it is highly important for the international community to implement this resolution on providing further effective support to Ukraine, Belarus and the Russian Federation in mitigating the consequences of the Chernobyl disaster. We should take into consideration the long-term nature of these consequences which continue to affect the health of the people living in this area and also keep in mind that the Government of Ukraine faces the newly emerging socio-economic problems as a result of the closure of the Chernobyl nuclear power plant.

I would like to emphasize that the problem of Chernobyl is especially relevant for my country. The former Soviet Union initiated the nuclear testing range by exploding a plutonium bomb on 29 August 1949 in the Semipalatinsk region of Kazakhstan. Tests continued in the Semipalatinsk test site (which was called the Semipalatinsk polygon) for more than 40 years. The explosion of over 500 devices profoundly affected the population of that area and destabilized most aspects of its life. The President of the Republic of Kazakhstan H.E. Mr. Nursultan Nazarbaev closed the testing range by his decree in 1989.

Nearly 50 years after the first bomb was exploded, the UN General Assembly recognized the seriousness of the situation in the Semipalatinsk region. In December 1997 it adopted the resolution on this issue providing the support of the international community to Kazakhstan in its efforts to meet the needs of the population of the region affected by the testing of nuclear weapons. This helped my Government to formulate an overall action plan to address the humanitarian, ecological and economic problems of the region. During the international conference on Semipalatinsk held in Tokyo in 1999 an integrated Semipalatinsk Relief and Rehabilitation Programme was introduced by my Government to the donor States which was comprised of 38 priority projects in five areas of concern: health; environment; economic recovery; humanitarian assistance; information and advocacy.

The rehabilitation of the Semipalatinsk region remains a matter of utmost importance to my Government as the current situation in the region is still complicated. The last report of the Secretary-General on this issue states that, due to the consequences of nuclear explosions, the population remains extremely vulnerable and is not in a position to meet the economic, social and ecological challenges. The experts from Japan carried out a radiological evaluation of the former Semipalatinsk nuclear site and arrived at conclusion that the present level of radiation there is 600 times above normal and is equal to that in Hiroshima after the nuclear bombing.

Having said that, I would like to emphasize that my Government is looking forward to continuing coordination by the United Nations system of the social, economic and ecological rehabilitation of the regions affected by radiation. Technical knowledge and expertise of the United Nations in the areas of health, ecology and economy are particularly valuable for the countries which suffer the consequences of the ongoing transition period. Further support of donor States, international financial institutions and non-governmental organizations in improving the situation in those regions is also highly commendable.

Thank you, Madame Chair

Statement

Mr. Shashi Tharoor
Interim Head, UN Department of Public Information

Excellencies, Friends and NGO colleagues. Today is a somber occasion. Many of us have just attended the solemn ringing of the Peace Bell outside this building to commemorate the 15th anniversary of one of the darkest

tragedies the world has known.

On 26 April 1986, at 1:23 a.m., the people of Chernobyl were exposed to radioactivity 100 times greater than the Hiroshima bomb. Clouds of radioactive material were blown northward through the sky. The accident directly affected over 7 million people, including more than 3 million children, and it contaminated a total area of 155,000 sq. km. Years later, babies are still being born with no arms, no eyes, or only stumps for legs. The unprecedented nuclear accident at Chernobyl has also had terrible and wide-ranging consequences. Fifteen years after the catastrophe, the area around Chernobyl remains a major environmental and humanitarian disaster zone.

Three countries were, and are, especially affected by the nuclear accident: Belarus, Ukraine and the Russian Federation. Seventy per cent of the radiation is estimated to have fallen on Belarus. As a result, 23% of its territory and population was seriously affected. 20% of the forests are still contaminated and a large agricultural area still cannot be cultivated.

In Ukraine, almost 3.5 million people have been directly affected by the accident, 1.3 million of whom were children. Sadly, several hundred thousand children continue to live in contaminated territories.

In the Russian Federation, approximately 57,000 sq. km, with a population of 2.7 million, were contaminated. This figure includes over 200,000 participants in the emergency work, 46,000 of whom are disabled today.

These countries are the victims; but the responsibility for helping them surmount their suffering cannot be theirs alone. In the face of this ongoing tragedy, the Department of Public Information is pleased to co-sponsor this segment of the World Information Transfer Conference on Chernobyl: "Economics of a Catastrophe". I would like to thank Christine Durbak for her work in putting this commemoration together. We in DPI have followed the drama of Chernobyl closely over the years. Our news centre regularly features updates on the efforts of the international community to deal with the long-term effects. And indeed, we have no doubt that the events of April 26 1986 will have to be addressed by all of us for many years to come.

In a message on this occasion, Secretary-General Kofi Annan declared that "Together we must extend a helping hand to our fellow human beings and show that we are not indifferent to their plight."

The United Nations Under-Secretary-General for Humanitarian Affairs, Mr. Kenzo Oshima, has taken a leading role in international cooperation and assistance efforts in his capacity as United Nations Coordinator of International Cooperation on Chernobyl. The United Nations Inter-Agency Task Force on Chernobyl is one of the principal international coordination mechanisms together with the Quadripartite Committee for Coordination on Chernobyl, which consists of the ministers responsible for Chernobyl-related affairs and the Chernobyl Coordinator.

The Task Force includes the United Nations agencies involved in Chernobyl-related assistance, as well as other major international organizations working in this field. Several on-going programmes receive limited financial support from the Chernobyl Trust Fund administered by the United Nations Office for Coordination of Humanitarian Affairs. In 1999, the Fund had a balance of $170,000, more than half of which was a loan. This is a disappointing state of affairs. Immediate support is required from the donor community to replenish the Fund if urgent and vital needs are to be met.

Yet the news is not all bad. Today the radiological conditions in the area surrounding Chernobyl have largely improved. Some of the credit must go to the international community's commitment to improved nuclear safety at Chernobyl, and more recently to the decision by Ukraine to close down the Chernobyl nuclear power plant on 15 December 2000. However, the human consequences of the accident remain painful. Significant needs remain in the areas of health and environment, the most pressing area being psychosocial rehabilitation. Various United Nations programmes aimed at addressing the human consequences of Chernobyl have been chronically under-funded for many reasons. The Chernobyl accident is neither a traditional emergency nor a developmental issue. Problems of psychological trauma still persist, and the socio-economic impact of the accident has not been fully appreciated.

Much more must be done to address the outstanding needs and to encourage local planning for the future of the most affected region. We at the UN urge Member States, multilateral institutions and private donors once again to support priority projects on Chernobyl. The resources that have been requested are the minimum required to mitigate the calamitous human consequences of the Chernobyl disaster. To show solidarity with the Governments and the people of Belarus, Ukraine and the Russian Federation, which continue to carry the burden of the accident, the international community must continue its efforts to help ease the pain of the unprecedented catastrophe at Chernobyl.

For our part, we at the Department of Public Information will continue to do our best to enhance world public awareness of the consequences of the Chernobyl disaster and to stir the conscience of humanity in order to help protect future generations.

Today we shall hear first hand about these ongoing humanitarian, environmental and scientific efforts to cope with this disaster. We must not allow Chernobyl to fade from public awareness. We require accurate, up-to-date information to keep the public alert to the ongoing trauma and to help generate the political will among world leaders to tackle the continuing challenges. This has been the challenge that today's co-organizers, the World Information Transfer, have chosen to meet, and we appreciate this NGO's efforts over the years. Our speakers today will provide us with the information and input that will help rekindle our awareness and point the way forward.

Thank you.

Statement by The World Health Organization

Keith Baverstock, PhD
Regional Advisor,
Environmental Radiation and Public Health
WHO Regional Office for Europe

> ***"Few will have the greatness to bend history, but each of us can work to change a small portion of events....Each time a person stands up for an ideal or acts to improve the lot of others or strikes out against injustice, he or she sends a tiny ripple of hope."***
>
> Robert F. Kennedy

1. The Accident

On the 25 April 1986, the Chernobyl reactor No 4 was due to be shut down for routine maintenance. However, before shutting down the reactor it was to be used for tests to do with the emergency shutdown and implementation of emergency cooling. For various reasons the tests were delayed and the reactor placed into an abnormal operating state. It was when attempts were made, in the early hours of the morning on Saturday 26 April, to prepare the reactor for the tests that an abnormally large excursion occurred, leading to an explosion. This removed the lid of the reactor and the roof of the building housing it and resulted in a fire that burned for several days. The accident resulted in the release of the greater part of the more volatile fission products that had accumulated in the reactor core.

It was in Southern Belarus, Northern Ukraine and Western Russia that fallout was heaviest, leading to a very heavily contaminated region within 30 km radius of the stricken reactor. The fallout that was measured after the accident and used as the basis for planning the response to the accident, is mainly that from the long-lived isotope of Caesium, ^{137}Cs, with half-life of 30 years. These measurements do not reflect the large depositions of the isotopes of iodine, mainly ^{131}I, which, being very volatile, was released predominantly in the first few days of the fire. With a half-life of only 8 days, few reliable measurements were made, but the contamination resulted in the very significant increase in thyroid cancer now being observed in these regions.

^{137}Cs increases the exposure of the whole body of those living in contaminated regions by both exposing them to external radiation and, through eating contaminated foodstuffs, to internal radiation. For these reasons, the area within 30 km of the reactor is not inhabited now and will not be so for several tens of years. Outside this area are zones, called strictly controlled zones, which are contaminated to a lesser extent and where clean food is imported, thus, resulting in lesser exposures.

The contamination of Caesium extended throughout much of western Europe although that beyond the three most affected countries is quite patchy and was probably mainly the result of rainfall at times when the fallout cloud was present in the air. Areas now affected by ^{137}Cs include parts of Lapland and some areas in the UK. In Lapland, reindeer are subject to control due to high levels of ^{137}Cs. Their sources of food are largely limited to lichens, which concentrate the Cs. In the UK, marginal upland pastures, where sheep are reared, retain the Cs in the soil and, thus, in the pasture. In these areas sheep are still subject to control, and are expected to remain so for the next decade. Also, according to recent reports, fish have retained relatively high levels of Cs in lakes in Nordic countries.

2. Health effects of the Chernobyl accident

A sufficiently large exposure to radiation can lead, within days to a few months, to death. As the core of the stricken reactor was exposed by the explosion those most immediately and closely concerned with responding to the disaster, e.g. firemen, were at greatest risk. In all some 200 persons were suspected of severe radiation exposure compounded by both thermal and radioactivity induced burns. Of the 200, 28 died due to their injuries including the acute effects of radiation.

Radiation can also cause cancer and hereditary effects, that is, illness in future generations. It is a basic tenet of radiobiology, the study of the health effects of radiation, that no dose of radiation, however small, is without a risk of health effect. In other words there is no threshold of dose below which radiation exposure can be assumed to be entirely safe. As we are continuously exposed to natural background radiation, some of the disease that we see around us must be due to that radiation. Best estimates suggest that a few percent of cancer is due to natural background radiation. However, natural radiation is ubiquitous and cancer such a common disease (affecting up to 30% of the population over a lifetime), that it is not possible to identify those cases of cancer caused by natural radiation. Radiation from Chernobyl can be seen as adding to the risk from natural exposures. The important question is by how much is the risk increased.

This is not a simple question to answer as there are not many examples where it has been possible to study the effects of radiation on health from exposures of the type resulting from the Chernobyl accident, that is relatively small doses spread out over long times. Most of our knowledge derives from the inhabitants of Hiroshima and Nagasaki who survived the atomic bombings in 1945. Here the doses were generally much higher than after Chernobyl, and delivered rapidly (in less than a second). By following these survivors we have estimated the risks of exposure to radiation but these results may not necessarily be applied directly to the populations exposed after Chernobyl. For example, a specific kind of mutation, that of instability of the microsatellite domains, has been reported in children of parents exposed to the Chernobyl fallout. The health implications of this type of mutation are not known and the effect is not reported in the survivors of the atomic bombings. This emphasizes our lack of knowledge about the effects of exposure regimens like that from radioactive fallout.

The most prominent health effect, in terms of cancer, to date, has been the increase in thyroid cancer seen in those

exposed in southern Belarus. The United Nations Scientific Committee on the Effects of Atomic Radiations (UNSCEAR) reports 1800 cases among those who were children at the time of the accident in the Ukraine, Belarus and the Russian Federation. Up to the present the number of deaths is thought to be in single figures, but can be expected to increase with time. The cases started to appear 3 to 4 years after exposure. Previous experience of the induction of thyroid cancer in children by radiation had not clearly indicated this early onset, but does indicate that an increased risk of thyroid cancer in the exposed population can be expected for 40 years from exposure. Another unanticipated consequence was the very widespread incidence of the disease, with cases appearing several hundred kilometers from Chernobyl. With some 2.3 million children exposed in the three countries we may expect a total of 6000 to 8000 thyroid cancers. Higher estimates have been made but the evidence to support such claims is weak.

The thyroid cancer is certainly mainly due to the uptake of radioactive iodine in milk to the thyroid gland, where it remains until it decays. For children, with a small thyroid gland, the doses can be very significant from quite low levels of contamination. As a result of this increase, the World Health Organization has revised its advice on the use of stable iodine to block the uptake of radioactive iodine after nuclear accidents. Many countries store stable iodine tablets close to nuclear facilities, but now the WHO recommends that that these tablets are more widely available for children, even in countries which do not have nuclear facilities.

The radioactive iodine may yet be the cause of more ill health. Iodine is concentrated in the female breast, especially of lactating women. The period before appearance of the thyroid cancer of 3 to 4 years is not thought to be typical of solid tumours and may be peculiar to young children. Many cancers take 10 to 20 years to appear after exposure to radiation and so an increase in breast cancer may yet occur in the future.

If the appearance of such large numbers of thyroid cancers was unexpected, the absence of another disease, leukemia was equally unexpected. An increased risk leukemia has commonly been found in irradiated populations, including the survivors of the atomic bombings in Japan. Doses were such, in some areas, relatively close to the accident site, and to some of those workers involved in recovery and clean-up activities, that leukaemia might have been expected. However, there are no clear indications of an increased incidence of leukaemia that could be attributed to the accident.

The now well established excess of solid cancer in the Japanese survivors of the atomic bombings was not fully recognized until the early 1970s, some 25 years after the bombing. In this case detailed study of the exposed population commenced about 12 years after exposure. Initially, it was thought that radiation only caused leukaemia. It will, therefore, be some years yet before we could say, with confidence, what the effects of the Chernobyl accident on cancer incidence have been. It is, however, important to note that no study comparable to the follow-up of the survivors of the atomic bombings in Japan is in place for those exposed to the Chernobyl fallout. Without such a study it will not be possible to speak with confidence about the effects, or the absence of effects, of the Chernobyl fallout.

Neither can the cancer producing effects of Chernobyl be assumed to be confined to the Chernobyl region. A small increase in cases in other parts of Europe will occur but it is most unlikely that it will be "visible" against the background of naturally occurring cancer.

There has, however, been another health effect, the so called psychosocial effect. Generally people fear the effects on their health of exposure to radiation, particularly those exposed involuntarily. Although this effect was well known before the Chernobyl accident, it was seen after the Three Mile Island accident in the USA in 1979, its magnitude and its persistence were not anticipated. One well-known Swedish psychologist described the situation in the Chernobyl region as "an epidemic of stress related disease". The psychosocial effect is of particular interest to the WHO as its definition of "health" extends beyond the absence of disease and includes the presence of a sense of well-being. Thus, living in fear for your health whether justified or not is, in itself, unhealthy.

The psychosocial effect took many forms in the Chernobyl region and beyond. For example, there were changes in diet for fear of exposure to radioactivity in food, there were changes in "illness behaviour", in other words, people went to the doctor for things that, in other circumstances, would not have bothered them, and doctors responded by agreeing that these concerns might have been related to the Chernobyl accident. There was a social element in which those who were able, moved from contaminated regions, leaving them deprived of essential skills in the community. It could be argued that these social and psychological disturbances have been more damaging to health, particularly in the Chernobyl regions, than any other aspect of the accident so far.

What of the future? The Chernobyl accident was the accident that could not happen. A meltdown of an operating reactor with release of the radioactivity to the environment was the "worst case scenario" chosen because it was so extreme and had virtually no prospect of occurring. But it did. And it proved to have had enormous costs, both in financial terms and in social and health costs, in the broadest sense of those terms. It has compounded the problems, particularly of the two smaller countries affected, Belarus and the Ukraine, in the transition to market economies. The costs are, however, not confined to the most affected countries. In the UK sheep meat from certain regions still cannot be sold freely 15 years after the accident.

3. Conclusions

Could it happen again? Unfortunately the answer to that question must be "yes". There are basically two ways of assessing the probability of future accidents. One is a detailed analysis of the engineering aspects of the facility and how frequently its components might fail, a so called fault tree

analysis. The other is to assess past experience and project forward. This second method suggests that a core melt accident is quite a probable event in the next decade, of the order of a 1 in 2 chance. The first approach yields a much lower estimate of risk when based only on component failure, but yields a similar probability if allowance is made for human error, which was clearly a factor in the Chernobyl accident. Of course a core melt does not necessarily mean that there will be release of radioactivity to the environment, as illustrated by the Three Mile Island accident.

Regrettably, not as much has been learned from the experience of Chernobyl as might have been. The economic constraints on the most heavily affected countries and a lack of really effective aid from the international community, leaves much undone, both in terms of humanitarian assistance to the most affected, and in terms of understanding the full health consequences of such accidents. In that latter sense we are all the losers; affluence does not protect against the effects of ionizing radiation. It is still not too late to, at least partially, rescue this situation through the creation of a foundation to fund research and humanitarian assistance. The estimates of the cost of the Chernobyl accident run into tens of billions of dollars. Although the mortality caused by the Chernobyl accident is not and probably will not be, as great as that from many natural disasters, the much more difficult to measure, psychosocial consequences, have taken a very serious toll in terms of well-being for a significantly large population. One of the causes of the psychosocial effect is the lack of knowledge about the health consequences of such exposures.

Some might argue that nuclear power is too dangerous to use. But its risks have to be compared with the alternatives. Energy is required and the waste products of fossil fuel use are also damaging to health. Air pollution and global climate change are the products of power generated from oil, coal and gas; radioactivity is the waste product of nuclear power. In the long run, to be environmentally sustainable, energy must come from renewable resources. Nuclear power, though, will continue, for several decades, to be a component of global energy production, and if the associated risks are smaller then those from fossil fuels the present contribution may even be increased. For nuclear power, however, safety must be of prime importance and preparedness to deal with the consequences of accidents, although essential, is no substitute for their prevention.

Chernobyl Tragedy

Ms. Adi Roche
President, Chernobyl
Children's Project

Chairperson, ladies and gentlemen, it is my great privilege to be here for this conference which marks the 15th anniversary of the Chernobyl nuclear disaster. The Chernobyl Children's Project in Ireland has 70 groups spread throughout our country of volunteers, and that is throughout the island of Ireland, north and south, who firstly fundraise the whole year round to raise urgent moneys for humanitarian supplies and also to bring children to Ireland for rest and recuperation.

Through our 14 aid programs, our goal is to alleviate the suffering and in the process to say to the victims that, "yes, you are our brothers, our sisters. Your plight, your pain is not forgotten." The project and I have worked for the past ten years with the survivors of Chernobyl, and we have witnessed the pain, and we have seen the suffering first hand.

In my remarks about this terrible calamity, I cannot speak with the authority and brilliance of a scientist or of a doctor. I cannot prove my statements with startling laboratory or field test experiments. I can, however, offer you my truth, my witness, of what I've seen and heard over the past 15 years in my daily work with the victims of this tragedy. The people of the stricken regions of Belarus, western Russia, and northern Ukraine, have had to endure 15 years of living in the world's most radioactive environment, in forced displacement, the world's complacency and ignorance. But worst of all, they have had to watch their children being struck down. I cannot keep count of the children that I have met and who have subsequently died, children that I believe have died as a direct result of Chernobyl.

The survivors are facing a demographic disaster which science can't yet completely assess the consequences. Dr. Vladislav Ostipenko, head of Belarus Radiation Medicine Institute, reports, "We are now seeing genetic changes, especially amongst those who were less than six years of age when the accident happened." These people are now starting to have families, so we are witnessing the effects of the disaster move to the next generation. This silent killer, radiation, is threatening the gene pool and the future of the people. Countless lives in the Chernobyl affected areas have been destroyed by death and in health. According to the UN, 7 million are affected, half of which are children. Scientific research shows that the people are faced with soaring levels of infertility, genetic changes, affecting the future of their race. Mortality rates are currently outstripping their birthrates. In Belarus alone, 90% of their children are deemed victims of Chernobyl. Severe damage to the immune system has weakened the body's ability to fight cancer cells. Already in Belarus, they have seen such soaring levels in cancer of the thyroid gland that it is considered to be in epidemic proportions. According to leading thyroid expert, Dr. Demychek in Minsk, he says that thyroid cancer has increased by 2400%. He says, "It is like as if our children have been attacked by radioactive iodine-131."

Let me share a story with you. Last November, when working in Gomel, which is the main Chernobyl zone in Belarus, I came across two young doctors who were trying desperately to help families who were caring for terminally ill children at home without any medicine or proper hospice care. I immediately asked to visit such a family, and I found a nine-year-old boy, Slava, who had cancer of the liver and

also a brain tumor. He was lying in his parent's bed in a very deteriorated state. He was incontinent and in and out of consciousness. Slava lay on the only bed in that one room flat while his parents and sisters slept on the floor. Slava had no painkillers, no incontinence pads, and no creams to ease his bedsores. His parents were doing the best they could, but they had no money to buy what he needed. All they wanted for their son was a death with dignity, a death free from the ravages of terrible pain. I was advised that this family were one of many, and that the doctors had no form of transport to travel between the villages to visit the families. They begged us for two bicycles, ladies and gentlemen, two bicycles, so that they could make their health visits. They also asked for steroids, morphine, and other drugs. There and then we decided to support these courageous doctors and families, and now we have a small hospice movement growing. Just last week, we donated, in addition to the two bicycles, a fully equipped left hand drive ambulance, along with a six month supply of everything they could possibly require to give other dying children some ease and comfort. Friends, Slava died just 2 weeks ago, but his legacy lives on. And in his memory, this now strengthened hospice movement will give to others what came too late for Slava.

It is impossible to say whether we are over the peak of the consequences of radioactive contamination, or whether we are just on the threshold. While this disaster is 15 years old, the consequences last to infinity. Other tragedies are vying for the world's attention, but Chernobyl has been relegated to history. It is our responsibility, however, to speak out. I have visited the contaminated areas of Chernobyl many times. I have watched as hundreds of thousands of people have been made environmental refugees in their own countries. Thousands of towns and villages have been obliterated, wiped off the map, bulldozed into the ground, encased in mountains of concrete in order to suppress radiation levels.

On several occasions, while working in the contaminated zones, I have met with many of the old people who have simply refused to leave their birthplace. I remember at the village of Lypa in Belarus, talking with one such family, and I asked why. The father knelt on the ground. He picked up a fistful of the earth and with tears in his eyes, he kissed the earth and he said these words: "This is the earth of my ancestors. The earth is my soul. If you take me from the earth, you take my soul."

I met one woman and I asked her about Chernobyl. And she replied, "I have not only lost my home, my livestock, my farm. I have lost life. Chernobyl is like a stone in my heart, always heavy, always present." Her husband joins in and he says, "This is the war of all wars. Chernobyl means death, for the song of this village has come to an end."

The images from Chernobyl are different to the deeply disturbing images of war and famine, where you see the immediacy of a bomb or a bullet or of starvation. The war that has been raged on the people of Chernobyl is a silent, insidious, invisible, but deadly one. Despite the final closure of Chernobyl on the 15th of December, the words, "The next Chernobyl will be Chernobyl itself," often run right around my brain, haunting me with the images of a crumbling sarcophagus crashing down on a burnt out reactor, releasing even more radiation than the original accident in 1986. Knowing that only 3% of the original nuclear material was expelled in 86, leaving 216 tons of uranium and plutonium still buried in the exploded reactor, is a chilling reminder that the closure was not the end, but the beginning.

Tall cranes stand forbidding, leaning over the shells of reactors five and six, frozen in time, relics of when time stood still at 1:23 AM on the 26th of April 1986. And yet the tragedies of Chernobyl are not confined to the immediate areas, but rather over the years are gradually spreading far beyond the reactor. One disturbing aspect of the refugee story is how contaminated houses are being robbed of their furniture and of their possessions and sold outside the zone. The houses are stripped, carefully disassembled, and then are sold and rebuilt as holiday homes as far away as the Black Sea. The former villagers see this as a further violation of their homes and of their lives.

Apart from the serious risk of spreading contamination further, another alarming development is the growing movement of refuges from war-torn areas of the former Soviet Union, places such as Azerbajan, Kazakhstan, Uzbekistan. Fleeing from one horror to another, these unfortunate people are moving into radioactive houses in deserted villages. I met one refugee who told me, "I would rather die slowly from radiation than to die instantly from a bomb or a bullet."

And finally, in a startling development, I have recently been advised that new houses are being built in the most contaminated zone, known as the "purple zone." And that people are being encouraged with financial incentives to return to live there. Local farmers are even being directed to start plowing again and start sowing crops in highly radioactive fields.

For this 10th International Conference, as we gather to become global partners and talk about global solutions and offering hope, I would like to speak out on behalf of my organization, and to reaffirm our desire to make common cause with all of those working to alleviate the suffering of Chernobyl. To those governments and organizations and individuals involved in this monumental task, I put forward five proposals.

One, I propose that arising from this conference, we create an umbrella organization that will gather all Chernobyl organizations from throughout the world. By working together, we bring a combined strength to addressing the continued problems of the region. In developing the concept of partnership, I propose a stronger role for NGO's in this process, for we are the ones on the front line, with the experience, the contacts with the victims for Chernobyl. Chernobyl is still in crisis. I therefore propose that we seek special funding for a Chernobyl crisis effort. This initiative, to be implemented through the UN Department of Humanitarian Affairs, which will then call on all govern-

ments to significantly increase their resources devoted to Chernobyl. This vital department needs to be provided with appropriate funds and personnel. NGO's could assist and advise on how such funding could be used.

I call on all governments to follow the good example given by the Irish government, who have an open-door policy for the health needs of the child victims of Chernobyl. I propose that other countries follow the example of the Irish and Belarusian governments in the brokering of adoption agreements. And finally, I encourage each of the governments of the affected countries of Chernobyl, of Belarus, western Russia, and northern Ukraine, to do everything in their power to assist and facilitate all humanitarian efforts from abroad.

I would like to commit, on this 15th anniversary of the Chernobyl nuclear disaster, my organization, the Chernobyl Children's Project, to participate fully in any initiative that would promote this partnership. And I am confident that many NGO's like ourselves would like to be part of that partnership and that our role would be acknowledged and respected.

These proposals would build on the good work of the past 15 years and would go much further in securing a healthy and safe future for the citizens of Chernobyl. And they would help to reinvigorate our efforts as we face a growing complacency and tiredness within governments and within NGOs about the issue of Chernobyl. We must wake the world up to reality, because Chernobyl is with us forever. And on this day, we remember the catastrophe that is Chernobyl. We call to mind the human face of that catastrophe, that suffering, that sacrifice, and also that neglect, that negation of reality. And particularly today, I appeal to us to remember the innocent children.

I leave you with the words of the great Russian writer, Fyodor Dostoevsky, who said, "That no world event was worth the shedding of one child's tear." Too many tears have been cried already. Let our task be to restore joy where there is sadness, hope where there is despair. For the most precious gift in life, is life itself.

Chairperson, ladies and gentlemen, let us today rededicate ourselves to doing everything that we can to protect it. Thank you very much.

Keynote Address—Chornobyl: A Ukrainian Tragedy and an Important Page in World History

Ambassador Professor Serhiy Komisarenko, M.D.
Palladin Institute of Biochemistry
Kyiv, Ukraine

The accident that occurred at 1:24 a.m. on April 26, 1986, at the Chornobyl Nuclear Plant (ChNP) in Ukraine unleashed close to 4 tons of U235 fuel and fission products and became the greatest ecological and technological catastrophe the world has ever known. Fifteen years has provided us ample time to estimate the immediate effect of some of the health consequences, but fifteen years is still too short a time to overview the tragedy with all the outcomes it is expected to bring in the future to the Ukrainian, Belarusian and Russian people.

The accident had a huge and multifaceted impact on Ukraine, Belarus and Russia, which remained part of the USSR until 1991. Multifaceted in the sense that Chornobyl had a profound effect on economic, social, political, health, environmental, and other facets of life. The outcome of the accident revealed the cynical basis of communist ideology, deepened the Soviet Union's economic and political crisis, and contributed a great deal to the disintegration of the USSR. The direct costs of combating the Chornobyl disaster and indirect losses due to the catastrophe are $13 billion and $130 billion respectively, totaling more than $140 billion. The accident also ruined the indigenous ethnographic culture of the region as people from villages, small towns, and even entire regions had to be relocated to various (sometimes remote) locations in Ukraine.

The accident brought about the necessity to immediately evacuate the entire population of the city of Prypiat (approximately 50,000 persons). This was the town that serviced the atomic plant and the town of Chornobyl (approximately 20,000 inhabitants). The accident required a massive effort to stop the nuclear fire that burned out of control for weeks after April 26. It also required the government to construct an emergency shelter over the destroyed reactor No.4, to clean a vast, heavily contaminated area as well as emergency equipment used in the emergency response, and to build a new town relatively close to the disaster site. This new town of Slavytych was needed to house the families of 25,000 workers who had to continue to work in shifts at the nuclear plant. Overall, more than 163,000 inhabitants were resettled between 1986 and 1991 from radioactively contaminated areas.

Though Soviet and Communist Party authorities made many crucial mistakes in dealing with the Chornobyl catastrophe, the existence of centralized authoritarian power with a large industrial infrastructure made it possible to mobilize huge human, industrial and financial resources to combat the consequences of the accident. Among others, the human factor was of utmost importance and a special army of servicemen, both from the military, police and civil services, was formed. These people, called liquidators (about 600,000 from the entire USSR) were responsible for building the shelter, for decontaminating the area around the reactor, etc. The liquidators were among those whose health suffered the most form radioactive fallout and stress.

The total radioactive fallout from Chornobyl was estimated at 50 million curies, which is equivalent to the intensity of radioactivity that would result from the simultaneous explosion of 500 Hiroshima A-bombs. Besides the 30 persons who died shortly after the accident and 134 who

acquired acute radiation sickness, the number of people who have been affected by the catastrophe was in excess of 3.2 million. Among these were 1.1 million children.

The precise negative impact of Chornobyl on the health of surrounding populations is quite difficult to estimate. Underestimation (sometimes approaching panic) was especially prevalent during the first weeks or months after the catastrophe. This clearly had a negative effect on public moral, hindered scientific approaches to the crisis and undermined sound decision making.

Given the various spectra of radioactive isotopes and the various doses of irradiation obtained, we can categorize several groups whose health was most affected:

First, there was the population, which was relocated from the abandoned zone around the ChNP.

Second, there were the liquidators who worked on-site during the time of greatest health risk in 1986-87.

Third, there were the liquidators who worked on-site between 1988-89.

Fourth, there is the population, which continued to live within a heavily contaminated area. Finally, we must consider the impact on the population, which used to live or is still living quite far from the ChNP but which was affected during the first months after the fallout and which was consuming agricultural products and drinking water contaminated with radioactive products.

The most evident and pronounced effect was registered in children suffering from the irradiation of the thyroid gland by 131-iodine as well as by other shorter-lived iodine isotopes. The individual exposure doses of radiation of the thyroid gland in 1986 were from 0.05 up to 40 Gy. More than 1.5 million persons received radiation doses exceeding permissible values (5 cGy for children up to 3 years old and 10 cGY for children of 3-18 years of age). Unfortunately, there was almost no iodine prophylaxis for children around Chornobyl and other affected areas. The result was that during the years 1986-1999 there were 1644 cases of thyroid gland cancer in Ukraine in children at the age from 0 to 18 years old at the moment of the accident (in 1986 there were 16 cases and in 1999 there were 255 cases). These figures are much higher than expected based on prior scientific knowledge.

Besides thyroid cancers, the elevated numbers of breast cancers among women are found as well as deterioration of "general health" and vast appearance of rather profound psycho-somatic diseases within those people who continued to live in the contaminated areas and also in the liquidators.

A team of Ukrainian immunologists in 1986-1988 performed a unique study of immunity in liquidators. It was found that low-dose radiation after Chornobyl (at the level of 255 mSv) caused dramatic decreases in the number of natural killer cells (CD16+, CD56+ cells) in these individuals. There was also a noticeable decline in the activity of these natural killer cells. These cells act as the first natural line of defense against cancer and infections. This immune suppression I named "Chornobyl AIDS". The cause of these disorders and other diseases was mainly combined with (internal and external) radioactivity but also combined with stress and other factors such as heavy metal contamination in the environment.

Now that the Chornobyl Nuclear Plant has been taken out of operation and is being decommissioned since December 15, 2000, it is vital to provide support for Ukraine to combat the entire complex of health, environmental, economical, social and other problems the country is acing on its own.

IAEA and Chernobyl

Dr. Berhanykun Andemicael
Director, IAEA

Thank you very much for this long introduction. I would like to thank the organizers, particularly Dr. Christine Durbak of World Information Transfer (WIT), for inviting me to speak at this solemn 15th anniversary commemoration of the Chernobyl accident. I do so on behalf of the Director General of the International Atomic Energy Agency and I am very pleased to be appearing again in this group. I was also invited to speak at the 10th anniversary and in a sense I feel I am coming back to the family because I have been here before. I am very glad to know that we have distinguished guests here, including His Grace here, and other important guests, and I am very glad to share the panel also with such a distinguished group of doctors, scientists, and people in public affairs.

Well, I would like to congratulate actually the WIT and the Children of Chernobyl Relief Fund on their commendable effort to focus debate on issues of global health and environment with special attention to the consequences of the Chernobyl accident. I think your group has maintained an active interest in this, has kept this very serious problem on the agenda, and I think this is a very significant service that you have been providing.

Now, the Chernobyl accident of course, was the most devastating accident in the history of nuclear power. Looking back at the 1986 accident, the director general of the IAEA, Dr. Mohamed ElBaradei said yesterday, I quote, "The accident had a disastrous impact on life, health and the environment in Ukraine, Belarus, and Russia, and prompted fear and concerns in other nations of the world about the effects of radiation. Chernobyl was a tragic but important turning point for the International Atomic Energy Agency. It prompted us to focus unprecedented energies and resources to assist the affected people and help ensure that such a serious accident would never happen again." This was publicized in a press release yesterday.

Now, the IAEA's involvement in providing support began immediately after the accident and has continued ever since. Within a few days of the accident, the then director general, Dr. Hans Blix, was among the first external visitors to the Chernobyl area to assess the situation and to help mobilize international emergency support. In fact, because he went there just in a few days, he was not even concerned about

his own personal self, about the risks involved. I saw pictures of that visit, he was wearing a special attire and he looked actually like an astronaut. So he was one of the first people on the spot.

Now, in my presentation I do not intend to go into the statistics of the tragic human casualties, both during and following the accident, which are well recorded and widely known. But I wish to stress generally the serious consequences on the long-term physical health of the population of the area, and particularly the people who were children at the time of the accident, among whom cases of thyroid cancer are growing. And I would also like to focus on the serious psychological effects and the negative socio-economic impacts in the three affected countries.

Now, in the introduction at the beginning, Dr. Matkiwsky had sort of challenged me about a study that was done in 1991. What I would like to say is that a number of studies were done, that was actually the first major study done, these were preliminary studies, and the conclusions of the study were not conclusive. In fact, I was very glad to hear from Dr. Becker, he referred to the 1991 study, and he said it actually accurate but of course it was too early to do it.

Now, in this context, what I would like to say is that it's very, very important to take the period in which the studies were done and to understand also under what circumstances they were done. The second point is that if reference is made, it's always good to have a quotation so that we know exactly what was said and in what context it was said. But, I am very glad that this question was raised because it has been raised to me in private also and this gives me a chance to comment on it.

Now, this leads me to emphasize on the value of scientific assessments. There are a lot of scientists, medical doctors here, each one has been doing a study, and we have heard a valuable set of presentations. In science, nothing is really closed. You continue to look at it to see if something was missed. Circumstances may change, and therefore continuous scientific study is indeed to be encouraged.

Now, for the Agency, in order to mobilize emergency and long-term assistance most effectively we at the Agency, together with a number of other concerned international organizations, have relied on a series of scientific studies on the radiological, health, environmental, and socio-economic consequences of the accident. By the 10th anniversary in 1996, the findings of earlier preliminary studies were amplified by more comprehensive studies that were thoroughly reviewed by an international conference cosponsored by the European Commission, by the World Health Organization, and the IAEA. It's entitled, "One Decade After Chernobyl." In fact, I have placed some copies of the study, a small version of the study, on the table. It includes the conclusions of the study. The conference was organized by these three organizations, but in cooperation with the three affected states, the Russian Republic, Ukraine, and Belarus. And also with 6 other international organizations: the United Nations, UNESCO, UNEP, the FAO, the UNSCEAR, which deals with atomic radiation, and the OECD, the nuclear energy agency of the OECD. So this was a huge conference where all of those organizations which have something to do with the scientific work of Chernobyl, the environmental aspects, where the health aspects were involved. So it was not done only by the IAEA, because the IAEA needs support, needs confirmation of the preliminary studies. The report sums up the causes and consequences of the accident and it remains a good scientific basis for preparing assistance programs.

The more recent report for the UNSCEAR for the year 2000, which has been criticized by some, has confirmed the continuing validity of those findings, the findings of 1996 and has updated them, particularly as regards the rising cases of thyroid cancer among growing children. We can thus say that we have acquired a solid understanding of the causes and consequences of the accident but also, I would like to stress also, that we have a very good idea about the immediate measures that need to be taken and that have been taken so far. Now, we know that the measures taken so far are not adequate. Much more needs to be done by the international community to alleviate the consequences of the accident in all areas. And by the international community I mean not only the intergovernmental organizations, but the non-governmental organizations, indeed civil society. And a great deal of useful work is being done in this respect.

Let me now focus on the kind of assistance that the IAEA has been providing. Hundreds of international initiatives are alleviating the effects on the human health and the environment, on the economy of the affected regions. Of the many IAEA projects initiated for the region, the following are of particular importance:

First, regarding food production. In Belarus, the Prussian Blue Project, sponsored by the FAO and the IAEA has helped to save annually over 30 million dollars worth of milk and meat by reducing the cesium contamination in those products. Using a Norwegian technique of adding Prussian blue to animal feed causes the cesium to bind to the Prussian blue rather than its being taken into the animal's bloodstream, to be eventually excreted with no harm done to the flesh or the milk. In Ukraine, a milk contamination plant initiated by the IAEA is capable of reducing cesium and strontium, the levels of cesium and strontium, by up to 80%.

Now, I would like to comment of the restoring of the economic life. In Belarus, the production of rapeseed on contaminated land has been successful because suitably chosen varieties are known to take minimal uptake of radionuclei. Rehabilitation of contaminated land for this purpose has now reached 50,000 hectares. Rapeseeds are valuable in the production of biolubricants for industry and high protein cattle feed. The technical cooperation program of the agency also includes regional projects for the three countries and others in the neighborhood affected by contamination. One major goal is to test and demonstrate the methods to achieve significant dose reduction in radiation-contaminated villages and to rehabilitate forest areas. If these activities are successful, hundreds of thousands of people will be able to come back to their villages and the economy will be revived. This will reduce the burden actually on the

government and on the international community, so it's a worthwhile investment for this kind of project.

Now, my next point is on the decommissioning of the power plant. The recent shutdown of the entire nuclear power plant in Chernobyl is an important milestone for nuclear safety. The IAEA is providing technical advise and support to Ukraine for the safe decommissioning of all the units, in the management of radioactive waste of the plant, and in assessing the radiological integrity of the sarcophagus around the damaged reactor.

Now, region-wide, we are very much active in promoting nuclear safety. We have a number of projects. The Chernobyl accident was caused by design deficiencies and by violation of operating procedures, that is by a combination of technological and human failure. The lessons learned have been a driving force behind a decade of assistance from the IAEA to countries of central and eastern Europe, including the Russian Federation. Much of the work has focused on identifying the weaknesses in the design and in improving the safety of the two types of Soviet made power reactors, particularly the older WWER model and the RBMK model. Extremely useful work has been done to design safety issues on operational safety and on regulatory oversight, which is very important. The Agency's safety issue books, resulting from the lessons learned, are now used internationally as a basis for planning safety improvements.

Now, the Agency has also been engaged in law making and a number of conventions have been adopted. In fact, immediately after the Chernobyl accident, within record time, in 8 weeks, the board of governors was about to adopt 2 major conventions, one dealing with early notification in case of a nuclear accident, and the other one dealing with nuclear emergencies. And more recently we have a framework, a more general convention, on nuclear safety and another convention on radioactive waste. So there's a body of law now developing so that we are beginning to establish a regime in nuclear safety, so this is an important area of activity.

In conclusion, I would like to stress that the IAEA's effort is only a part of a major international effort, supports the extraordinary national efforts being made by the three affected countries. Much has been accomplished but a great deal remains to be done on all fronts. Thus, it's in the interest of the international community, as a whole, to mobilize sufficient resources for its relief.

Thank you very much.

Chernobyl Associated Childhood Thyroid Cancer Status 15 Years Later

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This is the 15th anniversary of the Chornobyl accident which occurred in the newest of the four power reactors in the Chornobyl complex which contained four RBMK reactors. These reactors were flawed in design, had inadequately trained staff, and a poor safety record. The Chernobyl plant is located 90 kilometers north of Kiev at the border with Belarus and was destroyed completely by the explosion and fire. The ruptured fuel elements released many tons of nuclear fuel particles as well as 500 million curies of radioactive elements. As you've heard, there were 32 immediate deaths, 28 from radiation and burns, in addition to 140 individuals with acute radiation poisoning, most of whom were the "liquidators" brought into fight the fire.

The graphite core burned fiercely for 9 days, each day delivering different amounts of radioactive material into the atmosphere, the initial release being the largest. Finally, after 10 days of major efforts, the boron, sand, clay, and lead that were dropped by helicopter, helped put the fire out. And of course, in the absence of containment (i.e. lack of concrete shell over the reactors, as is standard for these RMBK reactors) discharges entered the atmosphere directly.

The plume traveled west and northwest in a circuitous route and over a period of 7 or 8 days deposited radioactivity of various sorts, contaminating vegetation and fodder for cattle. Radioactive particles fell in the early part of the cloud, the vaporized isotopes of iodine somewhat later, and they were washed out of the clouds by intermittent rain. The distribution of the radioactivity was heterogeneous, with many hot spots of activity; some areas had 100 times more activity than land adjacent only a kilometer or so away. Such findings greatly complicate efforts to determine radiation dose.

The first official Soviet announcement of the explosion occurred on May 14th, 1986 but by that time an increase in background radioactivity had been detected by many of the health departments throughout Europe. However, because of delays in the announcement and the official secrecy as well as problems of logistics (as can be understood in the midst of the evacuation of the population of Prypiat and other areas), potassium iodide for thyroid blocking was not readily available and it was given only erratically days after the accident. Potassium iodide is a thyroid-blocking agent. It consists of non-radioactive iodine which fills up the iodine receptors of the thyroid and prevents the accumulation of iodine and radioactive iodine subsequently exposed to the thyroid. This blockade of thyroid uptake of radioiodine in fallout protects the thyroid from radiation. However, despite its effectiveness if given before or immediately after exposure to fallout, less than 25% of the exposed population received KI.

The primary interest in following the accident from the medical and physiological point of view are the iodine isotopes since the thyroid gland accumulates iodine very specifically and uniquely and it uses it to make thyroid hormone. It enters the body primarily though food but it can also be absorbed through inhalation close into the source. Cows absorb the iodine with the foliage they eat, the iodine is accumulated by the milk glands where it is concentrated and secreted in milk. This is the major source

of transfer of radioactive iodine. Children, who, of course, drink more milk than adults get the largest exposure.

We have learned lessons from past experience in the 1930's and 40's with external x-ray exposure to the neck of children used to treat tonsil infections, thymus enlargement, otitis and acne. These exposures have been shown over a subsequent period of 20 to 30 years to cause thyroid cancer in a significant proportion of the individuals so exposed. In this way we have learned of the sensitivity of the thyroid gland, particularly of children, to radiation. However, for a number of technical reasons, radioactive isotopes of iodine in general have not been shown to cause thyroid cancer or nodules except for two unfortunate catastrophes which have taught us too much about it; the first is the Marshall Islands' exposure, following the Bikini tests in the Pacific, and the second is the Chernobyl accident.

Although many other isotopes are discharged in the event of a reactor accident huge amounts of iodine-131 are released. The Chernobyl accident has produced a variety of effects of which you've heard a great deal. Among the non-radiation related effects are severe psychological and social stresses resulting from the dislocation of people forced to move to new home locations and the effects of the transition. The financial burden, has been huge and is a major problem for the government with its inevitable political impact. Of the radiation related effects, 32 individuals died immediately from the radiation exposure but most also with severe burns. Another 200 or so had acute radiation syndrome. About 600,000 or so liquidators were called in to put out the fires and had varying radiation exposure. This group has a variety of vague and not so vague symptoms which are classified. These individuals are in part disabled and unable to work and are supported by government pensions. And of course, all of this has engendered fear of the continuing effects of the accident.

It is important to determine how much radiation exposure there was and just how much radiation did each person's thyroid receive and to determine the correlation of the thyroid radiation dose with subsequent effects. The best way of doing this is by direct measurements, if possible. We were very fortunate that there were almost 500,000 direct thyroid measurements made at the time of the accident. Most of the measurements were obtained with simple radiation monitors that were placed over individuals' necks.

The other source of dosimetry information is meteorological data. We have extensive satellite weather data which is very helpful but the major factor is dose reconstruction by lifestyle analysis, i.e. how much milk people drank, and how much fresh vegetables they ate, and where they were at the various times. From this data mathematical modeling is done to calculate how much of the fallout is in different areas and how much gets to the cow and into the milk. From this we are able to calculate thyroid doses with some accuracy.

It is of interest that rural individuals received a bigger radiation dose than urban individuals. Rural children received an average of 106 centigrade and urban children 44 centigrade in this particular study. The reason for that is that rural children have immediate access to backyard cows and backyard milk, whereas the urban children get their milk through the usual commercial pathways which takes longer for delivery allowing time for isotopic decay.

In September of 1992 a paper in *Nature,* or more specifically, a letter to the editor, reported finding thyroid cancer in children. Over the subsequent years these numbers became more prominent and significant. In Belarus and particularly in Gomel, there was almost a hundred-fold increase in childhood thyroid cancer. Smaller numbers were found in other parts of the Chernobyl area but also increased in Kiev and other distant sites. And year by year the incidence of thyroid cancer continues to increase. 66% of the individuals who developed thyroid cancer were under 4 at the time of the accident and thus were exposed as small children. 31% at age 5-9, and again there's great variation in areas. In most cases the tumor was papillary, a relatively benign kind of cancer, although in 50% the tumor did penetrate to the surrounding tissues. A small number had distant metastases, but some of the tumors were quite large. However, most of these are manageable, are treatable, if they receive appropriate treatment at the right time. A projection of the number of thyroid cancers likely to occur in the most affected population, for children aged 10-14 in 1986, the total number is on the order of 4,000 to 8,000.

Thank you.

Children: Uniquely Vulnerable to Environmental Hazards

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The risk of harm from exposure to environmental hazards is related to a person's age and developmental stage. I will review how children are different from adults and why these differences may make children more susceptible to environmental hazards. I will discuss mercury and ionizing radiation to illustrate these differences, although there are numerous other examples.

Children develop in stages (fetus, newborn, infant, toddler, pre-schooler, school-age child and adolescent.). Each stage is characterized by differences in exposures and susceptibilities. Differences in exposure result from physical location, breathing zone (closer to the ground), greater need for oxygen, calories and fluids, types of behavior, and long "shelf life". Differences in susceptibility are related to organ systems that are rapidly growing and developing.

Mercury is ubiquitous and exists in three forms (elemental mercury, inorganic salts and organic compounds), each with its own toxicity profile. Sources include natural sources and mercury coming from environmental contamination, as

when fossil fuel is burned. Atmospheric mercury deposits in water, where bacteria convert elemental mercury to organic mercury (methylmercury). This is taken up by fish which is eaten by people. Organic mercury is a neurological poison, and is especially devastating to the brain of the fetus. This was illustrated in Minamata Bay, Japan, where there was industrial discharge of organic mercury resulting in high levels of mercury in fish eaten by pregnant women. Mothers who had no or few symptoms gave birth to severely affected children. Babies developed psychomotor retardation, blindness, deafness and seizures over time. "Minamata Disease" became an example of the way environmental pollutants can cause devastating harm to unborn children.

Ionizing radiation includes X-rays and gamma rays. These short waves possess enormous energy, penetrate solid objects and drive electrons from their orbits around atoms causing tissue damage. Fetuses and young children may be especially susceptible. The best estimates of dose-related effects come from studies of the Japanese atomic bomb survivors who experienced a single instantaneous whole-body exposure and from Marshall Islanders exposed to fallout from nuclear weapons tests in 1954.

Children exposed to high doses of radiation can suffer irreversible brain damage. Severe mental retardation was seen among those exposed to the atom bomb while in utero and was related to the dose of radiation and the time of exposure. Mental retardation is apparently due to the interruption in the proliferation and migration of neurons from near the cerebral ventricles to the cortex as observed in animal experiments. Small head size without mental retardation was also seen and was six times more common than is severe retardation. Small head size is due to small brain size and its occurrence without mental retardation is thought to be because of loss (death) of supporting tissue (glial cells). The lowest dose causing severe mental retardation from the atom bomb was far above levels used for diagnostic X-rays.

Persons exposed to high levels of radiation have an elevated risk of cancer. Children exposed to the atom bomb had a higher incidence of leukemia compared to adults. There was an age-related risk of breast cancer with the highest risk seen in those exposed at age 10-19; no increase was seen in those exposed as adults. Children exposed to fallout from nuclear weapons testing at the Marshall Islands showed numerous abnormalities in the thyroid including thyroid cancer. Children exposed to fallout from the Chernobyl disaster developed high rates of thyroid cancer. In all these instances, children were more susceptible than adults.

When thinking about exposures to environmental hazards, it is important to recognize that children are unique and vulnerable and are not "little adults".

Vanishing Borders: Protecting the Planet in the Age of Globalization

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Thank you very much, particularly for the invitation today from Dr. Durbak. It's really a pleasure to be here on such an important day in terms of our collective memory of the history of international environmental catastrophes.

In thinking about my remarks today, I was reminded of the introduction I'd used to a study that I wrote that came out shortly before the Rio Earth Summit and it was about international environmental governance issues. But I started the report by quoting from an interview I'd read with a former Soviet foreign minister, Eduard Shevardnadze, and he was recalling the time of Chernobyl when he said he'd received an avalanche of inquiries from foreign governments, demanding an explanation for the high levels of radioactivity that were suddenly being detected over their territories. To quote a bit from this interview with Shevardnadze, he said was, "That was the day of Chernobyl. Even before we pronounced this name, and even before we revealed for ourselves and the whole world the scope of the catastrophe which it designated, it had already become abundantly clear that from then on, no ecological calamity could any longer be regarded as pertaining solely to that national territory on which it had occurred."

So as Shevardnadze was saying, Chernobyl is clearly a wakeup call to the world about the level of ecological interdependence which exists among us. And that's the broad theme that I'm going to address today, so I'm going to jump up a notch if you will from the very interesting and informed discussion we've been having about the effect of the Chernobyl accident 15 years later to reflect a little bit more broadly on where we've come in the years since in grappling with the transboundary nature of environmental issues at large. In a sense these are many of the issues that are raised in my book, *Vanishing Borders,* which, as was mentioned, was published last year.

In the years since Chernobyl, of course, the number and severity of international environmental catastrophes has simply continued to mount. Just a few months after the Chernobyl catastrophe there was the accident on the Rhine River in Switzerland where a fire at a chemical warehouse led to spills of very serious chemical contaminants into the Rhine River which then, of course, were carried downstream and affected many other countries along the Rhine River's route. Just this past year we had a somewhat similar accident in Romania with the cyanide spill as a result of a mining operation in Romania, contaminating large swaths of the Tisza River, which feeds into the Danube, killing fish for many, many miles and contaminating the waters and indeed ruining the livelihoods of fishermen downstream. So it's become abundantly clear that manmade environmental disasters cross borders with impunity.

But recent years have also led to growing awareness that

what we used to think of as "natural" disasters often have environmental components at their roots. So increasingly, we are referring to so-called "natural disasters" as "unnatural disasters." And in fact a college of mine, Janet Obranovich, wrote a chapter in our annual *State of the World Report* on exactly this theme.

What are some of the environmental issues that are contributing to the rising toll of unnatural disasters around the world? Well, clearly climate change is one of them, with scientists telling us that climate change will cause increases in extreme weather events, such as hurricanes, storm surges and the like, with very large tolls for human beings. Now, the damages caused by climate change are exacerbated by problems like deforestation and changes in land use patterns that make countries particularly vulnerable to the impact of so-called "natural disasters." We saw this very much in evidence when Hurricane Mitch slammed into Central America in 1998, causing economic losses of over 8 billion dollars, which was more than the combined gross national products of Honduras and Nicaragua combined. And this is just part of a broader pattern. The rise of economic damages as well as terrible human suffering as a result of so-called "natural disasters" has climbed steadily in recent years. The economic toll of these so-called natural disasters over the 1990's added up to over 600 billion dollars worth of damages, which was more than 15 times the toll that such disasters took in the 1950's. In 1998-1999 alone, over 120,000 people were killed and millions were displaced as the result of natural disasters. And it's the world's poorest people that often bear the greatest brunt of the fallout from so-called natural disasters.

Beyond the sort of acute disasters that Chernobyl, of course, was perhaps–(tape ends)

–and this has become even more the case in recent years as globalization has really taken hold and with it the very rapid growth in the movement of trade and investment and travel across international borders.

To give you just a couple of examples of some increases in trade that have a very big impact on the health of the natural world, the growth of forest products exports would be one, the timber trade. We've seen the value of forest products exports climb nearly five fold since 1950, reaching 139 billion dollars worth in 1988. And we've seen in many countries such as Malaysia, Indonesia, and the Philippines, there's a very direct correlation, you can see that as countries pumped up their forest products exports they wiped out their flora, to the point that some of these countries have now become net importers rather than net exporters of timber.

Another example of an environmentally sensitive commodity that's increasingly moving across international borders with worrisome ecological effects is rapid growth in fish trade. As consumer appetites for fish have grown, we've seen exports of fish climb nearly five fold just since 1970, reaching about 52 billion dollars worth in 1997. This is a period in which we've learned from the UN Food and Agriculture Organization that all of the world's 15 major fishing grounds are now at or near their sustainable limit.

An additional area with direct implications for human health, which of course has been much of the focus of this conference, where we've seen a rapid growth in world trade with problematic environmental and health fallout, is the rapid increase in pesticide exports over the last several decades. We've seen a nearly 9 fold increase in such exports since 1961, reaching over 11 billion dollars worth in 1998. And it's particularly worrisome that exports of the most hazardous pesticides have also been increasing fast, including some that have been banned or seriously restricted in industrial countries.

One of the implications of the rapid growth in trade and travel that has been set in motion by globalization has been a biological integration of the planet of unprecedented proportions. What I mean by this is that we have species and microbes moving around the world at unprecedented rates, which often causes both ecological calamities as well as human health disasters. On the former of those 2 issues, the first of them, the threat of bio-invasion, what this term refers to is the spread of what are called "exotic species" worldwide, species that are shipped around the world, perhaps in the ballast water of ships for instance. Three thousand to 10,000 aquatic species move around the world everyday in the ballast of ships. And when this water is discharged, the exotic species are discharged along with the water, where they often cause extreme ecological harm and that in turn causes large economic costs. One example would be the spread of zebra muscles in the Great Lakes here in the United States, which has clogged intake pipes and caused billions of dollars worth of economic harm.

Just as exotic species move around the world, we know that microbes do as well, with the result that we're seeing an unprecedented spread global epidemics, something that I would imagine was discussed quite a bit yesterday. Perhaps the most recent example that's received world attention is the spread of foot and mouth disease in the United Kingdom and animal disease, in this case, which has raised awareness, I think, to an unprecedented degree, of the extent to which globalization is making us all increasingly vulnerable to diseases worldwide.

A third category of movements across international borders with major implications to the health of the natural world is a problem that we've called "international environmental crime." And this is actually a subject that I wrote along with one of my colleagues, we wrote a chapter again in our annual *State of the World Report* about it. And what this often comes down to is the movement of contraband around the world that violates the terms of international environmental treaties as well as national environmental laws, but which we're having a hard time controlling, given the rate at which borders are being breached by trade and other forces. One example would be trade in illegal wildlife, which, of course, is controlled under the 1973 CITIES convention on international trade and endangered species. But despite this convention, there's nearly 5 billion dollars worth of illegally traded wildlife that crosses borders every year. This is one quarter of the total value of wildlife trade,

three quarters of which is legal, although restricted under CITIES. And to bring this down to specific country level examples, in Brazil, 12 million animals are secreted out of the country per year, animals for which it's illegal to send them across borders, to trade in them, and 7 million animals are smuggled out of the country of Columbia.

Another type of international environmental contraband is the growth in the movement of hazardous waste across international borders. Of course, we've seen some spectacular examples of this over the last decade or so. Some of you may remember the ship, the Khian Sea, that sailed around the earth for literally years carrying ash from Philadelphia's waste incinerator. This problem is still very much with us. Greenpeace has estimated that more than 100,000 tons of elicit waste entered the country of India in 1998 and 1999, including toxic zinc ash and residues, lead waste and scrap, used batteries, and a range of other contaminants.

Yet another type of environmental contraband that's undermining efforts to protect the global environment is trade in CFC's, chlorofluorocarbons, which of course, damage the stratospheric ozone layer and which are now severely restricted under the 1987 Montreal Protocol on ozone depletion. But, one of the difficulties in implementing this accord has been the growth of the black market in smuggled CFC's. The was particularly a problem in the United States as people had things like car air conditioners that they were still trying to service with restricted CFC's. At the height of this problem in the mid-1990's, an estimated 10 to 20,000 tons of illegally smuggled CFC's entered the United States every year, valued at 150 to 300 million dollars. Customs officials in Miami have been widely quoted as saying that this was the second largest form of contraband moving into the United States through that court, after the illegal drug trade at that time.

So, what I've given you is a quick snap shot of some of the ways in which as we learned through the Chernobyl accident how all kinds of environmental hazards can quickly be spread world wide where they affect the citizens of countries all over the world. We know that that problem exists. The question is, you know, what are we going to do about it? What can the international community do collectively to bring these problems under control? It's, of course, very appropriate that we're discussing this question here at the United Nations, which I think necessarily has to play a central role in helping countries to cooperate across international borders to combat shared threats. And in fact, there is a lot of activity, as many of you know, in international environmental diplomacy that has been taking place within these halls. The first major UN conference on the environment was held in Stockholm in 1972, the UN Conference on the Human Environment. And from that conference has flowed the negotiation of a large number of international environmental treaties, of course also from the Rio Conference in 1992. In fact, the UN Environment Program has recently put together a new tally of how many international environmental agreements exist, and they found that there are about 500 international environmental agreements that are sort of on the books if you will, and that about 60% of these have been agreed to since the Stockholm Conference in 1972.

So we've had a tremendous proliferation in the number of agreements. We've heard about a few related to nuclear accidents specifically just a few moments ago. But it's worrisome that at the same time that the number of treaties has grown, the condition of the planet has seriously deteriorated. We see record levels of greenhouse gases building up in the atmosphere for instance, and unparalleled levels of species extinction and the like. So we know that existing efforts at cooperating internationally on environmental matters has not been sufficient to turn around today's worrisome environmental trends.

Why? Well, there are a range of reasons, but I think if you look at the treaties themselves, they suffer from vague to non-existent commitments, they're often in very sort of general oratory language, they contain very weak enforcement requirements, and they're often plagued by insufficient funding to help countries around the world, particularly those in the developing world, to implement their requirements.

In addition to the situation with treaties, we have the question of the role of the United Nations Environment Program itself, which is a very small agency as these things go, particularly within the context of the UN system. In size, its budget is similar to that of US non-governmental organizations, places like the National Wildlife Federation. And I think that there's a growing sense that if we're going to be able to solve international environmental threats that we're going to need a stronger UN presence in the environmental area. This is in fact being much discussed these days in the run up to the 10th anniversary of the Rio Conference, the Rio +10 World Summit on Sustainable Development which will take place in Johannesburg, South Africa next fall. And in fact, here right now at the UN, as many of you know, the first preparatory committee for this summit is going to take place next week.

So we have kind of a unique opportunity to try to jumpstart some of the processes of international environmental governance so they will be capable of helping the world community reverse ecological decline. In addition to some of the reforms of international institutions I've already alluded to, I think it's very important that people recognize that governance is no longer just for governments, if you will, if it ever was, as we heard earlier about the role of citizen's groups in Ukraine and other parts of the former Soviet Union. All over the world one of the very encouraging developments since the Rio Earth Summit has been a tremendous spurt in the activities of international non-governmental organizations. And one of the benefits of globalization, despite some of the risks that it holds that I discussed earlier, is the fact that it has made it possible for non-governmental organizations to cooperate across international borders to an unprecedented degree. And I think that the very name of our sponsor here today is evidence of, you know, World Information Transfer, this is a key

element of what needs to take place and it's one of the things that globalization has to offer us, is the opportunity to harness new information technologies, internet, and the e-mail, and the like, to help generate the international response that's going to be required to get the problems of global ecological decline and the related challenges of sustainable development on the path towards solutions here in the 21st century.

Just to conclude, to return to the main theme of our discussions this afternoon, it's clear that Chernobyl was a watershed event in so many ways. You know, it was a watershed event for people in nuclear power, it was a watershed event for teaching us about environmental health risks, but it was also a watershed event in terms of helping us understand the cross border nature of the environmental threats we face. And I think that we can only hope that as we move into this new century, hopefully spurred by the World Summit on Sustainable Development next year, that we can finally begin to put in place some of the mechanisms that will make it possible for the countries of the world to work together, to actually reverse rather than simply to continue to bear witness to today's unprecedented biological impoverishment of the planet.

Thank you very much.

III. A New Education for the Next Generation

April 27, 2001

Keynote Address—Global Business: The First Steps in Uniting Nations on the Internet

Jay Walker, President
Walker Digital

Thank you. There is a great deal of excitement both in the US and internationally about the promise of the internet. And a lot of that excitement has focused, if you will, on the commercial applications of the net, businesses, entertainment, things of that sort. But there is an enormous amount of excitement I believe as well in the international community about what the internet might be able to do as an agent for positive change of all kinds, not simply commercial. An agent that can affect the outcomes of real world problems in a meaningful, in an immediate, and in a substantial way. In fact it's the promise of the internet as an agent for change that makes it so exciting, for everybody who uses the net, whether they be business people or in the public or social sectors of the world.

So let's take a look back for a few minutes, and start with what the internet is: it's a network. The term internet, stands for interconnected network. In fact, that's exactly what it is: a network. We don't think a lot about networks because they surround us all the time. We take them for granted. In the last century, 4 great networks have emerged since the industrial revolution. Each has changed the entire world in which we live in. And those four networks today are so much a part of our life we barely notice them unless they stop working. But understanding the power of those networks can give us insight into what the internet might mean for health and the environment, both here and abroad. The 4 networks are as follows:

The first was the electrical network. The network of electricity that surrounds us in this room today is only about a hundred years old. There was no electrical network, in fact there was no commercial electricity a hundred and 50 years ago. The world was a very different place. It looked a lot like the developing areas of the world today, where electric power is scarce, and where human and animal power are the primary sources of energy. We of course in the industrialized world take for granted that the electrical network surrounds us, is available for almost no cost, and is always there when we need it. However, invention and deployment of the electrical network was an enormous agent for change. If we think about health and the environment, and we think about electricity, we see the modern hospital, the doctor's office and tools, in fact the whole idea of healthcare is intimately tied to electricity. Turn off the power and there isn't much in the way of healthcare anymore.

The highway network was the 2nd great network of the last century. It fundamentally changed how we related to one another and our environment. Again, in the industrialized world, we take highways for granted. They seem to be everywhere. But for those of you who have traveled in the developing world, you know how wonderful it is to suddenly come upon a two-lane, paved highway. Highways have changed the whole notion of our environment, not just on the pollution side, where the internal combustion engine has certainly changed the balance of the ecosystem of the planet, but also in our ability to spread out, to get out of the cities, to create a suburban world, to move both in terms of space and as well as in terms of time from industrial centers in the world. And the highway network has led to all kinds of changes in both our ability to access healthcare as well as our ability to both manage the environment as well as degrade it.

The third great network of the last century was the telephone network. Again, the network changed everything around us. The ability to pick up a telephone and call anybody on the network, anywhere in the world, certainly changed our ability to be healthy. It changed our ability to access the healthcare system and of course, it changed our ability to learn or consult with other healthcare professionals. What you just saw recently with remote surgery is a good example of the power of the phone network to transmit images. Think about healthcare without telephones; it would look very, very different than it looks today.

The fourth great network of the last century was the

entertainment network. This is a network that actually calls itself a net as in ABC, CBS and NBC TV networks. The network of entertainment has surrounded the entire western world. The ability to be on television or watch television, to be plugged into the TV network, the music network, the radio networks, have completely and totally altered the landscape of what life is all about in many parts of the world plugged into the network. The entertainment network also has, if you will, a harbinger of what is to come. Because unlike the electrical network, the highway network or the phone network which are mostly physical, and for which infrastructure costs are very substantial, it turns out that the entertainment network had relatively low cost for users. In other words, for the cost of a radio, you could join the entire network and enjoy all of the radio programs at no extra cost. For the cost of a television, relatively inexpensively, you could suddenly be a full member of the entertainment network. That's one of the great lessons of the coming internet.

This big difference between perhaps the internet and the highway system or the transportation system or the electrical system, is that the physical costs to build out the network are much lower than any other world changing network before it. This is true in part because the network sits on top of the phone network, and in part because the phone network is being driven by the wireless telephone. Wireless phone service is rapidly expanding to the point where almost every place on the planet is on the phone network. Some have more bandwidth, more availability than others, but ultimately it is very clear that the telecommunications network will reach everywhere from the most rural village to the most densely populated city. As a result, the internet, which is really the world's first information, two way information network, sits on top of a paid for and well funded network, but it does so in ways that are very different. And though we don't have a lot of time today I'm just going to just focus on two or three of those differences because they will relate to health and the environment so substantially.

The first difference is speed of scale. The internet, or the network of information, scales very fast. Whereas the prior networks required a lot of time to scale, suddenly an information network can scale at frightening speeds. Literally, something that was unknown a week ago can be everywhere on the network in a few days. It's as if a movie, which suddenly appears in 2000 theatres becomes part of the common vernacular. That is the speed of the internet. Your ability to reach millions of people extremely rapidly is a very powerful force. Why? Because in health, an ability to make a breakthrough in health can suddenly be shared across all nodes in the network. Unlike having the limiting physicality of having to build new highways or having to build new power plants or desalinization plants, suddenly the network itself scales very fast. The parallel I use is, if one part of the human brain knows something, then the whole brain knows that same thing. There's no part of your conscious mind that knows something that isn't instantly available to the rest of the mind. That's the same with the internet. Once one node on the internet can know something, all nodes on the internet can know something, which offers enormous promise for how quickly we can disseminate improvements and other information based value.

Another interesting factor in the internet is its non-governmental aspect. Though governments can and certainly do regulate the internet, the fact remains that the internet is primarily a user-driven experience. It is very tough to censor the internet, to the disappointment of many countries. The result is that the typical speed of change which normally had a fair amount of government regulatory aspect suddenly takes on a user, or almost democratic dimension. A problem that was formerly hidden within a country can suddenly become visible across the whole of the internet. The ability to see environmental degradation and not bury it, the ability to conceal secrets of environmental problems becomes much more difficult in a world that is networked, especially once that network can move pictures. You look at the video camera revolution in the industrialized world, there are now over 50 million video cameras, as a result it's fairly hard in the industrialized world to do things in secret. Anything that is visible can be videoed, and those videos can be moved and transmitted. What happens when those videos can be put on the net? What happens when starvation and disease and hunger and poverty are no longer abstract concepts that take place in parts of the world that we don't see, but are concepts that are as close as the closest computer? What happens when you can turn on your computer and you can not only see someone who is suffering but you can reach out and help them directly without necessarily going through the infrastructure and bureaucracy which so often is a problem in reaching people with help.

Suddenly the world is interconnected in ways in which were wholly unexpected, much in the way the printed book had changed the world 500 years ago. Only the written word had that kind of impact, where suddenly you could read about something you couldn't see and you could be motivated to action.

So as we look in the commercial world and we see the rapid speed at which companies are exploiting the internet, I would argue that that is the harbinger of exactly what is going to be coming in the non-commercial world. The ability of businesses to have millions of customers overnight is the same ability for organizations to be able to help millions of people overnight. The ability of news and entertainment to be cast on broad frequencies is the same kind of dynamic that will appear as millions of channels on the internet. I think that in five or ten years, as we sit here at this conference and talk about health and the environment, we will be talking about how the global interconnected network, will radically shape and reshape the landscape of all kinds of information–from how we deliver value to consumers to how we deliver benefits to the world's population.

Thank you very much.

GEF (SGP) Projects in Africa

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Background: The Global Environmental Facility (GEF) is a unique international entity. Its mission, governance, management and internal procedures constitute innovative responses to the spirit and mandate of the 1992 Earth Summit in Rio de Janeiro. The GEF`s mission is the protection of the global environment. It was created to fulfill a particular purpose: the achievement of global environmental benefits through funding programs and projects in four focal areas: Biodiversity; Climate Change; International Waters; Ozone Layer depletion; and those that combat land degradation, desertification, and deforestation as they relate to the focal areas.

The implementing Agencies of the GEF are the World Bank, the United Nation Environment program (UNEP), and the United Nations Development Program (UNDP).

There are 3 types of projects in the GEF program:

• Regular GEF were Governments could apply directly for funding of projects average US $5.5 million and take several years to implement.

• GEF medium sized projects that can be submitted by governments, non-governmental organizations, academic institutions, local communities, and private entities. They require no more than US$ 1 million funding.

• GEF small grants program (GEF/SGP) , it is administered by UNDP. While it is an integral part of the GEF Corporate Business and the UNDP GEF unit, the implementation of the GEF/SGP is decentralized and country driven. The SGP complement the regular and medium sized GEF project funding by providing an access for the direct participation of NGOs, local communities and other small grassroots organization. The GEF/SGP was established according to the principle that unless the local people in every community are involved, the global environmental problems cannot be addressed adequately and with such a small amount of funding maximum US$ 50000 per project, local communities can undertake activities which will make a significant difference in their lives and their environment. However, the GEF/SGP is more than simply a fund to improve small grants to improve the local environment. By raising public awareness, building NGOs network and partnerships, promoting policy dialogue, the program seeks to help create a more supportive environment within countries for achieving sustainable development and addressing global environmental issues. According to UNDP guidelines the principal objectives of the SGP are:

• Demonstrate community-level strategies and technologies that could reduce threats to the global environment if they replicated over time.

• Draw lessons from community-level experience, and support the spread of successful community-level strategies and innovations among CBOs and NGOs, host governments, other agents on a larger scale.

• Build partnerships and networks of local stakeholders to support and strengthen community, CBOs and NGOs capacity to address environmental problems and promote sustainable development.

Taking into consideration the small funds and the ambitious objectives of the program, UNDP establishes strategic framework for the program implementation in step-by-step detailed documents. In each country, a board-based national steering committee provides overall guidance and strategic direction for the programme and screens and selects projects for grant awards. The committee guides the development of a country strategy and establishes country-specific eligibility criteria within the framework of the overall GEF guidelines. Members of the national steering committee serve on voluntary basis and typically represent the government (must approve the program), CBOs/NGOs community, national, academic, scientific & technical institutions and UNDP country office.

A national coordinators is responsible is responsible for managing the implementation of the country program. The coordinators works in close partnership with CBOs & NGOs to help proposal writing visits the sites and advises and ensure sound programme monitoring and evaluation.

GEF/SGP grants are awarded for activities that support community-level action in the following focal areas:

Climate Change Biodiversity International waters

Activities that address land degradation issues-primarily concerning desertification and deforestation can be supported if they relate to one or more of the focal areas.

GEF/SGP grants are not eligible in the Ozone Layer focal area.

Several other activities are eligible for funding under the GEF small grant program as:

• Community based assessment and planning grant. This is a small grant to support pre-project participatory assessment and planning meetings.

• Pilot demonstration activities. This is to test the viability of innovative community-level approaches to global environmental problem.

• Capacity development, this is awarded for targeted technical assistance and training activities which focus on capacity building for NGOs in GEF focal areas.

• Monitoring and analysis, this is to support program monitoring to help identify, asses and document best practices and prepare case studies of GEF small projects.

• Dissemination, networking, and policy dialogue, these issues are important to maximize the benefits of the program. Grants provided for dissemination of the best innovative practices, relevant networking activities, and policy dialogue efforts aimed at promoting a supportive policy environment for community-level action in the GEF focal areas.

In all GEF/SGP projects, emphasis should be on notable community participation, a capacity-building component,

sustainable livelihoods, gender focus, significant participation of indigenous peoples and promoting public awareness of global environment.

The GEF small grant program was launched in 1992 by UNDP and since its start more than 1300 projects had been funded in more than 50 countries in Africa, Middle East, Europe, Asia and Pacific and Latin America and Caribbean. This presentation is about the GEF/SGP for Africa.

Classification of Projects by Focal Area

Types of projects	Climate Change	Biodiversity	International Waters	All
Botswana	7	5	1	
Burkina Faso	7	15		
Cameron				
Cote d`Iviore	30	16	1	
Egypt	20	7	2	
Ghana				
Kenya	13	21	1	1
Mali	5	30	2	1
Mauritius	7	10	6	2
Morocco	2	2		1
Senegal		16	4	
Tanzania	14	2	1	2
Tunisia	5	28	5	1
Uganda		3	1	
Zimbabwe		13	1	

From the above Kenya followed by Tunisia are most active in implementation of GEG/SGP followed by most other African countries then Botswana, Morocco and Uganda came at the end.

The GEF/SGP program in Africa started in 1992 with the pilot phase with workshops conducted for all NGOs in the countries involved and a participatory approach was conducted to discuss different proposals for the grants. The main stress was on capacity building for NGOs and to increase their knowledge about environmental problems. Support for environmental active NGOs was a priority to give them more efficiency in management ,communication and social recognition.

Then in 1997 the program moved to the first operation phase and following UNDP guidelines each country developed a national program strategy build on the knowledge accumulated from the pilot phase with all stakeholders represented and the choice for projects fitting GEF focal area was achieved. After each phase UNDP performed a study of GEF projects and issues from the lessons learned documents with strategic framework more focused on GEF criteria, enhancing capacity building of NGOs, more technical assistance, better monitoring and evaluation, and more effective communication and outreach.

With that wealth of information and sound practices demonstrated and documented from the pilot and first operation stage of GEF/SGP, the second operation phase of GEF/SGP started in 1999 and still in operation now in most of African countries. The Main objective of the second operational phase is to secure the global environment benefits in climate change, biodiversity, international waters through community-based approaches that generates local benefits also.

This approach coupled with UNDP guidelines and strategic framework documents of the program were the key elements in its success globally and particularly in Africa. In fact this program could be regarded as one of the most successful programs of the UN with the non-governmental organizations. This is not due to the major impact on solving the global environmental problems but mainly through raising awareness in the communities at the grass root level and its impact on the national environmental policies and the most effective support of UNDP national offices for capacity building of NGOs and increasing their community outreach to act really as partners with their governments.

The program had demonstrated that the simple creative paradigm, "THINK GLOBALLY, ACT LOCALLY" was effective and stimulating for NGOs in implementing GEF/SGP of UNDP.

References: UNDP GEF—small grant program.

Improving Public Health Through Environmental Health Research

Dr. Kenneth Olden, Director
National Institute of Environmental Health Sciences (NIEHS)
Washington, DC

Thank you very much Dr. Durbak, it's a great honor to be here. The National Institute for Environmental Health Sciences is one of eighteen institutes in the National Institute of Health. The mission of NIEHS is to elucidate, determine the role of the environment in the etiology of human diseases.

Now, we have a very broad mission. I will tell you later that every human illness, almost all, have an environmental component. So we work on diseases as diverse as cancer, Alzheimers, Parkinson's, osteoporosis, rheumatoid arthritis, diabetes, asthma. It turns out that diseases are really caused by three things and I want to convince of one of those today.

First of all, diseases are caused by one's genetics. It's caused in part by one's environmental exposures, or they're caused by behavior, which is incorporated in the definition of the environment and genetics. In other words, behavior is genetically predetermined or it's environmentally acquired. Clearly, age and stage of development is important. So, children and senior citizens are more susceptible to environmental exposure not because of genetics but because of their age or stage of development. So it is important that we understand the interaction between genetics and environment as a function of age and stage of development.

So, it's important that if we want to prevent, and I under-

score prevent, diseases, we're going to have to understand both the contribution of genetics and the environment to the etiology of human illnesses. We will not be able to prevent diseases like cancers, for example, unless we understand the contributions of genetics and the environment. In fact, very few diseases are caused solely by the environment and likewise, very few diseases are caused solely by genetics. The truth is, most diseases are caused by gene-environment interaction.

This is a slide of a quotation by Judith Stern, professor at the University of California that appeared in USA today. And it says, "Genetics loads the gun, but it's the environment that pulls the trigger." That means that one can inherit a genetic predisposition to have a disease but never ever have the disease unless exposed to the environmental trigger. There are a number of examples that you are very familiar with. Let's start with asthma. Asthmatics are not always in respiratory distress-it is rare. But if put in an inappropriate environment asthmatics develop respiratory distress problems and often have to be hospitalized which often results in death. So, asthma is a disease that has a genetic underpin. In other words, asthmatics are genetically predispositioned to be asthmatic, to respond to allergens. However, it's the environment-cockroach allergens, dust mite allergens, acid aerosols, environmental agents that pull the trigger.

Now, the definition of the environment. We define the environment very broadly in the National Institute of Health. It is chemical, physical and biological agents which most people include in their definition of the environment, but you have heard today the environment is more than synthetic, and the emphasis in environmental health research and in environmental health regulatory agencies has been on synthetic chemicals. Natural chemicals are also part of the environment. And just because a chemical is natural does not mean that it is not toxic. So, both natural and synthetic, biological and physical agents are part of the environment, but the environment also includes issues, factors like diet, nutrition, socioeconomic status, behavior. It is everything but your genetic makeup.

I am pleased to say that the NIEHS is now investing supporting research in all of these areas. So it is possible to get a grant from NIEHS dealing with the behavioral aspect of environmental health, as well as all the other aspects.

In 1994, when the first breast cancer gene called BRCA I was isolated by a young man at the NIEHS, around the hallway from my own office and my own laboratory, we were boarding the plane in Research Triangle Park where NIEHS happens to be located. As you know, headquarters for the NIH is in Bethesda, Maryland. As we were boarding the plane in Research Triangle Park to go to Bethesda to have a press conference on this miraculous, exciting discovery–in fact it was so exciting, it was the second most exciting day that I've had in the nine and a half years as director of this institute, and the other was one of our scientists won the Nobel Prize in Medicine or Physiology. But on that day, as we boarded the plane in Research Triangle Park, I asked Dr. Roger Wiseman, what percentage of women who would inherit BRCA I could expect to have breast and/or ovarian cancer.

The going answer on that day, in 1994, was that 85% of women who inherited BRCA I, which was the only one that had been identified, isolated. We've subsequently identified and isolated BRCA II. Dr. Wiseman was also part of that team, and there have been two to four other modifier genes that are also known to be involved and have been identified in breast cancer.

Well, today, we know that it is not 85% of women who inherit BRCA I and BRCA II will have breast and/or ovarian cancer. The number is closer to 40 to 50% of the women who inherit BRCA I and/or II will have breast and/or ovarian cancer.

What happened in the intervening years? Well, we know, first of all, I mentioned, the other modifier genes have been identified. So, they play a role as well. We also know that there are environmental risk factors. In other words, environmental triggers that probably play and important role. Now let me admit, that while we've identified many human carcinogens in animal models, I cannot today tell you what the environmental risk factors are with respect to human breast cancer in humans. But I'm reasonably confident that when the stories end, genetics is going to play an important role: BRCA I, BRCA II, other modifier genes, but the environment will also play an important role.

There was a paper published in the New England Journal of Medicine, in the year 2000. And it really shocked the American public. It was by an author, Lichtenstein, and a number of co-authors. They decided to ask the question, what percentage of cancers, on average, can be attributed to genetics, versus the environment?

The conclusion of that publication, which generated a lot of excitement, was that no more than, on average, 1/3 of all cancers can be attributed to genetics. Well, the conclusion of the press was that it's environmental, but I know that's not correct. The remaining 2/3 contribution to cancers, is due to gene and/or environment interaction. So it is the interaction. The point I am making though is, that the environment plays a role in probably about 2/3 of all cancers.

Well, a similar study was carried out in 1998 on Parkinson's disease. And it was demonstrated using the cohort of twins, both identical and fraternal, veterans of World War II, that demonstrated unequivocally, that only about 15% of Parkinson's disease can be attributed to genetics. The other 85% was attributed to environment or gene/environment interaction. Again, you need the environmental trigger. Since 1998, a lot of very exciting studies have been done with Parkinson's disease. We've developed some very interesting animal models so that we can investigate the etiology and the pathogeneses of Parkinson's disease. We're going to make similar progress with other diseases.

Now, just a couple of the headlines and why so many headlines. They called myself, Rick Klausner, who's director of the National Cancer Institute, Francis Collins, who's director of the Human Genome Institute, to appear on talk shows, to talk about this. You know, it raised the new debate about gene versus the environment. Well, this a

headline out of the Washington Post, and you see what it says, so why was the American people so shocked by the revelation of the article by Liechtenstein and colleges in the New England Journal of Medicine? Because of the exciting breakthroughs, and it may have been exciting, the exciting breakthroughs in the Human Genome Project, over the past 8 to 9 years. People, American public, had been lulled to sleep, thinking that we will have solved the riddle of human diseases once we had the human genome in our computer. Well, what this article by Liechtenstein and colleges said was, "That ain't so."

Now, this is just one of the headlines, this is the Washington Post, and I think this one is out of the Newsweek. New York Times, almost all the weekly magazines had an article, and you can see again, people were surprised by that. Now I suspect there's no one on this panel and certainly no scientist was surprised by that revelation. We always knew that diseases are caused by gene/environment interaction.

Now, let we wind up. Why is it that we have not made, and I will admit that we have not made, the kind of rapid progress in environmental health research that we have made in the human genome effort? Less than 10 years ago, scientists got together and decided that in order to elucidate and understand disease etiology, we first should have the human genome in our hands. In other words, we should sequence and identify all the genes in the human genome. And as you know, that effort is now complete.

Well, environmental health scientists, like geneticists, we were busy in the early years, when I was in graduate school, chasing what we call "red flags." In other words, geneticists were chasing families that had a cluster of diseases, and that was appropriate. Geneticists still do that. Environmental health scientists were chasing one chemical at a time. You know, an occupational exposure, that demonstrated that there were a cluster of diseases, we went in and we investigated. What we had not done in environmental health research, is what the genome people did when they developed the human genome project. They sat down and said, "What is it that we REALLY need in hand to understand the contribution of genetics to human diseases?" And what we needed is just what we got a few months ago, the human genome, in hand.

Well, we sat down a few years ago and asked ourselves, "What do WE need, in the environmental arena, to provide good, sound scientific data for policy makers to make intelligent environmental health decisions as it relates to human health?" And what I will show you, but won't have time to elaborate, on the next 2 slides, is what we've decided needs to be done. We identified 6 or 7 issues that are really important for congress, for the Environmental Protection Agency, for OSHA and FDA, to make intelligent public policy decisions.

One, we need to know information on toxicity. The amount of information that we have on toxicity is very, very small. We need good information on exposure and dose, and we have very little information. As you remember, there was a lot of press and excitement when the CDC, a couple of months ago, released what they called the Exposure Report Card. There was so much excitement about that, because it represented the first data from direct measurements of chemicals in human tissues. Because we typically use indirect surrogates of exposure, we need what CDC did.

The other thing that we need is to re-sequence all of the environmental susceptibility genes, looking for polymorphisms: those changes in genes that make you and I more or less susceptible to environmental exposures. It turns out that we are not all equally susceptible as we assume in environmental regulation. We vary dramatically in susceptibility. The basis for that variation in susceptibility is genetics. And we initiated a project to identify all the susceptibility genes in the human genome.

There's the other three areas; we need good epidemiology, population based studies. We need information related to stage of development, as well as gender differences.

And let me just say that so much of 20th century medicine focused on treating end stage disease. It turns out that we know an awful lot about treatment of disease. We know less about the progression, the pathogeneses of disease, and we know even less about what initiates disease, the etiology of disease.

Now, if you really wanted to prevent disease, where would you start? Not with treatment, not with progression, you would start with initiation. Although, progression is important, and certainly we can prevent death from diseases just by understanding progression.

Well, my colleagues and I wrote an article for mutation research, and we recognized that if you're treating diseases, what you're really doing is treating gun shot victims. What we want to do in our institute is not just treat gun shot victims–but that is important– we need also to understand the genetic and the environmental contribution to diseases, understand the etiology of human diseases.

Thank you very much.

Ultraviolet Radiation and Skin Cancer in the New Millennium

Alan C. Halpern, M.D.
Service Chief,
Dermatology Service
Memorial Sloan-Kettering
Cancer Center
New York, New York

Thank you Dr. Durbak. I appreciate the invitation to participate. I would like share with you some of the details pertaining to this global problem, that is skin cancer, and specifically the implications of ozone depletion.

What I'll go through with you briefly are the different types of skin cancer because one of the things that you'll benefit most from this talk is, if you or a loved one have such a spot, you'll know to bring it to medical attention. And to give you some idea of what these are, what the

scope of the problem is, and how they relate the UV, or ultra-violet, radiation. In that context, a slightly, hopefully better, understanding of what ozone depletion is about, where we stand at the moment in this process and what is happening on a global level, and then end up with just a word or two on sun protection.

Skin cancer comes in two basic flavors. There are three major types of cancer that come in two basic flavors, the pink ones, so to speak, basal cell carcinoma and squamous cell carcinoma, and the typically darkly pigmented ones, malignant melanoma. Dr. Durbak has already mentioned melanoma because it is the more serious of the two and responsible for most of the deaths. However, both types are very significant and unfortunately, a growing problem.

Here's an example of a basal cell type skin cancer, a fairly prominent one, as well as a small squamous cell type skin cancer. These pink types of skin cancers, which love to happen in chronically sun exposed areas such as the face, have a lower potential to spread and kill people, although squamous cell type skin cancers surely do, but they have enormous implications in terms of disfigurement. If not caught until a stage like this, suffice it to say that this would be a very disfiguring piece of surgery. Catching these early is important, and if you have any pink spot that either won't go away or goes away but keeps coming back in the exact same place on your skin, especially if easily irritated, meaning something as simple as towel drying brings it to your attention, then it's very important to bring it to medical attention.

Melanoma as we mentioned is the more serious and typically more darkly pigmented of the skin cancers. The ABCD's for the early recognition of melanoma are these: asymmetry, border irregularity, multiple shades of brown to black, and a diameter that's not large but larger than a typical mole, meaning a little bigger than the size of a pencil eraser. If you have any brown spot changing color, shape, or size, this too is very important to bring to medical attention. When caught in its earliest stages, melanoma is simply cured with a bit of outpatient surgery and leaves a very minimal scar. Missed in its earliest stages, melanoma will unfortunately, in the majority of cases, spread, metastasize, and kill.

The problem we face with skin cancer in general is its epidemic proportions. The figures in the United States, for example, are over one million cases of non-melanoma skin cancer (basal and squamous cell) this year, over 50,000 cases of melanoma type skin cancer this year, with some 10,000 associated deaths. But more concerning than the numbers themselves is the dramatic rise that we have been seeing in skin cancer incidence.

To address that, I'd like to spend the next few minutes on understanding the relationship between skin cancer and sun exposure, and the most obvious has to do with skin color. And that is while skin cancer is clearly a global problem, it is not equally distributed across skin types. Skin cancer is predominantly a disease of Caucasians. Worldwide, skin cancer incidences are rising as dramatically as was seen on that earlier slide, although clearly in Caucasian populations closer to the equator, hence the Australian problem previously mentioned by Dr. Durbak. It's also important to know that while the majority of skin cancers occur in Caucasians, skin cancer can happen in anyone. And we do see skin cancers arising in individuals of all skin types and colors.

In terms of the relationship between ultra-violet and the skin, as you can see, if your skin is less naturally protected from radiation, you are at greater risk. I'd like to spend just a few minutes helping you understand the nature of ultra-violet radiation.

I want to ask Jay to share with us how he explains to his children to stay out of the sun.

(Jay Walker speaking): I was explaining earlier to Dr. Halpern that the sun is a nuclear explosion, and that generally speaking, when faced with a nuclear explosion, you go inside.

(Alan Halpern continues) I thought it was wonderful. It does sum it up. And part of what we are trying to understand on a global level is how to deal with that reality, and those are the dangers of sunlight. At the same time, Jay was quick to point out to me that he recognizes the sun as our friend as well. And that is, without the sun's warmth, photosynthesis, we wouldn't be here. In fact, there are also immediate health and quality of life issues that we benefit from the sun: it kills many pathogens, it allows us to see. And most of us, I think, feel a little better on a bright sunny day like today than we do in the dead of winter. Having said that, there are some significant negative health implications. The one we're focusing on here is skin cancer. Other forms of skin damage: wrinkling, age spots, a host of issues, as well as cataracts are also related.

What is ultra-violet? Ultra-violet is that part of the electromagnetic spectrum near violet on the spectrum. This is visible light, and this would be ultra-violet radiation, and it's broken into three groups: UVA, UVB, and UVC, depending on the wavelength.

The good news is that the higher energy ultra-violet, the UVC that would clearly be the most harmful to us, never reaches the earth. And the reason it does not is because of the stratospheric ozone layer. UVB tends to reach the earth but is largely blocked by ozone. And UVA tends to penetrate the ozone fairly readily.

UVB, easy to remember, are the burning rays of the sun. And hence it was actually erroneously thought, until recently, that it was these burning rays of the sun that were to blame for skin cancer. In fact, because UVA radiation can allow you to tan without first burning, it was thought that this might be a good thing since a tan darkens your skin and hence might protect you from sun exposure. The unfortunate reality, as we've come to learn only in the very recent past, is that both UVA and UVB contribute to skin cancer, and to sun damage of the skin. And in fact, we've only very recently come to understand that the skin does not begin the tanning response until it already senses broken DNA in the cells. So you have, by definition, sustained significant damage before you can see a tan. Hence there is no such thing as a healthy tan.

With that in mind, how does ozone depletion play into this? I don't want to give you the misimpression that the epidemic of skin cancer we have seen over the last several decades is related to ozone depletion. In all likelihood, it is not. Ozone depletion is a fairly recent phenomenon and skin cancer has been rising for many decades. It more likely relates to changes in fashion, and to changes in recreational activity and travel. The very people like many of us who tend to spend most of our time indoors but recreate outdoors, do so with less sun protection, less clothing, and especially the revolution of working on a tan and seeing it as a healthy or attractive thing. However, recent ozone depletion may dramatically increase the rate of rise of skin cancer during our lifetimes on a global level.

Just to understand what ozone is: molecular oxygen that we breathe and that we could not live without is a molecule composed of two atoms of oxygen. Each single atom of oxygen is referred to as a singlet oxygen. When you combine two singlets you have molecular oxygen. If you take molecular oxygen and add a singlet, so that you get this triple oxygen, that is ozone.

We've already mentioned ozone in the stratosphere. It's important because this can be fairly confusing. Ozone can occur throughout the atmosphere, including the part closest to us on earth and the part above the stratosphere. Ozone in the troposphere is called air pollution. Ozone in the stratosphere is: life saving. Location, location, location. It's not a real estate lecture. But the reality is that what we are trying to do is prevent the accumulation of ozone in the troposphere and make sure it's where it protects us from UV up in the stratosphere.

Without giving you a chemistry lesson, it's important also to understand that normally, radiation from the sun is responsible both for the formation of ozone as well as for the destruction. And this is a very well balanced system. It is because of this ability of sunlight to cause the formation of ozone, that if we can eliminate manmade chemicals that are currently breaking down the ozone layer, it has a very good chance of repairing itself.

The problem has been what have come to be termed "ozone depleting substances." There are a host of these. The most commonly recognized are chlorofluorocarbons, halons, hydrochlorofluorocarbons. What these have in common, and many of these are in refrigerants and coolants, is that when acted upon in the atmosphere by sunlight, they release halogens.

The problem is that a halogen like chlorine, if it finds its way up into the stratosphere, acts as a catalyst for the destruction of ozone. This is a reaction; the word catalyst is very important here because what it means is that one doesn't get that one molecule of chlorine out of the atmosphere. And that one molecule of chlorine, as a result, has the potential of breaking down over a hundred thousand molecules of ozone before it is finally quenched and finds its way back down to earth. This is an ongoing process that has led to an enormous problem.

The other important point on a global scale is understanding that a molecule of CFC that finds its way into the atmosphere above New York has as much of a chance of affecting the ozone in Westchester as it does in the air overlaying China. The nature of the winds at the stratosphere are such that these chemicals are rapidly dispersed throughout the atmosphere.

Hence, there has been documentation of thinning of the ozone. The most notable areas are toward the poles where the ozone has been naturally thin, and where there are in fact holes that have grown with time. The concerning news is that there are now multiple lines of data to suggest that this is a very real phenomenon. Understand that has not been easy science to understand, and it was only recent observations. We don't have a handle on natural cycles, for example, of the atmosphere for thousands of years. But the consensus data is unfortunate and is very real. The scientific backing of this is becoming stronger and stronger. There are some encouraging things happening.

The most encouraging has been from the United Nations Environmental Program's efforts in this regard on an international scale, to develop international protocols for the elimination of these ozone depleting substances. And there has been a great deal of progress made, although much more needs to be made. We could spend hours speaking of this alone. If you are interested, the actual details of the protocol, participating countries, and which specific amendments they are adhering to and have ratified can be found through the United Nations Environmental Program web site.

So, the short answer is, this is a significant program. It is a growing problem. It is one that is fortunately being addressed though the efforts of people here and elsewhere, but one that needs continued support at the international level and obviously has enormous economic implications.

At the moment, however, we are faced with the fact that we are all at dramatic risk of developing skin cancer. A very important line of protection at the moment is early detection, as we mentioned earlier. The second one is sun protection on a personal level. And it's very important never to work on a tan, (as we've said, there's no such thing as a healthy tan), to avoid intense sun exposure whenever possible, and to use protective clothing and sunscreen. Because Australia has a very significant problem, as previously mentioned, they have been pioneers in developing public health messages in this regard. Their "slip, slop, slap" campaign, slip on a shirt, slop on sunscreen, slap on a hat, has been popularized. In fact, if you have been to Australia, you will see there are actual "slip, slop, slap" stores that sell sun protective clothing, sunscreens, and help promote this message.

In summary, what I've tried to do is hopefully give you a better understanding a bit about the types of skin cancer, the growing problem, the role of ultra-violet in causing skin cancer, and the very significant potential role for ozone depletion to aggravate this problem in this new millennium.

And before you start working on an effective tan, take a good look at a raisin.

Thank you.

Information, Healthcare and Technology: The Impact of the Internet on the Future of Medicine

Dr. Ebby Elahi
Senior Medical Advisor and
Co-Founder, Surgeonesis

With the advent of new technologies in medicine and an unprecedented change in the means by which we communicate information worldwide, the time has come to re-evaluate established channels of medical education. The process by which we transfer medical knowledge and surgical skills no longer satisfies the demands of an ever more sophisticated and growing patient population and fails to take advantage of the most recent advances in medical science. If we want to establish international standards of care, we need to facilitate the acquisition of knowledge by providing readily available tools to practitioners around the globe.

One major obstacle to the transfer of medical and surgical information has been the inherent cost in developing and establishing channels of communication that are not only easily accessible but also easily upgradeable as new modalities and technologies are developed. With increasing worldwide availability, the Internet may be the solution. Members of the medical community worldwide have begun to confirm the inherent value of web-based initiatives that seek to facilitate the communication of important medical information. Such initiatives are particularly well suited to the practice of surgery, which requires visual learning of rapidly evolving techniques and technologies.

The potential benefits are great. Immediate worldwide access to critical medical and surgical information can serve to revolutionize medical and surgical education and harmonize international standards of healthcare. Given the rapid development of surgical technologies and the increased level of complexity of modern surgery, practicing surgeons worldwide must have continuous access to surgical developments for the world population to benefit from these advances. Without continued training, surgical errors and injury promise to become an increasing problem and preventable and curable conditions may frequently remain untreated. Furthermore, lack of uniformity and access to current information globally has resulted in uneven basic standards of care. Internet- based initiatives can serve to foster uniformity and ensure a higher quality of care in countries that traditionally have had limited access to modern advancements.

One main concern is that the development of quality technology is expensive and medical and surgical information is not centralized. A possible solution is a synergistic approach that combines different sectors of the community, including the private sector, to provide the resources necessary for a worldwide web-based network of medical and surgical information. Ultimately, we should re-examine the way in which surgical information is disseminated–a well-formulated web-based solution promises to enhance the practice of surgery, improving quality while making it less expensive and more accessible to the world population.

Standing Up to the Wolf Pack: Russian Indigenous People Fight For Their Survival

Ms. Sibyl Diver
Pacific Environment
Oakland, California

Good morning. Thank you for having me here today. I would like to especially thank the conference organizers World Information Transfer for making this information exchange possible. I'd like to begin with a prayer from my friend and colleague Nadezhda Novik of the Keto People in Northern Siberia.

"We are thankful for the strong awareness we have of our destiny on this small, blue planet Earth: we are nature's protectors. It is not in vain that my grandfather once spoke this prayer, and my mother repeats it today,

*"We thank Mother Earth for that which she gives us, her children—the forest and the river: they feed us, quench our thirst, clothe and shod us! We thank the heavens for its children—the sun, stars, and moon, for they light the way for our hunters! We thank the fire in our hearth, for it warms our family and our home! Our door is always open to those people with good hearts and pure minds! We present a deep bow to life!"**

From Nadia's words, you can get a sense of the strong, balanced connection between Russian indigenous peoples and the environment. Even today, many Russian indigenous peoples are still practicing traditional, sustainable resource use. However, environmental contaminants are polluting traditional territories and accumulating in animals used as traditional foods. Thus, we find that in practicing traditional use, Russian indigenous communities are becoming one of the first human casualties of industrial environmental pollution. Pollution that is, in fact, impacting us all.

As a brief overview, there are just under 200,000 Russian indigenous peoples, with 45 different ethnicities recognized by the federal government. These peoples are distributed across the Russian North, Siberia, and the Russian Far East, an area covering 58% of the country.

Many of these peoples still reside on their traditional territories, where they have utilized natural resources in balance with nature for thousands of years. Despite Soviet repression of Russian indigenous peoples from the 1920s on, traditional economies such as reindeer herding, fishing, and trapping have been preserved. This is, in many ways, thanks to the remoteness of remaining indigenous communities, often located in roadless areas and accessible only by helicopter.

Here are a few examples of present day traditional

resource use among Russian indigenous peoples. This slide shows Nenets reindeer herders. Here is an image of Evenk fishers and trappers.

Despite their remoteness, these communities are not beyond the reach of environmental pollution. Resource extraction, such as mining, oil and gas development, and other environmental pollution, such as acid rain and persistent organic pollutants or (POPs) have caused the contamination of traditional foods and traditional territories. This, in turn, has impacted the health of Russian indigenous communities, both physically and psychologically.

This slide demonstrates the impact of oil and gas development in the Russian Arctic. Oil and gas development on the Yamal Peninsula pollutes Nenets reindeer pastures, while pipelines obstruct reindeer migration routes. There are also problems with pipeline spills. Russia loses 3–7% of oil and gas annually due to inadequate pipeline construction, maintenance and repairs, according to a recent Greenpeace report. This amounts to 10–20 million tons of oil contaminating the environment across Russia each year.

This is the Norilsk Nickel Factory, located on traditional indigenous lands. The factory is the biggest single source of sulfur emission in the world and results in acute acid rain problems, which have destroyed more than 4,000 square kilometers of larch forests in the Norilsk area. This is not to mention the impact on the local fish populations, still harvested and sold in the city.

Due to environmental contaminants accumulating in traditional food sources, indigenous peoples across Russia are facing epidemics of tuberculosis, cancer, gastro–intestinal and immune diseases. For example, in many Udege indigenous communities where clearcutting has taken place, 70–80% of their children are sick from eating contaminated and parasitized fish. Along the Amur River in Khabarovsk Krai, there are similar problems with mining which has poisoned fish taken by the Ul'ch people. And the list could go on.

High levels of alcohol abuse within indigenous communities, high suicide rates, and disturbing life expectancy statistics reflect other social health issues. At the Third Congress of Russian Indigenous Peoples Irina Eliseevna Afanasieva, President of the Association of the Kola Saami peoples, described the situation in her community as follows,

"Today 50% of our Saami population is without work... There is not one week that goes by when we do not bury one or two people. They leave voluntarily from life, because they are at a dead end. There is no work, no normal life, no social protection. It is not rare that they go to the other world with a noose around their head."

Russia's 1997 census reported that, in some communities, life expectancy for an average indigenous male is 41–42 years. Average life expectancy for indigenous peoples is, generally, 10 years less than the Russian average. These problems are exacerbated by high poverty level and unemployment rates, as high as 50% in some Buriatia indigenous communities.

Given this crisis, the Russian federal government should prioritize the environmental health of Russian indigenous peoples. Additionally, we hope that Russia can resolve a basic conflict, common to many countries around the world. That is, while indigenous people view land as a way of life, government and industry see indigenous territories as a source of commercial profit.

To ensure the long–term health of Russian indigenous peoples and their environment, we hope that the Russian government can reverse some of its recent policy decisions. For example, the government has dismantled environmental protection structures such as the State Committee on Ecology (the Russian equivalent of our Environmental Protection Agency). Second, it has ignored existing constitutional laws guaranteeing Russian indigenous land and resource rights, such as the 1999 Law on the Guarantee of Rights of Indigenous Minorities or such as Article 28 of the Russian Land Code which states that traditional indigenous lands cannot be allocated for non–indigenous activities like oil, gas, and mineral development or tourism without the consent of indigenous peoples. For instance, on the Kola Peninsula in Northwest Russia, Russian regional authorities closed valuable traditional fishing grounds on the Ponoi River to Saami traditional use and granted exclusive fishing rights to a commercial tourist company – without the consent of native peoples. Similarly, in Khanti–Mansisk and the Yamal–Nenets Autonomous Okrugs in Siberia, reindeer pastures have been turned over to oil and gas enterprises without consultation. Both of these land allocations were given without indigenous consent and were, therefore, illegal by Russian law. The Russian government can prevent such obstructions of its laws in the future by allowing and encouraging public participation in land use decisions.

The Russian indigenous community has responded to these problems. Indigenous peoples are lobbying for their rights on a federal and international level through the Russian Association of Indigenous People of the North, also known as RAIPON. Russian NGOs, such as Ecojuris and Rodnik, are taking legal action on behalf of Russian indigenous peoples' constitutional rights. And local indigenous communities are launching their own protests and campaigns. For example, in a recent action, Evenk reindeer herding peoples, afraid that their sick and malnourished children would not survive winter on the taiga, called upon their regional government for assistance. When they received no response, indigenous herders dressed their children in their traditional clothing, drove their sleds hundreds of kilometers to the Krasnoyarsk administrative center, converged in front of the regional government building, dropped their children off, and departed for their winter camp. They had no choice, since, outside of Krasnoyarsk, supply points had been closed and medical treatment was not available. As a result of this action, the local government was forced to care for these kids. The administration released funding to foster these indigenous children over the winter, provide them with basic health care and build a children's home for the indigenous community. Following a severe winter, parents returned to pick up their children.

Here's an example of some of RAIPON's recent work, including the November RAIPON coordinating meeting in

Salekhard and the First All-Russia Youth Forum of Nations.

To be successful, indigenous peoples around the world need your support. Here's what you can do to support the Russian indigenous movement. International governmental bodies can encourage the implementation of Russia's constitutional laws on indigenous rights. At the 4th Congress of Russian Indigenous Peoples this April, RAIPON deputies specifically expressed interest in having independent international observers monitor the implementation of Russian indigenous rights laws. In addition, we hope that legal commitments to Russian indigenous peoples will be upheld and supported in any international agreements, such as future negotiations for Russia to join the World Trade Organization (WTO.)

Second, scientific research is needed to document environmental health problems. Although traditional knowledge has documented health problems among indigenous communities, ostensibly linked to environmental factors, causation of these problems does not go undisputed. Persistent organic pollutants are one example of this. The United Nations Environmental Program in Norway is already conducting a monitoring and assessment program on environmental health problems impacting Arctic Peoples, including a study on POPs; however, such studies are vital for indigenous peoples across Russia, not just in Arctic.

Finally, audience members can support Russian indigenous NGOs or international NGOs providing information and campaign assistance to Russian indigenous peoples. International funding can support specific projects, such as legal training, exchange programs, both international and within Russia, as well as publication of much-needed educational materials. Second, audience members can support individual campaigns. For example, Pacific Environment is appealing to the new governor of Koriakia to approve an indigenous "Territory of Traditional Use" (TTP), which will ensure that indigenous lands are protected over the long term from industrial resource extraction projects. Although the TTP was almost finalized, political will supporting its creation has dissolved following recent Koriakia regional elections. International pressure may provide the necessary impetus to win this battle to protect indigenous land.

I would like to close with a quotation, once again, from Nadia Novik, who could not join us today. The elders of the Keto clan "Bal'na dyeng," Clan of the Cherry Trees say,

*"Today we encounter an elk, with a full rack of antlers, taking a defensive stance against a pack of approaching wolves; thus he gathers his strength and will surely not become their victim. The elk that runs away is the potential victim. This is a lesson for everyone. This is our own defense and our chance for survival!"**

Thank you.

**Used with permission from Nadezhda Novik, president of the Turukhansk Association of Indigenous People of the North.*

The Importance of Water Quality For Human Health

Alexandra Cousteau,
President, Philippe Cousteau Foundation
Vero Beach, Florida

That life on this planet is dependent on water is common knowledge. Without water, life would never have come to be or continue to exist. Today, the rapid degradation of water quality around the world is cause for great concern, especially in light of the projected population growth. Dead zones and high toxicity levels are spreading along our coastal waters and throughout our rivers, lakes, and aquifers with consequences that we should all be aware of.

Closing Remarks

H.E. Ambassador Mr. Elias Gounaris
Permanent Representative of Greece to the United Nations

Excellency Ms. Christina Spyraki, Dep. Minister for Health and Welfare of Greece, Your Excellencies the Permanent Representatives of so many countries, amongst you Ambassador Valeriy Kuchinski of Ukraine, co-sponsor of this Conference, and Ambassadors Lavrov of the Russian Federation and Ling of Belarus whose countries were directly affected by the tragic accident in Chernobyl, Dr. Durbak of the "World Information Transfer" whom I thank for bearing the responsibility of organizing this event, which is the Tenth in a very important series of Conferences which have served as a critical scientific information and increasing awareness forum, Distinguished speakers, Distinguished guests, Ladies and Gentlemen, Thank you all for attending the "10th International Conference on Health and Environment: Global Partners for Global Solutions", a Conference organized as a parallel event to the 9th session of the Commission on Sustainable Development of which Greece is a member. Let me remind you that the CSD-9, only a week ago, dealt with–among other important issues–the most important environmental issue of Climate Change during its first week of deliberations.

Let me go back to our Conference. I would like, at the outset of my brief Concluding Remarks, to draw your attention to the participation, today, of representatives of the new generation in our concluding session of our three-day Conference.

For it is this generation that represents the future and highlights the need for us to do our outmost to protect it. Because it is the young within every generation that are the most vulnerable, but at the same time it is them who represent hope. Hope that awareness for the profound impact environmental degradation has on human health will

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World Information Transfer
MISSION STATEMENT

Knowledge brings new choices.
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World Information Transfer, Inc., (WIT) is a not-for-profit, non-governmental organization in consultative status with the United Nations, promoting environmental health and literacy.

In 1987, inspired by the Chernobyl nuclear tragedy, WIT was formed in recognition of the pressing need to provide accurate actionable information about our deteriorating global environment and its effect on human health to opinion leaders and concerned citizens around the world.

WIT exercises its mandate through:

1. The publication of the *World Ecology Report*, a quarterly digest of critical issues in health and environment, published in five languages and distributed to opinion leaders around the world, and for free in developing countries.

2. The annual international conference on *Health and the Environment: Global Partners for Global Solutions* held at United Nations headquarters in New York since 1992. The world's leading authorities in the field of environmental medicine and science share their latest findings and discuss possible solutions with leaders in governments, business, organizations, and the media.

3. Developing of CD-ROM projects focusing on sustainable development and human health and research on health issues as they relate to the environment.

4. Providing humanitarian relief to areas devastated by environmental degradation. Supplies and equipment are sent to schools, hospitals and orphanages in areas contaminated by the Chernobyl fallout.

5. Centers for Health & Environment providing centralized specific scientific data pertaining to health and sustainability issues. The objective of the Centers is to promote ongoing research, education and implementation of corrective programs. The first center was opened in Kiev, Ukraine, in 1992 and moved to Lviv, Ukraine, in 1996 to K. Levyckoho 11a, #15, telephone/fax: 322-76 40 39. The second opened in Beirut, Lebanon, in 1997, at Bir Hasan, United Nations Street, Al-Salaam Building, telephone: 961-1-853657.

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We have not inherited the world from our forefathers…we have borrowed it from our children. –Kashmiri Proverb

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World Information Transfer, Inc.
(ISSN #1080-3092)
451 Park Avenue South, 6th Floor
New York, NY 10016
Telephone: **(212) 686-1996**
Fax: **(212) 686-2172**
E-Mail: **wit@igc.org**
Electronic edition available on:
http://www.worldinfo. org

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increase. Hope that our mistakes will be avoided in the future.

Our three-day Conference on "Economics of Health and Environment" focused on **"Globalization and Health",** on the **"Chernobyl Commemoration"** and on **"New Education for the Next Generation".** All three sub-items of our agenda are key elements pertaining to the issue of the inter-linkage between environment *and* health and of the importance of the environment *for* health.

In shaping the substance of the Conference World Information Transfer asked the question "how can economic policy promote or derail health and environment globally". The question was addressed by the speakers of our first session notably by Ms Christina Spyraki, Deputy Minister for Health of Greece.

It was argued that **globalization** might have a negative impact on health in some cases; but, on the other hand, isn't it indeed a consequence of globalization that public awareness increases and hence prevention might be possible? Our world is experiencing so many communicable diseases that concerted action is of outmost importance.

The second and third sessions of the Conference included presentations on the specific and continuing health effects of the radiation from Chernobyl as well as the wider long term economic and environmental implications. Indeed, we did commemorate the **Chernobyl** tragic event, fifteen years ago yesterday–Ambassador Kuchinski and Professor Komisarenko of Ukraine addressed the participants in this long day commemoration–both reminding ourselves of what has been considered as the worst nuclear power generated disaster in mankind's history and making us realize once again the many dimensions and long term consequences of the accident.

But most importantly, it reminds us of the evident: Accidents of this sort know no boundaries; like environmental degradation knows no boundaries. Almost all speakers were clear about it; there is a necessity for international cooperation to this end to be enhanced. Chernobyl has been an unfortunate proof of how such catastrophes may have immeasurable consequences for an indefinite period of time. A plethora of data have been referred to. But it is not only the data, it is not merely the documentation of what has happened; it is common sense that the least we can do is increase safety standards and application of those standards when it comes to nuclear energy.

It has also been said, by Mr. Tharoor, Head of DPI, during yesterday's launching of the exhibition on Chernobyl, that we "cannot close the book on Chernobyl". Yes! We cannot close the book on Chernobyl. Because people affected need our help and because Chernobyl is educational. And that is how the third part of our Conference falls into place:

"Education for the next generation". An education that can be largely promoted through a globalized world, using the positive aspects of globalization for the benefit of the people in need, for the less fortunate. An education that promotes health and environmental literacy as a way to prevent people from actions or inertia that may have devastating health effects.

Finally, I would also like to note that there is a linkage between education and prevention through the medium of increased and effective cooperation. The idea expressed by Ms Adi Roche of the Chernobyl Children's Project to create an "umbrella organization" not only to mitigate the disasters but also to prevent disasters of this kind is an excellent one.

Let me not say more, since too many words are not always for the better; our speakers were numerous and their input most interesting which have made, I believe, this Conference a success. It has been a pleasure for Greece to have co-sponsored this event and once again I thank the organizers and each and every one of you for having participated. Let us give the message to the younger generation–perhaps some of our future leaders and thinkers are right here in this room–that creating technologies and new business concepts, as addressed by Jay Walker of Walker Digital, may lead the way forward; but most of all they need to fight ignorance, they need to prioritize health and environment.

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WORLD ECOLOGY REPORT
451 Park Avenue South, 6th Floor
New York, NY 10016

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"Never doubt that a small group of thoughtful committed citizens can change the world. Indeed it's the only thing that ever has."
Margaret Mead