Woodrow Wilson International Center for Scholars

Commemoration of the Chernobyl Disaster: The Human Experience Twenty Years Later

OCCASIONAL PAPER #295

KENNAN INSTITUTE

The Kennan Institute is a division of the Woodrow Wilson International Center for Scholars.

Through its programs of residential scholarships, meetings, and publications, the Institute encourages scholarship on the successor states to the Soviet Union, embracing a broad range of fields in the social sciences and humanities. The Kennan Institute is supported by contributions from foundations, corporations, individuals, and the United States Government.

Kennan Institute Occasional Papers

The Kennan Institute makes Occasional Papers available to all those interested. Occasional Papers are submitted by Kennan Institute scholars and visiting speakers. Copies of Occasional Papers and a list of papers currently available can be obtained free of charge by contacting:

Occasional Papers
Kennan Institute
One Woodrow Wilson Plaza
1300 Pennsylvania Avenue, NW
Washington, DC 20004-3027
(202) 691-4100

Occasional Papers published since 1999 are available on the Institute's web site, www.wilsoncenter.org/kennan.

This Occasional Paper has been produced with the support of Federal Conference Funds from the Woodrow Wilson International Center for Scholars. TheKennan Institute is most grateful for this support.

The views expressed in Kennan Institute Occasional Papers are those of the authors.

ISBN 1-933549-19-X

ABOUT THE CENTER

The Center is the living memorial of the United States of America to the nation's twenty-eighth president, Woodrow Wilson. Congress established the Woodrow Wilson Center in 1968 as an international institute for advanced study, "symbolizing and strengthening the fruitful relationship between the world of learning and the world of public affairs." The Center opened in 1970 under its own board of trustees.

In all its activities the Woodrow Wilson Center is a nonprofit, nonpartisan organization, supported financially by annual appropriations from Congress, and by the contributions of foundations, corporations, and individuals. Conclusions or opinions expressed in Center publications and programs are those of the authors and speakers and do not necessarily reflect the views of the Center staff, fellows, trustees, advisory groups, or any individuals or organizations that provide financial support to the Center.

Woodrow Wilson
International
Center
for Scholars

Commemoration of the Chernobyl Disaster: The Human Experience Twenty Years Later

Conference Proceedings

OCCASIONAL PAPER #295

Contents

Panelist Biographies

Oleh Shamshur is the ambassador of Ukraine to the United States. He graduated cum laude in 1978 from Taras Shevchenko Kyiv University, Department of International Relations and International Law, with a specialization in international relations. He received a Ph.D. in history from the same institution in 1982. Prior to his appointment to his present post, Shamshur served as deputy minister of foreign affairs of Ukraine; head of the European Union Department of the Ministry of Foreign Affairs of Ukraine; minister at the Embassy of Ukraine to the Benelux Countries; and first secretary/counselor of the Permanent Mission of Ukraine to the United Nations and other international organizations in Geneva. Shamshur was a visiting scholar at University College, London in 1993, and worked at the Institute of Social and Economic Problems of Foreign Countries, Academy of Sciences of Ukraine from 1984 to 1989.

Vladimir I. Rybachenkov has served since 1993 as a counselor in the Ministry of Foreign Affairs of the Russian Federation (Department for Security and Disarmament, Nonproliferation and Nuclear International Cooperation Division); currently he is also serving as counselor at the Embassy of the Russian Federation to the United States. In this capacity, his sphere of responsibilities includes international cooperation in the field of excess weapons fissile material management, bilateral nuclear cooperation, and IAEA activities. He participated in the Nuclear Cities Initiative negotiations as well as in the development of new arrangements for the Russian-U.S. agreement on highly enriched uranium and low-enriched uranium. From 1994 to 1997, Rybachenkov participated in the development of *Guidelines for the Management of Plutonium* (published as an IAEA information document). Further, since 1993 he has been a member of Russian delegations to the regular sessions of the IAEA Board of Governors and the IAEA General Conference. Rybachenkov graduated from the Moscow Institute for Physical Engineering and holds a Ph.D. in computer sciences.

Dmitry Ponomarev has been counselor of the Embassy of the Republic of Belarus to the United States since June 2003. Prior to his current appointment, he served in the Ministry of Foreign Affairs of the Republic of Belarus starting in November 1995. During that period he held several positions, including deputy head of the Department of Foreign Policy Analysis. Prior to joining the Ministry of Foreign Affairs, he held several positions in academic and educational institutions in Belarus. He holds candidate's degree in history and a degree in interpretation from the Minsk State Teachers' Training Institute for Foreign Languages.

Blair A. Ruble is director of the Kennan Institute of the Woodrow Wilson International Center for Scholars in Washington, D.C. He also serves as director of the Comparative Urban Studies Project at the Wilson Center. He received his M.A. and Ph.D. degrees in political science from the University of Toronto (1973, 1977), and an A.B. degree in political science from the University of North Carolina at Chapel Hill (1971). He has edited more than a dozen volumes. His book length works include a trilogy examining the fate of Russian provincial cities during the 20th century: *Leningrad: Shaping a Soviet City* (University of California Press, 1990), *Money Sings! The Changing Politics of Urban Space in Post Soviet Yaroslavl* (Woodrow Wilson Center Press and Cambridge University Press, 1995), and *Second Metropolis: Pragmatic Pluralism in Gilded Age Chicago, Silver Age Moscow, and Meiji Osaka* (Woodrow Wilson Center Press and Johns Hopkins University Press, 2001). His latest book, *Creating Diversity Capital: Transnational Migrants in Montreal, Washington, and Kyiv*, was published by the Woodrow Wilson Center Press and Johns Hopkins University Press in 2005.

David R. Marples is professor of history and director of the Stasiuk Program on Contemporary Ukraine at the Canadian Institute of Ukrainian Studies, University of Alberta. He has written 10 single-author books, including three

on Chernobyl: *Belarus: From Soviet Rule to Nuclear Catastrophe* (Macmillan Press, St. Martin's Press, and University of Alberta Press, 1996), *The Social Impact of the Chernobyl Disaster* (Macmillan Press, 1988), and *Chernobyl and Nuclear Power in the USSR* (Macmillan Press, 1987). He also edited the 1997 book *Nuclear Energy and Security in the Former Soviet Union* with Marilyn J. Young. His articles have appeared in *Slavic Review, Europe-Asia Studies*, *Nationalities Papers*, *Eurasian Geography and Economics*, *Post-Soviet Affairs*, and other publications. He is vice president of the North American Association of Belarusian Studies and a board member of the Association for the Study of Nationalities and of the Forum for Democracy in Belarus, German Marshall Fund of the United States. At the University of Alberta, he was awarded the Faculty of Arts Research Prize for Full Professors in 1999, the J. Gordin Kaplan Award for Excellence in Research (university research prize) in 2003, and a Killam Annual Professorship for 2005–06. Marples received his B.A. from the University of London (1975), an M.A. from the University of Alberta (1980), and a Ph.D. from the University of Sheffield (1985).

Martin Sletzinger is the director of East European Studies at the Woodrow Wilson International Center for Scholars in Washington, D.C. Before coming to the Wilson Center, he served from 1976 to 1978 as a staff consultant to the International Relations Committee, U.S. House of Representatives, and to the Commission on Security and Cooperation in Europe, with areas of expertise including the Balkans, Eastern Europe, Russia, NATO, NATO enlargement, and European issues. He received a Ph.D. in government from Harvard University in 1977. He also holds an M.A. in Soviet studies from Harvard and a B.A. in political science from the University of Pennsylvania.

Didier Louvat is head of the Waste Safety Section of the Division of Radiation, Transport, and Waste Safety, Department of Nuclear Safety and Security, International Atomic Energy Agency (IAEA). He graduated from the University of Paris in 1984 with a degree in geology and an advanced specialization in environmental applications. He received a doctorate in isotopic geochemical sciences from the same university in 1987. That year he began his professional career at the IAEA, working as a technical officer for the application of nuclear techniques in resolving environmental problems. In 1992, he joined the Nuclear Fuel Cycle Department of the French Atomic Energy Commission (CEA) where he developed programs related to the geological disposal of radioactive waste. In 2000 he became head of the French Environmental Radioactivity Laboratory for Radiation Protection, at the Institute for Radiological Protection and Nuclear Safety. In 2004, he returned to the IAEA. At present, in addition to being head of the Waste Safety Section, he leads the IAEA Radioactive Waste Management Program. Louvat has been a lecturer in the advanced environmental geosciences course at the University of Marseilles and a member of the Scientific Advisory Board of the French Research Center of Uranium Geology.

Murray Feshbach is a senior scholar at the Woodrow Wilson International Center for Scholars, Washington, D.C. He holds a Ph.D. in economics from American University. He served as chief of the USSR Population, Employment and Research and Development Branch of the Foreign Demographic Analysis Division (now the Center for International Research) of the U.S. Bureau of the Census from 1957 to 1981. After his retirement from federal service in 1981, he accepted an appointment as a research professor at Georgetown University; he is now a research professor emeritus. During 1979–80 he was a fellow of the Kennan Institute at the Wilson Center. In addition, at the request of the U.S. Department of State, he served during 1986–1987 as the first Sovietologist-in-Residence in the Office of the Secretary General of NATO, in Brussels, under Lord Peter Carrington. At the Wilson Center, Feshbach is conducting research on the policy implications of the demographic, health, and environmental crises in Russia. He has published a number of books, including *Ecocide in the USSR: Health and Nature under Siege* (with Alfred Friendly, Jr.; Basic Books, 1992) and *Ecological Disaster: Cleaning Up the Hidden Legacy of the Soviet Regime* (Twentieth Century Fund Press, 1995). He has also written more than 115 articles and book chapters, and has presented papers at numerous

international and domestic conferences, as well as testimony before the U.S. Congress.

Leonard Mazur is chief operating officer, Triax Pharmaceuticals, and a member of the Board of Directors, Children of Chernobyl Relief and Development Fund. He began his business career with Cooper Laboratories while completing an M.B.A. at Temple University. Notably, while at Cooper he was involved in the creation of Cooper Vision, which ultimately became the largest eye care company in the United States. In 1981, Mazur joined the U.S. Pharmaceutical Division of BASF as director of marketing. He was responsible for introducing into the U.S. market one of the first calcium channel blockers, a breakthrough medication used to treat hypertension and other heart disorders. He then joined ICN Pharmaceuticals in 1984 as vice president of sales and marketing. While at ICN, he launched the first antiviral drug for treatment of a deadly respiratory virus that afflicts infants. In 1995 he founded Genesis Pharmaceutical, a company focused on dermatological products, and, until recently, was CEO of Genesis Pharmaceutical. Currently he is establishing Triax Pharmaceuticals, a new pharmaceutical venture. He is president of the New York/New Jersey chapter of the Ukrainian-American Professional Business Person Association, and serves on the Board of Trustees of Manor College, Jenkintown, Pennsylvania. Besides an M.B.A., Mazur holds a B.A. from Temple.

Marcy Kaptur represents the Ninth Congressional District, which includes the Toledo area in Northwest Ohio. She is currently serving her twelfth term in the U.S. House of Representatives. As the most senior Democratic woman in the House, Kaptur serves on the Appropriations Committee, as well as two of its subcommittees, Defense and Agriculture. She remains dedicated to democratic institution-building across the globe and has spearheaded private charitable efforts for the people of Ukraine and other countries. As co-chair of the Congressional Ukrainian Caucus, she has lead efforts to establish an exchange program between the U.S. Congress and the Verkhovna Rada, Ukraine's legislature. She was the key sponsor of regulatory changes that forced accountability on Russian food aid relief, helping to ensure that $1 billion in U.S. resources goes to people in need, not into the black market or the pockets of government bureaucrats. As a congressional leader on issues related to international trade and human and labor rights, Kaptur will continue to assess the impact of NAFTA and will actively engage on the side of workers in upcoming trade negotiations. Trained as a city and regional planner, she practiced 15 years in Toledo and throughout the United States before seeking elected office. Appointed an urban advisor to the Carter White House, she helped maneuver 17 housing and neighborhood revitalization bills through Congress at that time. She recently received the Director's Award from the Edmund A. Walsh School of Foreign Service at Georgetown University for her commitment to increased understanding and appreciation of the peoples and cultures of Eurasia, Russia, and East Europe. She earned a B.A. in history from the University of Wisconsin and a masters degree in urban planning from the University of Michigan.

Geoffrey D. Dabelko is director of the Environmental Change and Security Program (ECSP), a nonpartisan policy forum on environment, population, and security issues at the Woodrow Wilson International Center for Scholars, Washington, D.C. For the past 12 years he has helped facilitate dialogue among policymakers, practitioners, and scholars grappling with the complex connections linking the environment, health, population, conflict, and security. His recent research focuses on environmental pathways to confidence building and peacemaking, with an emphasis on managing freshwater resources. Dabelko is principal investigator for ECSP's Navigating Peace Water Initiative on conflict and cooperation regarding water resources, and co–principal investigator for the Environment, Development, and Sustainable Peace initiative, an international effort to bridge the gap between Northern and Southern perspectives on the environment, development, population, poverty, conflict, and peace. He holds an M.A. and a Ph.D. in government and politics from the University of Maryland, and an A.B. in political science from Duke University.

Alla Yaroshinskaya is president of the Center for Ecological Study and Education in Moscow. She received a degree in journalism from Kiev University and worked for 13 years as a correspondent. At the end of 1986, she began to feel uneasy about the supposed evacuation of areas that had been contaminated by radiation from the Chernobyl accident, and began to investigate. In 1989, Yaroshinskaya was nominated for election to the new Supreme Soviet of the USSR. While serving on the Ecology and Glasnost Committee of the Supreme Soviet, she continued her campaign for full disclosure of the extent of the Chernobyl contamination. In 1990, she was appointed to a commission to look into the matter. In April 1992, her article, "Forty Secret Protocols of the Kremlin Wise Men," was published by *Izvestia* and picked up by Western news media. Yaroshinskaya is the author or co-author of a dozen books and more than 700 articles in scientific magazines and the mass media. Her book *Chernobyl: The Forbidden Truth* (University of Nebraska Press, 1995) was published in five languages. She is also the originator, editor-in-chief, and co-author of the *Nuclear Encyclopaedia*. In 1993, after working as deputy to the minister of press and information of the Russian Federation, she became an adviser to President Boris Yeltsin. She has been a member of Russian delegations to the United Nations to negotiate an extension of the Nuclear Non-Proliferation Treaty and to participate in the UN Women's Conference (1995). Actively engaged in political and public work on human rights, press freedom, and nuclear issues, she is president of the Ecological Charity Fund, co-chair of the Russian Ecological Congress, chief of the Federal Council of the All-Russian Social Democratic Movement, and a member of other international committees.

Mary Mycio is an American writer based in Kyiv and the author of *Wormwood Forest: A Natural History of Chernobyl* (Joseph Henry Press, 2005), an account of her journeys through the thriving radioactive wilderness in the "zone of alienation" around the Chernobyl nuclear power plant. The *Providence Journal* has called the book "a completely unexpected piece of natural history." *Discover Magazine* wrote that the book "has a haunting grandeur that should appeal to naturalists and fans of the apocalypse alike." Mycio holds a B.A. in biology and a law degree from New York University. She has written for the *Los Angeles Times* and a variety of other newspapers around the world. She is also director of the IREX U-Media Legal Defense and Education Program for Ukrainian journalists.

D. J. Peterson is a senior political scientist at the RAND Corporation, Santa Monica, California. Peterson began his career focusing on environmental policy and management in Russia and the former Soviet Union. His first RAND project was a book, *Troubled Lands: The Legacy of Soviet Environmental Destruction*, published by Westview Press in 1993. He recently completed a multiyear research venture examining the business, social, and political implications of the information revolution for Russia. This work was funded by the Carnegie Corporation. For five years he assisted with the execution of the RAND Business Leaders Forum—a biannual meeting of Russian, American, and European business executives to discuss trends in international commerce, economics, and politics. In 2003, he helped produce studies of the Russian automotive sector and political and economic risks in Russia. In 2004, he contributed to a study of Russian corporate foreign investment strategies in the Commonwealth of Independent States. His work has been cited by *The Wall Street Journal*, *The New York Times*, the *Los Angeles Times*, the PBS news series *NOW with Bill Moyers*, and in the U.S. Senate. Peterson received a Ph.D. in political science from UCLA in 1996.

Margaret Paxson has been senior associate at the Kennan Institute since November 2002. She holds a B.A. in anthropology from McGill University (1987) and an M.Sc. and Ph.D. in anthropology from the University of Montreal (1991, 1999). Paxson's doctoral research was on the subject of social memory in rural Russia, and was based on more than 17 months of fieldwork in a single village in the Russian north. In 2005, Paxson published *Solovyovo: The Story of Memory in a Russian Village* (Indiana University Press and Woodrow Wilson Press). In addition to social memory, Paxson's broader research interests include postsocialist transition, agrarian religion

and traditional healing, and the philosophy of science. During 1999–2000 she worked with David Hoffman of *The Washington Post* conducting research for his book *The Oligarchs*. She has published academic articles in various venues and journalistic pieces in *The Washington Post Sunday Magazine* and *The Wilson Quarterly*. Paxson has received awards and fellowships from the Social Science Research Council, the International Research and Exchanges Board, the Kennan Institute, and other organizations. She has also worked as a consultant in organizational anthropology; a coordinator, designer, and presenter for Mayor William A. Johnson's Biracial Partnerships for Community Progress, a race relations initiative in Rochester, NY, and as an instructor in the Department of Sociology and Anthropology at Concordia University, Montreal.

Kate Brown is an assistant professor of history at the University of Maryland, Baltimore County. She is the author of *A Biography of No Place: From Ethnic Borderland to Soviet Heartland* (Harvard University Press, 2004) which won the American Historical Association's George Louis Beer Prize for best book in international European history, the Heldt Prize from the Association of Women in Slavic Studies, and an honorable mention in 2005 for the American Association for the Advancement of Slavic Studies' Wayne C. Vucinich Prize. She holds a Ph.D. in history from the University of Washington and has received fellowships from the Social Science Research Council, the International Research and Exchanges Board, the Davis Center of Harvard University, the National Council for East European and Eurasian Research, and the Eurasia Foundation.

Irene Zabytko was born and raised in the Ukrainian Village section of Chicago. Her first book, *The Sky Unwashed*, a novel about Chernobyl, was very highly acclaimed and was selected as a Barnes & Noble Discover Great New Writers Book, a Book Sense 76 Pick Selection, and a New England Booksellers Association Discovery title. She is currently producing a documentary about the real-life Chernobyl survivors living in the "exclusion zone" who were the subject of her book. Zabytko has held fellowships at the Mary Anderson Center, the Ragdale Foundation, the Helene Wurlitzer Foundation of New Mexico, the Edna St. Vincent Millay Colony, and the Alden B. Dow Creativity Center. Most recently, she has been an artist-in-residence at the Leighton Studios at the Banff Centre, Banff, Canada. She holds an M.F.A. in creative writing from Vermont College and teaches an online fiction writing class for the Gotham Writers' Workshop. She is also the literary contributor for the NPR-affiliate arts program *The Arts Connection*, heard on WMFE-FM, Orlando, Florida.

William Novick is professor of surgery and pediatrics at the University of Tennessee Health Science Center (UTHSC), Memphis. Novick came to UTHSC in September 1993 and became the endowed professor of the Paul Nemir Jr. Chair of International Child Health in October 1999. Novick is founder and medical director of the International Children's Heart Foundation, a nonprofit organization whose primary focus is on improving the care of children in developing countries. The foundation has operated on more than 2,400 children with congenital heart defects in 19 countries. In 2002, Novick was presented the Red Star of Croatia by President Stipe Mesi? for his humanitarian service to the children of Croatia. In 2004, Novick was awarded the Franskaya Scorina Humanitarian Presidential Medal for his dedication to the health and well being of Belarusian children with congenital heart defects. Born, raised, and educated in Alabama, Novick did his undergraduate work at Troy State University and graduate work in biochemistry and medicine at the University of Alabama at Birmingham. He received his training in general surgery at the University of Pennsylvania and cardiac training at the University of Alabama at Birmingham. He is board certified in general and thoracic surgery and is a member of many professional organizations.

Yuriy Kosin is a former nuclear engineer who devoted about 20 years of his life to seeking out, through the lens of a camera, the human face of Ukraine. He was among the 800,000 "liquidators"—the army of mercy that came down to the "hell of Chernobyl." It was not until later in his

life that he realized the importance of his participation in the response to the national call for help; at that time he was just filming in the "zone of alienation." Among his major projects are "Transgressions," "Ukraine," and "Revolution That Turned Into a Celebration." Kosin has participated in more than 40 joint exhibitions in Ukraine, Russia, the United Arab Emirates, Germany, Russia, Slovakia, France, and other countries.

Joseph Sywenkyj began photographing Chernobyl in 2000 for the Children of Chernobyl Relief and Development Fund. Subsequently, his work on Chernobyl has appeared in numerous publications, including *The New York Times*, which did a feature on tourism in the Chernobyl region. Sywenkyj's ability to capture human frailty and the pain of disease has led him to photography projects on HIV-AIDS, tuberculosis, and families learning to cope with chemotherapy, remission, and stress. In 2003, Sywenkyj received a Fulbright fellowship to conduct his photographic studies of AIDS patients and their families in Ukraine. His work has been exhibited in New York, Washington, Philadelphia, and elsewhere throughout the world, including South Africa, the Netherlands, and Spain.

Program Partners

University of Alberta

Opened in 1908 as a board-governed public institution, the University of Alberta has become one of Canada's foremost research-intensive universities, with external research funding during 2004–05 of more than $415 million Canadian ($375 million USD). The University of Alberta serves more than 35,500 students in more than 200 undergraduate programs and 170 graduate programs. Students enjoy an exceptional quality of life on a friendly campus in a city, Edmonton, which values creativity and innovation. The university's pioneering spirit inspires faculty and students to advance knowledge through research, seek innovation in teaching and learning, and find new ways to serve the people of Alberta and the world.

Harriman Institute, Columbia University

Since its founding in 1946, the Harriman Institute, formerly the Russian Institute, has maintained its position as a leading center for the advancement of knowledge in the field of Russian and Eurasian studies through the research conducted by its faculty, students, fellows, and visiting scholars, and the training of scholars and professionals.

The Harriman Institute strives to facilitate the effective use of the unique resources it possesses to further the work of the diverse community of scholars in residence, students, and the more than 60 faculty members who make up the Harriman Institute faculty. Taken together, the library collections of Columbia University and the New York Public Library constitute the single largest concentration of Russian language materials in the United States. Moreover, the numerous resources of New York City—the UN missions; the many foundations and societies based in the city; and the wealth of museums, special collections, and archives, to name just a few—ideally complement those of Columbia.

Through its programs, conferences, lectures, and publications, the Harriman Institute seeks to create a forum for intellectual exchange and the further enhancement of its students' education.

Woodrow Wilson International Center for Scholars

Established by an act of Congress in 1968, the Wilson Center is the United States' official living memorial to President Woodrow Wilson. As both a distinguished scholar—the only American president with a Ph.D.—and a national leader, Wilson felt strongly that the scholar and the policymaker were "engaged in a common enterprise."

The Wilson Center is a nonpartisan institute for advanced study and a neutral forum for open, serious, and informed dialogue. It brings pre-eminent thinkers to Washington for extended periods of time to interact with policymakers through a large number of programs and projects. The Center seeks to separate the important from the inconsequential and to take a broad, historical perspective on the issues.

Kennan Institute

The Kennan Institute was founded as a division of the Woodrow Wilson International Center for Scholars in December 1974, through the joint initiative of Ambassador George F. Kennan, then Wilson Center Director James Billington, and historian S. Frederick Starr. Named in honor of Ambassador Kennan's relative, George Kennan "the Elder," a 19th-century explorer of Russia and Siberia, the Kennan Institute is committed to improving American expertise and knowledge about Russia and the former Soviet Union.

The Kennan Institute bridges the gap between the world of ideas and the world of public affairs by bringing scholars and government specialists together to discuss political, social, and economic issues affecting Russia and other successor states to the Soviet Union, seeking always to place these issues within their historical context.

Environmental Change and Security Program

Population growth. Water scarcity. Degraded ecosystems. Forced migration. Resource depletion. Pandemic disease. Since 1994, the Environmental Change and Security Program

(ECSP) has explored the connections among these major challenges and their links to conflict, human insecurity, and foreign policy. Through publications, meetings, and events, ECSP promotes dialogue about the environmental, health, and population dynamics that affect both developing and developed nations.

Global Health Initiative

AIDS orphans. Avian flu. Bioterrorism. Child mortality. Gene therapy. In September 2005, the Woodrow Wilson International Center for Scholars launched the Global Health Initiative to provide a forum for an interdisciplinary examination of these and other critical health challenges facing the United States and the world. By leveraging the Wilson Center's strong regional and cross-cutting programs, the Initiative seeks to promote dialogue about health within the foreign policy community.

East European Studies

The East European Studies (EES) program at the Woodrow Wilson International Center for Scholars provides fellowship opportunities in an effort to foster research and training on regional issues. EES offers a nonpartisan forum for debate on Eastern Europe in the nation's capital. EES organizes seminars, conferences, workshops, and briefings featuring prominent scholars and policymakers. In this way, EES contributes to the aim of the Wilson Center, which is to provide a link between the world of ideas and the world of policy, bringing them into creative contact, enriching the work of both, and enabling each to learn from the other.

Preface

Blair A. Ruble, Director, Kennan Institute

On April 26, 1986, Reactor 4 in the nuclear power plant in a small city north of Kyiv—in what was then the Ukrainian Soviet Socialist Republic—exploded, making the city of Chernobyl a household word around the world. However, although many people know the basic story of the Chernobyl disaster, its aftermath and particularly the human experience of the affected populations in the following years are less well understood.The Kennan Institute, in cooperation with the University of Alberta and the Harriman Institute of Columbia University, convened a two-day program on April 25–26, 2006, not only to commemorate the 20th anniversary of the disaster but also to encourage a productive conversation among people who approach the Chernobyl tragedy from different perspectives. Our goal was that out of that conversation a fuller appreciation of the disaster and its consequences would eventually emerge.

Twenty years is an awkward length of time for looking back upon an historic event. Many people who experienced that event firsthand are still alive, and yet for many that event is already past history and beyond their life experience. Whether the event is ingrained as an experienced reality, or learned secondhand from documents and sources of various types, each form of knowledge has value.

As the following pages will show, the perspectives from different forms of knowledge indeed highlight different aspects of the same reality. For those who approach a historical event through sources and documentation, what people think they saw and heard is little more than hearsay. For those who lived through an event, the question is, can sources and documentation surpass what they know they experienced? If you add in a dash of generational politics, the resulting brew often leads to some form of "revisionism" and backlash to that revisionism. Unfortunately, disputes between both "schools" often get mired down in a pernicious sort of point scoring.

This tendency becomes even more pronounced when one tries to grapple with the human experience and consequences of an event, as this conference has. Yet it is vital that we keep a sustained dialogue on Chernobyl, because the effects of this disaster will be with us for decades—if not centuries—to come. It is our hope that this conference, and this edited transcript of the conference proceedings held at the Woodrow Wilson Center, will contribute to and sustain this dialogue in a meaningful way.

In closing, I would like to acknowledge the financial and institutional support without which this conference would not have been possible. Funding for the conference and this publication came from the Woodrow Wilson Center's Federal Conference Fund, and from the University of Alberta. Columbia University's Harriman Institute organized a tremendous associated program held the day before our conference. You will find the program from this first day listed in this publication.

I would also like to thank the Woodrow Wilson Center's Environmental Change and Security Program, Global Health Initiative, and East European Studies, as well as the Canadian Institute of Ukrainian Studies Press, the Children of Chernobyl Relief and Development Fund, the Embassy of Ukraine to the United States, and the Embassy of the United States to Ukraine for their help in planning and implementing this conference. Alla Rachkov and Diana Howansky at Columbia University's Harriman Institute have been of tremendous help to us, as have been former and present directors Cathy Nepomnyashchy and Mark von Hagen. Finally, I should note that David Marples at the University of Alberta has been involved every step of the way.

I want to single out for special mention former Kennan Institute Deputy Director Nancy Popson. This conference, as well as much of the Institute's programming on Ukraine, arose from her vision. From the Kennan Institute staff, I also would like to acknowledge Renata Kosc-Harmatiy and Joseph Dresen for their work on both the conference and this publication, and Markian Dobczansky and Megan Yasenchak for their work on this publication.

Woodrow Wilson International Center for Scholars
Conference Cosponsored by the University of Alberta; the Harriman Institute, Columbia University; and the Woodrow Wilson International Center for Scholars

April 26, 2006

Commemoration of the Chernobyl Disaster: The Human Experience Twenty Years Later

Introductory Remarks

Oleh Shamshur, Ambassador of Ukraine to the United States

Vladimir I. Rybachenkov, Counselor, Embassy of the Russian Federation to the United States

Dmitry Ponomarev, Counselor, Embassy of Belarus to the United States

OLEH SHAMSHUR: Distinguished participants, dear friends, quite naturally I would like to start by expressing sincere gratitude to all the sponsors of this event and to take note of the quality of the experts who have congregated in this hall. I have no doubt that today's discussion will make a very important and valuable contribution to our deeper understanding of the nature of the greatest technological catastrophe in human history, its consequences, and, perhaps most importantly, what the future holds for all of us within the context of Chernobyl.

Twenty years ago, Chernobyl was a small town with an ancient history and barely 50,000 inhabitants—a spot of land deep in Ukraine's heartland. Two decades later, Chernobyl is now a city buried alive. It has become a warning of the dangers posed by human ignorance and the misplaced feeling of supremacy over the forces of nature. It also stands as a symbol of the hypocrisy, inefficiency, and the incapacity of the communist administrative and command system, with its inherent disregard of the individual's freedom and life.

In the early stages following the explosion—the most critical from the perspective of health—when the West was sounding the alarm, the Soviet authorities were depriving the citizens of true information about the debacle and its real scope. As countless thousands of people, unaware of the danger, were exposed to the massive radiation, the legitimacy of the Soviet system was tarnished for good. Glasnost did not pass the litmus test of Chernobyl.

At the same time, Chernobyl has become a monument to self-sacrifice and human suffering. We should first and foremost remember the victims of Chernobyl no matter where they have resided—those innocent civilians and 35,000 liquidators—unassuming heroes who put their lives at risk in order to mitigate the consequences of the accident and prevent a total meltdown.

The toll of the Chernobyl disaster for Ukraine is extensive. By 2004, over 500,000 human lives were lost as a result of the health deterioration caused by the Chernobyl accident. Among them are almost 7,000 children. As of 2006, 2.6 million Ukrainians have the status of those affected by the consequences of the Chernobyl disaster. More than 160,000

Ukrainians were driven away from the lands where their ancestors had lived for generations. Ten thousand square kilometers of once fertile and flourishing land remain polluted by radiation, as well as 2,218 Ukrainian townships and villages. By 2015, aggregate economic losses incurred in Ukraine by the Chernobyl disaster will amount to $170 billion.

Ladies and gentlemen, I am deeply convinced that in our assessment of the aftermath of the Chernobyl catastrophe, we should never forget that experts and humankind have yet to comprehend and to measure the full scale of the nuclear devastation. In this respect, we face numerous challenges, including the hazardous effects of continuous exposure to extreme radiation, possible genetic mutations, and radiation threatening the water and other components of the food chain that are present in an environment with long-lasting radioactive elements.

The gravest implications of Chernobyl might well lie ahead for Ukraine and other nations. They should be vigilant and well prepared to act. This only underscores an urgent need to enhance international cooperation in finding other good solutions to the numerous problems generated by the Chernobyl disaster.

In Ukraine, we have always appreciated the support from the international community, in particular the U.S. government, and from NGOs that assisted the victims of the disaster, especially the children. I think it would be very proper today to thank all those concerned for what they have done in the course of those 20 years to help Ukraine to address the manifold aspects of the Chernobyl fallout and to alleviate human suffering. We count upon continued international assistance in tackling the most urgent of the current Chernobyl-related problems—that of constructing a new shelter for the ill-fated reactor, because the old confinement structure, which shelters 200 tons of nuclear fuel, has been rapidly deteriorating. The situation is extremely grave and will not stand any further delay. The time that has passed since that tragic day of April 26, 1986, has proved the necessity of promoting comprehensive interdisciplinary study of Chernobyl-related problems encompassing technological, medical, biological, environmental, sociological, and historical aspects. As far as I understand, promoting interdisciplinary study is what this conference and roundtable are all about. I wish you every success in your discussions. Thank you.

BLAIR A. RUBLE: Counselor Vladimir Rybachenkov, from the Embassy of the Russian Federation to the United States, is also a very appropriate speaker for our event today, because he combines a distinguished career in diplomacy with a background in the physical sciences. He has served as counselor at the Ministry of Foreign Affairs of the Russian Federation, with responsibility for issues relating to security and disarmament, nonproliferation, and nuclear cooperation. He has participated in the Nuclear Cities Initiative negotiations, as well as in negotiations relating to other events associated with nuclear proliferation. Between 1994 and 1997 he participated in the development of *Guidelines for the Management of Plutonium,* which was published by the IAEA [International Atomic Energy Agency], and he has been a member of the Russian delegations to that body. As his work on these issues might suggest, he has a background on the technical side as well as the diplomatic aspects concerning nuclear cooperation. He is a graduate of the Moscow Institute for Physical Engineering, and he holds a Ph.D. in computer sciences. With that I would like to welcome him here to the Wilson Center.

VLADIMIR I. RYBACHENKOV: Good morning, ladies and gentlemen. First of all, I would like to commend the organizers of this conference for their initiative to commemorate the 20th anniversary of the Chernobyl accident. Indeed, they offered us an additional opportunity to express sympathy to the victims of the greatest man-made disaster of the last century and to pay tribute to the emergency and recovery operation workers, who helped to mitigate the consequences of the tragedy. The selflessness and immense sense of responsibility are really invaluable. By sacrificing their health and sometimes their lives, they saved the lives of many thousands.

One has to acknowledge that serious errors were committed by the leadership of the Soviet Union during the first days after the accident. However, further events testified to the fact that all possible manpower and material resources

were mobilized to solve the numerous problems that were brought to light. These actions included medical examinations, assistance to inhabitants of the contaminated regions, resettlement of people from dangerous territories, and decontamination of these territories. The scope of these efforts is characterized by the fact that 25 Soviet research institutes affiliated with the Ministry of Health and the Academy of Sciences were involved in the above-mentioned activities.

Moreover, new institutions were created, such as the Institute for Safe Development of Nuclear Energy, which is located in Moscow and was created in 1988. Also, there is a special medical and dose metering center in Obninsk, in the vicinity of Moscow, which has collected a database on half a million irradiation cases and provided assistance to a great number of patients.

The Russian Federation took the baton from the Soviet Union and continues to pay special attention to the mitigation of the consequences of the Chernobyl accident. Yesterday, President Putin pledged $2 million to Ukraine for the decommissioning of the three remaining Chernobyl reactors, including removal of spent fuel and its repatriation in Russian-produced containers. He also announced the forthcoming opening of a new international rehabilitation center for liquidators.

It would be unfair not to emphasize that enormous efforts made by the governments of Russia, Ukraine, and Belarus, which have been supplemented to a significant degree by the involvement of the international community, including organizations of the United Nations system, the World Bank, and the European Bank for Reconstruction and Development. International solidarity was also fully demonstrated by a large number of NGOs and private initiatives. There is a common understanding that the main thrust of current efforts should be changed. Social and economic restoration of the affected regions, as well as alleviation of the psychological burden of the general public and emergency workers, must become a priority.

In conclusion, I would like to touch upon another lesson that has been drawn from the Chernobyl accident, namely, that one cannot blindly rely on advances in technologies in the

absence of clear-cut evidence that their application is not fraught with catastrophic consequences. Clearly, such a conclusion was predetermined by the tragic explosion of the Chernobyl nuclear unit and has led to a long standstill in the development of nuclear power in many countries. For example, no new nuclear power plants have been constructed in this country for almost 15 years. Nowadays, the situation is drastically changing due to the advent of the new generation of nuclear power plants, which posses the quality of so-called intrinsic safety that is based on the laws of physics, and is not dependent on operators' behavior. One may hope that the Chernobyl syndrome is over and will not hamper the implementation of the initiative recently announced by the presidents of Russia and the United States related to the development of advanced nuclear reactors in order to effectively address issues of energy safety, environmental security, and nuclear nonproliferation.

Thank you very much for your attention. I look forward to listening to the program, which promises to be very instructive.

RUBLE: Next, we will hear from Counselor Dmitry Ponomarev, from the Embassy of the Republic of Belarus to the United States. He held a number of positions within the Ministry of Foreign Affairs prior to coming to the United States as counselor of the Belarusian Embassy.

Among his previous positions, he served as deputy head of the Department of Foreign Policy Analysis. He has also worked in several academic institutions and educational institutions and holds graduate degrees in history and interpretation.

DMITRY PONOMAREV: Ladies and gentlemen, on behalf of His Excellency Mikhail Khvostov, the ambassador of the Republic of Belarus to the United States, I would like to extend thanks and appreciation to the Kennan Institute and to the Woodrow Wilson Center for the opportunity to participate in today's event.

Precisely 20 years ago, the Chernobyl catastrophe occurred. In Belarus alone it has meant hundreds of human deaths, hundreds of thousands of internally displaced persons, and thousands of premature deaths of grown-ups and children alike. Consequences of the disaster for the Republic of Belarus have proved to be acute. They are characterized more adequately as a national disaster. Consequences of the Chernobyl disaster continue to adversely affect Belarus. Presently, about 21 percent of Belarus is contaminated by radionuclides. There are about 2,800 settlements located in the contaminated areas, with a population of more than 1.5 million people, including about 420,000 children.

Since 1991, more than $13 billion has been spent by Belarus alone to implement rehabilitation activities. The government of the Republic of Belarus has been conducting systematic activities and rehabilitating the affected areas.

On January 11, 2006, the government of Belarus approved the state program on overcoming the consequences of the Chernobyl catastrophe for 2006–2010. The main areas of this program are as follows: production of agriculture products with radionuclide content considerably below the permissible level, rendering medical assistance to the affected population, and certifying psychological rehabilitation and research activities.

Thanks to the efforts undertaken on the national level, a number of problems have been solved. Resettlement of people has been practically completed. A sound radiation monitoring system and necessary registration are in place. Special attention is given to social protection of the affected population. Still, Belarusian experts predict that in the nearest future, alongside the growth of thyroid cancer cases, there is a high probability of increased rates of other cancer diseases, as well as cardiovascular and other noncancer diseases. Therefore, the health problem remains in the focus of the government's attention.

International cooperation forms an integral part of the Chernobyl recovery efforts. Belarus notes with satisfaction that Chernobyl issues are adequately reflected in the agenda of the United Nations, as well as within all 11 United Nations agencies.

We express gratitude to all those who have taken close to heart the Chernobyl tragedy, to everyone who has rendered assistance in overcoming the Chernobyl tragedy. At the same time, Belarus appeals to all foreign governments and international and nongovernmental organizations to promote international cooperation in order to overcome the consequences of Chernobyl, in the spirit of humanism and solidarity.

And just as a small footnote, several days ago in Minsk there was a special international conference devoted to Chernobyl consequences. Those of you who might be interested to find the latest updates from the field about the social, economic, medical, and environmental consequences can find material from this conference on the website of our embassy (www.belarusembassy.org). Thank you very much.

RUBLE: Please join with me in thanking all of our diplomatic speakers. We very much appreciate their coming here today to join us and to initiate a good start in what is a very busy day for them.

Panel 1: An Historian's Perspective

Chair, **Blair A. Ruble,** Director, Kennan Institute, Woodrow Wilson International Center for Scholars

David R. Marples, Professor of History, University of Alberta

BLAIR A. RUBLE: When we were planning this event, there was a very short list of speakers we felt that we absolutely had to include, and David Marples was at the top of that list. I think David is well known to anyone who has been concerned with Chernobyl. His first two books on the subject, *Chernobyl and Nuclear Power in the USSR* and *The Social Impact of the Chernobyl Disaster,* immediately became landmarks in what has been a burgeoning industry of Chernobyl-related studies. When we approached him, David immediately welcomed the idea and, together with his colleagues at the University of Alberta, has been very helpful to us and to the Harriman Institute in bringing together this program.

DAVID R. MARPLES: Thank you. It is a great pleasure to be here in Washington for the commemoration of Chernobyl. Today I am going to offer the perspective of a historian. I do not think that when I first started writing on Chernobyl I was writing from the perspective of a historian, because it was a contemporary event, but it is now a historical event.

The Chernobyl disaster has given rise to numerous analyses and reports, many films and documentaries. It has been the subject of widespread unresolved debate as to the number of victims, the medical effects, and the impact of radiation on people's health. It has led to several serious rifts. While it tends now to be commemorated on significant occasions, particularly anniversaries, its effects are very much still with us.

Last September, a consortium called the Chernobyl Forum, which included a number of UN organizations headed by the International Atomic Energy Agency, as well as certain branches of the Russian, Ukrainian, and Belarusian governments, issued a new report that totaled about 600 pages in length and purported to give a definite account of the disaster and its consequences. The report's press release gave several main conclusions: First of all, up to 4,000 people could eventually die from radiation exposure, but by mid-2005 the death toll from Chernobyl-induced radiation stood at less than 60. Among 200,000 liquidators working at the site in 1986–87, 2,200 deaths were expected. Because of the changing pattern of radionuclide breakdown, the emergency zones that were originally designated for Chernobyl might need redefining. The worst health impact to date has been the outbreak of thyroid gland cancer among 4,000 children, but this has resulted in only nine deaths.

The Forum report maintains that the greatest enemies to date to those living in areas contaminated by Chernobyl are poverty and the difficulties caused by relocation. In turn, the stress caused by the events has led to a decline in mental health, and the chief dilemma currently is the psychological toll. The report mentions the feeling that Chernobyl is the cause of all problems, and suggests that this has led to a dependency on the state rather than self-reliance and local initiatives. And it has led the Forum to criticize those Chernobyl-related programs that it considers to have enhanced, rather than reduced, this dependency. According to spokesperson Michael Repacholi, the overall effect and the sum total of the Chernobyl Forum is "a reassuring message."

In April 2006, Greenpeace issued an alternative report that disputed virtually all the findings of the Chernobyl Forum. This report was based largely on contributions from scientists at government institutions in Ukraine, and to a lesser extent Russia. I noted one contributor from Belarus. This account focuses exclusively on health effects.

In contrast to the Forum's total of 4,000 additional deaths from Chernobyl, the Greenpeace report claims that in Belarus, Russia, and Ukraine alone the accident caused an estimated 200,000 additional deaths between 1990 and 2004. It adds that cancers, including leukemia, are common in the affected areas and among the liquidators.

In Belarus, it cites a 40 percent rise in cancer between 1990 and 2000, but in the contaminated regions, such as Homel' region, the increase was over 50 percent.

The incidence of thyroid gland cancer in the highly radiated Bryansk region of Russia was double that of the federal average. That is over the decade 1988–1998. By 2004, the incidence of thyroid gland cancer was triple the Russian national average.

The Greenpeace report states that there could be 90,000 additional cases of cancer in the three most affected countries, and that children under the age of four at the time of the accident are particularly susceptible. It documents the increased incidence of diseases of the respiratory, digestive, vascular, and musculoskeletal systems, as well as abnormalities of the immune system, congenital infections, genetic abnormalities, and premature aging.

The Greenpeace report comments that the reasons for the discrepancies between the Chernobyl Forum report and its own should be investigated with some urgency and that research into the impact of Chernobyl 20 years on needs to be increased. The question, though, is, how can such discrepancies exist? There is really some debate over this. Clearly, science is not a monolithic discipline, and in the case of Chernobyl there is no single set of correct and simplistic answers or forecasts.

There is also the question of the difference between the two reports, and I think there is quite a significant difference between the press release issued by the Chernobyl Forum and the contents of the Forum's report itself. Just to give one example, the figure of 4,000 deaths is based on a single table in the Chernobyl Forum report. If one adds up the figures from that table it does not even add up to 4,000, it adds up to 9,000. In addition, the Chernobyl Forum report focused on three republics: Russia, Belarus, and Ukraine, whereas Chernobyl affected practically all of Europe. In other words, it is really taking only a fraction of the area contaminated and then projecting long-term cancer effects. In that way, it might be noted that the difference between the two reports is perhaps not so marked as it might seem.

Turning back to the beginning of the Soviet nuclear program, the Soviets focused on two main reactor types. The favored choice was the RBMK, a graphite and water-moderated reactor that had been diverted from use during the atomic weapons program from the mid-1950s; hence the predominance, in the early accident days, of the ministry dealing with atomic weapons, the USSR Ministry of Medium Machine Building. The RBMK can be refueled online, thus saving valuable time, but it suffers from numerous defects. According to the KGB reports released in 2003 from Ukraine, there are at least 30 serious defects in the RBMK. These include a positive void coefficient, meaning that it becomes unstable if operated at low power, and the lack of significant containment over the reactor, which, for example, the Canadian graphite-moderated CANDU reactors claim to have. The RBMK's prototype was the station at Sosnovy Bor near the then-city of Leningrad. Stations were also constructed at Kursk and Chernobyl. A new generation of RBMKs were constructed in Ignalina, Lithuania, and construction also began at Smolensk, in western Russia.

The alternative reactor, and the one used for export as well as domestic production, was the water-pressurized VVER, which can be found across eastern Europe as well as in countries such as Mongolia, Finland, and Cuba. The Soviet prototype for the VVER was the reactor site at Novovoronezh.

The site for Chernobyl itself was chosen in 1970 on the left bank of the Prypiat River, and the first reactor came online in October 1977. There were frequent problems in the building of the first two reactors, partly as a result of the haste of the program and its adoption of a rigid timetable. In the year 1978 alone, the time when Unit 2 came into operation, 170 workers were injured in accidents at that site. From 1981 to 1985, there were over 1,000 emergency shutdowns, including 381 at RBMKs and over 100 at the Chernobyl station itself.

At the Rivne station in western Ukraine there was said to be no adequate disposal site for low-level nuclear waste. Although it was a VVER reactor, the containment over the reactor was still insufficient to contain the release of radioactive substances in the event of an accident.

In general, most of these problems were blamed on the factories manufacturing the equipment. At Chernobyl, four reactors—each one 1,000 megawatts in size—were in service by 1984, with two others at different stages of completion. Unit 5 had been the subject of heightened anxiety in the Ukrainian media, particularly by the Prypiat journalist Liubov Kovalevska in *Literaturna Ukriana*. Units 5 and 6 were twin units built some distance from the main reactor site.

On September 9, 1982 a serious accident occurred at Chernobyl Unit 1 prior to a scheduled shutdown. The exact causes are not known, but one of the reactor channels ruptured when power was raised to 20 percent. At first, the authorities in Moscow saw no cause for panic. The accident was said to have been contained, and no one had been affected. Within several days the reports became more alarming, and it was revealed that significant amounts of radiation had escaped from the plant's confines. A top-secret report from the KGB noted that areas at least 14 kilometers to the northeast of the plant and 5 kilometers to the southwest had been contaminated. Among the settlements that were badly affected by this accident was Chystahalivka, which was one of the villages evacuated immediately after the 1986 disaster just four years later. In other words, it was contaminated twice. The document trail on this accident soon went cold. A government commission was appointed to investigate, but its conclusions—or even whether it actually met—are not known. Neither the Soviet public nor the international community was ever informed about this 1982 accident.

In 1982 the Soviet Union was a member of the International Atomic Energy Agency, but secrecy was in any case ingrained. The 1982 accident set the precedent for the government's behavior and actions for the one in April 1986.

Chernobyl is about 10 miles south of the border with Belarus and is at the very north end of a complex water system involving the Kyiv Reservoir and several river systems that eventually lead into the Dnipro River.

The intricate details of the accident are too complex to be elaborated here, but it is well known that operators performed an experiment during a scheduled reactor shutdown to see how long a disengaged spinning turbine could continue to generate power to the plant's cooling pumps before emergency turbines came into operation. The safety tests had been conducted by two operators under the jurisdiction of the deputy chief engineer. Altogether, about 17 shift workers had been present for this test, but the plant manger and the chief engineer were both absent. Inexperienced operators had turned off many safety systems, and the experiment led to a power surge within the reactor that blew the roof off Unit 4 around 1:23 in the morning of April 26. The resulting radioactive debris reached a height of around one kilometer, and for the next two weeks radiation continued to escape through the gaping hole. An estimated 260 million curies entered the atmosphere before the hole was plugged on May 10.

The initial explosion released only a few hundred kilograms of particles, but the resulting graphite fire within the reactor released additional material. The total release was initially believed to be 3 percent of the contents of the core, but that figure is somewhat in dispute. The radiation cloud that formed was transported by wind in a northwestern direction, so that major fallout occurred on the territory of Belarus. The initial danger was the spread of the graphite fire to the roof of the third reactor unit.

The process of informing both the public and the outside world about the disaster occurred very slowly. The first announcement publicly came on April 28 from Radio Moscow, but it only came after nuclear plant workers in Sweden detected high levels of radiation on their shoes before they went in to work at their own station. The Swedes thus realized an accident had occurred somewhere in the Soviet Union. The Politburo set up an operative group under Mikhail Gorbachev's two key associates, Yegor Ligachev and Nikolai Ryzhkov, and these leaders then set up links with several ministries of key importance for a nuclear accident, particularly the union and republican ministries of

health and the State Committee for Hydro-Meteorology and Environmental Control.

The first detailed reports were printed by the media on April 29, three days after the disaster—repeating a figure of two dead from the accident, but giving no other details. In Belarus, the first reports in the local media occurred about a week after the disaster.

The graphite fire continued to burn, eliciting the arrival of fire crews from Prypiat and from Kyiv about 80 miles to the south that had to come along a single narrow road northward. Helicopters began to drop lead, boron, and sand onto the reactor to quash the fire. Initially, an evacuation area was designated at a 10-kilometer radius around the reactor—meaning that Prypiat, the town housing reactor workers, with a population of 45,000, and the village of Chernobyl, population 10,000, were the main settlements to be evacuated.

Up to that point, particularly in the city of Prypiat and on the morning of April 26, life continued virtually as normal. Men were fishing and at least two weddings were held outdoors that day. Farmers reported sometimes burning their feet on the soil. No health warnings or even advice to stay indoors was offered to local residents. A government commission was established under Borys Shcherbyna, deputy chairman of the USSR Council of Ministers, which took control of the Chernobyl site.

On May 2, Ligachev and Ryzhkov flew to Chernobyl and promptly expanded the evacuation zone to 30 kilometers. It is reported that about 60,000 people were evacuated between May 2 and 4. The early and most seriously affected victims were transported to the specialized Moscow Clinic No. 6, while others were taken to hospitals in Kyiv. By May 4 it was reported by the Politburo that 1,882 people had been hospitalized, including 204 seriously afflicted with radiation sickness. These totals soon began to increase substantially. On May 1, radiation levels over the reactor were reportedly 80 roentgens per hour, and in Prypiat 200 microroentgens per hour. Three days later, a change in the direction of the wind led to a dramatic rise in the radiation background of the city of Kyiv, with a population 2.5 million. By May 8, radiation levels at the reactor site were still rising, reaching 1,000 roentgens per hour, which was 77,000 times the background norm.

The KGB accounts report two explosions, the second of which was the most powerful and, among other things, destroyed all the fire-extinguishing equipment. As the radiation cloud formed over the reactor, the lack of Geiger counters made it impossible to take accurate readings of radiation levels. The KGB's role was to investigate the causes and assign responsibility for the accident, but it also concentrated on things like the need to control traffic in and out of the zone and on the busy road from Kyiv.

By late May the key priority was the construction of a temporary roof, the so-called sarcophagus over the destroyed fourth reactor unit, and the construction of a cable pathway for the delivery of building materials. A key concern was that dropping materials on the graphite fire had served to push the reactor downward toward the water table. Coal miners were brought in to construct a concrete shelf underneath the reactor, which might otherwise contaminate the Prypiat River, which linked to the Dnipro, as well as the Kyiv Reservoir, the main water supply for the Ukrainian capital.

Other priorities were the collection and burial of radioactive deposits, starting with the roof of Units 3 and 4 and the removal of the so-called Red Forest close to the site that was critically irradiated. The contaminated zone was divided by the government commission, based mainly on the fallout of the long-term radionuclide cesium-137, and altogether there were four different zones. The evacuated area, called the "zone of alienation," was projected to remain empty for several decades and had over 40 curies of cesium-137 per square kilometer [$^{137}Cs/km^2$] in the soil. The zone of compulsory evacuation had a level of between 15 and 40 $^{137}Cs/km^2$. There was a zone of permanent control at 5 to 15 $^{137}Cs/km^2$, and all territories with more than one curie per square kilometer of cesium-137 had to be monitored constantly.

In the early period, about 118,415 people were evacuated from the various zones, although often evacuations were to areas that were already in the path of the radiation cloud so that sometimes people had to be moved again. The zones were inevitably somewhat arbitrary, since a single

farmer's field could fall into all four categories depending on where the measurement was made. By the year 2000 some 350,400 people had been evacuated, the largest portion moved between 1991 and 2000. Of those numbers, about 163,000 were from Ukraine, 135,000 were from Belarus, and over 52,000 were from Russia.

These events constituted a response to a nuclear emergency, and they might be considered a normal response. In many ways the Soviet Union was not a normal society, and in several respects the reaction to Chernobyl leads to questions. The cleanup operation, which eventually involved over 600,000 people, according to the KGB documents, was conducted in appalling conditions. While tours in the zone extended, often without warning, lifetime radiation levels were exceeded, there was overexposure to radiation—particularly on the reactor roof— and there was a lack of facilities. This could have been alleviated with a better response to offers of assistance from abroad. It was reported that many Geiger counters did not work beyond the level of 25 rem, but once this level was reached, workers continued to stay in the zone.

Initially, volunteers from all parts of the Soviet Union, who remained in the zones for the first weeks, carried out the main cleanup operation. They were eventually replaced by military reservists, but the reservists were not monitored, and many of them simply disappeared and do not appear later on any register. That many subsequently died seems a foregone conclusion. They were in the zone at the very height of the tragedy, and the Ukrainian film director Volodymyr Shevchenko, who did go to the zone immediately after the accident, died after filming in the area. Health data in any case were soon officially classified. Once the reservists arrived from the military, casualties were closely guarded by the USSR Ministry of Defense. When deaths occurred, they could be attributed to various illnesses. In fact, no one who fell ill and died in this period officially died as a result of Chernobyl radiation.

By the spring of 1989, as a result of glasnost, maps appeared in the Soviet media indicating that the area of radiation fallout was much broader than first reported. Hundreds of Soviet families thus suddenly discovered that they were living in a radioactive zone, particularly in western Ukraine and large areas of Belarus.

This map [Map 1] indicates clearly the path of the radiation cloud over Belarus in late April. You can see the cloud moving to different [areas] of the republic: first to the west, then into central areas of the republic; finally, the change in the wind direction pushes it to the south. The red areas in the southeastern part of Belarus were the most heavily contaminated.

The reaction to this new information on fallout levels can only be imagined, and it led to demands for additional and quite controversial future evacuations. Essentially, the damage had already been done: radioactive food had been consumed, delivered locally and nationally, and even exported for the previous three years.

The combination of secrecy and distortions at a time when the Politburo knew many details about the impact of the disaster, but chose not to disclose them, has been termed by Alla Yaroshinskaya, former Soviet deputy and aide to Boris Yeltsin, as the "Big Lie." Alla managed to rescue many of these documents for posterity in late 1991 [see her presentation at Panel 3—Ed.].

The acclaimed Soviet report to the IAEA in Vienna in August 1986 about the causes of the accident went no further than human error, ignoring the well-known defects in the RBMK reactor. In fact, the isolation of all decision making for the nuclear industry in Moscow and Gorbachev's decision to use Chernobyl as a form of state propaganda for a campaign to remove all nuclear weapons from the Earth by the year 2000 led to a virtual paralysis among the authorities in Kyiv and Minsk. It was reported incidentally at Chernobyl that 72 party workers were on the run and no one knew their whereabouts. And who can blame them?

By the late 1980s, the Soviet Union faced a financial and political crisis that undermined its efforts to deal adequately with the aftermath of Chernobyl.

In addition to Soviet culpability for many of the problems that emerged, one should add that there was also wild speculation about the real consequences of Chernobyl. Reports in the West claimed that there could be as many as 15,000 people dead. There was also at least one documentary film showing genetic abnormalities in

livestock as early as 1988. These have been defined under the general heading of "radiophobia" and led to many uncorroborated reports—the most notorious being that red wine and vodka were the best cures for radiation sickness.

Such beliefs were a result of official silence and the lack of information from authorities. There were very few political victims of Chernobyl—surprising given an accident of this magnitude. The minister for medium machine building was retired, but he was already 88 years of age. In the summer of 1987, the plant director, Viktor Brykhanov, along with the chief engineer and several operators were put on trial in the town of Chernobyl. Brykhanov received a sentence of 10 years of hard labor, which was rather harsh given his powerless role as a plant manager and his absence during the major events. It was said at the trial that he had misled the public about the true level of radiation at the site by dozens of times.

Glasnost also spurred political opposition in Ukraine. Most notably, the nascent environmental movement Zelenyi Svit, led by the medical doctor Yuri Shcherbak, initially formed in late 1987. By early 1989, Ukraine, like the Baltic states, had its own popular movement for perestroika, called Rukh, with a founding congress held in September of that year. Rukh soon began to demand an end to the nuclear power program in Ukraine, as well as Ukrainian sovereignty over its industrial installations and its economy, which was in fact achieved by the summer of 1990.

The antinuclear movement developed right across the former Soviet Union, stopping large-scale nuclear power construction in various places. Yuri Shcherbak is well known—he later became the ambassador of Ukraine to the United States, and then later to Canada.

After Chernobyl, several measures were taken to try to keep the nuclear power program in place. Although the fourth reactor was permanently shut down, the three remaining reactors were all back online by December of 1987. Units 5 and 6 were never completed. Due to the evacuation of the town of Prypiat, a new town was constructed for plant workers, called Slavutych, in the oblast of Chernihiv, about 40 miles to the northeast of the Chernobyl station.

The International Atomic Energy Agency, which signed an agreement with the Soviet Union in 1985 on the application of safeguards at nuclear facilities, basically took control in terms of supervising technical improvements to the RBMK reactors. These improvements included things like raising the uranium enrichment, making sure that no experiments, safety or otherwise, could be conducted in the absence of the plant director, and ensuring that no one could shut down reactor safety mechanisms. Seven such mechanisms had been switched off during the tragic 1986 experiment. Eight years later—and one may wonder about why it took so long—the IAEA declared that the Chernobyl RBMK reactor was inherently unsafe and that the station should be closed down. As we know, it was closed down much later.

Chernobyl devastated Ukraine and Belarus, contaminating 8 and 22 percent of the landmass of those republics, respectively. In Belarus, 25 percent of the forest area was contaminated. While only about 0.5 percent of its total territory, a very large area of Russia was contaminated, including Smolensk and Bryansk oblasts in particular. Over five million people currently reside in areas with more than one curie per square kilometer of cesium in the soil.

In Ukraine, the long-term impact of cesium, strontium, and, to a lesser extent, plutonium will continue in perpetuity in regions such as Kyiv, Zhytomyr, and Chernihiv, as well as parts of western Ukraine including Rivne and Volyn oblasts.

In Belarus, the main affected regions are in Homel, Mahileu, and Brest oblasts. Many villages in the Homel region are depopulated, while others subsist in poverty, but virtually no young people remain there.

When the sarcophagus covering the fourth reactor unit was completed, by the fall of 1986, it began to erode naturally. It was only meant to be a short-term building, and initially a German-French consortium designed a roof of more permanent construction. Later the Ukrainian government reopened the project for bids, and now a rival bid has emerged from a U.S.-Ukrainian consortium for the so-called shelter implementation plan over the destroyed fourth reactor.

Both Ukraine and Belarus have introduced moratoria on the construction of new reactors. In Ukraine's case, it was declared in 1990 for 5 years, and in the case of Belarus it was declared in 1998 for 10 years.

The last topic I want to look at in detail is the question of health effects of Chernobyl in the different regions. As it has already been mentioned, this has become a very controversial subject. The figure of 31 initial deaths and less than 60 deaths to date is under review because of the number of deaths at the reactor site in the summer of 1986. The percentage of healthy children in the contaminated zones was reported at around 80 percent in the mid 1980s; today, it is said to be less than 20 percent.

In Belarus, as a result of Chernobyl, 1.5 million people are under medical observation. That is over 15 percent of the population, including over 330,000 children. The cleanup crews, or liquidators, have suffered a variety of ailments. Many have committed suicide. At least 5,000 were dead by 1990. At least two sources reported 10,000 dead within a decade of the accident. As noted, the Greenpeace report lists just under 34,000 deaths among liquidators in Ukraine.

The difficulty here is corroborating the results. A central register is lacking, and there is a plethora of often conflicting medical studies and an incomplete source base. What does seem plain is that liquidators, evacuees, and current zone residents face a variety of health problems that have resulted from Chernobyl—but also from falling living standards, a lack of nutrition, and a sort of psychological stress cited in the Chernobyl Forum report.

Overall, the number of people declared to be suffering from the Chernobyl accident in the territories of the former Soviet Union in December of 2000 is 7.1 million. Of that figure, 4.5 million were living in contaminated regions and over 500,000 were liquidators, who were on the scene in 1988 to 1989. Breaking down these figures among the republics, the number of victims in Ukraine was just over 3 million, just over 2 million in Russia, and an estimated 1.82 million in Belarus.

Thyroid gland cancer began to surface among children staring in 1989. It was practically unknown in that age group before that year, and it has been directly related to the release of radioactive iodine from Chernobyl. In Belarus, 19 deaths have been reported among those on whom thyroid surgery has been performed in recent years.

Levels of leukemia have risen throughout the contaminated zone, though the levels remain within the upper limits of European norms.

One also has the onset of new diseases not formerly attributed to radiation, such as childhood diabetes, and this possible impact of low-level radiation is a matter for sustained debate. In Belarus, Dr. Yuri Bandazheuski, a nuclear specialist and former rector of the Homel' Medical Institute, conducted a study of the incidents of cardiovascular sickness among children in that region, and concluded that relatively low subjection to cesium-137 could cause cataracts, heart disease, and other maladies. He was also critical of the sale of radioactive vegetables, and maintained that the contaminated region around Chernobyl and Belarus had actually worsened over time. We do not know the final results of these studies because he was sent to jail for about eight years shortly after his study appeared.

The serious health dilemmas that have resulted from Chernobyl have led local scientists to question figures from the IAEA-led Chernobyl Forum report.

The surprising thing about radiation is that it kills some people outright, but others that it theoretically ought to kill go on to recover.

I cited one report from Belarus by a scientist, Alexander Yablokov, who reports that the number of thyroid cancers among children in Belarus is over 10,000 today, rather than the 4,000 cited in the Chernobyl Forum report, which has implications for the long-term mortality rate. Though the report acknowledges a significant rise in the various types of cancer among liquidators and breast cancer among women living in the zone, it has been criticized for saying nothing about the lack of immunity to diseases generally characterized as "Chernobyl AIDS." There is information about an apparent link between radiation and the increase of newborn children with abnor-

malities like Down syndrome. Yablokov and others take issue with a number of other conclusions by the Forum. They note, for example, that the report declares that the final death toll from Chernobyl will never be known precisely. Just a little later on, it is stated that in Russia there will be an additional 4,726 deaths. How precise could one get? Yablokov in particular believes it is incorrect to say that the rise in mortality cannot be attributed to Chernobyl since there has been a rise in mortality in all former regions of the Soviet Union. While this is true, the first significant rise in morbidity occurred specifically in the Chernobyl-affected regions. Yablokov also objects to what he calls the nebulous language in the Forum report, with frequent use of phrases like "not altogether clearly," "it is possible," "not definitively," and "not corroborated by statistical data." He believes they are deployed essentially to conceal data that are statistically credible.

He cites studies that indicate a direct link between radiation and increased stress, particularly in Europe—in fact, the report fails to note the impact of Chernobyl outside the three major countries of concern: Belarus, Ukraine, and Russia. He could have added that the report does not take into account the intricacies of the Soviet system, which had already concealed a major nuclear disaster at a weapon site in Kyshtym in the 1950s, and also the 1982 accident cited at Chernobyl.

In the year 2000, the Ukrainian government of Leonid Kuchma closed the Chernobyl plant permanently in the hope that the output of the two remaining reactors could be offset by the commissioning of Western aid for two new reactors at the Khmelnytsky and Rivne stations, both VVER 1000s. There are over 100 radioactive waste burial sites in the zone today, many of which cannot be described as safe or permanent.

As described recently in the book by Mary Mycio [*The Wormwood Forest: A Natural History of Chernobyl*], the zone has effectively become depopulated and a virtual wildlife park, aside from about 1,000 elderly so-called *samosely* who have returned to their homes.

After 20 years there is no consensus on health effects of the accident, and there is a notable rift between the scientific establishment represented by the IAEA and the popular media on what are the real results of Chernobyl. It is actually one of the most protracted and unfortunate elements of the disaster, inasmuch as it hinders an open discussion.

As I said at the beginning, there is the Chernobyl Forum report, there is the Greenpeace report, but really there is nothing in between. If the Chernobyl Forum report is led by the IAEA, an agency whose goal is to promote the development of nuclear power, one could equally well say that Greenpeace is an organization that is dedicated to the end of nuclear power. Why is there nothing in the middle of these two reports? Of course, these two agencies do not communicate with each other.

The accident had a profound impact on the national development of the republics, particularly in Ukraine, raising national consciousness and, concomitantly, sentiment that was notably anti-Moscow—where the nuclear ministries were all located.

According to a survey in Ukraine by the Razumkov Center, Chernobyl today is an issue still preoccupying residents of Ukraine. According to this survey, it ranks fourth on the list of concerns for Ukrainians after low income, unemployment, and crime. According to this same poll, over 64 percent of people in Ukraine believe nuclear power to be a dangerous or a very dangerous form of energy production, and almost 55 percent oppose any expansion of Ukraine's nuclear program, which is certainly now an increasing possibility given the war over gas prices with Russia.

In Belarus, Chernobyl increasingly is identified with campaigns of the political opposition. For example, an event that draws crowds will take place in Minsk: the Chernobyl March. This time, it follows several protests over the nature of the presidential election and the way in which it was held.

Independent studies of the disaster in Belarus are rather difficult to produce. The government has also criticized programs abroad for Chernobyl children that it says do not necessarily bring benefits.

In most cases, families have lived on the contaminated land for the past 20 years. The health crisis in Belarus elicited the convocation of the

first Congress of Doctors in 1998, which noted an overall rise in the incidence of sickness of 32 percent and a 50-fold rise in the number of children with thyroid gland cancer.

Twenty years later, the legacy of Chernobyl continues in Ukraine and Belarus in particular. Newly independent states succeeded the Soviet republics, but faced overwhelming economic problems by the year 2000. Ukraine had an estimated total cost from Chernobyl of $128 billion, and in Belarus the estimated costs have been around $235 billion. For Belarus, that sum was actually equivalent to 32 total annual budgets of the year 1985. This gives some idea of the scale of the problem. Twenty years later, over 10,000 young people have cancer. Thousands of liquidators are dead from causes that may or may not be linked to Chernobyl, but their deaths are nonetheless premature since they were mostly men in their forties.

Even the populations of the two republics, as is that of Russia, are in steep decline. Belarus has "lost" over 500,000 people since 1985. The Ukrainian population has declined by 4.5 million in that same period. The lack of fertility among these populations, as well as mass migration from the contaminated regions, are both linked directly to the Chernobyl disaster.

The world, of course, has moved on to new crises: the war in Iraq, famine in Africa, the danger of nuclear weapons being manufactured in Iran. But there is no closure yet on Chernobyl. There is no foreseeable end to the debate, and there is no relief from the profound medical, social, and psychological burden placed on seven million people living with these effects in the soil and in the food chain today.

QUESTION AND ANSWER PERIOD

QUESTION: Mr. Marples, first of all I would like to thank you very much for your overwhelming presentation. Nonetheless, I would like to make some corrections. I think you are very much mistaken in stating the period of membership of the USSR in the IAEA. It became a member of the IAEA at the beginning of its activities in 1958. The first representative to the IAEA from the Soviet Union was the famous Russian minister of foreign affairs, Mr. Vyacheslav Molotov, so it is not 1985 but 1958. I think my colleague from the IAEA who is present here can confirm that.

MARPLES: Let me make a correction. 1985 was the first year that the IAEA was allowed into the Soviet Union to a civilian nuclear power station.

QUESTION: Yes, but you were speaking in terms of membership. You were saying that the Soviet Union was not a member of the IAEA in 1985, which is not true.

My question is concerning the figures that were given by you referring to Professor Yablokov. With all my respect to Professor Yablokov and the figures that he is presenting, I am not sure that we can take all these figures for granted without any discussion. You know, only three days ago in Moscow a commemorative conference was held marking the 20th anniversary of Chernobyl, and the director of the Institute for Safe Development of Nuclear Energy spoke there. He referred to the statement of Professor Yablokov some time ago that he was trying to corroborate AIDS disease here in the United States, saying that after Chernobyl and maybe because of Chernobyl, it was augmented by 15 percent. Thank you.

MARPLES: I do not see how the comment on Yablokov really contradicts anything I said. I cited Yablokov, one of his articles, as criticizing the Chernobyl Forum report, and that report has come under criticism from a number of different people, in all fairness.

QUESTION: I was just wondering if you were aware of any studies that might have been done in relation to your comment at the end linking the demographics and the fall in the population of Ukraine and Belarus to Chernobyl?

MARPLES: Yes, dozens of them. I have traveled to Belarus specifically to go through some of those studies. I would say the numbers are probably close to 50 or 60 major studies, including different regions in Belarus. They examine not just the radiation effects but generally why the population is declining so rapidly, and why the death rate is so much higher than the birthrate.

Chernobyl is regarded as a factor—not necessarily the only factor, but definitely a factor. It is not the only factor, because population is declining in Vitebsk Region, which was also contaminated by iodine before it was contaminated by Chernobyl fallout.

Migration is a factor. Young people tend to leave the villages and move to the towns. The fear of living on irradiated land is also a key factor. Women not being clearly confident in having children is another factor.

So the population decline is obviously not something that is new to the government; it is well known. It is regarded as a priority, and the government of Belarus has also talked about repopulating those regions either with new migrants or by encouraging people to go and live there. Ukraine is similar in many regards.

It is also fair to say that over the past 10 to 15 years the demographic problems in all those three countries have been a cause of great concern. It is happening all over Europe of course, but the rate of decline is higher in these countries than the European average.

QUESTION: In your presentation you made a lot of comparisons among Belarus, Ukraine, and Russia, and you placed Belarus in first place. Is it because you believe that Belarus suffered most from this event, or is it because you paid more attention in your research to Belarus? In my belief—and I have written a book on demographic consequences of the Chernobyl disaster for Ukraine's population development—I believe that Ukraine suffered more in this story.

QUESTION: Do you have any data present on the long-term effects outside those three countries, for example, in northern Europe and western Europe?

MARPLES: I gave some figures on the number of people evacuated and the total area contaminated. It is a simplistic thing to do, but if you just look at the total area contaminated by Chernobyl—by total area, with one curie of cesium alone—Russia received the most contamination. If you look in terms of high levels of contamination—over 15 curies per square kilometer—then Belarus received the most. That is a fact; there is no question about it. The worst-affected regions of Ukraine were around the Chernobyl reactor and, to a lesser extent, in three northern regions and the western region. It is really a matter of where the radiation cloud went, and because of the way the wind was blowing, Belarus got a massive dose. That is not to say that the problems are not very serious in Ukraine, and I am not in any way belittling them. But an additional factor to consider for Belarus is that it has a population of only 10 or 9.7 million today. Therefore, we are talking about nearly a quarter of the population. Ninety percent of the republic was contaminated by radioactive iodine. So it is the scale, rather than anything else, that defines the terms of how different republics were affected by Chernobyl.

The question about Europe is absolutely relevant and extremely important. I have not done studies on the fallout of Chernobyl in Europe, but they have been done—particularly in southern Germany, where there was a major problem. Chernobyl also affected large areas of Poland, Slovakia, Greece, and Turkey. It extended as far north as Scandinavia, Lapland, affecting the reindeer population. The mountainous regions of the British Isles, Snowdonia National Park, the Lake District—all these areas got large doses. It is for those reasons that the figure of 4,000 dead is not relevant. It cannot really be taken seriously because Europe—and the whole world—is affected by Chernobyl. In terms of long-term effects, Europe was affected. However, vast areas of Europe, and even large areas of Russia, are not normally considered to be in the contaminated zone.

Panel 2: The Health Perspective

Chair, **Martin Sletzinger,** Director, East European Studies, Woodrow Wilson International Center for Scholars

Didier Louvat, Head, Waste Safety Section, International Atomic Energy Agency

Murray Feshbach, Senior Scholar, Woodrow Wilson International Center for Scholars

Leonard Mazur, Chief Operating Officer, Triax Pharmaceuticals, and Member, Board of Directors, Children of Chernobyl Relief and Development Fund

DIDIER LOUVAT: I am here today not representing the IAEA, but the Chernobyl Forum. We were asked by the Kennan Institute to give some highlights about findings and recommendations of the Chernobyl Forum. First of all, I would like to briefly describe the process of how the Chernobyl Forum operated. The Chernobyl Forum was initiated by Mohamed ElBaradei, the director general of the IAEA, at the end of 2002. It was initiated because of the discrepancies existing between the UN agencies dealing with or talking about the Chernobyl disaster, and also at the request of the affected member states, primarily Belarus. Its formation was announced during the visit of Mohamed ElBaradei to Belarus.

What was the primary objective of the Forum? It was to build a common UN position to support the UN Development Program strategy that was proposed at the time, and was still under discussion with the three affected countries—Belarus, Russia, and Ukraine. This is the objective of the Chernobyl Forum, and nothing else.

It was composed of eight UN organizations involved in the treatment of the fallout from the Chernobyl disaster: the International Atomic Energy Agency (IAEA), the World Health Organization (WHO), the Food and Agriculture Organization (FAO), the United National Development Program (UNDP), the United Nations Environment Program (UNEP), the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), and the World Bank, plus representatives and experts from the three affected countries that were under investigation. The results of the Chernobyl Forum were reported to the 60th UN General Assembly, which approved a resolution supporting the Forum's results.

How the Forum operated: We had a steering committee made up of senior representatives of the eight UN organizations and representatives of the governments of the three affected countries. We had also two expert groups: one on health (coordinated by WHO) and one on environment (coordinated by the IAEA), plus we had a report to refer to that was prepared by the UNDP on the strategy for recovery. Participants in the expert groups were selected on the basis of their involvement and scientific work related to Chernobyl over the previous 16 years.

Each group met several times to examine health consequences and environmental consequences. Every year, from 2003 to 2005, we had a steering committee meeting, where the work of the different groups was reviewed. If a consensus existed, then the group would move forward; if no consensus existed on a portion of any of the reports, then the group would reexamine the issue. That means that all of the Forum reports on health and environment—and later on social and economic consequences—were reviewed and approved at each step of their development by each UN organization and by the governments of the three affected countries. The final report was approved in April 2005 by the entire group and was then presented at a conference in September 2005. I will come back to that later.

The objective of each expert group was to provide a consensus statement, both on health effects and environmental consequences, to serve as a scientific basis for the UNDP's strategy focusing on Belarus, Russia, and Ukraine. Nothing more, nothing less. We were also asked for our opinions on recommendations on radiation, health care programs, and remediation programs, and on the gaps that remained in the knowledge that we had on the disaster.

I am going to present three types of conclusions—general conclusions, health conclusions, and environmental conclusions—and we can discuss these conclusions whenever you wish during the day. There is no doubt that the Chernobyl catastrophe was the most severe accident in the history of the nuclear industry. It was by far the first radiological accident of such magnitude. Figures have already been given by previous speakers. It also became evident for the Forum's participants over the course of the years that the most significant problems were the resulting civil, social, and economic depressions, which affected Belarusian, Russian, and Ukrainian regions after the catastrophe and later during the 1990s.

The Forum participants also noted a serious problem for the general public in the affected regions. In considering the average dose for the people living at the time of the accident in the affected regions of Belarus, Russia, and Ukraine, we have split them into four groups of people. These people were split with respect to the task they performed during and after the catastrophe of the accident, and also by the dose they received. One group is the liquidators, which represents the group of workers who participated in emergency and remediation operations from 1986 to 1989: we included the 600,000 people who were registered as liquidators at the time, and some of them received more than 100 millisieverts (mSv) as an average dose.

Next we have the people evacuated just after the accident from the exclusion zone, 116,000 people, who received a mean figure of 33 mSv. These people were carefully monitored at the time of the evacuation, but there is also uncertainty concerning the average doses, and I can comment later on that.

Next we have the residents of the strictly controlled zone (SCZ), who are a corps of 270,000 people who received less than 50 mSv. This group is less precise because not all these people were carefully monitored from the time of the accident up until now.

Finally, we have the residents who resided in the contaminated area at the moment of the accident, a corps of five million people who have received a mean between 10 and 20 mSv from the year of the accident until now.

Just for understanding, the mean natural background dose received by any human body during 20 years is 50 mSv, and that varies on the basis of the place where you live.

Regarding the aftereffects: the corps of several hundred emergency workers received radiation doses. We know for sure that around 50 died from actual radiation syndrome—bodies that were diagnosed with severe sickness due to radiation. Then the Forum made a biostatistical forecast on the core group who received more than 100 mSv. According to these biostatistical forecasts, the radiation received at the time by the liquidators has caused or will cause the premature death of around 4,000 people from a corps of

Summary of average accumulated doses to affected populations from Chernobyl fallout

Population category	Number	Average dose (mSv)
Liquidators (1986–1989)	600 000	~100
Evacuees from highly-contaminated zone (1986)	116 000	33
Residents of "strict-control" zones (1986–2005)	270 000	>50
Residents of other 'contaminated' areas (1986–2005)	5 000 000	10–20

600,000. This is already verified in a corps that has been well monitored by a Russian physician, and Ivan Ivanov and colleagues produced a book with this data.

Ivanov noticed a doubling of the lack of morbidity in workers who received more than 200 mSv. He noted some increase of mortality of around 5 percent caused by solid cancers, and he noticed something that is new in radiation protection. He was able to link cardiovascular disease with high radiation exposure. He also noted an increase in cataract frequency, but this is still very tiny and needs to be investigated further.

The Forum also pointed out that it is only 20 years after the accident, and certainly for this corps we do not have all the effects appearing right now. The message of the Forum is that this corps of liquidators should be monitored and provided health care. There is no doubt about that.

Another corps that was well identified is the corps of children and adolescents who received substantial radiation doses in the Chernobyl region due to the consumption of milk. From 1992 to 2002 in the three countries of the affected region, about 4,000 thyroid cancer cases were detected in this corps. More than 99 percent of the children affected were successfully treated. Some died because they were diagnosed very late. When the Forum said they were successfully treated, that means they did not die. It does not mean that these people have a normal life; they still suffer from the sickness. It is something you suffer from your entire life.

Now if we extend the observation to the five million residents of the contaminated area, up to now we have no reliable data on increased incidence of any somatic disease except for thyroid cancer in children and adolescents. And the WHO group spent a lot of time looking at all the data provided from all sources. It worked to sort out what was reliable information, and what was unreliable information. There was a debate in this group over how to extend the biostatistical forecast. Everybody agreed that a dose above 100 mSv is related to effect, and an effect can be a cancer. Below 100 mSv, nobody knows exactly what is happening.

There was a discussion within the group, and it was decided to make the calculation but to say it was highly speculative. So the calculation was made and this is the discrepancy, which was addressed by Mr. Marples and was not indicated in the press release. A biostatistical forecast, if implemented as it has been for the corps of liquidators, would predict a small radiation-induced somatic morbidity in the future. I indicated differences of less than 1 percent in cancer mortality, and this is what we put in this booklet. Actually, if you take the numbers that were calculated, the difference is less than one per million.

We would never be able to observe this because the statistical population will never be large enough. We would need around one billion people to see an effect, and we have only five million people affected. Then the uncertainty attached to this predication is not only large, it is completely uncertain.

I will maybe insist on this next point, because not only the Forum but also several other groups and reports have come to the conclusion that there is no prevalence of malformation at birth at the moment in the affected countries. A lot of physiological consequences have been traumatized by the relocation, breakdown in social contact, fear and anxiety about radiation, and unexplained physical disorders. There is a tendency to relate any physical-systems disorders to radiation. We have to differentiate what is directly radiation-induced—and therefore will be used by the radiation protection community to improve the system of radiation protection and the system of emergency preparedness—and what is secondarily related. Fear is an effect of the accident; but if fear is giving psychological trauma, it is not a radiation-induced trauma. Or, if you want, you can call it is "secondarily induced." The UNDP pointed out that victims of the "Chernobyl syndrome" consider themselves invalids rather than people who are lucky survivors of a terrible catastrophe.

Regarding the environment, both natural processes and the early and the timely and efficient efforts of remediation that were implemented in agricultural lands have reduced the radiation level in the environment several hundred times, and the majority of land now is safe for life and economic activities. That means we have identified which portions of the territory should still remain restricted to public access, and these portions, mainly forests, will be

restricted for decades to come because the remediation process is not effective in this type of environment. In addition, the exclusion zone remains and should remain restricted.

Regarding the effect of the accident on nonhuman biota: radiation caused a number of acute adverse effects on the nonhuman biota, and this was noticeable. The Red Forest is one example. But after a few years the environment recovered and, as has been mentioned previously, it is now a wildlife paradise. Why? Simply because we removed the main stress on the environment—men. We have no comparison of any type of zone that was not contaminated and was free of men that could have developed at the same time in the same way. So we cannot compare to determine whether this wildlife development is completely natural or not.

The main message of the Chernobyl Forum is focused on decommissioning, rehabilitation, and proper radioactive waste management in the exclusion zone. This is a big burden on the shoulders of Ukraine, and the international community will help Ukraine—or at least the UN will help Ukraine in this task.

These are the social and economic repercussions that were developed by the UNDP. I will not expand on that because the previous speaker illustrated this very well.

Regarding the recommendations: of course targeted research on health and social consequences should be continued for a long time. The knowledge that was gained during the accident and after the accident in overcoming all the consequences has to be preserved, and has to be included in the radiation protection system.

There are detailed recommendations, for which there is not time to go through, but if attention has to be paid in terms of health, it should be paid to the liquidators and to the screening of the people who were children and adolescents at that time, as well as their children. In the environment, again I repeat, the big task is the remediation of the exclusion zone and the decommissioning of the four units, including the damaged one.

This was reported at the International Conference on Chernobyl in September of this year. You can access all the documents produced by the Forum through UNDP's website, the WHO website, and the IAEA website: the highlights, the health report, the environmental report, and the UNDP report on social and economic consequences. You can access the presentations, which were made at the Forum [www.iaea.org]. Everybody was invited to the Forum, and I cannot agree with Mr. Marples when he says we did not invite people to address this. Greenpeace was there. Greenpeace expressed itself as much as it wanted. Its proposed resolution was not accepted by all of the Forum participants. Again, everybody was invited; everybody got a chance to comment on the Forum results. And again, this was approved by the United Nations General Assembly in the 60th session. Thank you.

MURRAY FESHBACH: The IAEA report, if you read it, is much more assertive than the gentleman, Dr. Louvat said about two minutes ago. There is a lot of uncertainty. In the World Health Organization's separate report, it is very clear about the uncertainty, including the fact that instead of using 4,000 predicted deaths, they restore the 5,000 that was in the IAEA report of 1996, and say the probable number will be 9,300—but then, who really knows? I agree—who really knows? I think that we can choose any number we want and you can find a source for it. If you ask me, I will give you between 30,000 to 200,000 or more, and I believe neither the lower figure nor the upper one. I am not trying to be eclectic, I believe fully we do not know.

I think there are some issues that we can bring up at this point, such as why they don't include the other republics. Of the liquidators, 93 percent came from Belarus, Ukraine, and Russia, but there were a number from outside those three, and I think that they have to also include them in their mortality estimates.

On the issue of congenital malformation, let me mention what an Israeli survey found: "Of one hundred children of liquidators who had emigrated to Israel, the rate of genetic mutations among those born after the accident was 700% higher than among those children who were born before 1986." This is from *Der Spiegel* online on 17 April of this year.

There are other problems. I will not go up and down all the tables, but there are other issues,

like the Lithuanians. They sent 5,400 liquidators, volunteers or otherwise. Some of them may have been Russians, not necessarily only Lithuanians. Of those, 264 have died and 260 are permanently disabled (according to the Lithuanian health officials). Disabled means you probably will die prematurely, as was brought up, but again they are not included.

In Estonia 4,800 liquidators were involved, and 144 deaths were attributed to Chernobyl by 1997, 28 of which were suicides. Now you can say suicide should not be included because it is not due to high doses of radiation. But there is a whole psychological issue, or psychosomatic illness, which leads to stress and heart complications. Alcoholism, lifestyle issues, and behavior patterns also are not included in this kind of review, as I understand it. Now, I may be wrong.

Now, as to the issue of leukemia: leukemia is a very difficult issue in Soviet statistics and continues to be so in Russian health statistics. They use the term "hemoblastosis," and I have asked a number of American physician friends of mine, what is "hemoblastosis"? I have sort of an understanding, but if you go into the gory details of the ICD, the International Classification of Diseases, as used in Russia, some 80 to 90 percent of these are leukemia cases, but you never see a direct figure for leukemia. It is extremely rare that you will find an open citation. But if you look into the detailed materials of the Cancer Institute in Russia, you will find this information in various limited-distribution handbooks which I acquire. I did research on the leukemia cases a long time ago, and I have not done anything lately, so I am not making any assertions for any total numbers now. But you have to be very careful because the leukemia figures do not appear as such.

There is also the issue of experts used by the IAEA, by Greenpeace, by WHO. It is the case of "I have my experts and you have your experts; maybe never the twain will meet." Here we obviously have a potential for conflict.

One of the experts they do not use—or at least my research assistant and I could not find a single reference in the footnotes to the IAEA report—is Keith Baverstock. Baverstock used to be the head of the team from the U.K. that went to Belarus 10 years ago. They checked 104 slides that were thyroid cancer related, and they found that 102 were accurately measured. He also found that the cancer was an aggressive type. He has recently come out against this IAEA report saying they pay no attention to his findings. Maybe they are correct not to, but I doubt it.

Besides the Lithuanians and Estonians, again there is the question of other causes of deaths. The IAEA itself in 1996 or 1997 said that there were about 100 to 200 thousand induced abortions as a consequence of Chernobyl. Now if you want to call it psychological—but these are fetal losses, and fetal losses are deaths, and in that sense why exclude them?

What about the people from Uzbekistan? What about the people from other areas? The Swiss consider that they have lost people; the Swedes do too, and so on. If you want to limit yourself to the three republics, that is one approach, no question. But it should not be limited to considering acute radiation sickness or thyroid cancer. Thyroid cancer takes 20 to 25 years to fully come forth, and we are just about at that point.

You also have the question of breast cancer, which is considered to be developing, and it will be shortly again. The same thing happens with lung cancer. I asked Academician Aleksandr Chuchalin, the chief pulmonologist of the Ministry of Health and head of an institute and many other things, and he believes these cancers are going to be showing up shortly.

Thus, you have potential for changes in these numbers. It is more the assertiveness that bothers me. It is one estimate with its own definition—perhaps correct, perhaps not. But you have to include other people as well. That's another kind of approach.

On the genetic mutation issue, I definitely do not agree with the IAEA. There are a lot of local reports about many-percentage-point increases in difficulties of children. A book on demography and health in Ukraine written for the national security institute of that country documents this evidence as well.

So I am not sure that I think that the coverage was as thorough as I would like. But I want to make one last point. In Alla Yaroshinskaya's report, you read about secret protocols. I did not spot any reference to the secret protocols of the

Politburo Operational Group in either the IAEA or WHO reports; these were very important events. Testifying before the Constitutional Court of Russia in 1992, Yegor Ligachev said in particular that he did not feel any personal guilt for concealing the truth about Chernobyl from the people. He called the Politburo directive on the procedure for covering events in the Chernobyl nuclear power station in the press and the trials of those responsible for the accident not a restriction, but a regulation, of information. Well, you call it what you want, and I'll call it what I want to call it.

Further, it emerged that some two weeks after the "event," on 8 May 1986, at a session of the Politburo Operational Group on the nuclear power station, the maximum acceptable radiation levels for the population had been increased tenfold, from 3.5 rem to 35 rem. So that made it possible to count hundreds of thousands of people as not having suffered from the accident. Also, it was revealed that a note from Yuri Israel who was the hydrometeorological service director at the time of the accident, declared that the contamination zone was actually much wider than the designated 30-kilometer area, but that note had been ignored.

Thank you very much.

LEONARD MAZUR: As a member of the board of directors for the Children of Chernobyl Relief and Development Fund, I am very grateful for this opportunity to address this distinguished panel. I would like to share some of the latest information we have obtained on the long-term consequences of the Chernobyl nuclear disaster. What you are going to hear from me today is going to be diametrically opposed to what you heard from Mr. Louvat.

I also want to share some of the success that our foundation has had in improving the quality of treatment for children who suffer from thyroid cancer, birth defects, leukemia, and immune deficiencies. In the past 16 sixteen years, our organization has worked tirelessly and zealously to give Ukrainian children a fighting chance to overcome a host of life-threatening diseases. Through an integrated program of physician training, humanitarian aid, and the infusion of state-of-the-art medical equipment, we have given local doctors the tools they need to combat these illnesses, to reduce infant mortality, and to enable children to fully recover and lead a normal life. Through that process, we have gained a lot of insight into what is actually happening in Ukraine. In the process, we have learned a great deal about the potential impact of radiation exposure on young lives. It is well known that children and unborn infants are particularly sensitive to the influence of ionizing radiation, even in very small doses. The National Academy of Sciences, in its report, repeatedly stated that there is no safe dose of radiation, contrary to what we heard earlier. Even a tiny particle of plutonium, if injected into a lung, can cause cancer over time. The amounts of radiation released by Chernobyl were anything but tiny. Chernobyl unleashed over 260 million curies of radiation over a vast area of Ukraine, Belarus, and much of eastern and northern Europe.

Dr. Marples reminded us that the first reports of abnormally high radiation levels came from Sweden, over 1,000 miles north of the disaster site. Indeed, recent studies have shown that cancer rates have risen even in those remote areas. Even as far away as Wales, Ireland, and southern France, health authorities have been forced to impose restrictions on dairy products, mushrooms, berries, and other foodstuffs that were found with high concentrations of radiation as late as 1998.

If you did not see it, last week in *The New York Times* the headline read, "In Throats of Émigrés, Doctors Find a Legacy of Chernobyl." What they found is that there is a rise in the incidence of thyroid cancer here in the United States. There is a sharper rise in New York State, however, and that sharper rise is directly attributable to the presence of émigrés from the former Soviet republics who brought a gift with them from the Chernobyl accident.

Even 20 years after Reactor 4 exploded and after it was entombed, Chernobyl continues to pose a very significant risk to children and adults. There is a lot of data available from a lot of sources. Much of it comes from the research institutes and the various state governmental agencies in Ukraine, but there are also numerous articles published in prestigious peer-reviewed journals on the impact of this catastrophe. We also have international teams that have gone into Ukraine and studied this extensively. They have found all sorts

of serious short- and long-term consequences as a result of the Chernobyl accident. Everyone now acknowledges that the mass release of radioactive iodine-131 caused an epidemic in thyroid cancer in both children and adults. We have learned that another 9,000 children in Ukraine suffer from precancerous conditions.

But thyroid cancer is by no means the only detectable effect of Chernobyl. Over the past four years, a team of American and Ukrainian geneticists have tracked the condition of 104,000 newborn children in the provinces of Rivne and Volyn. These provinces in northwestern Ukraine received a significant amount of nuclear fallout from Chernobyl. In the first stage of their study, the researchers found a fourfold increase in spina bifida in children. What is especially telling is that the rate of spina bifida and neural tube defects is even higher among newborns in the contaminated northern districts of Rivne known as Polisia. If the national average in Ukraine for spina bifida is 12 cases per 10,000, the rate in Polisia is 28 per 1,000, or nine times higher than the international norm of 3 per 1,000. The March of Dimes was sufficiently disturbed by the spina bifida epidemic that it launched a special campaign in Ukraine to introduce more folic acid into the diet of pregnant women.

Under the supervision of Dr. Wladimir Wertelecki, chairman of medical genetics at the University of South Alabama, the research team in Volyn and Rivne also discovered many rare and unusual birth defects such as polydactylism (infants born with extra fingers and toes), cataracts, deformed or missing limbs, and deformed or missing critical organs. They documented and photographed these cases and set up the first birth defects registry in Ukraine. With the support of the United States Agency for International Development (USAID), they were able to expand their research into three more provinces and to create omnicenters that provide computer access and support for families of children who suffer from these abnormalities. We very much would like to see USAID and other international agencies continue the funding for this program.

The Institute of Genetics in Kyiv has found a steep increase in the rate of birth defects affecting the eyes, including cataracts and blindness. Over 2,500 newborn children were registered with cataracts in recent years, but last year alone, 423 infants were registered with eye cataracts. In 2001, the rate of cataracts was twice as high as in 1993. This goes well beyond anecdotal evidence, and it flies in the face of last year's IAEA report claiming that there was no genetic impact from the Chernobyl accident. As early as 1994, Japanese scientists from the University of Hiroshima found very similar birth defects in Belarus. They studied 30,000 newborn infants and stillborn fetuses and found twice the rate of deformities such as cleft palates, cataracts, polydactylism, missing and deformed limbs, and spina bifida. In 1994, it was documented that an unusually high number of children were suffering from stunted torsos, dwarfed limbs, and abnormally-sized heads with normal or superior mental faculties. There is growing suspicion that their limbs and extremities are underdeveloped because their fetuses absorbed radioactive particles instead of calcium. Since radiation has a profound effect on the endocrine system, which regulates human growth and development, there could be a combined effect on the fetus during the most vulnerable early stages of development.

There is other strong evidence that Chernobyl exposure is the key culprit in the emergence of many diseases and birth defects. A few years ago, a team of researchers from Israel and Ukraine studied tissue samples from the children of Chernobyl liquidators—the 600,000 emergency workers who rushed to the scene of the reactor explosion to remove debris and to build the emergency shelter around the damaged core. These liquidators suffered very high doses of radiation. Among their children, researchers found a sevenfold increase in chromosome damage as compared to their siblings born prior to the disaster. Researchers in Italy and Moldova, as well as other cities in Ukraine have documented similar chromosome damage. This chromosome damage is very foreboding, as it may affect not only this generation but also its descendants, the so-called grandchildren of Chernobyl. Extensive research by Belarusian doctors under the leadership of Drs. Petrova and Dainiak of Yale Medical School showed that women living in radiation-contaminated zones have twice the rate of pregnancy

complications and birth defects as their counterparts living in relatively clean zones.

Birth defects are only one of the factors that damaged these children's health. A Harvard University study found that children in Greece who were in utero at the time of Chernobyl had a higher chance of developing leukemia than unexposed children. Another case-controlled study funded by the U.S. Office of Naval Research found a statistically significant increased risk of leukemia—especially acute lymphoblastic leukemia—in children in the radiation-contaminated regions of Rivne and Zhytomyr. These rates were found to be twice as high as the rates for the region of Poltava, which had the highest rates of childhood leukemia prior to 1986.

Although the IAEA report from last fall claims there has been no increase in cancer, there is ample evidence to the contrary. The rate of breast cancer in contaminated areas is substantially higher than in the country as a whole. Chernobyl liquidators are also dying of cancer and leukemia at a rate 2.7 times higher than that for other Ukrainian working-age males. We have to remember that most of the liquidators were young men in their twenties and thirties at the time of the accident. Of the 344,000 liquidators living in Ukraine, over 34,000, or 10 percent, have already died. Of this number, 25 percent have died of oncological illnesses, while the rate of cancer deaths for other working-age males is only 9 percent. These are figures coming directly from the Institute of Radiation Medicine at the Division of Demographic Studies in Ukraine. If that extra increment of cancer death is attributed to Chernobyl, then the death toll among liquidators is already 8,600—more than twice the total number of cancer deaths predicted by the IAEA. This does not include the death toll among the more than 200,000 liquidators who were scattered among other republics of the former Soviet Union. It does not include emergency workers who are still battling cancer or those who are likely to be stricken after the 20-year latency period for many other forms of cancer.

Completely arbitrarily, the IAEA and the World Health Organization dismissed cardiovascular illnesses as being unrelated to radiation exposure. Yet studies of the Japanese population following the bombing of Hiroshima found that many survivors developed cardiomyopathy, or weakening of the heart muscle. Even among young children in contaminated villages, there is evidence of cardiovascular illnesses that could shorten their lives or lead to early disability. According to a screening program conducted in the contaminated village of Ivanka, in northern Kyiv province, nearly 75 percent of all children suffer from high blood pressure. This is highly unusual, and stress is probably not a major factor for children living in this bucolic rural area. It is a purely physiological condition. Radiation tends to weaken the blood vessels and make them more susceptible to the incorporation of harmful agents.

Congenital heart defects are also a major problem in Ukraine and Belarus. Those of you who saw the Oscar-winning documentary *Chernobyl Heart* know about the excellent work of Dr. Bill Novick in trying to repair these conditions. Over 6,000 babies are born each year in Ukraine with life-threatening defects. Two thousand infants die within the first year of life, and only 680 receive timely operations that can repair these conditions. The rest become cardiac invalids.

Since the year 2000, our organization has been devoting a great deal of effort to expanding Ukraine's capacity for early diagnosis and surgical corrections of these conditions. I am pleased to report that just this year we delivered new cardiac ultrasound and surgical equipment to our partner hospitals in Lviv, Kherson, Chernivtsi, and Dnipropetrovsk. Thanks to the ice-skating galas we organized featuring Olympic champions Viktor Petrenko, Sasha Cohen, and Grushina and Goncharov, we were able to support a new open-heart surgery program at the Odesa Regional Children's Hospital. Contrary to the impression created by last year's UN report, the radioactive contamination spread across 50,500 square miles of Ukrainian territory is not dissipating anytime soon. Studies at the Institute of Pediatrics, Obstetrics, and Gynecology in Kyiv have found evidence of radioactive strontium and cesium in placenta and breast milk among women exposed to Chernobyl radiation, as well as in the baby teeth and bone tissue of stillborn infants. There is also evidence that young children are absorbing

cesium and strontium into their bones instead of calcium and potassium, which is leading to conditions such as osteomalacia and osteofibrosis, the embrittlement and fusion of bone tissue in abnormal growth patterns.

At the Children of Chernobyl Relief and Development Fund, we are hoping that a new wave of cancers does not occur, because Ukraine is ill-prepared to handle such an epidemic. At the same time, we are anticipating the worst and working very hard to rebuild Ukraine's medical infrastructure, which was terribly neglected during the Soviet era.

In conclusion, we would like to offer several recommendations that we think would go a long way to strengthen the medical infrastructure of Ukraine and help develop a more accurate assessment of Chernobyl's human toll. First, we urge the United Nations to provide continued funding for a second stage of a historic survey by the Ukrainian Alliance for the Prevention of Birth Defects that is tracking over 104,000 newborns in those contaminated regions and expanding that monitoring to other regions as well.

Second, in addition to tracking thyroid cancer and thyroid tumors in children and adults, the World Health Organization and other health agencies must expand the scope of their research to include other forms of cancers that have a longer latency period.

Third, the United Nations could make a very important contribution to public health in Ukraine and Belarus by providing the technology and training to combat the large number of congenital heart defects in the children's populations.

Fourth, beyond cardiac monitoring, there is a critical need to improve prenatal care in general: to identify problem pregnancies and to train mothers in healthy life styles and dietary changes.

Fifth, although the IAEA has denied any increase in leukemia, Ukrainian, Greek, and Swedish doctors have reported increases in radiation-exposed populations. We need to brace ourselves for the possibility—if not the likelihood—that long-term exposure to strontium-90 and cesium-137 could result in bone tumors and leukemia in the coming decade. We have now seen how modest financial investments can dramatically improve survival rates and pediatric oncology centers.

Finally, we need to remember that the IAEA completely misjudged the latency period for thyroid cancer and denied that there was a thyroid cancer epidemic in children until well into the 1990s. We urge the international community to remain vigilant for other unforeseen health problems that may appear in the next 20 years, even if they are being ignored by various research establishments.

I would like to close with a Ukrainian proverb that states, "You don't see the world if you look through your own window." Thank you.

QUESTION AND ANSWER PERIOD

QUESTION: To me, the comments on the IAEA reports that we just heard—from pretty well-respected experts—are very compelling and pretty scathing. I'm just curious, particularly given Murray Feshbach's remarks, if there is some reconsideration that maybe the IAEA was a little bit too definitive in its numbers, and if so, will there be any effort to make it known that the situation might be a little bit more uncertain than it was presented as being?

LOUVAT: Thank you. First of all, the IAEA report details environmental consequences. Everything related to health should be referred to as the WHO report. The IAEA had no part in the WHO report. We were attending the WHO group as observers. We never intervened, we never commented. Everything related to health in the Chernobyl Forum was coordinated, written, or decided by the WHO. This should be clear. Even in the WHO there were two co-chairs in the group. One was a well-known U.S. physician, Fred Mettler, and the other was Elizabeth Cardis, who is the head of the Radiation Unit of the International Center for Cancer Research, which is a WHO center.

The WHO people have already started to complement what has been done to support the UNDP strategy. For example, Cardis just published a paper on Chernobyl's impact on Europe, which had not been the aim of the Chernobyl Forum, but which served as the impetus. In the figures released today or yesterday, Cardis made an

estimation of the effects of low doses below 100 mSv. I never said that there is no effect below 100 mSv. I said there is no consensus on what this effect is. Regarding plutonium, I agree with you that the ingestion of any microgram of plutonium can lead to cancer. Nobody can challenge that.

Again, you have to keep in mind that the Chernobyl Forum existed to try to put a scientific basis on all the existing peer-reviewed literature. All the existing peer-reviewed literature was to help the UNDP to discuss with the governments—mainly of Belarus and Ukraine—about how to redirect the UN support to develop these territories socially and economically.

MAZUR: I think the concern that we have is that the report generated headlines and created an impression and a perception that minimized what happened at Chernobyl in terms of the long-term effect. As a result of that, there is going to be a certain segment of the worldwide population that is going to have one point of view based on headline news. But those of us who are in the know are going to have another point of view. As a result, we may have battles for the next 10 years to try and override what was created as a result of that report.

QUESTION: I was looking at the Chernobyl Forum report here, and on page 47, in the health-related actions that were recommended, point 8 out of 9 says that "programs targeting the minimization of the psycho-social impact on children and those who were children at the time of the accident should be encouraged and supported." That seems to be a recommendation without a lot of teeth. And yet, based on your review of the Forum's report, you said that the psychological consequences of Chernobyl are the most serious outcome. That may be making some assumptions. That worries me a bit because, consciously or not, people in health know that mental health is always given the backseat. So it looks like all the consequences have been reduced to making them a mental health issue, and then giving a very low-level recommendation. Do you have a response to that?

LOUVAT: I don't feel that the WHO group has reduced any of the consequences. It has really revisited all the existing data. All the issues mentioned by Mr. Mazur were also carefully looked at by my colleagues. What was important for the WHO group was really to see what can be attributed to radiation as a health effect, and what can be attributed to a secondary effect—as was mentioned by Mr. Mazur this time, because this could impact the way the public health system will be developed in the future in Ukraine, Belarus, and Russia. This was the primary interest of the UNDP: how to better address the public health problem in Belarus and Ukraine. So, one way to look at it is to see what is directly attributable to radiation—for the liquidators, for example. And if it is a secondary effect, maybe it involves other parameters that are worth looking at as well. It was said this morning by Mr. Marples that though we are all born equal, we do not have equal exposure to radiation. Basically, cancer is in us. What will make it appear is a conjunction of parameters and the type of exposure we encounter. But then, among low-level causes of exposure—sunburn, the fact that you are eating meat with charcoal, the fact that you are drinking or smoking—you have plenty of parameters, and this is very difficult to disaggregate in the Chernobyl data. I am glad, really glad—and I think other countries, other institutions, and the UN are, too—that your institution is providing proper detection material to Ukraine. Because what we need more than anything else is reliable data. The report did not say that data does not exist. It says there is no evidence. A lack of evidence does not demonstrate a lack of relation, and then we have to look for the evidence. But when there is evidence—possibly, there is—this should be tackled. But then we find rates of malformation at birth in this country, which are higher in noncontaminated territories than in contaminated territories. Then we cannot clearly say that there is a link between contamination and malformation. Take any bottle of any alcohol in this country, and it is written that consumption of alcohol by pregnant women—even at a very low rate—will cause birth defects. This is known.

MAZUR: I would like to just comment that there is data available. As a matter of fact, there is plenty of

data, there is a plethora of data. I just received by e-mail in the last 48 hours—it is not a total, complete report yet—a statistical compilation of the impact of Chernobyl in cases of neoplasms, thyroid cancers, etc. This actually compares statistically the rate of sickness among certain populations in the exposed areas to the rate for those in the unexposed areas, and the evidence is dramatic in terms of the effect.

QUESTION: My concern is the monitoring to get the data. The Japanese have done an extraordinary job of following up on Hiroshima. Every two years, my Japanese friend—who was six years old when the bomb was dropped—has to report either to a consulate general or to a Japanese research team. We are getting continuity, and this is critical to this type of monitoring.

Now Russia has had at least three nuclear events that we know about, of which Chernobyl is the most public. Two of the three big ones were kept secret. Do we have a record of systematic follow-up? What is the position of your organization on insisting that this is a long-term project, that there is genetic damage to be traced, and so on? The Japanese model should be the one to pursue. Do you feel they are firmly committed? Did your organization push proper monitoring so that we can get the data on what is a long-term problem?

LOUVAT: You are perfectly right. My organization, the IAEA, as well as the French-German initiative for the environment, will continue to support the International Chernobyl Center in monitoring the environment. We have often been accused of intervening in the health problem, but we have been very careful not to jump into the health problem. But I agree with you. I think in Chernobyl we also deserve an international health center like the one existing for the environment. There is no doubt about that. But again, this can be seen as a Forum result. I hope this will be discussed this week in Kyiv. However, I certainly doubt that the IAEA will be proactive in this section.

Again, remember that everybody is accusing the IAEA of manipulating data, and of trying to diminish the consequences of the accident. We tried to be as passive as possible regarding health. If I am here today, it is because the UNDP asked us to be here, since the UNDP is in Kyiv, WHO is in Kyiv, my people are in Kyiv. I was the only one available. I am trying to represent the Forum. I am defending a health report on which I have been an observer, but I believe this report was done honestly by a group of independent experts who were all specialists on the issues.

QUESTION: I study nuclear cities professionally as a sociologist. It is well known that many people from Chernobyl were settled into nuclear cities in Russia, because these cities were under the control of the Ministry of Nuclear Energy. Many people still live there. I tried to study some environmental and health problems in Sosnovy Bor near St. Petersburg, which is where the Leningrad nuclear power station is situated. In the previous year, I had received data that the incidence of Down syndrome in this city was three times higher than in other cities of the Leningrad region. My colleagues from the Genetic Centrum and I tried to investigate this case, but all of us immediately received a strict order from the Federal Security Service to stop this investigation. My colleagues from the Genetic Centrum stopped their activities. I tried to investigate, because I have a state registration on my subject, but I could not get any data on these people in order to investigate. What are the reasons for their kind of situation? Maybe it is a consequence of Chernobyl. Maybe it is a consequence of the accident in 1965 at the Leningrad nuclear power station. Maybe there are other reasons, but we cannot investigate. It seems to me that it is not the only case in which it is impossible to investigate, and to get the full picture of the consequences of the Chernobyl accident. Could you comment on this case? Thank you.

QUESTION: I was a member of the Chernobyl Forum, expert group "Health." There were three committees: thyroid cancer, leukemia, and non-cancer effects. I was on thyroid cancer and leukemia. I can tell you that we made the decision to consider only peer-reviewed journal articles. Much of the new information that you have been presenting here today, Mr. Mazur, may not have come before the group.

The noncancer health effects group clearly had a wide range of conditions to evaluate, and they did something on premature mortality that drew a lot of attention. Today, this avenue seems to draw the most interest. As I said, it may be that they confined themselves to the very few articles that were actually published in journals. So it is important to feel that this is valid information if one is to try to get it published.

LOUVAT: This illustrates how the groups worked. Among themselves, they decided independently up to what point they were considering data. Regarding the data—which does not exist for whatever reason—clearly it was not used by the group. But we are the United Nations—we exist to serve our member states, and we depend on the information that the member states provide to us. Clearly, if the case you report exists, then this data is probably missing, and this lack was noticed by the group. We, the group on environment and health, only assessed existing data published at the time.

MAZUR: There have been journal articles that have appeared in Ukrainian medical journals. I guess the question I have is, were those submitted and reviewed?

QUESTION: I was not on the committee that interests you the most, so I cannot tell you what their decision was. In our case, I think all of the data of interest eventually made it into the international English literature. But we may have included some Ukrainian: the *International Journal of Radiation Medicine,* for instance, which is Ukrainian and English.

QUESTION: If you speak about data, it is a well-known fact that during the Soviet period, after the Chernobyl catastrophe happened, the Ministry of Health gave strong top-secret recommendations to doctors in the regions of the Chernobyl catastrophe not to show real data in the cases of victims and liquidators of the catastrophe. So my question is, if you have this different data, much of which is wrong—because there is a lot of evidence that this data is wrong—how can you provide real and true conclusions? Thank you.

LOUVAT: We are speaking on two different levels: what was the actual number of casualties, and what has been the predicted number of casualties. As I said, what has been predicted for the liquidators is a pretty good estimate. So that means that the people who were affected at that time—we will never know which names we had, but they are included in this group of casualties. This is the dilemma of this biostatistical exercise. But again, the groups went through all the data they had. They couldn't make any conclusion with the data they didn't have. If data exists somewhere or if you know that there is some data, I encourage every one of you to publish this in a clear manner as soon as possible.

The WHO group did not base its conclusions on real cases of death, but made a statistical forecast with respect to doses received. The doses were pretty well assessed. So the fact that you have observed death just confirms what is in the report. Yes, casualties will have already happened.

QUESTION: I spend most of my time doing the sort of risk protections that we have spoken about today, but normally for diagnostic X-rays rather than nuclear power. I'm not a fan of radiation, but on the other hand I think that there are some new estimates of the projections of cancer deaths that should be considered by the group here today. They are the updates by Elizabeth Cardis that were just mentioned. The 4,000 projected deaths that we have been talking about today were mostly based on Elizabeth Cardis's original report.

LOUVAT: Exactly.

QUESTION: She is independent. She spends a lot of her time also assessing risks to workers in the nuclear power industry, and believes that there are excess risks there as well. Her new estimates, which were published in the *International Journal of Cancer,* suggest that there will be about 25,000 premature cancer deaths in Belarus, Russia, and Ukraine, and also including the rest of Europe—the 500 million population in the rest of Europe. This time she wanted to make it very clear that there is a lot of uncertainty around these figures. They are just projections. They are based on risk

models primarily from the Japanese atomic bomb survivors, but that is the best we can do under the current circumstances. The uncertainty interval she gives is between 10,000 and 60,000. I personally think that these are the best estimates currently available. They update the previous estimate of 4,000 specifically for the highly exposed Belarusian, Russian, and Ukrainian populations, and they are based on much more validated scientific methods than the Greenpeace estimate of 200,000.

MAZUR: I would like to comment on that because that methodology has been criticized by others with a different point of view. The Japanese data from that time frame is incomplete and not terribly accurate, and to use that as a projection factor is very questionable. It reminds me of what happened with the AIDS epidemic in the mid-1980s. Since I come from the pharmaceutical industry, I am very familiar with the forecasts that were developed here in the United States by public health officials. They forecasted catastrophic penetration of that disease throughout the population, and their models were all based on *The Kinsey Report*, which said that 10 percent of all males had had a suspected homosexual encounter. They used that in their projection factors, and it never came true. Just the opposite.

LOUVAT: This is a bit of a caricature. The work of Cardis is very respectable, although it is discussed. At the beginning of the month here in Washington, it was discussed at the annual meeting of the National Radiation Protection Council. I was not there, but I talked to Elizabeth just after. She said it was evenly discussed. It is not clear whether we can extend these biostatistical analyses below 100 mSv or not. I think the work done on radiation workers is a good step, a good way forward. But even there, we are talking at least to 30 or 40 mSv, not to 10 or 20. And again, even if this protection system is based on survival of the detonation of an atomic bomb, it has worked for 40 years. It has been efficiently protecting the people and the worker for the last 40 years. I can tell you that I have been presenting the Chernobyl Forum results to different audiences. This is an audience today that is very much inclined to public protection, but I also presented this same presentation in February to the Waste Management Symposium in Tucson. There, the first reaction I got was, "Oh, good, then we can relax the system of radiation protection." I said, "No, not at all. It is very much too early to make any decisions on the radiation protection system." Maybe it is based on high exposure over a short time, but it has worked for the last 40 years. We have to keep that in mind.

Luncheon Speaker

Revisiting Congressional Hearings on Chernobyl

Marcy Kaptur, U.S. House of Representatives

BLAIR A. RUBLE: It is a great pleasure to be able to welcome to the Wilson Center and to introduce Congresswoman Marcy Kaptur. She has been a great friend of Ukraine and a friend of other countries in the region as well. Representative Kaptur is the most senior Democratic woman in the House, and she holds seats on the Appropriations Committee, as well as on the Defense and Agricultural subcommittees. Everybody in Washington's ears will perk up when they hear "Appropriations Committee," I am sure. She is also co-chair of the Congressional Ukrainian Caucus and one of the leaders in efforts to establish a Congress–Rada exchange program. She has been an opponent of waste in international aid, and she has played a particularly significant role in regulatory changes that have forced accountability on Russian food aid relief and other technical assistance programs. She has been a leader in issues pertaining to international trade as well as human rights and labor rights.

She represents Toledo and northwest Ohio, and is serving her 12th term in the House of Representatives. She won her seat during the recession of 1982 as an outspoken advocate for working people, and she has remained an advocate for working people throughout her career. Prior to being elected to Congress, Marcy Kaptur worked as a city and regional planner in Toledo and surrounding areas. She earned her master's degree in urban planning from the University of Michigan, after completing her undergraduate work at the University of Wisconsin.

Representative Kaptur then served as an urban adviser to the Carter administration, and, interestingly, we have not talked about this, but we both became interested in urban studies at more or less the same time. So it is with a little note of sadness that I mention Jane Jacobs, who passed away yesterday. The story of Jane will nonetheless help me properly introduce Marcy Kaptur. Jane Jacobs actually revolutionized how we all live now, and was particularly influential on those of us entering the field of urban planning back then. She wrote a book, *The Death and Life of Great American Cities* [1961], which grew out of her community activism and totally transformed the approach to urban planning, not just in the United States, but eventually worldwide. Jane studied in Ukraine and in Russia very actively, and I think this is a good way of introducing Congresswoman Kaptur: This is a story of someone who in a way may be seen as starting out on the fringes of where real power is. But, through a concern over what is happening to her community—and what she sees happening in her professional life—is activated, and really begins to have an effect on decisions that are made. This is a model that, I think, speaks to her career. I think that Jane Jacobs would probably be thinking about communities and this whole discussion on how society responds to catastrophes. Surely Jane Jacobs's approach to cities and to the economy would be very helpful in our discussion of the effects of Chernobyl on society. So it is very fitting that today in particular we have an urban planner, as well as a friend of Ukraine, speaking. And with that I welcome Congresswoman Kaptur.

MARCY KAPTUR: Thank you so very much for that kind introduction. I love the atmosphere

here. This feels—you can tell when you walk into a group—this is a very learned audience, and I want to thank our guests from the Russian Embassy and the Belarusian Embassy and perhaps other nations that are here, and give us a chance just to get to know one another better. The ambassador of Ukraine has been with us for a portion of today. Thank you so much, Ambassador Shamshur, for being here and spending so much of your day with us. We value it greatly.

I was just saying to [Wilson Center Director] Lee Hamilton that I first traveled to Ukraine in 1973, before a lot of you were probably born. We drove in from what was then Soviet-occupied Poland, and we were the only car on the street. I went with our mom. I was driving, and I can remember being held at the border for five hours. Actually, I remember crossing what was then the Czechoslovak border. We had our American passports and we entered the no-man's land area, if you are old enough to remember that. And I paused. I put the brakes on and we looked at one another and thought, will we ever come out? Because the men who were walking on the other side of the no-man zone had rifles with bayonets on the end. I can remember entering a world, and it transformed my life. We were looking for our family. We had been cut off from them since prior to the First World War. I can remember driving across that zone and then entering another world, a world that I have had a deep interest in my entire life, long before I was in the Congress.

And as I travel back there today and I remember—I was just sharing with one of the brilliant photographers who was traveling with us—we found Lviv, and there were no cars. We were the only car. Our car was confiscated and placed in what is now the opera house in Lviv, behind old gates that had not been cleaned in what looked like a hundred years, and now the opera house is completely refurbished. We stayed in this place that is now called the George Hotel but then was the Intourist Hotel. I remember them stationing a very large woman outside our door who had a water bottle just in case we got thirsty. All the experiences that we had and the great joy we had in being escorted by people we did not know to find a long-lost great uncle who had survived 20 years in the concentration camps in Siberia and hearing his story. Oh, my God. It was unbelievable because my grandmother was not able to know her own family's history. She had died in 1970, and I felt like sort of a resurrection at that point, being able to put together the other half of our family's story.

So I feel very blessed by the life that I have lived and the opportunity I now have to serve in the Congress of the United States, and particularly to continue a lifelong interest in Ukraine, and the people of that region of the world and to hold deep respect for their perseverance, and to be able to talk to people from Ukraine, from Russia, from Belarus, from Poland, from Hungary, in such a different way than was possible when I was in my twenties. So I just even feel honored to be here today on this very historic occasion this week commemorating the 20th anniversary of Chernobyl and to remember and to work together as a world community. What better place than at the Wilson Center to think how each of us can contribute to the betterment of humankind as a result of the understanding that we develop together about what happened, to try to be scientifically accurate as a world community and to present this to the future in the same way as I was able to present the history of our family to our future generations and our family. We, as a world community, need to embrace the Chernobyl tragedy with scientific rigor and to leave for the future a much better record than we have today. The work is incomplete. It is an unfinished piece of art, really.

Now, from the community that I represent, which is the longest coastal district in Ohio, that stretches between Toledo and Cleveland along Lake Erie embracing the Lake Erie Islands—I call it the crown jewels of Ohio, that is really what I represent—why would I hold an interest beyond our family history and my love of open societies and the future that I see in Russia and in Ukraine, in Poland and Hungary and Belarus, and so many other places that I never thought I would live to see? I just feel so gifted living at this point in our world history.

I happen to represent the worst nuclear power plant in America. It is called Davis-Besse, and in my career I have had to divert time from other concerns to be very belligerent as a member of Congress and to point out terrible, terrible mishaps and failures of management and engi-

neering that have occurred in the Davis-Besse plant, which sits right on Lake Erie. In fact, just this past year they were assessed the largest fine that the Nuclear Regulatory Commission in our country has ever imposed on a private plant. They also have had to invest half a billion dollars to fix the last mess that occurred inside that plant. And I have to tell you it has moved me to a place where many Americans are not, and that is to a legislative position where I oppose all future nuclear power construction in this country, and support other forms of power.

I have a legislative record that takes me in that direction, but it is because I lived through and have seen situations that endanger the people of our community and our Great Lakes freshwater system. And I am angry. I am angry as an American. I am angry that our private sector has failed my community twice in my career in the energy sector, and that I had faith when I came to Congress in the Nuclear Regulatory Commission (and I am sorry if there is anybody in the audience from the Nuclear Regulatory Commission and its staff), but they have twice failed my community. I cannot trust them anymore. We do not have a third time to be fooled in our community. So I am driven partly by interest in nuclear power, safety, proper management, and proper construction by having lived through what has happened in the plant in our region. Why should I, as a member of Congress, have to devote this much time to a plant that has been so poorly constructed and so poorly managed? Were it not for the workers, the plumbers, the pipe fitters, the boilermakers in our region who saved the lives of the people in our region—only through their valor and knowledge did we not have nuclear radiation released into the atmosphere. But it should not have been that kind of tense situation. I just want to bring you right up to the edge of this country's unaddressed nuclear issues. I want to start there so you understand the motivation, a deeply historical but also terribly current motivation in terms of what is happening in my region.

Twenty years ago today, a human error triggered the explosion at the Chernobyl power plant's Reactor 4, causing the worst civilian nuclear catastrophe in the history of humankind. It transcended geographic boundaries. The power of what happened was 90 times the force of the bomb that was dropped on Hiroshima. That is something to think about in and of itself. Immediately after the explosion, increased levels of radiation were registered as far as Japan and the United States. And this morning we heard very eloquent testimony from the ambassador of Norway and representatives from Sweden and Belarus about what happened in adjoining countries. The hardest hit obviously were the people in communities of Ukraine, Belarus, western Russia, and northern Europe.

I think one of the most powerful stories I have ever heard from some of the humanitarian groups and nongovernmental organizations working in the region was about some of the villages in Belarus that had been evacuated or were evacuated because it was not safe to plant seeds or to harvest crops. In some of those places, because of unrest in other countries such as Afghanistan, people have begun to filter back and live in those villages under very unsafe conditions.

One man from Afghanistan was asked, ''Why would you be here? It is very unsafe, you could die. You could die from cancer.''

And his answer was, ''Well, it is safer than being shot in Afghanistan today.''

What a life choice.

The scope of the devastation that followed Chernobyl was unprecedented. More than 600,000 emergency workers, who were called liquidators, risked their lives putting out the reactor's inferno that raged for 10 days while exposing themselves to extremely high and deadly doses of radiation. I have a book that is written in Ukrainian, and I cannot read Ukrainian, but looking at the pictures, looking at men going into the affected area with little gauze hats and masks and gloves, it is unbelievable that people would be exposed in that way to deadly doses of radiation.

Hundreds of thousands of people were forced to leave their homes because of radioactive contamination, and more than five million people in Ukraine, Belarus, and western Russia found themselves coping with life in towns and villages contaminated by radiation. The ambassador from Norway said this morning that when the incident happened he was vacationing somewhere, I think he said in Africa or he was assigned to Africa, and he came back home to Norway. He said, usually

we go to the beaches and you have the temperature [gauge] that tells you whether the water is warm enough for you to go in, but all of a sudden there was another meter that became common in Norway, and that was the radiation meter to detect what was actually happening in areas in which people had formerly resided.

Twenty years after the initial fallout, Chernobyl has not been relegated to the history books. Twenty years later, it continues to cause human suffering as well as environmental and economic hardship. If any of you have time this afternoon, if you come up to the Rayburn Building, you will see photographs and a video presentation showing how individual people in communities have been impacted by the Chernobyl explosion, the lingering health effects, and the incredible cancers and bone conditions that are affecting people. And we do not know as a world what human form will evolve based on what happened there one generation, two generations, three generations out. I have never, ever seen human beings who looked like those I have seen now from these affected areas.

It is critical that we do not allow ourselves to forget the looming consequences of Chernobyl, lest the tragedy repeat itself, and therefore I thank you for being here today, for being concerned citizens of our world. We must remind our fellow Americans and the world that those problems continue to exist and the countries that were affected by Chernobyl require assistance in resolving them. In order to achieve these goals, of course, there is the Congressional Ukrainian Caucus, and I have to give credit to our other co-chairs, Congressman Roscoe Bartlett of Maryland, Congressman Curt Weldon of Pennsylvania, Congressman Sander Levin of Michigan, and literally dozens of other members of Congress who have been a part of helping us to move legislation, and [to generate] concern about Chernobyl and other issues in that region of the world.

This week we are having special events. We thank the Kennan Institute and the Woodrow Wilson Center for what is occurring here to try to direct worldwide attention to Chernobyl and the resultant issues that challenge us all. Tomorrow in the Congress we will be having hearings from 2 until 6 p.m. in Room HC6 of the Capitol itself. There will be hearings on Chernobyl and briefings, and there will be many, many speakers talking about the human dimension of the Chernobyl catastrophe—the long-term effects of radiation on health, environment, and agriculture—with many, many preeminent scientists [speaking]; and then the responses of governments around the world to the Chernobyl catastrophe, involving many ambassadors, former ambassadors, and current government officials [as speakers]. We will record this. It will be open to the public. Following that there will be a reception on Capitol Hill tomorrow night in Room B369 between 6 and 8 p.m. involving many of the humanitarian groups and nongovernmental organizations that continue to be engaged in reaching out to those affected. This will be done in conjunction with our Congressional Ukrainian Caucus, so you are all warmly, warmly invited.

The Kennan Institute did ask me to talk a little bit about this, and I will be brief and then open it up for questions if that is your format. They asked me to talk a little bit about what is happening in Congress. Again, I thank the Kennan Institute for organizing a major conference on Chernobyl and helping us lift this up to the world because 20 years is a very short time. It has been more than 20 years since I first traveled to Ukraine, and 20 years passes very quickly. And we know that there are generational issues and intergenerational issues involved in the study of this event.

I should mention to you that it is also very appropriate that the Woodrow Wilson International Center's founder was Senator Daniel Moynihan, who was chairman of the subcommittee in the Senate at that time on nuclear regulation, which was part of the Senate's Committee on Environment and Public Works. He held the first hearing on Chernobyl in 1992. He did so many firsts. He was a great senator from New York and a great scholar. And so it is very appropriate that this center host this particular event.

Also, this particular week the Helsinki Commission, which is the U.S. Commission on Security and Cooperation in Europe, held a hearing on the 20th anniversary of the Chernobyl incident under the leadership of Senator Sam Brownback [of Kansas], its chairman, and

Congressman Christopher Smith of New Jersey, its co-chair. But they followed up on a similar hearing that was held in 1996 on the 10th anniversary of Chernobyl, so there has been a bit of repetition here, a bit of follow-up.

I should tell you that the resolution we passed last evening, House Resolution 703, recognized the 20th anniversary of the Chernobyl nuclear disaster and supported continuing efforts to control radiation and mitigate the adverse health consequences related to the Chernobyl nuclear power plant. The resolution was sponsored by Congressman [Henry] Hyde [of Illinois], Congressman [Tom] Lantos [of California], Congressman [Elton] Gallegly [of California], and Congressman [Robert] Wexler [of Florida], along with our entire Congressional Ukrainian Caucus and members of that caucus, and it was unanimously passed, which was a very good sign.

So we had planned this week of activities to try to help to inform the world and to better understand, ourselves, what we can do as a world community. And [as] I said this morning, [if] you think about the world, there are some things that belong to all of us. Certainly the waters of the world belong to all of us. Certainly the air of the world belongs to all of us. I believe that in the future Ukraine and the United States will feed the world once the Ukrainian economy gains full steam. And I just heard about a project in Russia that gives me great confidence that some of the areas that had been underplanted and underused are being developed now, and they will move Russian agriculture beyond where it has ever been before.

If we look at the relationships that will be there 50 years from now, I think if we look at Chernobyl, Chernobyl really belongs to the world. It is something we should work on together and understand environmentally, scientifically, and politically. Chernobyl should be a magnet for the world community to develop working relationships and closer ties on every level: politically, diplomatically, scientifically, educationally, and medically. It provides us that opportunity if we but open our eyes to see it.

So I thank you for having that willingness by your being here today and to say that we have a lot of education to do, in our country as well as in the eastern and central parts of Europe. What I had experienced in going to the village of our grandparents, for example, in the heart of Ukraine—I tried to encourage people there to begin small businesses drying mushrooms and drying berries. The first reaction I was given was, "Oh, we cannot do that. They are radioactive."

But I said, "But on the map your area is not really affected," but they do not believe it. They do not believe it.

So the challenge to all of us is to understand together, to learn together, to be open together, and to use this as a great organizing tool. You know, we always read in some of the Western press about the competition between Russia and Ukraine and who will get into NATO first, or who will do this first, or who is related to Poland or Hungary better. And I keep saying forget the competition. Let us figure out how to cooperate, and let us cooperate on projects like

Chernobyl that have world merit and are challenges worthy of our life effort.

So I am just thrilled to be here today. I am thrilled you are all here today. I did not know there would be this many people. We welcome your engagement. We thank these incredible representatives from the affected countries and know that for this congresswoman anyway, even to be able to have this conversation with people whom, 30, 40, or 50 years ago, we would never have been given the opportunity to meet in this way, puts me in a different place. It puts me in a very reflective mood, one that is very reinforcing. Thank you so very much for being here today. I am very pleased to take any questions you may have, and I will call on the ambassador and our representatives from the other nations as well if there are questions that come up that would benefit from their great talent and intellect. Thank you so very much for your attention.

QUESTION AND ANSWER PERIOD

QUESTION: I am a medical director of an organization called Jewish Health Care International. We have multiple programs in the former Soviet Union, primarily in Ukraine and also in Belarus. We go into different communities and help them build their infrastructure in terms of providing improved services, enhanced services to the people, specifically in Belarus and in Minsk. We have

seen very complicated cases of advanced cancer problems like we have never seen before, based on our education.

My question is, is there any primary address, or are there any resources available to address some of these complicated issues? When we saw these patients, these people, they basically had nowhere to go—they were out at sea. We could not provide or enhance an infrastructure. We did not have the capability, not because Belarus or Ukraine did not have the expertise or the education, but [because] they did not have the resources to provide the level of expert care to take care of these complicated cases. My question is, what do we do with them? Is there a primary address where we can refer patients? Is there a resource to address some of these issues? And if there is not, perhaps we should look at it.

KAPTUR: I do not know if you are participating in the Hill hearings tomorrow at all, but I think that members like myself are looking for a clear path forward. I do not think there is broad understanding in the Congress of what needs to be done basically, in terms of the sarcophagus and the improvements to it. We know it will cost over a billion dollars. The United States has been the largest contributor, giving $200 million for the improvement of the sarcophagus. But in terms of the health systems, my mind is open. There may be others who have a magic solution, but I do not think the Congressional Ukrainian Caucus has an agenda related to health.

I know that in general, in the hospitals that I have visited—for example in Russia, one of the projects I personally am working on through my community—I think part of the answer is to link medical facilities globally if we can identify them with specific places, as you are saying. I do not know whether those places have been identified. Maybe some expert from USAID or someplace else knows something I do not know. But for example, we found in Russia, in Moscow, in a place called Balashikha, where we were trying to link resources for maternal health and the birth of children, [that] there were very, very intelligent doctors [and] nurses, very willing to help but underequipped. And we found the necessity to help, to bring equipment, and to try to create a training center, and then bring doctors from throughout Russia and nurses from throughout Russia, and relate it to a very specific place. So just personally through my own work, rather than try to help every place, we could identify places—if [resources] did not already exist—where we could develop those kinds of relationships. We know that they have to be continuing. We know that training has to be involved, and we know that the provision of equipment has to be involved. So I would hope that the creation of those types of places, if they do not exist, could be a part of what results from this week's activities. I certainly am not a doctor, I am not a scientist, but if intelligent people talk to me and give me ideas politically, maybe I can help make them happen. And so we would look to the scientists and the medical doctors who are here this week to help lead us in that direction. This is an international medical challenge that we all need to rise to.

QUESTION: Thank you very much, Congresswoman, for your heartfelt speech. I know about you and your activities in Ukrainian issues for maybe more than 10 years, but I see you here for the first time, and I am so glad. I know that there are many funds and organizations involved in the consequences of the Chernobyl disaster, relief in Ukraine and aid to Ukraine or other countries, Russia and Belarus. But there are newer organizations and they raise a lot of money, but they do not have a really scientific basis for how to spend it, which direction to go. And sometimes they spend money all in one direction, and some directions are underfunded financially. Is there any chance to coordinate their activities? Are you going to do this? Or maybe it is a role or a task for other organizations, to coordinate this technical assistance and aid to nongovernmental organizations?

KAPTUR: That is really a good question. Just this morning I had a chat with the former U.S. ambassador to Russia, James Collins. You are talking about NGOs and so forth. He is on the board of something called the Open World Leadership Center in our country, which is an independent federal agency administered through the Library of Congress, which participates in exchanges of individuals from Russia and from Ukraine. They

have thousands, literally thousands and thousands, of these exchanges.

I said, "Mr. Ambassador, I attended a reception in Kyiv of 150 exchangees." And I said, "But you know what, that is all it was—a reception." This is in the area of agriculture. But I said, "Would it not be great to assemble those folks and figure out how to build something on that?" So I think that cooperation, even between governmental programs, does not always happen.

In the NGO community, of course, it is endless what can be done. And my only suggestion would be that if you are working in a country, try to find others who are working there and maybe form a little coalition, an umbrella group of NGOs that are dedicated to a particular cause, and then share your experience. But, again, people tend to be competitive: "Well, I am doing this." But it is important to use your diplomatic skills to try not to duplicate and to try to really strengthen your efforts by mutual cooperation.

I suppose that the new ambassador to Ukraine—I understand Mr. Bill Taylor has been nominated for that position—would be a very good person to help work with the Ukrainian ambassador or work with the Russian ambassador or with Belarus in calling together all of those groups either in our country or in the given country, and at least to have that discussion. So if you have suggestions in that regard, I would be happy to pass them on to them, and I think at that level it would get the kind of priority that might be very beneficial to those involved.

RUBLE: I think we are out of time. I will probably be in trouble for what I am about to say. I learned long ago that whenever Jim Collins says something, to follow his lead. I will point out that in the past several years embassy budgets to support programming for alumni of U.S. government programs in the region have been reduced dramatically. If the State Department were more receptive to programming, and, more importantly, the people who control the financial strings in the State Department understood exactly the point that Jim Collins was making, I think a number of NGOs and also agencies that work with U.S. government programs would be able to accomplish a lot more. It has been very frustrating to see people come through institutions like our program, like IREX [the International Research and Exchanges Board], the Corcoran program, the Fulbright program, and then go back and not really have a support network in place, because the people in the State Department who make the decisions do not really value those programs. I hope that one benefit that will come out of this event will be to take a look at this broader set of issues as well. Thank you very much.

Panel 3: The Environmental Perspective

Chair, **Geoffrey Dabelko,** Director, Environmental Change and Security Program, Woodrow Wilson International Center for Scholars

Alla Yaroshinskaya, President, Center for Ecological Study and Education, Moscow

Mary Mycio, author, *The Wormwood Forest: A Natural History of Chernobyl*

D. J. Peterson, Senor Political Scientist, RAND Corporation

ALLA YAROSHINSKAYA: This is a very painful topic for me and I have prepared a paper, but after this morning's discussion, I have decided to say something not written because I would like to share my own experience. At the time of the accident, I lived close to Chernobyl with my family—two children, including a younger son, two years old. I want both to share my personal Chernobyl story and to stress how many secret documents were produced at that time. If they had not been revealed, nobody would really know what happened at Chernobyl.

At that time I lived in Zhytomyr, which is 130 kilometers away from the Chernobyl nuclear power plant. I worked as a journalist for the only newspaper in the Zhytomyr region, a Communist newspaper called the *Soviet Zhytomyrshchyna*. I have to say that it was really very painful for us, because we did not know what was really happening at that time. Only a few days after the accident we heard the news over a Stockholm radio station, that something "not very pleasant" had happened at the nuclear power plant at Chernobyl. This plant was close to us, but we did not actually realize that it was a very dangerous situation at that time.

Because I was a journalist, the people called on me to go to the northern part of Zhytomyr region, which was contaminated by the Chernobyl accident. Many asked me to write honestly about what really was going on there, because they had children and did not know what was happening or what they should be doing. Maybe evacuation might be in order? So I decided to go there, because I was a journalist. Although I thought it would be easy to just go to the editor-in-chief, ask for a business trip to this contaminated area, collect materials, and write an article, it was not so simple.

The editor-in-chief told me very seriously, "Well, it is impossible to go there. This is not our business." Because I was a journalist, however, I realized that, yes, in this case it really was my business, and I must go. So how could I get there without permission? Since I worked for the industrial department at the newspaper, I decided to go to another region close to the northern part of our Zhytomyr oblast. Because I could not go to Narodychi District, which was very contaminated, I asked for a business trip to Malino District, which borders Narodychi District. I spent one day there, and the next day I went to Narodychi District because it was very close.

I met many people there. Many of the women told me about the soldiers who came to clean their houses, removed the soil, and told them nothing about what was really going on. They were afraid for their children first of all, but also about their health. I understood that I must visit more of those places to collect materials for articles, because people had to know what was going on.

I spent some weekends traveling in our car with my husband. We went to those contaminated areas, and although I wrote the articles, it was not possible to publish them. I want to point out that this was already the beginning of perestroika and glasnost in the Soviet Union during the Gorbachev period. However, although it was perestroika and glasnost in the Kremlin and in Moscow, unfortunately these reforms did not apply to our region, especially after Chernobyl.

I also went secretly to Moscow, because perestroika was there, and maybe I could publish my

article in a Moscow newspaper. But this too was absolutely impossible. I went to *Pravda, Literaturnaya Gazeta*, and *Ogonyok*, which was very progressive at that time, but they did not publish it either, explaining to me the taboo, and telling me that it was just impossible to publish it.

At that time, Gorbachev announced a new election for the Soviet parliament, and the people wanted to vote for me as a member of this parliament in Moscow. This was a real battle, because the local authorities did not wish to see a candidate like me from Zhytomyr come to Moscow. But people supported me, and in 1989 more than 20,000 people went into the street in order to support me and my program. It was a very special time in my life.

So finally, I was elected to the Gorbachev parliament with 90.4 percent of the votes. This was the highest percentage in the Soviet Union; former President Yeltsin received the second-highest percentage at that time. The first thing I wanted to do, of course, was to have the floor in order to tell this congress in Moscow what was going on in the Chernobyl zones. Day after day went by, but nobody was going to give me the floor, and I realized on the last day that I could not go back to Zhytomyr without saying something about Chernobyl. People were waiting for my speech, because a live broadcast was airing from the Kremlin, and many at home were paying attention to what was going on. There was a big wave of glasnost at that time. Again, glasnost for everything, except Chernobyl.

At last I understood that nobody would give me the floor, so I had to take an important step. Backed by 20,000 voters, and in front of the deputies of the Soviet Union, I went directly to the president, to Gorbachev, and said, "Please, I am Yaroshinskaya from Zhytomyr. Please give me the floor. I want to talk about Chernobyl." I told him that if he would not give me the floor, I would take it for myself, and I needed to talk about Chernobyl "because nobody knows how people live there, how people suffer there, and how people die there."

"Well," he told me, "OK, sit down here and you will have the floor." They gave me just three minutes, which is a very short time to say something about Chernobyl. I had a videotape from the Narodychi District of Zhytomyr Region, and I publicly handed Gorbachev the tape, and requested that he show it. I asked for their attention and declared that the Chernobyl victims needed help. This was one of the first public forums where I could say something about Chernobyl freely. I was really happy. Then, sometime after my speech, 12 villages of the Narodychi District were resettled to a safer place.

I continued my investigation as a deputy, and joined the Committee on Glasnost, where we created a special commission on Chernobyl. We asked the Ministry of Health, the Ministry of Defense, and the Politburo of the Communist Party to give us large documents categorized "secret" and "top secret," but we ran into extreme difficulty. When we finally received the documents from the ministries, we saw that the Soviet government had ordered all data relating to the accident at the Chernobyl plant—especially data related to the health of the population affected by the accident—to be marked "top secret." Further instructions from the Soviet Ministries of Health and Defense were to classify radiation doses accumulated by the population, the liquidators, and the military personnel. Medical staff was also ordered not to make a diagnosis of acute radiation syndrome in the cases of the military liquidators, but replace it with something else. Thus, it is clear to me that the recent report of the Chernobyl Forum has the wrong data, because I found and read many documents on the topic.

By the end of the Soviet Union, we had received more top-secret documents: 40 secret protocols from the Politburo of the Communist Party. During these last days of the Soviet Union, I went to the building housing our commission on Chernobyl, and I noticed that a big truck had pulled up to that building. Workers were just loading documents and materials from the Soviet parliament onto this truck. So I realized immediately that we had no time. Although we had received these top-secret protocols, we had no time to even look through them. I realized that somebody could take this document, put it in a truck, and send it to some unknown archive.

I went to the commission, opened the safe, and took these 600 pages of secret documents. I look at them very briefly and saw that they were very important documents. I wanted to make copies of

them, and had to go to the only copy bureau or copy office in the Soviet parliament. So with these 600 pages, I went to the copy bureau and asked that the copies be made. When I returned the next morning I found that no copies had been made, and the staff of this copy bureau explained to me that there was a person who had looked at [the documents] and did not give permission to make the copies.

I went to this person and I said, "Look, the Soviet Union is already almost dead, but we are still Soviet deputies. We will still exist for two more months and I still have the right to copy any document because I am a deputy, and over 200,000 people sent *me* to parliament.

And he responded, "Look, this is a top-secret document. You must go to the organization that classified this document, and ask *them* for permission to disclose this document. After that, you will have permission to make a copy."

By this time, however, President Yeltsin had already banned the Communist Party, and some of the party leaders were sent to prison. So who would give me permission to make a copy? It was strange. I called the new chief of the KGB, Vadim Bakatin, who was appointed by Gorbachev to replace the former KGB chief. When I asked for his help, Vadim Bakatin told me, "Well, I'm so sorry. I cannot do that because this is not our organization."

But this was very interesting and strange, because this meant that the man at the copy bureau who did not give me permission to make copies was not from the secret service. This just meant that some other organization was inside the Soviet parliament monitoring the copies deputies were making.

I finally made the copies, and there was really important information inside of those documents. It was really interesting to know that by the middle of May 1986, already more than 10,000 people were hospitalized. The Politburo then made a decision to change the acceptable level of doses, and confirmed new norms of acceptable radiation levels 10 times higher than the old norms, and in specific cases increases of those norms to levels 50 times higher than previously. What does this mean? It means that 10,000 people became "healthy" immediately. So imagine that tomorrow President Bush announced that the normal temperature of the human body is not 36.6 but 40 degrees [Celsius]. Suddenly nobody is ill here. This is what happened with norms.

A second example in these documents also affected me. As a deputy, I had sent a letter to the prosecutor general of the Soviet Union, and received a reply on questions regarding Chernobyl-related contaminated meat. They sent me a reply that about 50,000 tons of contaminated meat were produced at that time, and were sent to refrigerators. This was waste, radioactive nuclear waste, but the authorities just sent this meat to refrigerators around the contaminated area. Eight refrigerators in the Zhytomyr Region were full of contaminated meat. And what did the Politburo do? It gave a special recipe to local authorities to use with this meat: mix one part of the contaminated meat and nine parts of the non-contaminated meat, and send it around to the country, not only to Moscow. This was in the secret documents.

Here is a third example, which affected me very much. There was a special decision made by the Politburo that in the two months when they resettled 160,000 people, pregnant women and children were resettled *back* to 30 kilometers from the contaminated area. This was to resettle more than 200 villages. The question is why they made such decisions, such strange decisions. From my point of view, pregnant women are better off living in a healthy environment, and not back in a contaminated area. They wrote that these women could receive 10 rem per year after they returned to that place. Well, I do not think that was a very reasonable decision.

I want to add that some months ago I found one more protocol. This protocol [concerns] a meeting of the Politburo held three days after Chernobyl and headed by Mikhail Gorbachev. What affected me was that they did not discuss the question of how to help people; nor did they discuss the question about the health of children or women or the population. Instead, they discussed the question of what precise information they should deliver to people inside the Soviet Union, to people in the "socialist camp," and to people in "capitalist countries." It was very strange for me, because—as we know today—900,000 people were living in the contaminated area.

A fifth document I wanted to mention is one of the first reports made by Academician Leonid Ilyin, who was the primary individual covering up the truth about Chernobyl. (My statement carries great responsibility, but I found this report, which was signed by 19 scientists.) It was made three years after Chernobyl, and he wrote in this report that 75 million people in the former Soviet Union were affected by radiation after Chernobyl. The first time I came across this figure of 75 million people was in reply from the prosecutor general to my letter when I was a parliament deputy. But I could not release this figure, because I thought the prosecutor general had just made a mistake! Now I realize that the prosecutor general of the USSR probably took this figure from Academician Ilyin's report, or maybe from some group of people who know about this number.

Finally, I want to mention one more secret document about the reactors, in which the Politburo discussed the question of the quality of reactors in the USSR. This is another interesting topic. But what affected me very much as a person—as a human—was that they discussed between themselves this topic of a nuclear catastrophe, and they compared the nuclear catastrophe to a little nuclear war in the center of Europe. But what did they tell us? "Don't worry, be happy!"

I wrote some books about the Chernobyl nuclear catastrophe. My last book has recently been published in Moscow, titled *Chernobyl Twenty Years Later: Crime without Punishment*.

In conclusion, I think the international community should decide to organize an international committee, in order to review the whole situation around the people who covered up the Chernobyl catastrophe, because there are still nine million people who live under radiation and suffer.

MARY MYCIO: First of all, I am not sure where Alla Yaroshinskaya gets her numbers about nine million people living in contaminated areas. I am also not sure about the 75 million who are affected by radiation in the Soviet Union. My understanding is that 75 million people lived in the European part of the Soviet Union, and might have been affected by radiation. But to make them the same kind of victims as people who were really subjected to high doses is really diluting the very concept or definition of what a Chernobyl victim is.

I would like to talk about the environment, and I would like to make a perhaps controversial statement about what effect Chernobyl had on the environment in the areas immediately surrounding the reactor. It is usually said that Chernobyl was the greatest environmental disaster in history. I think that may need some rethinking. Chernobyl was a great humanitarian disaster, it was a huge social disaster, and it was a huge economic disaster. The ironic and perhaps paradoxical result of what Chernobyl did is that by forcing about 350,000 people from their homes—not all in a contiguous area around the reactor, but, say, 200,000 people in an area that is equivalent to the size of two Rhode Islands or two Luxembourgs, depending on what your point of reference is—it has created a nature reserve that is thriving in spite of the radiation. Most scientists who study the zone and who study the environment would argue that radiation has paradoxically allowed nature to thrive by getting rid of people because the greatest danger to wildlife is not radiation, it is human activity. Thank you. I am open to questions.

D. J. PETERSON: I wanted to give you some higher-level questions or put some higher-level ideas out there. A lot of information has been conveyed today. There are three themes or three levels of analysis that I want to explore very briefly.

The first one is the local level. The second is the national and regional level, so Russia, Ukraine, and Belarus. Finally, I want to look at the environmental impact at the international level. I want to take a little bit of liberty here with the panel theme and really talk about how the environment and political, social, and economic development are all tied together.

Let us focus on the local level. We have heard a lot of discussion about the impact of the accident, the radiation, dislocation, evacuation, alienation—basically, a review of the history. Now, 20 years later, the discussion is really starting to turn from what went wrong or how the situation can be controlled to what we do in the future. I think the future has been put on the agenda in two ways by two people—Alexander Lukashenko, the president of Belarus; and Viktor Yushchenko, the

president of Ukraine. Both are asking how we can redevelop the area, how can we make use of the area, how can we revitalize it. Lukashenko, as far as I understand, is doing it somewhat surreptitiously. It is not an open process. There are reports, for instance, of encouraging agriculture, redeveloping dairying and forestry operations, and encouraging people either to resettle or to move into contaminated areas.

Mary and I were on CNN International during a news program with an interview with President Yushchenko, and he talked about the need to invest in the area and in particular to promote forestry and agriculture as ways to redevelop the highly contaminated areas around Chernobyl. I think it is an interesting theme. How do we look forward? How do we make use of it? But I think there are several things that need to be done first. As we heard in David [Marples]'s presentation early this morning, you need to first stabilize the Chernobyl plant and get ahold of the radiation situation a little bit better.

One of the questions that the CNN interviewer was asking was, "What needs to be done to get to this vision of a revitalized region?" For me, one of the first things is stabilizing the reactor itself, putting a cover over it. There have been discussions and proposals put forward and it is not finalized, but people are hoping that construction will go forward in the next year or so to put a cover over the sarcophagus so that its deterioration will slow down and perhaps be stabilized.

The second big step that needs to be taken in terms of the environment concerns the material and the reactor itself. The long-term issue is what you do with the material inside the reactor—the molten reactor and machinery parts as well as the large amounts of fuel that are still there on the floor. Again there are discussions, and there are proposals put forth on ways that you can stabilize it and perhaps even remove it and then dispose of it. It is a long-term issue, but an important one that needs to be addressed if you are going to try and stabilize this region and perhaps remediate it.

Finally there is the issue of the radioactive material around the region, whether it was the dirt that we heard was scraped off from around people's homes or the material that was contaminated—helicopters, the heavy equipment, vehicles. We know that a lot of this has been disposed of hastily, or just dumped and left there. That material has to be more permanently and safely disposed of. So before you can even talk about any long-term solution or approach for the region, one of the things that needs to be done is that the contamination needs to be stabilized and better isolated.

I think the issue of economic development is very interesting. Ideas have been put forward for things like eco-tourism. You could say it is to see the beautiful animals that have revived there that Mary Mycio has written about and documented. Or perhaps it could be this kind of macabre investigation—looking at what went wrong. It is akin to the people who are going to New Orleans now to see the damage.

So eco-tourism is a theme. But does anything more than just brief visits to the region make sense? Do you really want to have forestry and agriculture in the region as an industry as it develops beyond the subsistence level? The idea that people would want to knowingly buy wood and build their house with wood that was grown in the Chernobyl area, even if it was clean, is far-fetched. There is a really serious branding issue here, especially with food. We talk about buying coffee from sustainable rainforests. Do we really want to buy food from the Chernobyl-contaminated areas? It's a good question. It might be well-meaning, but I think there is a huge perception problem. The idea of revitalizing the region is very problematic. To do that you also need to build roads and infrastructure, and you need to have governance structures. Does it really make sense to try and bring all that back in at this point, especially if you have not stabilized the reactor and the facility itself?

Going forward, another big issue is: You might be able to spend money and restabilize and perhaps rehabilitate the physical damage around the reactor, and perhaps you can improve the economic conditions of people who live in the region in various ways. But I think the real intractable problem is, how do you repair the psychological damage—the trust issue? I think Alla Yaroshinskaya's presentation and her comments really call out the questions we have about government and officials. I think the debates that we have heard all day about information and numbers really call into question our trust in the

system and in information. So how can we possibly have faith about anything they do in the future? I do not see the trend getting better.

Dr. Yaroshinskaya called for an international commission to look at and perhaps identify blame. Well, you have had this international commission—very high level—under the auspices of the UN looking at the health and the environmental impacts. It was a two-year effort, it had a huge participation across a number of agencies, and I do not think it has really reduced or made us any clearer or more comfortable with the situation there. If you read the presentation, if you read those documents, it makes you wonder more, because I think—as David pointed out—there are very elemental mistakes made in the document. If they could not get these numbers right, if they could not match up the data right, or if they could not convey it in a very clear and concise manner, you have to ask yourself, what is going on here? I think even though there is a lot of good information in those documents, and even if it probably is very reliable on many fronts—the way the information is conveyed, the way that some people did or did not participate—it just still raises questions. At the end of the day, I do not know how much more research, analysis, and data compilation we can do. I do not think anything is really going to solve the problem. Again, maybe this idea of just letting the region lie there perhaps is the best solution.

Let us look at the regional/national level. I wanted to quickly point out some themes. For me, looking at Chernobyl and its impact on the Soviet regime, I think for the Soviet officials there was the secrecy—we had this cover-up, these Politburo memos, and so on. At the same time, I think Chernobyl was a real wake-up call. I think for a lot of officials it really pointed out how rotten the system was. My book opens up with this classic discussion during a walk in the woods between [Foreign Minister Eduard] Shevardnadze and Gorbachev. I cannot underestimate the role Chernobyl played in causing political change, even as you had this suppression of information and this cover-up. It drove glasnost, as we heard.

Alla Yaroshinskaya is a prime example of how Chernobyl was used to get information out and to bring out independent voices and information. She was at the forefront of a movement, and I think very quickly you saw in politics that once she made this first step, people were really willing to go out and address other environmental issues. Then they moved on to the broader political and social issues.

Chernobyl started a political revolution. It started an environmental revolution, because people started looking at their own neighborhoods and looking at the problems. It also started an anti-nuclear revolution. What we saw shortly after Chernobyl was that the Soviet nuclear power plant construction program was completely frozen for many years because of local opposition to plants being built in neighborhoods around the country.

After the breakup of the Soviet Union, things changed. Where people in Lithuania had been protesting against the Chernobyl-type reactors in that country, suddenly their reactors became a symbol of national power. So from nationalism emerged national security concerns. We see those reactors still as a very important part of Lithuania's economic transition and economic growth today as a member of the European Union.

Another prime example is Armenia. After the earthquakes its two reactors were shut down. But as Armenia plunged into deep economic depression, the reactors became an important symbol of independence and the lights coming back on. So however dangerous and old those reactors were, they have been a symbol of national power and national revival.

What we are seeing now in Russia is that nuclear power is on the upswing. Whereas in 1999 nuclear power accounted for about 13 percent of electricity produced, that figure climbed to 16 percent in 2003. That number is going up because new reactors are being brought online, and projects that were frozen have been brought back into construction. Now the Russian Atomic Energy Ministry has a huge nuclear power development program underway, and they want to have nuclear power account for 25 percent of Russian electricity production by 2030. They are projecting that they would like to start commissioning two new reactors every year starting in 2011. This is a real reconsideration of the role of nuclear power in Russia.

Nuclear power is also being embraced in Ukraine again. Even with the long-awaited decommissioning of the Chernobyl facility in 2000—the ending of power production—nuclear power today still accounts for 45 percent of electricity production in Ukraine. So nuclear power is a critical player in Ukraine's economic turnaround today, and it has become even more critical since the beginning of the year because of this "Gas war." Officials and individuals are really reconsidering the role of nuclear power in their lives.

Looking at the international level, finally, again I think Chernobyl played a very big role, along with Three Mile Island in the United States and nuclear accidents in Japan, in really forcing European countries and American communities to rethink nuclear power. In Germany, after the "natural gas war" that took place this winter, people are starting to rethink their government's commitment to phase out nuclear power. They are considering extending the lives of reactors, or at least continuing to rely on nuclear power for a longer period.

Finally, I think the whole nuclear debate is being subsumed by concerns about global climate change and thinking differently about the world and environmental risk in general. I think this is fascinating. Because where nuclear power and nuclear waste were seen as the ultimate long-term threat that you can't get rid of, people now are looking at global climate change, and many people are starting to think that perhaps that is the greater threat. We are seeing a nuclear power discussion and the prospect of new nuclear power facilities here in the United States. Nuclear power accounts for almost 20 percent of the U.S. electricity supply, so we are very dependent on nuclear power.

I was just at San Onofre State Beach in Southern California, which is in north San Diego County. It is an amazing beach, very wild. It is just north of Camp Pendleton, which is a kind of off-limits area. But right there on the north side of San Onofre State Beach is the San Onofre nuclear power generation station. There are these two nuclear reactors right there on the beach. You can see them from Route 5 if you are ever driving to San Diego. I looked at them much differently this time because I thought, "Wow! That is clean energy." With all the concern about global climate change now, we really think differently about Chernobyl and the risks associated with nuclear power.

Finally, we come to this issue of alienation, which was raised by David this morning. Today there are other issues competing for our attention. Of course, today we have got Iran, and Iraq, and the United States, but there are also a lot of environmental issues that are competing for attention. The issue we are focusing on, this notion of alienation, is very interesting. Chernobyl is a no-go zone that is not for people anymore. Maybe at the time it was somewhat unique, but today in the world we are facing a lot of these situations. We are seeing desertification increasing in Africa and China, for instance, and of course in Central Asia as well. We are well acquainted with the loss of the Aral Sea. We are losing the Antarctic, we are losing the ice caps at the North Pole, and people are saying that those regions are basically going to disappear and become water, if predictions are accurate. The United States just lost a significant part of the Mississippi Delta from Hurricane Katrina, but that was also a longer-term trend that has been going on for decades. The problems brought about by Katrina have highlighted again this real sudden loss of an ecosystem or a region. So today, around the world, Chernobyl is competing with a lot of these losses.

The interesting point that I think Mary Mycio brings to the table is that we have lost Chernobyl from a human perspective, but perhaps are getting it back from a natural perspective. That, to me, is a very interesting and perhaps hopeful way to think about one of the legacies of Chernobyl. Thank you.

QUESTION AND ANSWER PERIOD

QUESTION: I consider myself a child of Chernobyl, even if it is in a more diluted sense than Mary referred to. I was in Belarus, and I was two at the time of the Chernobyl disaster. Granted, I am not sick right now, but I do not know what awaits me in 20 to 30 years. My father did have cancer, and luckily, because of American medical intervention, he is fine and he is alive.

But the question that I want to pose is to Mary: when we are looking at the environmen-

tal factors, in what way should we consider the human perspective? I have seen pictures of horses with the background of the Chernobyl power plant. It is great that we can look at nature and at the way that it is thriving. If for nothing else, it is a provocative and very interesting image. But can you please tell me, have you met with the people who have been directly affected by this? In looking at the nature and at what is happening in this developing environmental perspective, have you also met with those who are directly affected? Because I am a little troubled by the perspective of allowing the environment to be the positive aspect of this. Thank you.

MYCIO: Thank you very much for that question. It is a very good one. I think that my book is a little more comprehensive on this point than my statement earlier. I do not in any way underestimate the cost and pain that Chernobyl caused to human lives. The only point that I was trying to make is that there are costs that are tolerable in an animal population that are not tolerable in a human one. My only point was that by getting rid of people, Chernobyl allowed the wildlife to rebound. That does not mean that individual animals may not be suffering. They very well might be. But in wildlife biology we measure the health of an animal population by its numbers, not by the health of its individual members, which we cannot know anyway. There is not even enough money to study that.

In terms of dealing with people who were victims of Chernobyl, yes, I talked to many people. I talked to people who believe they are victims of Chernobyl and I have talked to people who are victims of Chernobyl. I want to point out a study that was recently done in Ukraine in which they talked to people who live in contaminated regions—where there is no doubt that they are contaminated—and talked to people who live in regions that were almost unaffected by Chernobyl. All of them consider Chernobyl to be their number one health problem. How do you tease out the effects of so many public health issues that exist in the former Soviet Union, not only in regions that are contaminated by Chernobyl but because of the psychological effect? How do you tease out the health effects of Chernobyl from the general decline of public health in this part of the world? It is almost impossible.

I want to point out one thing. In the UN report and in many other reports at the humanitarian forum that was held in Kyiv yesterday, there were talks about the declining life expectancy of men. Men in Ukraine die at—I don't remember the exact figure—but it is around 57 or 59 years old. This is a huge public health crisis. Nobody talks about that. They mention that men are dying, but all of the public health information and efforts are directed at women and children. I am not saying that is not an important thing, but it is the men who are dying, so that is another issue that is not getting enough attention. It is mentioned just sort of as a sideline. I am not really sure what to do about it, but it also deserves attention.

In terms of the horses in the background of the Chernobyl power plant, I want to point out that recently I have learned that those horses are poached massively. One third of the population is missing. That is one reason why I have been calling for declaring the Chernobyl zone a wildlife refuge. The wild animals that are there as a result of human error and horrible human miscalculation should at least get protection from people who are exploiting their trust of people. Thank you.

DABELKO: As someone who is not focused on this area of the former Soviet Union but someone who looks at the intersections between environment and security institutions, I would like to mention a parallel to this kind of ironic twist. On military bases around the world, including in the United States, we have this kind of almost eerie parallel between wildlife biodiversity richness and the absence of human beings. Many say that military test ranges in this country are some of the most biodiversity-rich areas of the country.

QUESTION: I retired from the Environmental Protection Agency at the end of March. I wanted to follow up with Mary on the wildlife issue in the sense that it is another natural experiment just like the one in Hiroshima. But have studies been done on whether the radiation is affecting that wildlife population, whether it is a real ecological system as you would expect, or whether it is skewed in

some way? I could image that different animals may be differently sensitive to radiation. Then I realized it is an exclusion zone, and presumably the ecologists who might be allowed in there if they wanted to go might not have had an opportunity to study it.

MYCIO: Thank you for that question, and it is also a very good one. Unfortunately, one of the problems with Chernobyl's wildlife and with its status as an exclusion zone is that there is not really very much money for studying the wild animals. There is a very good reason for this, given limited budgetary funding, not only in Ukraine and Belarus, but internationally. Most of that is devoted to studies of human health, and I think that is the right thing to do. That means very little money is left for wild animal studies. They do studies of rodents, and we all know how interesting rats are, or birds that live in very radioactive areas. But in terms of the large animals, there is almost no money for that, because studying wild animal populations is very expensive. First of all you need to travel, you need jeeps, you need gasoline, you need hunters who are going to hunt them. Contrast that to studying mice, for example, where you need maybe 25 mousetraps, some cheese, and a few days. So there is no money to study them. In fact, there is very little money to monitor their populations, and that is one reason why I think that declaring the Chernobyl zone a wildlife sanctuary would be very beneficial. It would at least provide some limited funding for a range of services and at least counting the number of animals. Right now the animals are counted unofficially by the forest rangers, who do it as a sideline.

In terms of a balanced ecological system, it is very balanced. In fact, a few years ago, wolf hunting was banned in Ukraine. Years ago there were calls to do wolf hunts. All the wildlife biologists said that that is a bad idea, because the number of wolves is perfectly balanced to the number of prey. I should also add that there are lynx, and lynx are a rare species in this part of the country and in this part of the world. So in general, it is a very balanced ecological situation, and I would hope that it would remain that way. Thank you.

QUESTION: I have a question for Alla Yaroshinskaya. I was wondering if you noticed any shift in official attitudes toward Chernobyl lately, maybe toward these documents that you have been talking about, for example. There have been some changes in the openness and the accessibility of archives lately, and I was wondering if you had any impressions that this was affecting your work now as well.

YAROSHINSKAYA: Thank you. I have to tell you that three years after Chernobyl we did not have any glasnost on Chernobyl questions, and only when the first Congress of People's Deputies began to work could we say something as I said. Then later, it was too difficult to get some information from officials. People living in 16 regions of the Russian Federation know they lived in contaminated area six years after Chernobyl. This is the only fact they know. This tells you about glasnost and the possibility of knowing something that is wrong or that is good in this contaminated area.

I think that today it is not a problem to go to this contaminated area, to speak with people, to write articles.

But today there is another problem. I wanted to get back to the data of international organizations. I spoke with many scientists—from Japan, from Ukraine, for example—and they all asked me, could you please help us find the original materials at the institute headed by Academician Ilyin. They did not have permission to go there and look at original data. The people who work in this institute said they just put out a special issue on that topic, and they would look at their data and print a special newsletter or magazine, and send it to us. But this is not original data. This is just a special scientific magazine. So the scientists who work in this area actually told me they cannot go and see the original data that this institute has had since the time Chernobyl happened. Original data is a really big question. When we have no original data, how can we have original results? How can we be sure about conclusions when we do not even know if this data is right?

MYCIO: I just wanted to add that I agree with Alla on the issue of original data. One example of original data would be what the radiation doses were to the firemen and the people who worked on the night of the explosion. The fact

is that at the time they did not have Geiger counters or radiation meters at the plant that could measure radiation levels as high as those at the time the accident happened. So basically the sort of official or original data on this issue is 200 rem. The 200 rem figure exists only because that is the maximum that these meters could measure. And so in terms of original data, there is so much that is not known. As Donald Rumsfeld once said, "There are things that are not known because they can't be known, or they're not known because they're not known." This is an example of missing data and original data, which we will never know.

YAROSHINSKAYA: I wanted to add something. I agree with you that a lot of the time we will never know the original data, because the people responsible for it would not like this original data to be known. We have now a scientific method by which people can get to original data—if officials want to know it—but this is very expensive. We have a very good scientific method that can be used to review the doses received by firemen or liquidators. But who will give money to do that? This is first.

And the second: I have a very interesting document in my personal Chernobyl archive. I have the correspondence between the Minister of Health Protection of Ukraine Anatoliy Romanenko in Kyiv, and an official in Moscow. It was in one year after Chernobyl, and he wrote a confidential letter from Kyiv to Moscow stating that there were two and a half thousand affected children in just this one region of Ukraine. These children had levels of radiation at 500 rem. Per child this is cancer, real cancer. What did this official person in Moscow do? He sent a letter to the Central Committee of the Communist Party addressing this same topic of exposure of children, but he wrote in his letter that in contaminated areas in Ukraine no one person's illnesses could be connected to Chernobyl. This after the letter from Romanenko? So what can we say about the data now?

QUESTION: I would like to leave the issue of numbers aside for a moment, because when you hear a range from 4,000 to 200,000, it is an incomprehensible gap. But it does seem to me that one of the issues that underlies this gap is something that the representative this morning from IAEA and D. J. Peterson have pointed to. That has to do with the perspective with which one comes to the problem today, 20 years after, leaving aside everything that went wrong, all the dishonesty of the Soviet regime, and so on and so forth. The question becomes development. Obviously the health issues are very important to that, and you cannot begin to talk about the development of the region unless you have some handle on the public health of the region. That actually gets to larger issues, I think, of public health in these societies, which transcend the issue of why men are dying in Ukraine. It is not just Chernobyl. It has to do with alcoholism and trauma and all sorts of things. So one thing that has to happen is, if we are going to talk about development, clearly we need to begin to get serious about public health, and Chernobyl needs to be part of that discussion.

But then that leads to another question. Where does this region go from here? Does it just become a nature reserve? Lukashenko might have an interesting ad campaign: Buy used Chernobyl lumber and reduce your electrical bill. But seriously, D. J., maybe you are the best person to start this discussion off. What can the future of this region be? Because it seems to me that the core of some of the dispute with the IAEA approach is that it is an effort to begin to look forward at trying to figure out what useful function this region could play in the economies and life of the societies of the region. D. J., where do you see the openings for a possible healthier economic and social development of this region?

PETERSON: As we see on the maps, there are different degradations of contamination. To say that we are not going to do anything in the Chernobyl-contaminated areas of course does not make sense, because large parts of western, central, and eastern Europe are also contaminated, and obviously economic activity thrives there, and of course to the east, to the Urals. So one of the things we can do going forward is to continue the monitoring. There is a fairly good understanding already of the gradations of contamination. Obviously, you can grade economic activity or human activity by these regions.

It is about drawing circles; it is about continuing to monitor; it is improving access to information about current radiation levels. It is improving access to information about the implications of that radiation for public health or other types of activities. In the smallest circle, I think it just makes sense to have a zone of exclusion. You do declare it a wildlife area. You do keep it off-limits to people. I am assuming that the poaching that Mary is talking about is people poaching the horses for meat or to sell them, but it is poaching and they are being used for some kind of economic purpose. So you want to enforce the fencing off of that area and the exclusion of people.

I do not know if I have a good argument about how you deal with the land in between—the very, very low-contamination areas and the moderately contaminated areas. But again, a lot of this area has been depopulated because of economic issues, namely the fact that cities are where the economic development is, where the interesting jobs are, where young people want to go. About encouraging broad economic development in these moderately contaminated areas—I am not sure. Maybe you just leave them fallow also or allow limited agriculture.

I think there needs to be a comprehensive land-use plan or something that actually says what you want to do with these areas. I do not think anybody has really said how we should treat these areas and how we should use them in the future. It is more than about providing short-term assistance to the people who live there. I think there needs to be a constructive issue. As we know, one fifth of Belarus is contaminated to some extent, so what is the land-use plan for that area? I hope whatever develops in the future is developed in a public way so people have choices and input into those decisions, too.

DABELKO: D. J., can I comment on top of that? You are somebody who does a lot of risk analysis and risk assessments for both public and private entities. If you are looking forward and being asked what are the possibilities for incidents like this to occur in the future, what kind of risk level—whether it is a specific area that you focus on where you are suggesting that it might be more or less likely to happen—what do you say? What do you tell people who ask you if this is going to happen somewhere else in the former Soviet Union in the next 10 years and ask how it is going to affect their investments?

PETERSON: That is a really good question. I guess the easy answer is that there are a lot of places in the world you can go. There are a lot of places in Russia and in Ukraine in which you can go and invest and be a lot safer than right around Chernobyl. There are a lot of places where you can avoid the nuclear risk. You can grade it by reactor type—that is one way. The European community has demanded that the Lithuanians decommission their Chernobyl-type reactor. That should hopefully happen in the coming years. But I am not in a position to really rate nuclear facilities in Russia. Clearly, perceptions of risk at Soviet-type reactors are much higher within the international community than among Russian or Ukrainian engineers, physicists, and regulators. Even on this anniversary, the Russian government is putting out a nice drumbeat of information about how well Russian reactors are being run these days and how important changes have been made. And clearly there have been some significant improvements in safety in Russian reactors.

But I guess my easy answer will be that there are a lot of places you can invest away from the nuclear-contaminated areas or reactors and be fairly confident.

YAROSHINSKAYA: I want to add something. You are speaking about the possibility of working on contaminated land. This is a very funny question for me, because I live in Russia. Russia is a very big country. If you drive one kilometer away from Moscow, you will see huge fields and nobody working on these fields. Many people lived there in the Soviet period while working for so-called collective farms, but we do not have collective farms today. There is a lot of land even around Moscow that is free, and nobody works there. Why do we need to invest money in contaminated land, plant something, grow it, and then eat it? This is a strange question. We have a lot of very good soil in Russia, and we can use this soil. What do we need to put money into contaminated land for?

QUESTION: Dr. Peterson, you raised the point that nuclear power now accounts for 20 percent of energy use in the U.S. Representative Kaptur said she opposes all forms of nuclear power in the U.S. So could you comment on what would happen if her perspective would gain popularity in the U.S.?

You also mentioned global warming. So what would our options be if her policy choice to shut down nuclear reactors here was followed? Where would we go from here?

PETERSON: It is 20 percent of our electricity production, not our total energy demand. Where would we go? I do not know. A lot of the new electric power generation in the United States—for instance, in California—is natural gas. But the United States is extremely constrained on natural gas and on the amount that we can import into this country. If you look at who controls natural gas in the world, it is three countries: Russia, Qatar, and Iran. At least one of them is a very questionable supplier. Then getting it here is a big challenge.

We can go to coal. The United States has lots of coal, but you have both the urban air quality issue, with sulfur and mercury, and the climate change impact. A lot of people would advocate a huge conservation program over renewables. I am not quite sure. I do not know how Representative Kaptur's view could be implemented in the near future, where we could get rid of nuclear power. We could certainly let it wither, because a lot of nuclear facilities are aging and will be need to be decommissioned, although we are always finding ways to extend their lives, just like they are in Russia right now.

I frankly do think that we are going to see a renaissance of nuclear power in the United States. There are already plans to start the commissioning in the entitlement process for new reactors in the South. Again, different countries, France for instance, have made a commitment to nuclear energy because they see that as a better option than global climate change, [or for] other reasons. Europeans see diesel as fuel they are willing to use in automobiles, because it has a climate benefit over gasoline. We traditionally do not like diesel, because we see the air particles in our lungs. But perhaps that is going to change. I really do think that we are at a sea change right now on the climate issue, and it really could swing people in favor of nuclear power. Perhaps Chernobyl will be considered as something Soviet, different, and in the past, just like we look at Three Mile Island as something in the past.

QUESTION: Dr. Peterson talked about reactors of the Chernobyl type in Russia. Short comment. There are three nuclear power stations in Russia that have this kind of reactor: Leningrad, Smolensk, and Kursk. Two of the Leningrad-type reactors and one of the Kursk reactors have already exhausted their resources. Their resources go for 30 years, and now the government has made the decision to prolong the terms of their activity another 15 years. It is a very interesting fact that 5 years ago in the nuclear strategy of Russia, the term of increase was 10 years, and 2 years ago the terms changed to 15 years.

I was a participant in a public hearing on the question of the Leningrad nuclear power station. It was an absolutely unserious event, and all rules were violated. In accordance with the law, it is necessary to announce this kind of event for three days, but the announcement was issued only one day in advance. It was a weekend in July, and everyone was out of the city. The public hearing was in St. Petersburg, although the nuclear power station is situated in Sosnovy Bor, three hours outside of St. Petersburg. There were about a hundred officials from the nuclear power agency in Moscow and from the nuclear power station in Sosnovy Bor, and only 10 people from the public: three journalists, three participants from known government organizations, me, and about three very old ladies, who could not understand what was going on.

There was a lot of caviar, expensive food, and champagne, and there was no discussion at the time. But the officials issued the decision that there was a public hearing on this question, and this very, very serious question was decided in this kind of absolutely discouraging way.

What do you think about it? It is a very, very serious decision. It means 15 new years of use for Chernobyl-type reactors.

One more question, I am sorry. Is this type of decision possible in the United States, to prolong a reactor's life?

PETERSON: It is an interesting issue. First of all, the decisions to prolong a reactor's life, what they call the nameplate life of a facility, that happens a lot in a lot of different industries. It happens a lot in the U.S. power industry. It happens with aircraft. If you look at the B-52 bomber, it is a prime example where the life is continually extended, in part because of our knowledge of the facility. A lot of U.S. power plants—coal plants, for instance, or refineries—are much older than they were expected to be when they were designed, because we have gotten so much better at managing them. At a very superficial level, this is a common practice in many industries. The United States has gotten much better at running its nuclear facilities, and in fact the output from nuclear facilities has increased at existing facilities because we have gotten better at running them. That happens a lot.

The issue you are getting at is very interesting for two reasons. One is that you have permitting practices. I think the Putin administration has been very good about following the letter of the law or rule. They say they have to have a meeting, they have a meeting—but it is at an inconvenient location, it is hard to get to, it is not noticed, it is not announced in advance, it is not held for a certain period of time. This is a very common practice of observing the letter of the law but not following the intent of the people who wrote it. Perhaps it is following the intent. But the point is, you see this a lot. You certainly see this in corporate governance, with board meetings being held out at some resort in a very remote location so shareholders cannot attend and have their voice heard. This is a very common practice.

I think your description accurately conveys how officials view the situation. They do not want public participation. They do not want to have people questioning them.

The second point that I wanted to make is that nuclear power in Russia in particular has reattained the level of a national security interest. It is being reshrouded in secrecy. At some levels, you want limited access to nuclear facilities because of the nominal concern about terrorism and terrorist activities. But even on access to information, you are seeing the recreation of closed cities and closed facilities. Anything that challenges the prerogatives of the nuclear power sector in Russia is considered a national security threat. Thus, they try and limit input as much as possible.

YAROSHINSKAYA: May I offer a new question? You talk about the new nuclear concept of Russian nuclear power plants, how to develop Russian nuclear power plants. But we heard that President Bush also said some time ago that the United States is going to develop nuclear power plants. Do you know if plans already exist about how many nuclear reactors are going to be built in the United States?

PETERSON: I do not know if there is a plan—I have not seen one. Our approach is much different. In Russia you have RosAtom, the Atomic Energy Ministry, which has a centralized plan on how to generate so much energy. It is a very centralized process, and there is one builder, one organization that commissions and runs the facilities. Here in the United States, we have public utilities. Whether a reactor will be built is a decision made by independent companies. They might be incentivized by tax and policy, and they might be incentivized by streamlining the environmental regulations or the public review process.

But again, I think the interesting question will be when a real proposal for a nuclear power plant in the United States actually lands on the table and that meeting is announced. I am really curious to see who shows up and how loud the opposition is. That is a big question. Will people be concerned about their neighborhood, or will they be concerned about energy security, climate change, and economic development? I am not sure.

MYCIO: I want to go back to something that Dr. Peterson said. I forget exactly how he put it, but in terms of looking at Chernobyl in the context of the future of energy, I think it is very important to look at Chernobyl as an example of what energy costs. And Chernobyl cost a great deal in terms of human suffering, money and economics, and losing the value of land. But all other energy has costs as well. Fossil fuels have costs. Look how much the war in Iraq is costing. And I think that when we look at nuclear energy on balance, it is important to not just look at the cost of how many people died, how many peo-

ple will die, and how many diseases were caused by Chernobyl. How many cancers are caused by burning fossil fuels? How many coal miners die in mining accidents every year? How many wars are fought over fossil fuels? So when we make those choices, I think that we have to think about all of the costs of different forms of energy, not just one form of energy.

Panel 4: The Human Experience

Chair, **Margaret Paxson,** Senior Associate, Kennan Institute, Woodrow Wilson International Center for Scholars

Kate Brown, Assistant Professor of History, University of Maryland, Baltimore County

Irene Zabytko, author, *The Sky Unwashed*

MARGARET PAXSON: Today we have been talking about a catastrophe of epic proportions—epic in its breadth and its depth and in the scale of what is still unknown. As I've listened today, I have been struck by an important dichotomy in ways of thinking about the Chernobyl tragedy. On the one hand, it is seen by some in terms of defining, registering, and recording the extent of the pathology of this event. What was it? What happened? What went wrong? What is this illness that has been inflicted on this part of the world for so long? On the other hand, we have seen people really struggling today with the need for getting at normalcy, asking themselves "Where do we go from here?" I think both of these sides are really important, and they are going to continue to be important in this panel as we move on.

This panel, "The Human Experience," will look at what happened not just on sweeps of territories, or in the aggregates of inhabitants that live in this territory, or the horrifying statistics that pile up on various people who live in various places—but at the question of what happened to these people? People who live in families, people who have loved ones, people who have histories, people who are attached to homelands—not just parcels of land, but homelands and spaces. So, I would say the tragedy of Chernobyl cannot be understood or placed into history without an understanding of this grounded human context. That is one thing I want to keep in mind as we move forward.

There is another issue that arises that is rather personal for me. As I have been listening all day long, I have been thinking over and over again about one family that I got to know from my own research as an anthropologist in the Russian north, up in Vologodskaia oblast—which is quite far in miles from this tragedy. In this family, the father had been sent to Chernobyl to do cleanup. Two sons in this family had also been sent to the Caucasus as soldiers. This is quite typical in the provinces. These are the kinds of young men who do not know anybody with influence and cannot get their way out of war by paying someone off.

I wrote a magazine piece about families like this one whose sons were in Chechnya, and in the article I quoted Tatiana, the mother of the family. I just want to give you this little quote. This is in her words:

> I do not understand why they had to take my Andrusha [her son] so far away. They took his brother already and my husband. He did cleanup after Chernobyl. Those men were not even given gloves for their hands, just masks over their faces. They were told to clean the waste with tractors. And they were not supposed to take married men but my husband already had a wife and two children when he went. There was the roof of one building that was so contaminated that Japanese robots refused to clean it so they sent up the Russian men to do the job and now Igor's health is spoiled.

I wrote on about Tatiana and her family:

> I would look over at the kitchen, I would look over at the small dark-haired man who has been quietly going back and forth to the kitchen, her husband. "One thing you can say about my family," Tatiana adds, her voice lowering and losing its waver, "my husband and sons, they will not hide behind other people's backs."

I was thinking about this all day long and thinking about how there, far away in the Russian hinterlands, all the same questions are hovering. How does one heal from tragedies that people share? In this family one tragedy was Chernobyl, and the other was the wars in the Caucasus. How can suffering be known and then healed?

So with that I would like to introduce our two speakers, both of them prize-winning authors. I feel really honored to be able to introduce both of them today. Both of them are bearing witness to something, and I think that when we look at tragedies, the bearing witness—the active bearing witness—is extremely crucial.

KATE BROWN: The Chernobyl Museum in Kyiv presents the tragedy of Chernobyl as a particularly Ukrainian tragedy, and you see this when you go into the museum. There is a whole line of names of villages that are now evacuated, and there are the names of villages with a big line through them. And there are these hand-embroidered Ukrainian *rushnyky*, which are symbols of the Ukrainian Autocephalous Orthodox Church. Certainly, especially in the early 1990s, Ukrainian activists and politicians pursued a policy of national autonomy by using the crisis, the tragedy of Chernobyl. It depicted Chernobyl as emblematic of Ukrainian suffering in general at the hands of Muscovite power, of Soviet power. They said this was another way that Ukraine was used and mistreated as a colony; that Ukraine would never be safe under the control of Moscow. Chernobyl therefore justified independence. Since that time, Ukrainian politicians have been handed the problem of what to do with all these victims, and they have backed away from the portrayal of Chernobyl as this great Ukrainian tragedy. But the church has picked it up, and you could see this in the museum itself.

Certainly by the time of the accident, in 1986, the Chernobyl region was a Ukrainian heartland with Ukrainians making up a large majority of the population. Yet this version, this national version of the story, is full of silences. The evacuation of villagers and townspeople from the zone of exclusion in 1986 was just the last in a series of mass evacuations that occurred in the 20th century in this very region. The territory was shaken up by a century of mass displacements, deportations, and genocide. These deportations and population shifts transformed what had been a multiethnic borderland into a Ukrainian heartland.

So I think the silence around this representation of Chernobyl as a particularly Ukrainian tragedy overlooks a great deal. It overlooks the Jewish past of the city of Chernobyl itself. It was a famous shtetl where the Tsadik of Chernobyl held court. It overlooks the Polish past. Polish landowners made up a good majority of the people who lived in Chernobyl. In the area around the region Polish workers and artisans lived, and had lived there for a great many decades and centuries. And there were also a great number of Germans there who had settled in the region as religious dissidents and as entrepreneurs and businesspeople.

So I'm here to tell another story about the longer history of the 20th century that precedes Chernobyl, and in many ways makes the Chernobyl tragedy a requiem for a century of dislocation and destruction in the territory.

First I would like to describe to you what this part of right-bank Ukraine [land to the west of the Dnipro river—Ed.] was like at the beginning of the century, because it had long been a borderland of the Russian Empire. It had also been a borderland of the former Polish-Lithuanian Commonwealth. It was an area within the Pale of Settlement for Jews and was a mixing place of peoples migrating from the multinational empires—the Austro-Hungarian, the Prussian, and, of course, the Russian empires.

In terms of nationality, a majority of the people were illiterate, but they were also often trilingual. Observers who went to the area in the beginning of the century found few standardizations of language. Each village spoke its own local patois, a mixture of Polish, Ukrainian, Russian, Yiddish, or German, depending on the local demography.

Intermarriage was not uncommon among these peoples. Religion, too, also had no definite, discrete borders. I found peasants in my research who turned to the Hasidic *tsadik* [spiritual master—Ed.] for an amulet to cure an ailment. Jews would show up at the sites where the Virgin Mary had appeared and when there was a healing well or healing soil. Because of long distances, Catholics often prayed at Orthodox or Uniate churches. Or people simply formed their own

syncretic religious communities and met at home or met in the forest and borrowed heavily from local Protestant, Catholic, Orthodox, and Jewish dissenting traditions in the area.

In the 1920s, when the Soviet ethnographers started recording such things, they noted what they considered an alarming number of sectarian groups and Catholic rosary circles, which met in private homes rather than in churches. And with no architectural presence, they were very difficult to locate and thus root out. Oral knowledge was very important in this area, more important perhaps than literary knowledge. There is one account of a shtetl, Habno, where a man who was going there in 1924 was saying there was once a local history of this area, but because of all the wars the history text got burned, and so now they just had to ask people who once read it what was in it. So oral knowledge was more important than literary knowledge, and oral knowledge is often something that is in flux. Meanings, identities, and histories in terms of oral knowledge often change rapidly over time, change depending on the perspective of the one telling the story.

Knowledge also was often local. It was rooted to a particular landscape: a bend in the river, a swampy field, a forest haunted with the spirits of dead ancestors and the unclean forces that roam the earth and land, often untethered.

In sum, this borderland was inhabited by people who lived in multiethnic communities with several religious creeds. Locals were often cut off from the outside world for months because of impassable roads, and borrowed heavily from one another for sources of knowledge and belief. Often I find that people of one religion and one nationality group had more in common with their neighbors who were of a different ethnic group or religious group than they had with their co-nationals or co-religionists outside in Warsaw, Kyiv, or Berlin. Remember that in 1924 it took about 24 hours to get from Kyiv to Chernobyl, so we are talking about great distances at the time.

So the first major transformation of this territory came with World War I, which in right-bank Ukraine was a theater of hostilities and suspicions. During World War I, the tsarist army carried out a policy of deportation of aliens and then German subjects and also Jews from this area. Eric Lohr estimates that about a million people were deported from this greater area during this time.

The transformation from the Russian Empire to the Soviet Union also created a new border, a border that came very close to Chernobyl, right through right-bank Ukraine. Because of this, roads that had been conduits to Warsaw and to other parts of the empire now became dead-end streets with gates, border crossings, and border guards. Activities that had before been characterized as trade or visiting relatives now became classified as "smuggling." This became a real problem for the region. It became a dead-end street economically as well. The area was transformed, because most of the Polish landowners and the German businessmen left with the war and the revolution. Those who remained behind tended to be drawn from less literate populations who tended not to identify themselves in terms of "nation" and fixed categories.

The economy suffered very much at the time. In 1924, an observer of the shtetl wrote that there had once been a series of mines there with Catholic laborers or Germans from Polish Austria, but they have all disappeared. By the end of the 19th century only a textile factory remained in Mistechko Zamosti, and only a paper mill remained in the village 12 versts [about 13 kilometers] from Habno. The paper mill soon also closed, but the textile factory flourished for a long time.

In the first half of the 19th century, all the shtetl lived off the factory. Others traded clothes, made commercial trips to Berdychiv, Poltava, and even to Moscow. The factories closed at the beginning of the 1900s, and the shtetl lost its main source of income. People were forced to resort to small handicrafts and trading for survival. Then the memoirist goes on to describe how, during his time in the Soviet period, there was not even really an economy to speak of. Everybody was trading in bags of rye. He describes this very complicated system in which you had to hand five bags of rye over and six bags there and the rye broke out of the bags, and it sounded like it was a mess.

So my point is that this place went the opposite of what you think of in terms of progress in the 20th century. It became an economic backwater, and by the 1920s it was on the geo-

graphic, cultural, and economic margins of the Soviet Union. In 1897, the population was 9,300. By 1926, it had fallen to 9,000 people. The Soviets thought that they would help this place out, and they figured that one way to do it was to try to chart all these ethnic groups and then give to each population the socialist message in national form. So they sent in demographers and ethnographers, and they tried to figure out who was who. It was very difficult for them to do. Most people had no idea what they considered their ethnicity to be. They would ask somebody, and [that person would] say, "I am a *tuteyshy*; I'm a person from here," Or, "I am of the Catholic nationality." But they finally sorted it all out and tried to give people their national programs in their national languages, such as education in the village.

But the problem was that by the 1930s, once these national taxonomies were recorded, they started to generate charts and maps. And the charts and maps showed that some people signed up for the collective farm at lower rates than others. Some people joined the Communist Party at lower rates than others. The people who were most suspicious—probably not surprisingly, given the international scene—were Poles and Germans. So in 1936, in order to secure the border zone, the Soviet government shipped about 100,000 people of Polish and German nationality to Kazakhstan.

Later on, when the Germans occupied this region during World War II, they took these very same records, and they used them to promote their vision of racial hierarchies in occupied Ukraine. They took ethnic Germans and created a special colony called the Hegewald, where Germans were going to live in peace and prosperity. They kicked out all the other local farmers to do that. They took people identified as Ukrainians and sent them to the Ukrainian militia units and Ukrainian SS units, and they took Jews to the edges of villages and towns and shot them into pits, all using these Soviet records. And they were very intent on this, saying, "Did you get the records when you got to the town?"

I argue in my book *A Biography of No Place* that the Final Solution began in occupied Soviet territory in August of 1941, because Soviet records facilitated that in many ways.

After the war it was impossible to be German in Ukraine, and about 350,000 of those classified as Germans fled with the retreating Wehrmacht. The Soviet Union and Poland swapped populations after the war, sending Ukrainians from Poland into the Soviet Union and the remaining Poles from Ukraine into Poland.

I interviewed an ethnographer, an anthropologist of the territory, a woman by the name of Lydia Orel, and she remembered these deportations in the mid- to late '40s very well. It was very interesting. When I interviewed her, she kept confusing these earlier postwar deportations with the evacuations from Chernobyl in 1986. She had them connected in her mind. All of this created a new demography in the region. After 1950 there were no Germans, very few Poles, and only a few Jews, and for the first time, this place became a Ukrainian heartland.

Lydia Orel also described a territory that by the 1960s and 1970s was still suffering from the destruction of this history of deportations—including the Final Solution in World War II. It was still very much an economic and demographic backwater at that time. She described farmers who bought only kerosene and salt at stores in the 1960s and 1970s and subsisted mostly off what they found in the forests and what they grew on their small farms. She described villagers who still prayed to the spirits of the trees and sang songs to the spirit of the sun in the morning. The demographic impact also reflected this marginal quality. The population of Chernobyl in 1971 was all of 10,000. That is only 700 more than in 1897.

So this became part of the justification for placing the Chernobyl nuclear power plant exactly in this area. It was a very sparsely populated region in need of technological assistance and an economic boost. And then the rest, of course, is history.

I think Irene [Zabytko] will tell us more about the tragedy itself, but I would like to end by considering this metaphor of progress. It is perhaps the great irony that in each of these cases I have described in this region, reformers thought they were trying to improve the region, and what then came of the region was mass deportation or a form of genocide. Whether it was clearing the territory of enemy aliens, promoting programs for national minorities, creat-

ing racially purified zones, or producing cheap, clean nuclear power, in each case mass deportation was preceded by a desire to improve and help this very "backward" region. For this reason, we can perhaps consider Chernobyl a requiem to the 20th century. Thank you.

IRENE ZABYTKO: Thank you very much. It is a real honor to be here at the Kennan Institute and the Woodrow Wilson Center. I am not a scholar, and this is kind of a rarity. I am going to talk to you from the perspective of someone who is a creative writer—a fiction writer. I am not a scholar; I am not a scientist, even. Yet Chernobyl does have a very definite effect on me. I am Ukrainian. I have been brought up in the Ukrainian Village area of Chicago; some of you may know where that is located. My first language was Ukrainian, but I do not speak it very well and my mother will tell you that without hesitation.

It is interesting because, as I assimilated over the years and decided I wanted to be a fiction writer, I did not want to write about anything Ukrainian. It was not until I was on a fellowship as an artist-in-residence at the Helene Wurlitzer Foundation in New Mexico, about the time of the fifth anniversary of Chernobyl, that that changed. On NPR of all places I heard this fascinating report of the eyewitness accounts that were recorded about what happened to the real-life evacuees who had to leave Chernobyl. Then I read a newspaper account very soon afterward written by Marta Kolomayets in *The Ukrainian Weekly*. She and a group of women from a humanitarian organization went over to the exclusion zone, where they found a lot of elderly residents who had returned after being evacuated from Chernobyl. And that was interesting to me as a Ukrainian. It was interesting to me anyway as a citizen who is interested in global issues. But as a fiction writer, it touched off a whole different kind of reaction in me. I was thinking, oh, how did they survive that? It is related to what Margaret was saying as an anthropologist. How do people become healed when they have to suffer extraordinary catastrophes? These are usually people who are not very extraordinary. In fact, the people I write about are very simple peasants, as Kate was mentioning in her paper. They believe in pagan spirits. And also, my people in my book are very much into the Orthodox tradition and the Orthodox faith.

So as a fiction writer my concern was well, this is very interesting. There is a great deal of statistical and scientific evidence, etc., about the fallout and the aftereffects of Chernobyl, as we heard throughout this conference, that are very interesting and important. But the creative part of my brain was thinking, what happens to these people after they return? How do you live in a zone like that? How do you survive, especially if you are elderly? It was hard enough to live anywhere in what was the Soviet Union. What do you do when you return to your village? Are you that tied to living in your ancestral home? Or was it because people could not survive anywhere else that they returned to this place?

So I began writing a short story, and I had a main character named Marusia Petrenko. I do not know where she came from. I think she is my mother really, and yet not. Writers do not often know where they get their ideas from, really, when they are in the midst of writing creatively. And what happened was that I was writing a short story. It was pretty much based on Solzhenitsyn's story "Matryona's Home" that he wrote several years before *One Day in the Life of Ivan Denisovich*. I was very much influenced by that because of the peasant connection and everything—not that I have much to do with peasants—but I thought it was interesting. I mean, I am looking at it from the perspective of character development. And what happened was it grew into a novel, because the people started appearing in my book in a sort of supernatural way. I know this sounds crazy to all these scientists in the room today. However, as a creative writer, this is what happens when you are writing fiction. These characters start appearing. They are probably formed from people you know, such as people I grew up with in the Ukrainian Village, like my mother, and people I came across when I taught in Ukraine. I knew these people. They were Ukrainians. They materialized themselves as Ukrainians who lived in a village that I made up called Starylis. I had never visited a Ukrainian village before in that way, especially in the eastern part of Ukraine. So it just sort of happened that the short story emerged and materialized about what happened

to these people who came back after being evacuated. It turned into a novel, which was published in 2000, and there is now a movie deal in the making, which I am very proud of. But I am also doing the documentary based on the real-life inhabitants in the exclusion zone. I wrote the book because it was just something that mattered to me as a writer and something that I also wanted to ask as a writer: how do people survive these extraordinary circumstances in their lives when they are thrust in a situation like that? It is the "what-if" sort of question that creative writers ask when they are writing something like this as a story.

Basically, my book is about a group of people, the Petrenko family. The son works at the Chernobyl plant, and Marusia is the matriarch. She is in her seventies and she worked on a collective farm, and they all live in this village called Starylis, which is in the Chernobyl zone. It is very near the Chernobyl plant. At one point, the nuclear reactor explodes. People in the village do not know what was going on, but Zosia, who is the daughter-in-law, takes the children. They are all evacuated. The son eventually dies, and Zosia takes the children to Moscow. She is a very feisty woman. But Marusia decides to come back to her village, and eventually other women return as well. Before they do, Marusia rings the church bells and keeps her woodstove burning because she cannot believe that nobody will know that she is there.

I was trying to put myself in her mind-set. This was very curious to me. Here it is—we have the Chernobyl nuclear power plant, the height of Soviet progress at the time. Yet here is a woman who is a peasant and is very devout in the Orthodox tradition and believes in the Trinity more than she does the radiation. So that is a kind of juxtaposition between past and present, old and new traditions, ritual and progress, that she and the other characters represent.

I am going to read a little bit from the book, if you do not mind, to give a perspective, to put a real face on the human condition. I think one of the ways we can actually talk about Chernobyl is through literature, through the movies, through something beyond just the nonfiction articles and books and statistics that so many of us are able to find access to.

Anyway, I am going to begin with a very short excerpt from *The Sky Unwashed,* and this is where Marusia does return after about a year of being evacuated to Kyiv. She comes back alone. She lights her woodstove, hoping that someone will see the smoke, and she goes to the village church and rings the bells, hoping that somebody will hear her. And she meets a visitor:

> Marusia's eyes ached constantly and itched. The irritation wearied her so much that one evening she had to slice two pieces of a potato she was about to boil for her dinner and applied them to her swollen eyelids. The poultice ceased her pain somewhat. She found relief in a heavy dark sleep void of urgent dreams and did not awake until dusk.
>
> "Okh," Marusia said, disoriented and surprised to find the potato slices over her eyes. "I have to ring the bells." She grabbed a candle and a match and hurried to the church. On the way she heard crickets in the grass and saw the faint white half moon in the sky.
>
> She climbed the stairs in the church. High in the tower it seemed darker than usual. She lit the candle and waited for the wax to drip on the counter where she would plant the light. She heard a little humming sound and stumbled back on something that felt like a rope. She heard another screech and the rope came alive and whipped itself out of her path. Then she heard a dull thump followed by a low cry that sounded like an old woman's moan.
>
> "What's that?" she yelled.
>
> She peered into the growing darkness. Two cold-lit eyes stared at her from atop a ceiling beam. "Oh, hello *kotyku*," she said. She brought her dripping candle closer to its face. The cat's fur stuck up in spikes as though it had tried to wash the poison out of its coat. It sat there watching her slowing heaving its caved-in chest.
>
> "How long have you been here, *kotyku*? Are you crazy too like the dogs I hear at night and me?" she said. "Well, be careful that the man with the gun, the dog shooter doesn't get you."

The cat meowed but softer than before.

She was afraid to touch it. It hissed its fear, then scampered away down the stairs and out of her sight.

The next morning, she brought along a small bowl of powered powdered milk mixed with water and left it at the foot of the winding stairs. The cat jumped down from its place in the shadows and briefly rubbed against her ankles like an electric shock before it darted straight for the dish. It sniffed the milk for a long time before lapping it up.

"Oh, once you were a pretty one," Marusia said. The cat was matted and filthy. Its front paws were caked with dried blood and both of its ears were torn. "You've been fighting," she told it. "Be careful—there are wild animals out there. Fierce like bears." The cat looked up at her, blinked its filmy eyes and purred.

"You're welcome. Now excuse me, I have to ring the bells," she said, climbing the stairs. She rang them for a long time and was surprised to find the cat waiting for her when she came down from the tower. "Well how nice. But are you deaf? I swear I will be in no time." Her body swayed from dizziness and she had to steady herself against the clammy wall.

The cat followed her inside the church but stopped short of going outside the door. "No? Stay here then. You're such a skinny one. I wish I could feed you so that you can plump up like a pillow." She herself ate only once a day—mostly from her stored supply of dry staples and what was left of the canned vegetables she had preserved in the summers before the accident.

She thought about her limited pantry. She did have jars of apple sauce, green beans, peas and carrots left. And a few more jars of compote she had made of dried apples, pears and apricots. But those supplies will get very low in a matter of weeks. She feared the approaching winter. "Getting cold out there." She hesitated in the doorway.

"Well then, I'll just go back to Chernobyl and demand that they give me some food. Or maybe that *zaraza* dog catcher will be back. But it has been three weeks already…would he let an old woman starve?

"Yes he would!" She turned toward the cat, who meowed its sickly croak at her. "I won't starve. You are invited to share my food. I won't starve! I haven't lived as long to die like that. Don't you worry!" She stood in front of the iconostasis again, bowed low and left for home.

From then on, Marusia brought the cat milk every morning. Sometimes the animal came to her, other times she had to search for it when she found the milk untouched. She was surprised how much she missed it when she didn't see its mangy body curved over the bowl at least once a day.

Her mornings were spent gardening. Her hoe sometimes turned up old potatoes green and withered that she took in gladly. She would wash and boil them carefully. Everything counted.

She liked to hoe in the early morning after she had rung the bells, before the sun beamed its heavy rays on her. She searched and found some old seeds in her kitchen for beets and squash which would survive the light frosts. She sprinkled holy water over the dirt so that the seeds would gain strength and not be poisoned by at the evil lurking in the soil.

One morning she didn't see the cat in the church but found it staring at her in the garden. It looked grayer than in the dark tower, and its fur was slicked back with wet streaks, as though it had groomed itself before coming to visit her. Then it moved, pulling at the neck of a large dead rabbit.

The cat dropped its gift at Marusia's feet.

"What's this? Do you want me to bury that thing or eat it?" She laughed and prodded it with her hoe. It looked healthy enough but who could know.

"I'll make it for you," she said. "You'll be my guest. My first one since I came back home."

She found that the rabbit's skin tore off easily enough, and its flesh was pink. She roasted the legs and boiled a generous portion of potatoes and carrots.

She didn't notice the cat silently following her into the house. It sat on the sink where her granddaughter's cat used to rest, and it stared at the old woman, ready to pounce.

"We're going to die so let's at least eat well and look good in our coffins," she smiled at the cat. "But who will bury me? Will you?" She laughed and felt giddy because of the live presence of the animal.

"Will you drag me into the field and bury me? No I suppose not. Dogs are better at burying. Cats—what good are they? Except that you at least let me talk to you. Oh, and you did bring me this feast." She thought briefly about the dog catcher and hoped that she wouldn't be forced to turn the cat in to him.

For dinner they shared the rabbit. Marusia declared that it tasted as sweet and fine as the ones her father caught for Christmas dinner. "Not one difference," she told the cat who scuttled to a window ledge and licked its bloody paws.

Thank you.

QUESTION AND ANSWER PERIOD

PAXSON: Thank you very much. Actually, I want to jump in with something first that I was thinking about right at the end of your talk, Kate. You said something that really was quite striking. It made me sit here and think about it dumbfounded for a while. Progress is a tragedy, you implied. In this room, in the wideness of this room, there is a lot of conversation that has happened all day long about the need for energy. What are we going to do about these real human beings with real problems? How do they live? How do they get energy?

But you are talking about this really very hard and painful century, and I want to ask you, maybe both of you, to think about this question. Comment a little bit about progress, and what progress is and what it can be. We are where we are and we are in a place. We are not a hundred years ago in the world. We are in a certain place now, and we have needs and demands, but maybe we can reflect on that a little bit to get the conversation on the floor going, because I think there are people on the floor who might be thinking in somewhat different ways about this issue.

BROWN: One enjoys progress in a city like Washington, D.C., or New York, or Berlin or London. But if you live someplace in the margin, what you experience is, more often than not, the wake of progress. You get what lies in the wake of all the things that happen in the big cities, the things that happen in places that are lucky enough to be prosperous. I once saw a list of the top 10 environmental disasters of the last couple of decades, and they all happened in places I never heard of before. They happened in far out territories on the margins of countries, usually on the margins of major countries—some marginal city in Pakistan, for instance, or on the edge of Mexico. And I do not know if that is an accident, but I think it is worth considering. We have not had any major environmental disaster in New York that I know of.

ZABYTKO: What was interesting to me when I was writing the book was the total disregard the Soviet government had for the population. They had progress, yes, in nuclear energy and all these power plants in Chernobyl, and all this stuff. Interestingly, when I visited the Soviet Union back in the 1970s for the first time, they were really big on the word *progress*. They were always saying, "We have the biggest tractor in the world, we have the best electrical stations here," and things like that. This was their idea of progress. But they did not care for their population. They did not care that these people were dying from radiation immediately after the explosion. They would hide the truth from them as they would hide the truth in other ways. So it is a relative term. It is sort of a spin, this progress.

I was trying to bring that out in writing the book, how very little the people mattered to the government. That was just the norm. *Peasant* is not a derogatory term at all. Actually, I would have been proud to be in Marusia's place instead of [that of] the progressive people at the plant who

were making these decisions. This is a woman who was trying to just live her life with nature as much as she could. She worked on a collective farm, and basically this plant was in her backyard and it blew up. They did not protect her then, and they did not protect her after she was evacuated, either. This is based on a true story.

PAXSON: Now that you are beginning a documentary, can you talk a little bit about the conversations, the kind of conversations that you've had with survivors of Chernobyl?

ZABYTKO: I have not interviewed any. This is the point of going to do the documentary. People ask me how much research I did. Well, I did not do any research, really, in the conventional way, except to read newspaper accounts and hear whatever I could on the radio and the news, and that is about it. I took an extraordinary situation, Chernobyl. This could have been about the Holocaust. This could have been about the tsunami in Indonesia. This could have been about Hurricane Katrina. I took this extraordinary situation, and because I had a personal attachment—being Ukrainian, that part of the world, which I find very interesting anyway, and I do have a personal bond—the story just came through.

The whole point is to make a particular instance into some sort of universal transcendence, and trying to teach people. I do not know what I was trying to teach, actually. That was not my agenda; I do not have an agenda when I write a story. But some sort of moral truth or some moral question is raised in the process.

BROWN: I went a couple of years ago to the zone of evacuation and talked to people who were still living there. I found it remarkable that there was not much self-pity to be found there. It was just, "We have always lived here, we still live here, and we only eat things that come from the transports. We never eat anything locally anymore." And in the next breath, I'm being offered a dried little fish.

I said, "Did you get this out here?"

"Yeah, yeah, but these are clean fish."

There was this sort of remarkable staying power that I found extraordinary. From what I understand, there are more people coming back now. Perhaps from what I understand of Mary Mycio's work, the people who were evacuated were put in what we would recognize very well in America, these single-family dwellings, all gridded out in straight lines on this field. They just plopped them into these homes. Those older people are dying at faster rates than the people who remained in their homes within the zone. They had trouble handling the stress. The stress of the transition was somehow worse than the stress from radiation. So I found that sort of an interesting comparison.

QUESTION: I have a long-time interest in Russia, but I am with the Eisenhower Memorial Commission. I am fascinated by this session and the way in which numbers fail to communicate with regard to the human condition. I was thinking as we dealt with the numbers this morning—the experts in numbers, truths, and progress—it is all wrapped together, from my understanding of history, how poorly those numbers communicate the reality of what we experience to our larger population, which in a democratic society has to be very important to us. I think if I were just wearing my hat as a citizen, I would be very suspicious of the numbers I heard today in terms of their ability to communicate the reality of these very large events that we are talking about. So I think this panel is very important in a way that I am not articulating very well. It is somehow linked to the rest of our fellow citizens as we all try to participate in making these decisions, whether about nuclear energy or what have you. So I think I would like to compliment the panel organizers for sort of facing these issues, because I find you both very eloquent but leaving me—contrary to what you just heard—speechless almost. Numbers do not do it.

QUESTION: This question is for Dr. Brown. I am not a Russia specialist, but from what I have read about the geography of the marshes region, it makes it very difficult to move large military forces quickly. As a result, the main German and Soviet movements tended to avoid that region. Now obviously that did not prevent the working of the Holocaust and some of the other things that you described. But I am interested whether in your book you get into the influence of the geog-

raphy of that region on what happened in World War I and World War II?

BROWN: No, not really. I came across documents where the Germans would say, "We hold that territory in name alone." By late 1942, 1943, no German officer or soldier could go in there without getting picked off by the partisans. That is why the partisans chose to use that as their base of operations, because it was so hard to get through and you needed to have all this local knowledge to work it.

QUESTION: I read that the Germans used the Prypiat marshes area to test the V-1 rocket prototypes, and the Polish resistance in the area actually retrieved one of these, collected intelligence on it, and sent it to the Home Army people. It was communicated to the [Polish] government-in-exile in London.

BROWN: Amazing. I did not know that.

QUESTION: I am not sure where this comment is going to go but it strikes me as very interesting. We have a creative writer, an anthropologist, and a historian on this panel, all of whom approach the epic story of Chernobyl through individual lives and in some cases tell the story through very particular individual lives. The old woman who moved back, the woman in the far north of Russia who is talking about her family—the image that all three of you capture is very different in one particular way from the image that came up earlier in the day about the psychological effects of Chernobyl.

One of the strong images that came up this morning had to do with the Chernobyl syndrome—the idea that we are Chernobyl victims, not Chernobyl survivors. But all three of you talk about individuals who in some ways are Chernobyl survivors, not Chernobyl victims.

Maggie, your woman said, "My husband, my boys, do not hide behind anyone else." Is this a peculiarity? One question you always get is about the extent to which this is a peculiarity of an anthropologist going into the field, or a creative writer sitting at a typewriter and having a character come to mind. Is there something more systematic going on here about what it takes to be a survivor of Chernobyl rather than a victim? And if so, what do you think those characteristics are?

ZABYTKO: Well, a crucial matter when I wrote the book in the early 1990s was that the characters, especially Marusia—the main character, the old woman—are not based on any one person. She is really based on a conglomeration of personalities, and all I came up with when I was writing her as a character was that she was a very strong woman. And this is what I have experienced in my own life with the women in my life, my mother and my grandmother, but also going to what was the Soviet Union, seeing the women in action. It was just something that left an incredible impression on me. I did not think, "She is a survivor, I am going to write this story of her as a survivor." It just turned out that way because of the circumstances she was forced to face in the plot, in the story. So she just naturally evolved into that.

It is like Flannery O'Connor, the American fiction writer, said that you have to know your people, and somehow I just know my people. This is how this woman would act. She is strong enough to come back to her village after it has been irradiated. My goodness. She is not going to starve. She is just going to survive. That is just how the story is. This is how these people are. I never once thought of them as victims, curiously enough. It is interesting you brought that up.

PAXSON: That is a really interesting question. For me, as an anthropologist, this has to do with agency. When you look up close at people's lives, and you listen to them for a really, really long time, they seem like whole, fully fleshed-out people because that is what they are. Fully fleshed-out human beings have wills, they have agency, and they have the ability to make decisions in their lives. I feel that fairly strongly. It is not everyone that likes to think about that first. But this is a political issue. This can become a political issue in a lot of our fields. To what extent are human actors *actors*, and to what extent are they acted upon? And I think that both of these sides of the equation are really important. These are people who are actors. There are plenty of people who will come back into their villages, and into their lives, and figure

out how do they wrestle with the catastrophes and the joys that they have in front of them, on the one hand, and with the terrible, terrible things that happen to them that they have no control over, on the other. I think the question of agency is really sort of at the heart of a lot of what has come up today. Because we also have to be able to say, this is a terrible thing that happened to these people, and we as a human society owe them some measure of help and healing, on the one hand, and on the other hand, we cannot think of these people as simply expressionless specks in the wind. They are human beings, and they have the ability to have creative, imaginative lives as well. So is it something specific to Ukrainian or Belarusian or Russian villagers? I would not go that far, but I would think that when you slow down and you pay attention and you listen to people's lives, the picture that emerges is much, much more complex and much more subtle. Then I think we get a much better sense of what the role of agency can be.

QUESTION: Your comment about technology before set me to recall a talk I listened to last June by a specialist in the ethnology or cultural anthropology of the Chernobyl region. He is a fellow from Rhode Island, Roger Williams University, a fellow by the name of Myron Stachiw. He was a Fulbright fellow, and he went there to study this, and to work with the anthropologists, trying to preserve the cultural heritage of this region. One of the observations he made was that even with all the technology of the 20th century, it still does not make a heck of a lot of difference for these people. They have now gone back to the 19th century or even earlier with their farm implements, for instance. All of the collective-farm equipment is rusted out; it is not maintained. The common buildings are all destroyed. These people have nothing to turn to, so they have gone back to their very folk methods of reaping and winnowing and sewing and gathering of honey, for instance. He says it is a tremendously primitive society at this point. Except for the transports that bring in food, these people actually do their own farming in their own very primitive ways, and they have relearned how to manufacture their own equipment, including their plows. I do not even know half of the terminology for all these instruments. But it is an interesting thing because it has gone through a whole cycle of development and destruction, and now they are going back to the much earlier stage of development. That is just a comment. It just struck me when you mentioned it.

BROWN: I do not know how developed it really was in terms of agriculture. It is not the type of place where you can bring a big combine. There are some fields, but it is very swampy. It is absolutely gorgeous. There are streams, swamps, and marshland, and when you have a little bit of land you farm it, but there is not that much that a tractor can plow through. I remember visiting this cemetery, and in cemeteries people leave things at the graves. The crosses themselves from the 1960s and 1970s were all handmade of wood, and the baskets—they were all handwoven baskets. And there was even a *bort*, which was this honey hive that was just carved out of a log. It was still hanging up there. It had been bolted by a big metal screw, but other than that, it could have been the 18th century.

ZABYTKO: And I can just add that I think this return to what we would call more primitive technology first of all happened throughout the Soviet period, and second of all once the Soviet Union collapsed and the *kolhospy* [collective farms—Ed.] collapsed, and so this was what was left with or without tragedies like Chernobyl.

QUESTION: When you interviewed people in the affected region, did you get the feeling that Chernobyl was just another string of events that happened to people? Do they feel like it is just an event they have to overcome like their parents did—that they did not have any trust in government?

BROWN: I was not interviewing people about Chernobyl because the book I wrote when I was doing most of these interviews ended in the 1950s. But it did not come up when I was in some of these villages, not so close to Chernobyl, but farther south around Zhytomyr. I would ask older women, what about the Famine and what about collectivization?

Often what came up was the Holocaust. "Oh, we were rich in Jews in our village, and they came and took our Jews."

And, "Well, let me show you the graves."

I saw many graves outside many villages, not because I asked.

But a little bit farther south, Chernobyl did not come up that much.

QUESTION: I have a question that tries to bring together some of the different themes that have come up in the morning sessions and in the afternoon sessions, and that is of betrayal. A lot of the discussions this morning focused on Chernobyl as a betrayal of trust in government, of the promise to protect people, to warn them of harm or to help them recover from the pains and hardships inflicted by mistakes of governments or engineers or states.

And yet here there is a paradox in that the people who seem to be closest to that tragedy—the people who are living in the zone of alienation—in a way seem to be the least affected by the sense of betrayal, at least in the part that you spoke to. They go on with their lives. They kind of cope with the needs of subsistence farming. They offer fish to people who visit. And yet, if you look at the people outside of that area, the betrayal is really visceral to a lot of them, to those who are directly affected and ill, to those who were evacuated, to those who fear becoming victims and who are not clear if their health problems are related to Chernobyl or not, to those who found a voice in opposing the closed nature of the system—the people like Alla Yaroshinskaya, the people she represented. It even extends to the international community that was trying to understand what happened. All of those people saw this as a betrayal.

Given your intuition for what is happening in that area and the research that you have done, all three of you, I am interested in whether or not you see any potential to overcome that feeling of betrayal, if the sources of overcoming that feeling lie in the experiences themselves?

ZABYTKO: This is interesting because my characters feel very much betrayed by what happened to them, but the need to return to their ancestral home overrides that, and they still demand things from the government. They want their pensions, they want their cow. They think they should still be taken care of in the old way, especially because of Chernobyl. Now that is intuitive and that is just my characters, so I do not know.

BROWN: I do not have any prescriptions for the future as a historian. I am outside of my territory when we look forward. Chernobyl also coincided with perestroika and the bid for autonomy and independence. There is a tradition in that the founding moments for many central European nations are moments of great tragedy or loss: Mohács for the Hungarians, and Kosovo for the Serbians, and May 3rd for the Poles. Poles have a whole string of defeats. And "that is the reason we should have our nations, because we have been so martyred and we have suffered so greatly." So with that tradition, it is going to be hard to get over victimization and that sense of betrayal if you continue to justify your existence based on that kind of narrative.

PAXSON: Your question makes me think about what betrayal at that level is, and there are lots of different kinds of betrayal. This is the kind of betrayal where people as communities and as individuals blame something way up outside of themselves like a state. How does that work? That is complicated. I am thinking in my head about this woman who has her two sons in the Caucasus as soldiers and a husband who, years earlier, was sweeping off the roof in Chernobyl. Why did she end that interview by saying, "My husband and sons—they do not hide behind other people's backs"?

Now on the one hand, she has provided her men and her family to the state and she continues to do so, and that is trust at one level. She did not go running off anywhere. Nobody ran away. So there is a level of trust there still. But there is another level—and I have been grappling with this over the years—of trying to figure out how in rural Russia you have this relationship with the state. On the one hand, the state is granted a great deal of trust. On the other hand, people direct a different message to the state: "Leave us alone, and we can do this without you, and we will be what we can be in our space, on our own land, in our own parcel."

I do not know what will happen in terms of trust or betrayal, as events like these continue, but I do not think it can be good for the enterprise of creating trust for events like this to accumulate in the way that they have.

QUESTION: My question has to do with politics and inclusivity. I think one of the interesting things that the historical perspective brings out is the enduring power of the village and what is "ours" specifically as opposed to what is involved with the state. I was wondering if we can make any sort of historical judgments based on the reactions of people to the Chernobyl incident, to the experience with the Soviet ideal of progress, and maybe even to the sort of Ukrainian ideal of progress that has been the official stance since independence. I think each of the successive changes in regime had its own vision of progress, but there was a tendency to be sort of exclusionary in decision making, and no one necessarily thought to involve people at the village level. I am interested in post-totalitarianism. What kind of implications does Chernobyl offer to us, given that there is this long history of regimes that believed themselves to be progressive?

BROWN: I think you are right. In each case, the people who came in with ideas to improve the place had ideas that were very prescriptive: "This is what you should do. You are a peasant, you are dumb, dark, and we will tell you what to do."

Or "You are a Slav and you are dumb," or "You are a Jew"—whatever it was.

I do not see a major movement to change that in some ways.

[…] I think there are great fears about nuclear power, but more nuclear power plants are going up. It would be great to have that kind of conversation, and maybe that relates to this question about betrayal and victimization: "How are we going to take control of the situation and take charge, rather than have these things happen to us and be victims of them?"

PAXSON: I think Kate's last comment is a good one to have resonate in our minds as we think about moving forward.

Film Screening: The Camera's Perspective

Screening and discussion of Oscar-winning documentary *Chernobyl Heart*

Chair, **Margaret Paxson,** Senior Associate, Kennan Institute, Woodrow Wilson International Center for Scholars

William Novick, pediatric cardiac surgeon; Founder and Medical Director, International Children's Heart Foundation

---

MARGARET PAXSON: This is a moment now when we can illuminate the ideas that came up today with images of human beings who have lived through this tragedy. I am not going to introduce the movie at any length. We have heard about it several times today. It is called *Chernobyl Heart*. It is a Downtown TV Documentaries production. The director and producer is Maryann De Leo, and the production coordinator is Angie Kenny. We have here today Dr. William Novick. I will be introducing him after the film. He is prominently featured in the film. So with no further ado, *Chernobyl Heart*.

FILM SCREENING

PAXSON: Dr. William Novick is a professor of surgery and pediatrics at the University of Tennessee Health Science Center (UTHSC) in Memphis. Dr. Novick came to UTHSC in September 1993 and became the Endowed Professor of the Paul Nemir Jr. Chair of International Child Health in October 1999. Dr. Novick is founder and medical director of the International Children's Heart Foundation, a nonprofit organization whose primary focus is on improving the care of children in developing countries. To date, the foundation has operated on over 2,400 children with congenital heart defects in 19 different countries. In 2002, Dr. Novick was presented the Red Star of Croatia by President Stipe Mesić for his humanitarian service to the children of Croatia. In 2004, Dr. Novick was awarded the Franskaya Scorina Humanitarian Presidential Medal for his dedication to the health and wellbeing of Belarusian children with congenital heart defects. Born, raised, and educated in Alabama, Dr. Novick did his undergraduate work at Troy State University and graduate work in biochemistry and medicine at the University of Alabama at Birmingham. He received his training in general surgery at the Graduate Hospital of the University of Pennsylvania and cardiac training at the University of Alabama at Birmingham. He is board certified in general and thoracic surgery and is a member of many professional organizations.

Thank you so much for joining us today and for being willing to answer some questions. I know this is quite a stunning and powerful movie, and we might all be as speechless as I feel right now, but perhaps there are some questions that Dr. Novick could answer.

WILLIAM NOVICK: Let me just bring you up to date on the situation in Belarus for children with heart disease, so that you have a little bit of an idea of where we have gone since this film was produced. The foundation started in Belarus in December of 1996. The film was made on our trip of October 2002. Our program was discontinued for political reasons in 1998, and we were asked to return late in 1999. We were finally able to put a trip back together in 2001.

This hospital that you saw us operating in was a children's hospital of Minsk, the number one children's surgical center for the city and oblast of Minsk. It was funded entirely by the city of Minsk and received no federal funding from the national level.

At the reinstitution of our program in 2001, we had the opportunity to write a white paper about the issues of the children in Belarus with congenital heart disease, which was received by the Ministry of Health, and over the ensuing two years we spent a great deal of time discussing the issues for children with heart disease in

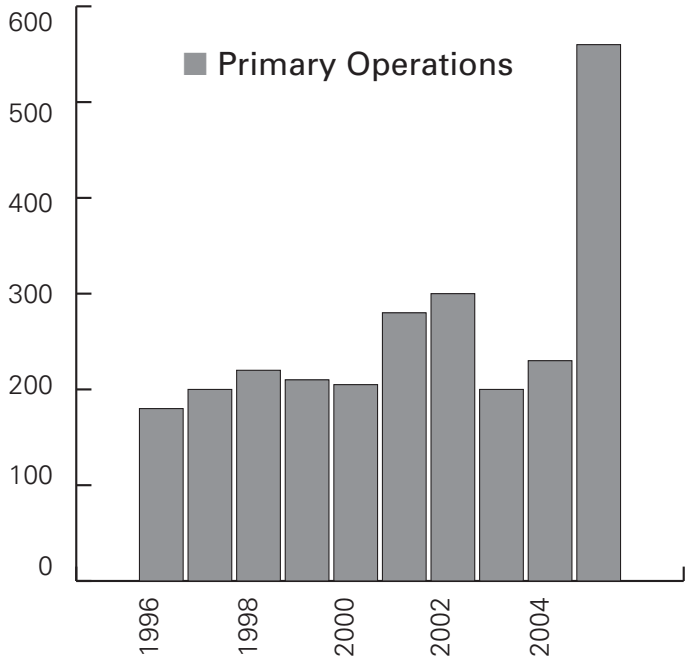
Belarus with presidential advisers as well as the Ministry of Health.

In early 2003, the president finally came forward and created a list of the major health care issues for the children of Belarus. At the top of the list was congenital heart disease. Second on the list—as you saw, a number of these children have severe neurological and physical deficits, so neurological disease was second on the list.

In early 2004, construction started on a new $24 million congenital heart center in Minsk attached to the first children's hospital, the idea being that this new center would become a republic hospital; that is, it would be funded strictly through the federal government rather than through the city of Minsk. I had the good fortune of attending the opening of this hospital the day after the presidential medal was presented to me, on December 30, 2004.

Prior to the opening of this hospital, approximately 150 children received surgery on a yearly basis at that particular institution and 150 others at an institution across town. With the combination of these two institutions into the new National Children's Cardiac Center, we hope to be able to increase the caseload for the children of that country. In the first 12 months, they operated on over 700 children with heart disease, which is an all-time high and double any previous number of children who received such operations over a comparable time period.

Development of Pediatric Cardiac Services in Minsk, Belarus



We continue to go twice a year. As a matter of fact, I just flew in from Minsk on Sunday, where I assisted them not only in operating on complicated cases but training and educating the nurses, physicians, and technicians on a regular basis.

We have done the same in Ukraine, at what used to be known as the Kyiv Institute of Cardiovascular Surgery, and is now known as the Amosov Institute of Cardiovascular Surgery. Unfortunately, the Ukrainian government has neither seen fit nor had the funds to build a center equivalent to the one in Minsk, which, quite frankly, is probably better equipped than the Washington National Children's Medical Center.

So as difficult as this film is to watch from the point of view strictly of children with heart disease, things have become very much better.

QUESTION AND ANSWER PERIOD

QUESTION: I used to work in Ukraine. Thank you, I think, on behalf of all of us. We are so very moved by the generosity of you and your professional colleagues. We understand that the Chernobyl accident occurred 20 years ago. Are these problems likely to continue for children? I gather these problems arise from the Chernobyl accident?

NOVICK: Let me try to answer the latter part of your question first. Congenital heart disease is seen all over the world. Ukraine and Belarus are nothing special with regard to the total number of children who are born with congenital heart disease. Approximately one percent of all live births, regardless of where you are in the world, are children who will have heart disease. So that is 1 per 100.

Now the issue in Belarus and in Ukraine—I have not traveled to western Russia, so I will not speak to that area—is whether or not the radiation induced changes in the parents' genetic material that resulted in a change in the percentage of defects of a specific type. Now let me try and explain that. There have been multiple epidemiologic studies around the world on what

types of heart disease occur in children at birth, and it is fairly well studied and fairly well proven that there are specific percentages of each different type of heart defect, regardless of where you are in the world. Yes, there are some defects that are more pronounced in certain areas of the world, but those have been well classified.

What we have found, unfortunately, is that there are two particular defects— which seem to have risen to extremely high levels for rare defects—that are now occurring at very high rates within the children who are being born with heart disease in both these countries. One of these defects is called Ebstein's anomaly, which is generally only seen in about half a percent of all children born with heart disease. Normally, in a country the size of Ukraine, you would see three or four of those children per year. What we have seen is that that number has tripled.

The other defect, the Chernobyl heart, which is the multiple holes in the heart, is seen even less frequently than the Ebstein's anomaly, and we are seeing as many as 8 to 10 of those children per year.

So has it caused an increase in the number of congenital heart defects in the general population? No. Has it changed the distribution to more complicated defects? We think that there is enough soft information to have a look at this in a serious epidemiologic way.

QUESTION: It is interesting that you say that it is one percent in Ukraine and Belarus, and one percent around the world—with congenital heart defects, the percentage has not changed. As I was watching this, I was looking for that link with radiation, and I did not quite see it directly in the film. It occurred to me that this is more of a condition of general social public-health problems in this part of the world. Is that part of what you are addressing when you go there?

NOVICK: Yes. I think that in the film you notice it is said that congenital defects had increased by 250 percent, and that is an overall statement that includes not only cardiac defects but also musculoskeletal, neurological, immunologic, etc. I do not believe that the care of children with heart disease, and the associated problems for those children, has been the direct result of Chernobyl, by and large. I think it has been, as we have discussed all day, a combination of factors. Chernobyl occurred at the time of the dissolution of the former Soviet Union, and the complete loss of support for many of the republics.

Unfortunately, the mind-set throughout Belarus and throughout much of Ukraine is that these children are being born [with cardiac defects] as a direct result of the radiation. I have to say that I agree and do not agree with that statement. We have not seen the overall incidence of congenital heart disease increase substantially. What we have seen is that more-complex defects are occurring more frequently. It is a general public health problem. Yes.

QUESTION: Thank you very much for your very important work. I have two serious comments. As a specialist, and as a sociologist who studies this problem, I have read the report of the IAEA partly presented by Mr. Louvat today. I can never agree with the point of this report. Supposedly, we must forget Chernobyl because the result of Chernobyl is only the 4,000 victims. But I will never forget my visit, and I am absolutely sure that all who see this film will never forget, and never agree with the IAEA report.

The second point is that I am very upset, I am worried, and maybe I will be happy if I am not right, but I think that the time of a new wave of nuclear energy is starting. If the first wave started in Europe, particularly in France in the 1970s, now we can observe a shift to Asia, and we can observe the very fast growth of the nuclear industry in China and India. The development of nuclear programs in Iran and North Korea is a very dangerous tendency. And as a specialist, I can observe the very dangerous tendency of the development of nuclear programs in Russia in the territory of the city of Orsk, which is situated in the Urals. Chernobyl now is concentrated. Its nuclear waste, its uranium and plutonium and many other problems, are there. The Russian government is planning to create new nuclear spots in the territory of Russia. We have many problems around the world now concerning nuclear programs. That is why your work and your film are very impor-

tant for all of us and for many people. Thank you very much again.

NOVICK: You are welcome. I am about as specialized a physician as you can become, and the principal point of our work—regardless of whether it is in Belarus, Ukraine, or any of the other multiple countries that we travel to—is to provide these children with an opportunity toward a life that they may not [otherwise] have because of the absence of adequate education, training, and experience [on the part] of the local physicians.

Now, the involvement that our group has had as a direct result of the work in the areas where Chernobyl occurred has moved us—or myself in particular—into this discussion of nuclear disasters. I had the unique opportunity two years ago at the United Nations to speak before a group at the General Assembly when this film was shown, which was the year that it won the Academy Award. And I do not think that my feelings have changed very much with regard to how we treat our Earth, how we treat our people, and where we are headed. And I have many of the same concerns that you do. We were given one Earth. We all need to get together, and we all need to determine are we going to survive here or are we not. It is really simpler than our governments and our leaders would like for us to believe. Unfortunately, governments and religions can make life extremely difficult for all of us. When you break it down for me to the level of a child whose life is dependent upon someone's intervention, then I do not think it matters whether they are Russian or Sudanese or North Korean. I do not think it matters whether they are Muslim or Orthodox or Catholic or pagan. I think that is what we all need to remember: what complicates our life are the laws and the rules that we artificially put in front of just being people. So we will keep doing what we are doing all over the world: trying to make a difference, and help children, and help physicians and nurses become educated so that they can care for their own. We will have to deal with issues like nuclear catastrophes.

It has been 20 years. I do not think the world should forget. There is a very old saying that perhaps we should all remember when we depart today, and that is that those of us who forget the past are doomed to repeat those mistakes in the future. I think that statement sort of sums up what we should do about Chernobyl. I do not think we can ever forget it. It is an ongoing, unnatural experiment that has been placed on these people, and we need to do something serious to correct this problem.

PAXSON: I do not believe that there is a way to summarize this better, and I am really grateful for what you just said.

QUESTION: Someone had mentioned that there was a need for continuity in data and studies, and you are in a unique position. You have been there and you are going to continue. I was just curious whether your organization is gathering information, and, if so, was any of it provided to the Forum report or the UN?

NOVICK: As a scientist—and I think of myself not only as a physician, but also as a scientist because of my previous training—we have all been trained to be observant, to observe changes that occur or abnormalities, and to document those things. I would have to say that I was a little remiss in my duties. We do keep data on all these children. We have a huge database of kids all over the world. But we had a very unique thing happen to us recently. In 1994, we went into Ukraine for the first time. We were asked specifically to come in and help with two serious problems that they were having. One was this thing called Ebstein's anomaly, where they had a very high mortality rate for children they were operating on. The other was this Chernobyl heart—multiple holes in the heart, where children were declared inoperable. Those were the two issues they really wanted us to help them with. So we taught them a new technique for this Ebstein's problem, and we invented a new operation for this Chernobyl heart problem. And over the years, Ukrainians, who are without a doubt some of the most ingenious people I have ever dealt with (my grandmother is Ukrainian, so I could probably say that safely), learned very well how to deal with this Ebstein's anomaly. So after about five years, we really did not need to help them on a routine basis anymore, but we stayed in contact through research and through other mutual projects that we had.

Last year, I was asked to participate in the gathering of all the data from the Amosov Institute of Cardiovascular Surgery for those patients with Ebstein's anomaly since the inception of its hospital. This is 40 years. We have 1965 as our start date, and we stopped collecting data on the patients in February of 2005 to collate and analyze the data.

Now, what we found is that pre-Chernobyl there were about three and a half patients per year receiving operations for Ebstein's. Post-Chernobyl, that number went to nine. Now that does not sound like a lot, but it is a 160 percent increase in the total number of patients receiving operations on a yearly basis.

Our intervention did not occur until 1994. If you look at the number of patients referred on a yearly basis for surgery, that number went up in 1987, and it skyrocketed. It went straight from 3 cases a year to 14.

Now we have gone back and looked at this a little bit, because this was an unusual finding. We were only looking to see whether or not we improved the situation, how the patients were doing, and so forth. We did not look at this from the point of view of what happened with Chernobyl. This fell into our laps. So we thought, OK, maybe it is because our intervention resulted in more referrals. Well, no. The number went up before we came. Then we thought, OK, if that is not it, then perhaps it was secondary to the fact that the cardiologists were holding back patients and they referred them later. And we looked at that, and it turned out that the patients operated on after Chernobyl were younger by a significant difference compared to the patients operated on before Chernobyl.

So tomorrow at the U.S. congressional briefings, I am going to present this data to them and suggest that perhaps this idea that there are not ongoing problems is not exactly right, at least in the area of congenital heart disease, and suggest perhaps that they should look at the possibility of doing a serious epidemiologic study in both Ukraine and Belarus on children with congenital heart disease. If this casual observation has found this issue, then what would real, strenuous scientific observation reveal?

QUESTION: Are your tissue samples from these operations, like the cells around the hole, being sent anyplace for genetic studies?

NOVICK: No. I am walking around holding this report because I wanted to make a point. Through the course of the day there has been discourse back and forth about what really happened there. I think all of you are more or less familiar with this subsequent report, and I would like to sort of put the following argument forward.

In 1986 in the former Soviet Union, the scientific collection of epidemiologic studies and subsequent publication were almost nonexistent. There were demographics on patients, yes. But strenuous science, not really.

There was a study produced by the Ukrainian Academy of Medical Sciences in 1998 that showed that there was a significant increase in the number of children being born with congenital defects in general from the time period 1987 through 1997. Within that, there were several children studied who were the offspring of liquidators, and what they found was that a number of those children—a very significant number above control population—had breakage in their genetic material, in their DNA. That report is actually available online in English now. I think that the Greenpeace side, if you will, of this is that a certain amount of material has not been collected, has not been validated, has not been looked at seriously. And I would make the same argument, that it is very difficult to look back at this. The way we intend to do it is to pick a very specific population of patients and to analyze their DNA for breakage.

QUESTION: As you know, in the case of thyroid cancers, specifically the papillary thyroid cancers, [these cancers] have been tied to not just chromosome breakage, but to specific breaks at specific points with translocations and deletions. We all know that out of those papillary thyroid cancers, some will have a genetic basis, some will not. The same thing is true of breast cancer. What chromosome region had been implicated, if at all? And if not, are there any plans to do such genetic studies around the cells around the hole?

NOVICK: I do not have all the data from that study from the Ukrainian Academy of Medical Sciences. The data was only recently passed to me by a member of the academy, who also happens to be a pediatric heart surgeon in Kyiv. It is our plan to review this data completely to determine whether or not any of that has been done. I guess the point that I would like to make is a little bit of the following with regard to comparing thyroid cancer in children to congenital heart disease. The issue with thyroid cancer, I think, is that the very significant bump in the number of cases was apparent to everybody throughout the health care system in Ukraine and in Belarus.

With regard to congenital heart disease, since there was not such a large bump in the total number of cases, then there was no perception that there was an issue with congenital heart disease. So nobody really looked at that group of children closely. Retrospective data is nonexistent, certainly in Belarus. The Belarusian Ministry of Health is interested in looking at this, but only on a defect-specific basis. And so we focused on those children who have Ebstein's anomaly.

QUESTION: Are you able to look at parallel studies of miscarriages and stillbirths to see if there is a rise in defects in children who do not survive, who are not viable, or who are not born, basically?

NOVICK: I would suppose that if the Belarusian government were to allow that, we would be able to do that. The scope of this study is going to be extremely limited. I think that we would have significantly more success with the Ukrainian government. We have very good relations with President Lukashenko, but when you start shaking the Chernobyl dust in Minsk, relations start to become frayed. So we will take what little bit of positive reaction we have and run with that.

QUESTION: Here is a question that has been hanging in my mind the whole day, and, in a way, it is beyond your expertise, but perhaps you can shed some light on this. It is a question of how do we end up with projections as wildly different as 4,000 and 200,000? The question really becomes, are there differences in motivation, are there differences in winners and losers, is it a search for the truth? How does this happen? That seems to me to be a fundamental question that has not been answered today. Because if we take at face value that everybody is trying to do their best to figure out what the legacy of Chernobyl is, it seems like the best does not get us to where we need to be because everybody's best is leading in a different direction. So what is your sense of what the story is behind this difference?

NOVICK: You know, that is really a politically hot-potato question you have asked. I am sure you know that. There was a slide put up earlier in the day, a statement made by Kofi Annan that the legacy of Chernobyl should not be forgotten—the disaster in and of itself, not only at the human level but on an environmental level, should never be forgotten. That statement was made by Secretary General Annan I think in 2000, and yet we find that six years later the UN has issued a statement saying that Chernobyl was not nearly as bad as we all thought it was. I think there are a number of issues that are causing these gross disparities to be published. We very much have a serious issue in the world right now with where our energy is going to come from. There are a number of countries that are pushing nuclear energy very hard, and it is the job of the International Atomic Energy Agency to make sure that it is safe and that we use it all around the world.

I do not think there is one single answer to your question. The Belarusian government specifically would like to reduce the cost that it has in its payouts to those individuals who live in the contaminated region. We were in Minsk in 2002 when President Lukashenko made a tour of the country and changed all, literally all, of the zones and reduced payments, as you saw, to a number of these parents. There are financial issues. I think there are pride issues. I think there are issues of ego that we all have to deal with. And then I think there are agenda issues. It is on the agenda of Greenpeace, if you will, to make any natural environmental disasters sound as bad as they can possibly be. It is on the agenda of the International Atomic Energy Agency to make nuclear power look as safe as it can possibly be. I do not think the truth will ever be known, and

I think that the statement earlier in the day that we have these two very disparate reports and nothing in the middle is an absolutely true statement. And the middle road is the road that we need to find.

The film obviously is extremely disturbing, and it was designed that way. I know Maryann DeLeo very well and have come to know her very well over the years. They wanted a specific story told. They wanted the worst possible story told.

Everyone has their agenda, and the data keeping and the secrecy that existed in the USSR at the time of this accident compound the problem that gives us this great disparity. If the data had been collected right, if the recording instruments had been available, if, if, if, if, if.... Unfortunately either it was not or they were not available. And so we are all left to guess.

As you know, your sister organization [the Harriman Institute at Columbia University] had this similar meeting yesterday in New York, and one of the points that was brought up in New York yesterday by an expert in thyroid cancer who is Ukrainian and who emigrated to the United States about 20 years ago, and is now a professor there at one of the universities in New York, is look, we do not really know how bad the thyroid cancer issue is because of the number of people who are emigrating out of the country. What they noticed in New York is that the incidence of thyroid cancer has gone up over the last five years. And when they looked back at how the population had changed, they found out that 50 percent of the immigrants into the New York area over the last five years were from these regions.

So the numbers that we are hearing coming out of Ukraine and Belarus are falsely low, because their population has now moved to the United States, and they are coming up over here as American thyroid cancers. So the dispersal of people is also, I think, complicating the ability of all of us to gather accurate statistics. Unfortunately, I think that coupled with all of the other things that we have mentioned during the course of the day, the inability to provide accurate data is what is giving us these totally disparate reports. We have the worst-case scenario by Greenpeace. We have the best-case scenario—it really did not happen and nobody is being irradiated—by the others.

I know that is not an answer to your question, but over the last four or five years that we have become involved in this, we have seen people in different countries act completely differently on the issue of Chernobyl. Even the same individuals have acted differently at different political times within their country. There was absolutely no discussion of Chernobyl. They all knew that I was coming to all of these talks and that I would be at the congressional briefings. And the only person who was interested in discussing any of this with me and providing me with any information was a member of the Ukrainian Academy of Medical Sciences, and I think the only reason is that he and I have been personal friends for 15 years.

QUESTION: Where are your tissue samples deposited after your operations, and did you have to negotiate any kind of agreement as to ownership of the samples?

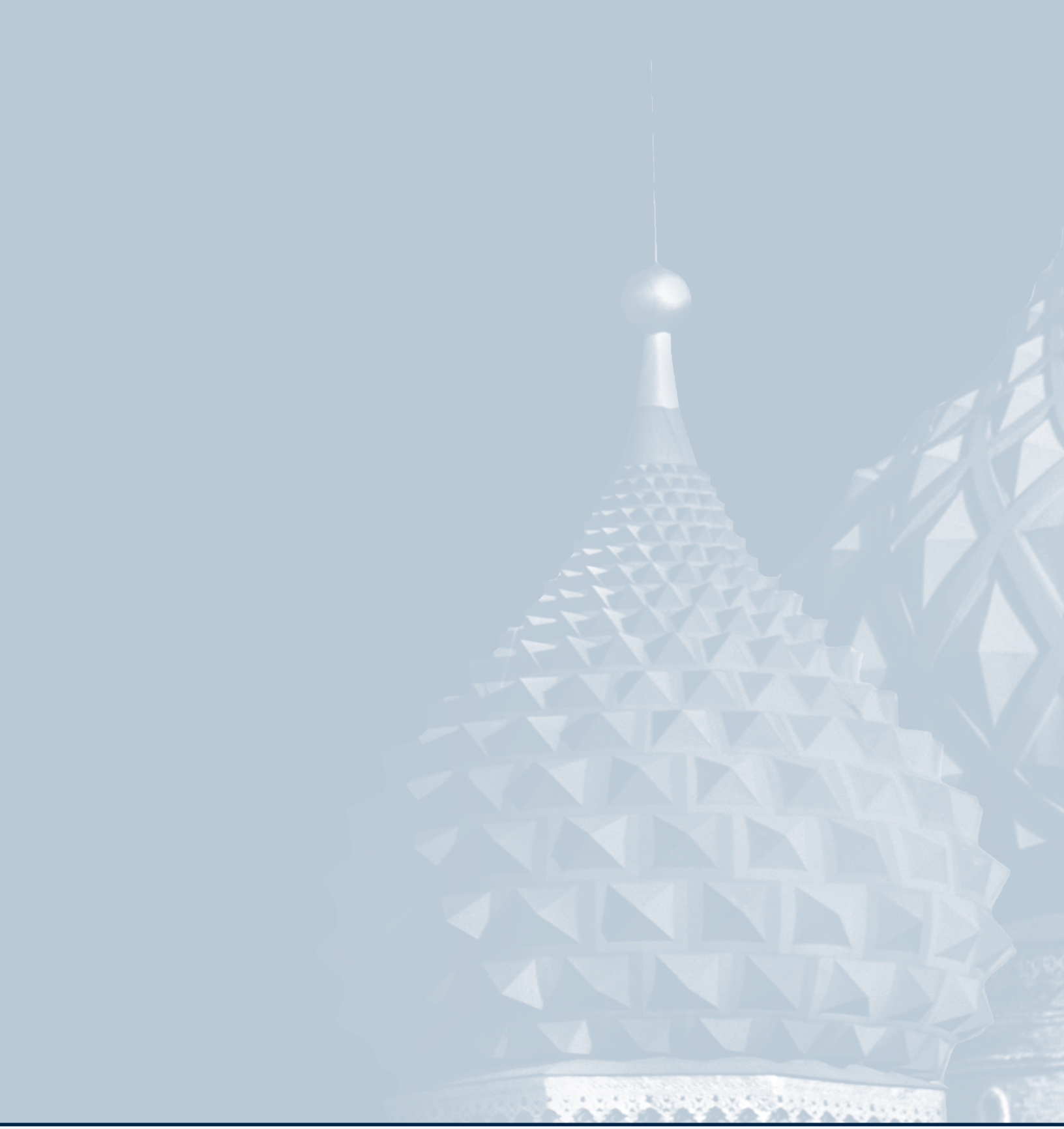
NOVICK: No, you are not allowed to take anything out of the Republic of Belarus that is in any way connected to the human. That is answer number one. Because we have other studies that we would like to do on pulmonary hypertension, which have nothing to do with Chernobyl, and we are not allowed to take one drop of serum out of that country.

Number two. The tissue samples ostensibly go to the pathology lab. I can tell you that it is extremely rare to get a path report back, though.

PAXSON: Well, to sort of sum up and finish this long day that we have had, this long, very rich day, I kind of want to return to what you were just addressing. I think that is a question that was coming to mind for me as well. You take us to a place where we can sort of return to one of the animating principles behind this conference. We can talk about these issues, hopefully without being attached to our agendas. Perhaps between the Greenpeace version and the official UN version, at some point we can approach a more common truth because there are complex truths out there. They may be complex and inconvenient, but they exist. By letting go of our agen-

das and by holding on to what you really so eloquently said, we can remember these are really very human issues, there are children who are suffering, there are people who are clearly suffering. You and this film have left us with indelible images, human images to take away from this long day, and I am very grateful to you for that, and I think we all are.

We can finish the day with that and take our heads away and our hearts away full from this long day. So thank you very much, everyone, for staying, and thank you so much, Dr. Novick.



Woodrow Wilson International Center for Scholars
One Woodrow Wilson Plaza
1300 Pennsylvania Avenue, NW
Washington, DC 20004-3027

Tel. (202) 691-4100 Fax (202) 691-4247

www.wilsoncenter.org/kennan

ISBN 1-933549-19-X