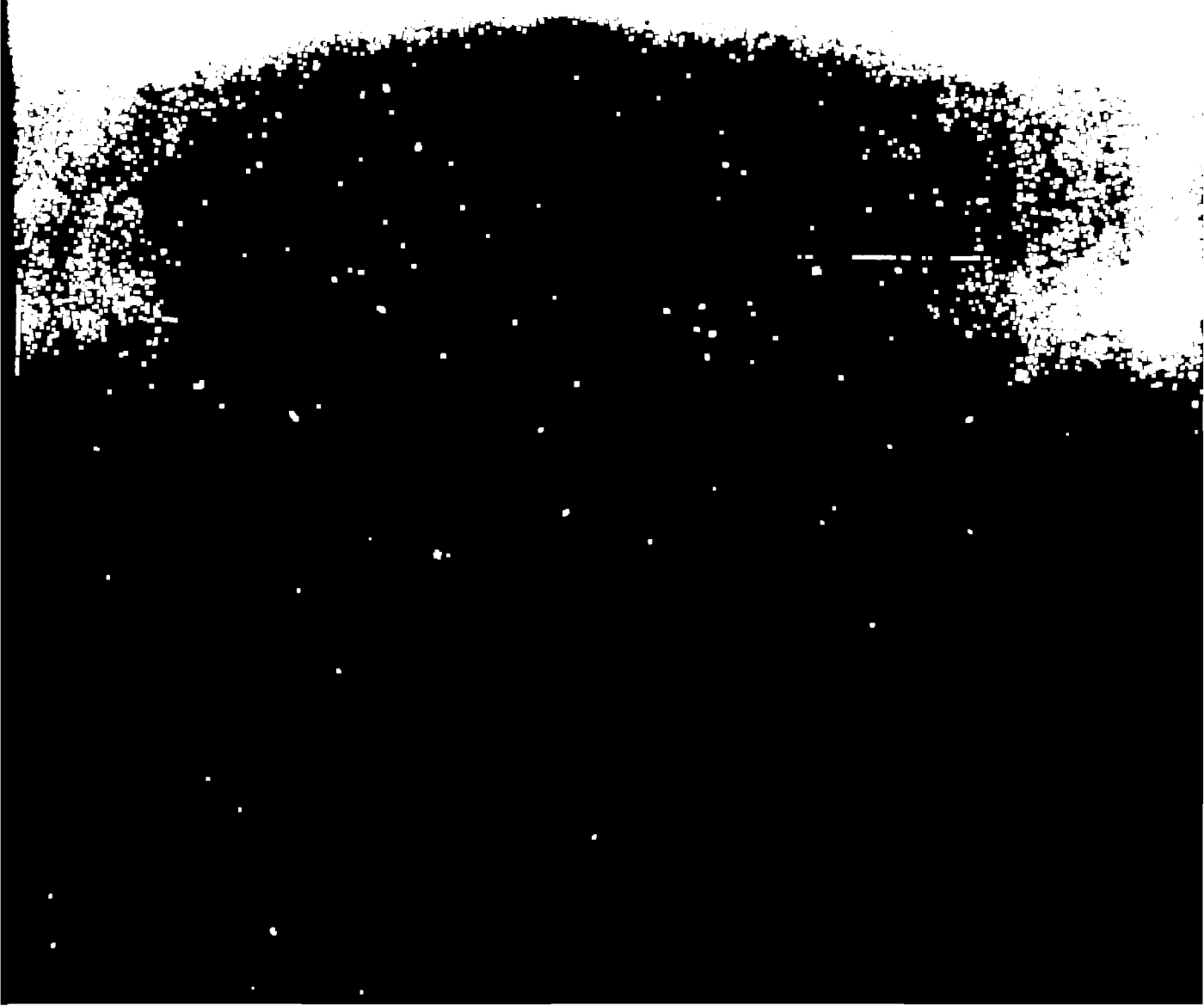


Nuclear Energy: A Balance of Power

Strategies presented at the IAEA Public Information Forum
11-13 September 1991, Vienna, Austria



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Summary

The IAEA held its first Public Information Forum in September, 1990, in conjunction with its General Conference. Due to the success of this first effort, Public Information Forum II was held 11-13 September 1991. Invited and attending from the international nuclear community were public information officers of the Member States' atomic energy commissions and agencies; public relations and information representatives of the international nuclear industry, including vendors, utilities and information dispersal groups; scientific societies; and trade associations.

The Forum provided an international opportunity for those working in nuclear energy public information programmes to learn from one another, and to exchange ideas and methods on how best to demystify this form of energy and reach the public for better general understanding of the issues involved. The IAEA serves as the arena—the clearinghouse—for this exchange of programmes, projects, and publications.

The title, "Nuclear Energy: the Balance of Power" set the theme for the presentations and discussions. It was recognized that energy sources, worldwide, are being debated with a new and growing emphasis on the effect of each source on the environment. Not only industrialized nations, but developing countries, recognize the need to address this impact as well as the critical linkage between a stable energy supply

and a healthy economy. As the debate continues, the questions persist. Will nuclear power continue to be a realistic option or will this energy source be neglected because public concerns cannot adequately be addressed or eased?

The second IAEA Public Information Forum attempted to go beyond last year's "What to do" material, so as to examine and **propose specific and creative "how to do it" methods for explaining the energy choices available and the environmental and economic costs involved.** Three, full-day work sessions were devoted to this effort. During the first day, speakers addressed the major reasons why the public is hesitant about nuclear power: primarily weapon proliferation and potential radiation damage to health, providing information and facts to help the public information officer better address these subjects. Presentations also were made on specific subjects suggested by last year's participants.

This report, "Nuclear Energy: The Balance of Power", reflecting the programme, is in two parts. One is designed to present the conclusions, recommendations and specific activities from the strategy sessions. This material may be put to use immediately as well as being helpful in planning and meeting future, long-term objectives. It is followed by examples provided by Forum participants. A separate section is intended as a ready resource for up-to-date information on non-proliferation and radiation and health.

IAEA Public Information Forum
Nuclear Energy

Economy  Environment

A Balance of Power

11-13 September, 1991
Conference Room II, 7th Floor, C-Building,
Vienna International Centre

Programme

11 September 1991

- 0800-0845 Registration - VIC Rotunda
- 0900-0915 Welcome by Dr. Hans Blix, Director General, IAEA
- Speaking of the Unspeakable**
Chairman and Panel Moderator:
Mr. David Fishlock, Former Science Editor,
Financial Times, London,
- Nuclear Weapons and Non-proliferation**
- 0915-1015 Panel Discussion:
Participants - Ambassadors and Representatives on the
IAEA Board of Governors from the following countries:
Australia - H.E. Mr. Michael Wilson
Egypt - H.E. Ms. Mervat Mehana Tailawy
Japan - H.E. Mr. Tetsuya Endo
USA - H.E. Mr. Richard Kennedy
USSR - H.E. Mr. Roland Timerbaev
- 1015-1030 Questions and Answers
- 1030-1100 Coffee Break
- Radiation and Health Effects**
- 1100-1230 Radiation Lessons from Chernobyl - What Scientists Know
Video on the Chernobyl Assessment Study
Hiroshima and Chernobyl Studies
Mr. Friedrich Steinhäusler,
Task Leader, International Chernobyl Study,
University of Salzburg, Austria
What Society Fears: Radiation and Risks
Why and How to Deal With Them
Professor Terence Lee, Psychology Dept.,
University of St. Andrews, Scotland
- 1230-1400 Lunch
- 1400-1500 **The French Experience**

Nuclear Energy/Electricity Ads
Mr. Jean Pierre Chaussade, EDF

French Farmers and Radiation
Mr. Philippe Guetat, CEA-IPSN
Mr. René Loyau, FNSEA

1500-1530 Opposition Crosses Borders

Mr. Jiri Beranek, Czechoslovakia
Atomic Energy Commission, Slazoka

1530-1600 Building Support, Not Opposition

Ms. Mary Boyd, "Managing Public Acceptance
for a New Facility", Louisiana, USA

1600-1630 Coffee Break

1630-1700 Nuclear Education in Chile

Mr. Eduardo Bobadilla Lopez, AEC

1700-1745 Panel Discussion:

Telling, Not Selling

The Governmental/Regulatory Agencies' PI Role

Japan - Mr. Shinichi Tomonari
Spain - Ms. Lola Anderiz Cebrian
Sweden - Ms. Gunilla Wunsche

1745-1800 Preparation for Strategy Sessions

1800-1900 Reception - VIC Restaurant

12 September 1991

0900-1730 Strategy Session I - III

1900 Heuriger Evening (Optional)

13 September 1991

0900-1200 Multi-media Event

Conference Room II - 7th Floor

Chairman: Mr. Warren Newman, Director,
Communications, AEA, UK

1200-1400 Buffet Lunch - VIC Restaurant

1400-1600 Strategy Session Reports and Summing Up

Closing remarks and thanks - David Kyd, Director,
Division of Public Information

Opening Remarks

Dr. Hans Blix

Director General of the IAEA

Welcome to the IAEA and to the second Public Information Forum on "Nuclear Energy: The Balance of Power." This meeting is the result of the enthusiastic response we received from last year's event. I am happy so many of you have been able to join us.

There is much talk about the free market system these days and how victorious that system is in the world today. There is less talk at the moment about democracy, which fortunately is also expanding victoriously in the world. This is an extremely important and heartening development.

Democracies have many great advantages. The most crucial is that they can achieve political change without violence. They give each of us an opportunity to influence the decisions that are taken in society. In a way, democracy is also a free market, a free market of views and of news and of ideas. To function well, this system requires vigorous presentations of policies—a competition between those who have views and facts to sell to the voters, to the participants in a democracy.

In the olden days, the only tool you needed for this was a voice and a soap box. In the media world of today, it is much more complicated. It is an art to reach out to public opinion. Many of you are practicing this art and you are indispensable for the presentation of the benefits, the problems, and the potential of nuclear energy.

I purposely did not say selling nuclear energy. Some will sell nuclear energy, and I have no grudge with that. Some will sell fear of nuclear energy and this is their right in the free market of views. The IAEA is very modest in the field of opinion shaping. But because our members demand it, and because it is the most effective way for us to function, we must stand for reliable information, not for selling.

In the IAEA, we do not have a choice. We must seek to be listened to, and to be seen; but invariably we must cultivate an asset that I believe we have. That is a reputation for reliability. We are a public institution and it is befitting for a public institution to be reliable.

To communicate with all aspects of society marks a higher level of ambition than just giving information. To communicate, you must choose your audience and you must seek to transmit on the wavelength of your audience so that there is reception of the transmission and perhaps even a reaction to it. We do not always succeed in these activities, but we must continue to try.

All is not technique, however. There must be substance; and it helps if that substance is keenly interesting to people. The non-proliferation question is certainly one that should engage a great many people, particularly because of the Iraq example. It should prompt people to ask "How can we strengthen the guarantees, so that this is not repeated? How can we work to ensure

that the few states in the world not yet legally committed to non-proliferation will also join one day?"

Or, take the question of the environment and the concern that we rightly have about global warming. This warming is in large measure linked to the excessive emission of carbon dioxide, which is in turn linked to the world's excessive use of hydrocarbons. By contrast, nuclear power does not give rise to any greenhouse gases.

There is, on the other hand, fear of nuclear power and inadequate understanding of the risk to society. There is a great task for those engaged in public information to try to convey to the public a better perception of risk.

The IAEA has engineers and scientists who will help you by bringing out some of the facts and putting them in your hands; facts about such things as electricity and the environment, and the health and environmental consequences of the Chernobyl accident. There is a great deal of data, but we need your skill and talent to present it.

With these comments about our attitude in the IAEA, and seeking to cultivate respectability, seeking to offer but not to sell reliable news and the variety of subjects on which we can assemble and analyze data, I would like to greet you once more. Welcome to the IAEA.

Public Information Handbook

In the following pages you will find:

- **Pillars of Public Information** - Basics for any programme
- **Key Concepts** - Public information “verities” developed by all groups
- **Strategy Sessions** - Scenarios considered
- **Recommendations** - Conclusions developed in the sessions
- **Ideas** - Oldies but goodies, new and useful, creative “Bright Ideas”
- **Examples** - provided by participants

Pillars of Public Information

- **Research:** Investigate attitudes with various types of polls and evaluate the information to determine what you should do.
- **Experience:** Experienced people—talented communicators and technical people—should be used. If a choice between them must be made, choose the communicator.
- **Intuition:** Research and experience are important, and the combination provides intuition. Polling may be secondary to common sense.
- **Resources:** People and financial resources are essential. With a small budget you must concentrate on people resources, use these to the best advantage and beat a path to management to get more resources.

Management must recognize communication as a critical component in executive decision-making. Public information is at least as important as any scientific or engineering endeavour in the nuclear community.

John Macpherson, AECL

Key Concepts

- **Prioritize** your concerns into an effective working plan.
- **Develop** a plan that is in the same format as all other departments in the agency or company so that it is understandable to your Senior executives. **Base it on Pillars.**
- **Concentrate** your communication effort first on the need for **energy** and **electricity**. Communicate the **need** for, and the **benefits** of electricity, the **tie** between community economic growth and energy, and the tie between well-being and electricity. Then talk about energy sources.
- **Communicate** with the community first. Know your neighbours, know your audience.
- **Present** the benefits of **nuclear** energy, normalize it by stressing benefits to the community and other industries there, such as financial benefits, jobs, electricity and contributions to clean air.
- **Present** nuclear energy not as the ultimate solution, but one **part of an energy mix**, including conservation and renewables. Choosing one energy source may be an option only few countries can afford.

- **Build** partnerships, first cultivating personal relationships, then other groups and companies that have similar problems, but a different product, and develop third-party groups of people who can speak for you.
- **Lighten up** and approach the task with a sense of humour. Use humour in your message, in your activities. It humanizes the technology, makes it approachable, less to be feared.
- **Focusing on risk is foolish** and can make people think nuclear is more risky than it actually is. Talk benefits, not risk, while not ignoring it as a legitimate issue.
- **Teaching the technology is a turn off** since the public does not need to be schooled as nuclear scientists or experts to accept nuclear.
- **Familiarize** the public with the facilities in the area.

Show them there is an open door with a welcome mat and they can come and visit. Familiarity does not breed contempt, it breeds comfort. You want people to feel comfortable with your facility.

Sandy Cannon-Brown, Video Takes

- **Break** the ignorance/arrogance syndrome.

Simplify the message, rather than throwing waves of technical jargon over people.

John MacPherson, AECL

Strategy Sessions

Each of three strategy sessions was asked to address a specific public information situation and to develop, through informal discussion and brainstorming, specific ways to resolve the problems and establish a productive public information programme that effectively reaches the public. Participants were encouraged to be creative and to look beyond the tried and true to find new approaches, with stimulating results.

Strategy Session I

“Let’s Start at the Very Beginning”

Strategy Leaders:

Mr. John Macpherson, AECL, Canada
Mr. Joon-Keuk Chung, KAERI, Korea

Facilitators:

Mr. John Bradburne, NUS Corp., USA
Mr. Richard McPherson, Private Consultant, USA
Mr. Otto Wildgruber, Siemens, Germany

Scenario Summary

Country X has a nuclear power plant operating; others are under construction and planned as there are limited energy options there. Environmental questions are being asked about using fossil fuels, but opposition to nuclear power is growing, particularly in a neighbouring country. Country X has little experience in public information nor much of a budget to establish a programme.

Strategy Session II

“Talking about Tough Topics”

Strategy Leaders:

Mr. Egon Frech, AECL, Canada

Ms. Mary Acland-Hood, The Uranium Institute, London, UK

Facilitators:

Mr. Thomas Elsasser, U.S. Department of Energy, USA
Ms. Roxanne Goldsmith, Nuclear Regulatory Commission, USA

Scenario Summary

Country Y has had a number of nuclear plants operating for years. No agreement has been reached about the disposal of nuclear waste, a matter of great controversy. A recent incident has aroused safety concerns which have added to public opposition. The country has a spotless safety record, but this has not prevented growing opposition. What can this country do?

Strategy Session III

“Reaching the Middle 40%”

Strategy Leaders:

Ms. Sandy Cannon-Brown, Video Takes, Inc., USA
Mr. Annti Ruuskanen, IVO, Finland

Facilitators:

Mr. Sam Arnold, Arnold and Company, USA
Ms. Francoise Guenette, AECL, Canada

Scenario Summary

Country Z has a troubled nuclear programme, with strong vocal opposition, even though almost 50 percent of its power comes from nuclear plants. Polls show 30 percent for and 30 percent against nuclear with an important 40 percent of the public uncommitted to either side. How do can this 40 percent be reached?

Recommendations

Strategy Session I

“Let’s Start at the Very Beginning”

If you are limited in resources, you spend it on people rather than things.

Start with the right people, the right public information person.

“The nuclear industry public information job is more demanding than most *public relations jobs*. It demands extraordinary accuracy, demands the ability to translate or transform highly technical information into understandable language. It demands a lot of knowledge which a person acquires over a period of time. And it demands honesty, disclosure, openness, and creativity.”

Start with technical champions in the organization who can go to management and tell them the public information officers are as important as the scientists and engineers or more so.

Start with the people working in the industry. Use your employees. These are the people who live in the community, work in the community, have the same feelings and concerns.

Starting with no public information experience, you train people, and you give them experience, and you train trainers to train others. This is where you use your employees.

Put the local capability to the best use possible. These are:

- employees, their families and their friends;
- labour unions;
- the educational community, professors, teachers, and students;
- police (police have to handle protesters. Help them understand.)
- medical professionals;
- economists;
- bankers and business leaders;
- religious leaders;
- politicians, and industries that use electricity;
- media and media groups;
- womens groups, peer groups;
- writers and artists;
- people living in the neighbourhood of nuclear facilities;
- consumer protection groups; and
- environmental groups.

(This is targeted communication and it demands a very comprehensive approach....based on an example presented by John Chung, KAERI, the Republic of Korea)

- Analyze the opposition, challenge their credibility, or match their own approach.
- Think long-term, not just about short-term, immediate fixes for problems.
- Get feedback and show results.

“Your report card will judge teamwork, credibility, leadership, preparation, dedication, accessibility, honesty, and trust.” (John MacPherson, AECL)

Strategy Session II

“Talking about Tough Topics”

To create a climate more favourable to nuclear power, a new strategy and new communications techniques are needed.

The opposition to nuclear waste and safety concerns are only manifestations of the lack of acceptance of nuclear power. People will accept nuclear waste if they understand they have to have nuclear power.

Evidence in support of this claim: In Sweden, between November 1988 and October 1990, opinion polls asked the public, “If scientific research indicated that your municipality was the best site, would you accept high level waste disposal in it?”

In November 1988, 42% said yes, 49% said no. May 1989, 39% said yes, 53% said no. But in November 1989, and October 1990, 53% said yes with 36%, and 37% respectively saying no. The only thing that appears to have happened between May 1989 and November 1989 was that the public was made to realize the economic and environmental need to continue operating nuclear power plants beyond the originally proposed phase-out commencement in 1995-96.

How we create a new climate for greater acceptance of nuclear power [is first to recognize it] requires a fundamental change in the way we behave, the way the industry thinks about the public and therefore acts as a result of that thinking.

The public appears to view the nuclear community as secretive, un-receptive of criticism, paranoid, dishonest, unforthcoming, arrogant, and discredited by past claims.

Editor’s note: Participants in Strategy Session II based their conclusions on Professor Terrance Lee’s presentation, “What Society Fears: Discussion on Radiation and Risks” made on the first day of the Forum. To briefly summarize: Professor Lee provided results of public opinion polls on the factors influencing perceived risk which found that **the public more readily accepted a risk if it was:**

voluntary rather than involuntary

ordinary	“	“	catastrophic
natural	“	“	man-made
immediate	“	“	delayed
continuous	“	“	occasional
controllable	“	“	uncontrollable
old	“	“	new
clear	“	“	unclear
necessary	“	“	luxury

Participants concluded that nuclear power was too often perceived as involuntary, catastrophic, man-made, delayed (radiation and cancer) uncontrollable, new and a luxury. They recommended ways to change these perceptions, including the following:

Voluntary: To make nuclear more “voluntary”, thus more acceptable, encourage public participation. Encourage, rather than avoid the public process. Allow people to get involved

in the decision-making process about the choices of electricity generating sources and where the facilities are to be sited. During this process, negotiations and compromises occur. The industry must give something—compensation, incentives—but it gets something in return.

Control: This is very close to “voluntary”. Give control over nuclear power, with advisory groups as part of the operation at all levels, local, state or province and national bodies. Give control by having a local committee responsible for independent environmental monitoring. Give control by involving the local and state police and the fire departments in emergency response planning. Make sure **they** tell the public how they are involved.

Funds for local amenities and other incentives are only important **after** control has been established.

Ordinary: Nuclear can be made ordinary by opening up the facilities to local visits. Japan is designing a power plant with observation galleries built right into the plant that people can walk in and look at the actual operation. This is much more effective than a visitor centre a mile or two away. Let them have hands-on experience, active stu-

dent participation visits such as Chile has, science fairs, and open houses.

Natural: Demonstrate that radiation is natural by providing specific groups with geiger counters. Show the radiation levels in the area of a power plant on signs that also show time and temperature, or make it available on computerized telephone systems, such as France does.

Necessary: Nuclear power is not a luxury. It is one of the energy sources which produces electricity, and you tie in electricity consumption with the gross national product, keeping it as close to home as possible.

Old: Nuclear energy is not necessarily new. There is a lot of experience with it in the world today; hundreds of reactor years of safe operation. Show people the old plants that have run for years and years. Show old plants shut down and the fuel safely stored.

“We advocate this fundamental change in the way we do things, although there is a degree of risk in making it. But there is much to be gained. For without this change, the real risk is that we might not have nuclear energy around at all.” (Egon Frech, AECL, Canada)

Strategy Session III

“Reaching the Middle 40 percent”

With an uncommitted group that neither supports or opposes nuclear power, the question is not how to change them or how to convince them of anything, the great challenge is to get their attention and then get basic information to them.

Ideas: old but good, new and useful, creative “Bright Ideas”

Invite the community to the facilities. Make these invitations, “big deals”—specific, concerted efforts to make people feel special and important, to feel worthy of an invitation.

- Make these open facility visits an international effort. Get the national and international nuclear scientific organizations and forums to pinpoint which facilities welcome visitors. Establish a coordination centre, which would provide the information to travel agents involved, provide brochures and pamphlets on the facilities so that the visits could be part of tour packages... Show that the nuclear community is open, worldwide.
- Some industries provide rewards or prizes as an incentive to bring people in. Managers of nuclear facilities could give out some sort of coupon that could be collected, perhaps specific types for students, another for parents. Make this a game and an educational experience.

Participate in the community in every way possible. Volunteer for boards and all community activities and events in addition to providing financial support. Offer Girl and Boy Scouts and Four H club members badges that can be earned in atomic energy. These same young people might be designated to be responsible for monitoring radiation in the community and showing the radiation reading graphically and colourfully, such as on a large clock in the community, that shows on a colour scale that things are fine.

Know the changing face of your community by talking with real estate agents and businessmen to know who is coming into your community and get to know them when they come. Participate with parade floats, hold celebrations of important days in nuclear

science, hold entire community science fairs, sponsor and participate in sports and cultural events.

- Sponsor a play, as Atomic Energy of Canada Limited did. It was about Madame Curie and the discovery of uranium. A comedy, it was fun; it was an educational activity in an area where the nuclear agency had not been active before and it gave the agency an interesting presence. It began as part of a Canadian summer festival attended by more than 500,000 people. The play was so popular it ran over two and a half months past the projected closing and was sent on tour throughout Canada. Other countries have bought the rights to the play. The AECL was able to do a lot of promotion that tied the agency to the theme and the success of the play. It was reviewed in the entertainment pages, which a lot more people read than they do the science pages, and the author and the agency were on talk shows as well. This provided the AECL with an entirely new audience and sent a very positive message. (Example provided by Francoise Guenette)

Develop some entertaining ideas that show the nuclear industry has a sense of humour, which demonstrates as well that nuclear technology is not so terribly forbidding. Humour humanizes experiences, makes concepts more comfortable.

- People believe that reactors are the most dangerous things in the world unless they are convinced otherwise. A way to do this might be to

set aside a time and activity that would bring some of the community into the reactor building, let them walk on the floor above the reactor itself. A game night with Scouts, or a social group could be planned to combine fun with the reality of safety.

- The cooling towers of nuclear plants have become the ominous symbol of nuclear power and a deadly danger. Defuse the symbol by painting the towers with artistic murals or bright colours (as France has done at some facilities) or as salt and pepper shakers as has been suggested in Finland. A less expensive option might be to write in large letters “This is just water!”
- Computer games are loved by children and adults. National scientific societies and forums might develop games that derive fun from making atoms and nuclear energy. They could be sent to schools, made available to libraries, or awarded to students for some specific activity, like a prize at a science fair.

People at work in the nuclear plant are the industry’s best ambassadors. They can be more extensively, more effectively used in telling the nuclear story (especially if they are given presentation and media training.) A very effective way might be to film them on video.

- Provide the schools with video programmes. Not just scientific ones, but some professionally-developed videos explaining some of the specific activities at the

facilities (especially if these are newsworthy and worth a press release) with the employees providing the action, making the explanation. These are the parents of the students, doing their job, as usual, but in this context and format, the “stars”. Copies of these videos could be made and given to each “star”, so that it becomes part of that family’s “picture album”. Women employees could be shown in specific videos for use with womens’ groups, and science and engineering students on summer jobs or internships appear on videos for high school students—peer groups talking to each other.

Advertising nationally is a positive effort, but in the local areas, non-issue advertising is most effective, particularly when used to advertise the activities already discussed. **Before people pay attention to an ad they have to be interested in what it says. First get their attention!**

There are a number of creative ideas that would reach the unconcerned and uncommitted but may be too expensive for one company or country to afford. These seem ideal for national or international collaboration and funding.

- Taking a cue from Disney World and Epcot Center, is the ATOM RIDE, designed by Madame Tussaud, from a concept developed by Warren-Newan, Atomic Energy Agency, U.K. It has been worked out in detail and is available for any group which could put up the funding. ATOM RIDE is literally a ride in which you climb into an atom, suspended on a rail system. This

carries you through the atomic world. Commentary is given as you ride along through this spinning, busy colourful world. It would be great fun for the participant as well as being informative and getting people involved. This helps to defuse the fear of the atomic world.

- Taking the successful idea of a science planetarium, build an “atomic” planetarium in a region of a country (or group of countries, such as Europe or Southeast Asia) where there are a number of nuclear plants operating. This would serve as a draw to get

visitors to nuclear facilities. There could be a world-wide effort, with special productions that travelled to each one of the planetariums.

- There are a number of new science shows on television and cable television that reach many parts of the world, such as CNN’s “Beyond the Year 2000”. There are an increasing number of outlets for science programmes, the increase in cable companies has made a ready market for such material. This provides a way to bring nuclear power into prime-time television in a positive sense.

Presentations and Examples

Several presentations at the Forum provided examples of either one of the public information problems addressed as hypothetical scenarios in the ses-

sions, or demonstrated the effectiveness of recommendations. Due to space limitations, a synopsis and excerpts appear in the following pages.

Opposition Crosses Borders

Jiri Beranek, Czechoslovakia

Our situation appears to be unique. Two countries, Austria and Czechoslovakia, with common borders and an even longer common history are in direct opposition regarding state energy policies. There is a large majority of pro-nuclear people in Czechoslovakia and a majority of anti-nuclear people in Austria. The conflict thus goes deeper than governments. For if this were the case, by the next election in either country, a new political party coming to power might change the position and stand by its neighbour. But that is most unlikely.

In many ways, the populations of our two countries are much alike. We have come together so many times and been divided so many times as a result of being part of the Austrian Empire, that judging by names in the telephone book, there could be as many as one and a half million Czechs in Austria and that many Austrians in Czechoslovakia. The culture, the mentality of each country is very similar; the conflicts from before the fall of the Austrian Empire are forgotten. We are all coming from one big pot. There were no remaining problems with Austria until this sudden conflict over nuclear power.

There are geological reasons for the different approach each country took to nuclear power. Austria has higher mountains than Czechoslovakia which doesn't get the same snow or the run off, so rivers have a limited flow with a maximum 5 percent hydropower capability. Austria has 75 percent hydropower production. To produce electricity, Czechoslovakia turned to coal, which it had in abundance, although it was of a very poor quality.

Czechoslovakia was the industrial core of the old Austrian Empire, because we had the natural resources—coal, minerals, and uranium. We had twice the population of Austria, perhaps 60 percent of the Empire's industrial base. We were also the financial source for the Empire because of industrial profits from production. After the separation from Austria, we built more new coal power stations to provide power for industry, and finally we reached the stage where we polluted huge parts of the country in such a way that even the old Communist government realized it was not acceptable.

For this reason we went to nuclear power in the 1970's—not just to balance the new demands for electricity, but to replace the coal burning in the old

facilities that caused such terrible air. But we had to use the only reactors available to us, from the Soviet Union, which are from the view-point of safety, defective, but there was no other way to go.

In Austria, the situation was different. Although they had considerable hydro production and potential, there was a very real possibility of these being exhausted, and Austria began to plan for nuclear power. However, when a referendum was held on this plan, the population rejected nuclear power, even though the vote was almost 50/50.

Czechoslovakia's coal resources were in the north, so power plants were built there, and in the south, the power transmission lines had to be powered with electricity generated with the new source of electricity. This logical transmission network was seen by Austria as a provocation against them. 'You would like our population to be involved if an accident would occur.' So, even though Austria had no legal reason to be involved with our country's sovereign right to build and operate nuclear power stations, we admitted there was a moral right. It would be *very unfair to protect the population up to the border and not care about those on the other side of the common border.*

Negotiations between the two countries began and an early warning convention was developed. The cooperation was great between the countries, but the Czechoslovak government then in power removed Beranek. After that the situation changed rapidly and both sides developed the hard, opposing lines that still exist.

The Soviet technology has been a source of great concern to scientists and

engineers in Czechoslovakia, and Beranek and others began to point out publicly after the "Velvet Revolution", that the first two units built had neither an emergency core cooling system or *containment, although the remaining six were acceptable by Western standards, as would be the six units now under construction.*

This issue was raised just as the country was undergoing extreme change, such as the economic and political problems associated with going to a free market. But the publicity was necessary to get public attention and public opinion to help us, as a regulatory body, bring governmental attention to get a decision taken on the two defective units as soon as possible.

Beranek sent an open letter to the Austrian Greenpeace, thinking they had common cause to increase the safety of these reactors. His message was 'Don't try to stop our construction of Temelin (a unit under construction) because it has the possibility to be the best nuclear power plant in my country.' The letter got the Czechoslovak government's attention and it established corrective measures for the old reactors. The letter was also helpful to this new democracy to use to start a public discussion about nuclear power.

It was not possible under the conditions of the past regime to say in public, 'Let's either reconstruct those old reactors or shut them down.' Why, no newspaper, no mass media would publish that! But our efforts gave evidence to our people that the *regulatory body was indeed defending their interests and providing constructive criticism.*

Greenpeace in Austria didn't answer the letter, but it responded. To a certain extent, they behaved like during the religious wars. They arranged for a dozen buses to take a lot of Austrians to march through our Czech cities. These people had no information and didn't really understand what they were there for. It was a demonstration of foreigners with no explanation.

We have a lot of experienced people in nuclear power, maybe 20,000 or 30,000, but they are not ready to participate in discussions with anti-nuclear people, because the past regime would not allow anyone to reach that level of prominence...So we have a lot to do to prepare our employees for this kind of discussion. We don't have the utilities and we don't have enough financial means or experience to start a pro-nuclear programme.

But the actions of the Austrians have had an adverse influence on our people, perhaps because of the instinc-

tive feeling from our past that anything coming from Vienna was a diktat. Our people don't like imported philosophies, especially after the last 40 years, and we don't like someone trying to influence our development.

A public opinion poll taken late in 1990 in Czechoslovakia showed 46% for nuclear power and 41% against. One month after the demonstration, in April 1991, a poll showed 57% for and 20% against, with 56% wanting to be informed on nuclear power.

There are two ways to resolve this situation. The first is through European integration, which should introduce regional ways to solve regional problems. The second possibility is proven by history. This conflict would be put aside immediately if there were a more important problem, such as how to sell agricultural products to the European Community under the best terms. Then the nuclear power story would be forgotten.

Managing Public Acceptance for a New Facility

Mary Boyd, Duke Engineering & Services, Inc. USA

The most important principle to remember is that you are affecting people and people must be communicated with in a respectful manner.

Louisiana Energy Services (a limited partnership consisting of URENCO, Fluor Daniels and three utilities, Duke Power, Northern States Power and Louisiana Power and Light) will build the first privately-owned uranium enrichment facility in the U.S. It will also be the first commercial use of centrifuge technology for enrichment in the

country, it is the first application to the US Nuclear Regulatory Commission for a license for a major nuclear-related facility in almost 20 years, and it will be the first nuclear-related facility in northern Louisiana. The plant will have an extremely clean operation; there are no high temperatures or pressures or chemical conversions.

We knew from our previous experiences that public acceptance could be achieved if the technical credibility of the companies involved was high, if

the information was disseminated properly, if the licensing period was used advantageously and if we paid attention to local politics and culture.

After Louisiana was chosen for the facility, LES began education efforts in the parish to prevent the spread of misinformation. These included familiarizing residents of the facility with a series of meetings throughout the parish.

As they got to know us, we got to know them, along with their level of support or concern. When opposition came, it was intercepted by a discerning local newspaper editor, with a little help from us. We had recognized that this attempt would be made and we were prepared. Our initial education efforts in the parish were critical in preventing the spread of this misinformation.

Other educational/communication activities undertaken by LES were:

- Door to door in the immediate area with information and materials.
- Taking two groups from the parish (community and thought leaders) to see two of the centrifuge enrichment facilities located close together in the Netherlands and Germany; providing plant tours and the opportunity to meet with employees and a variety of local officials and residents. The visitors could do interviews in the towns where the plants are located.
- Prepared a videotape from the trip so that others in the parish could share in the experience.

- Sponsored a trip of 20 residents to a fuel fabrication facility, a nuclear power station and energy visitor centre in South Carolina to show the two parts of the fuel cycle after enrichment and to let the people find out what it is like to have a nuclear facility in the community.
- On the trip they arranged to have local officials available for questions and answers, and the visitors were encouraged to stop and talk to anyone in the community about the facilities.
- Educators selected by the school board supervisor were invited to attend the summer teacher workshops on energy sponsored by Duke Power Co.
- Provided a tour of the environmental laboratories where water from the area was being analyzed for the environmental report.
- Took out memberships in important statewide and regional organizations
- Opened an information office in the parish with visually appealing exhibits and a knowledgeable local resident as a community relations representative.
- Started a newsletter that goes to every household in the parish.

At the NRC meeting, the majority of the folks in attendance were plant supporters. Most of the speakers in favour of the plant were people who had taken tours of the enrichment facilities or nuclear plant and could discuss knowledgeably the environmental issues they wanted the NRC to address. They are a core of support that is extremely effective.

Reaching the Middle 40%: A Canadian Perspective

Francoise Guerette, AECL, Canada

The Canadian nuclear industry developed a research-based communications strategy designed to reach the 40% (actually 45%) that research showed were neither advocates/supporters (35%) or strong/active opponents (20%).

AECL asked their researcher to go beyond the 'who' likes and 'who' doesn't, to understand the values and beliefs that caused them to develop their positions.

This is 'psychographic segmentation' of public opinion. We believe that if we can understand why Canadians hold certain opinions, we can change these with properly targeted public communications that speak directly to the 'why'.

AECL will use a communications strategy like an election campaign—determine where are three types of people—those against, those for and those who haven't made up their minds—**core, accessible and inaccessible**, and concentrate on attracting the accessible, because the core group is already on their side and the inaccessible

are deaf to information. The accessible are more receptive to communication and are crucial to "move the numbers" so that a majority supports nuclear energy in Canada.

Research showed:

- Simply **talking** about nuclear issues in opinion questionnaires appears to build support for nuclear power. (42% supported nuclear at the beginning of the question period, 63% supported it 15 minutes later at the end of the poll!)
- The need to "neutralize" the word nuclear and associate its use with strong positive outcomes.
- Environmental arguments for nuclear power are important messages.
- The need for reassurance about the safety of nuclear power. Two major concerns are waste management and prevention/containment of accidents.

With this strategy in hand, AECL is evaluating different methods to use, to fine tune the final product and evaluate the overall effectiveness of the strategy.

The French Experience: Nuclear Energy/Electricity Ads

Mr Jean Pierre Chaussade, EDF, France

In France, three out of every four light bulbs are nuclear powered.

Electricite de France (EDF) has a communication policy of total transparency, reporting every significant event to the public. This systematic acknowledgement of all incidents and

anomalies has, however, given the public a negative image of EDF and nuclear power. EDF has developed a more extensive dialogue with local residents and their elected officials in the neighbourhoods around nuclear power stations and it provides a regular information service for schools, universities

and the medical profession. In addition in 1990, EDF began guided tours of nuclear power stations, built around the slogan, 'A nuclear power station is there to be visited', and attracted some 340,000 visitors in a single year.

Then EDF decided to launch an innovative campaign aimed at the general public to explain the misunderstood phenomenon of nuclear power. It was the first time the general public had been directly addressed and the first use of this type of publicity.

Market research identified four opinion groups in France, the pro-nuclear lobby, the antinuclear lobby, pragmatists and the impartial. The campaign aimed at the pragmatists, a group sensitive to issues affecting the environment but believing in technical progress based on scientific advancement.

EDF also targeted this campaign to their own employees, so that they could answer questions on nuclear generated electricity in France. The press, national newspapers, news magazines, specialist publications, and regional daily newspapers, are the media used in the campaign as they dedicate the most space to EDF activities, and because they are the medium most suited to the population groups targeted.

The aim of the campaign was to publicize the fact that 'three out of every four light bulbs in France are nuclear powered' and this type of energy is constantly used in everyday life. Six characters, in black and white portraits represent the 'doubters', (people who fancied themselves fashionable) in a humorous light.

French Farmers and Radiation,

Philippe Guetat CEA-IPN and Mr. Rene Loyau, FNSEA, France

The Chernobyl accident caused a great deal of concern about radiation and health all over the world. In particular, European farmers and the public, who bought agricultural products, were deeply concerned, but did not know enough about the subject to understand when they should and should not be worried or take action. In France, the Farmers' Union set out to correct the situation.

The Union approached the experts at CEA-IPNS and asked their help in developing a "Farmer's Union Guide on Agriculture, Environment and Nuclear Plants: How to react in case of an accident".

The IPSN was anxious to help in order to show that reactors were as safe as possible. The readers would be able to help the agency in case of accidents, and the guide would also serve as a public information publication.

The guide was developed around the concepts that:

- Nuclear scientists are people and they work for other people;
- Nuclear science and techniques are not difficult to understand;
- In case of an accident, it is possible to predict what can happen and who is concerned and establish that a system of protection exists; and

- It is possible for individuals to react to an accident on a personal level, for their livestock and their land.

The Farmers Union and the IPSN envisioned the farmers as the primary readers of the guide. Farmers know about life, about risk and that accidents can happen. They are used to mishaps due to climate, disease, other citizens, government and the Common Market! They have concerns for themselves, their equity and, depending on the type of their agricultural production, they have a variety of different problems.

The guide is also helpful to citizens who buy and eat the food produced by the farmers, to journalists so that they can provide their readers with the best information possible, especially in case of an accident, to the nuclear community, to teachers and ecologists.

The document was organized with independent chapters so that the reader could start wherever he wanted, depending on his interest and level of

knowledge. Explanations were immediately followed by practical information. There was a balance between text, maps, diagrams and photos and a systematic classification of problems or actions. There was one final chapter to describe basic accidents and one single page set out what must be done at different distances from the radiation release point.

To make the guide as readable and interesting to the farmer as possible, there were direct, short sentences, the technical vocabulary was limited and comparisons were used. Humour was limited to drawings.

The partners had as many people as possible read the material before it was published—specialists, the general public with no knowledge of either agriculture or radiation, farmers, and people interested in the environment. All comments were taken into account. Improved explanations brought a higher degree of objectivity and clarity. But the major testing has been with the French population and the international community. The book proved to be so popular it sold out quickly.

Chile's Nuclear Public Education Programme,

Eduardo Bobadilla Lopez, CNEC, Chile

Chile has two nuclear reactors devoted to research and education. Both are under the management of the Chilean Nuclear Energy Commission (CNEC).

In both the developing and industrialized countries, nuclear development plans and programmes face public rejection. This opposition can stop the

necessary development of nuclear energy, but gaining public acceptance is not easy and it demands great effort. CNEC decided to take the initiative in facing anti-nuclear groups with a large educational campaign to supply information to students and the general public, with the hope of gaining public acceptance for the usage of nuclear power as an alternative power.

Our commission projected an institutional image that emphasized its human and technical capacity, in addition to its infrastructure and the guarantee of safety in the use of this kind of power. They also collaborated with the educational institutions to train people so they can decide to work in this field.

The activities were directed towards two types of audiences. One was primary school students and the general public. The other audience was high school students and professionals. All the printed brochures and audiovisual material were developed on different levels of complexity and according to the level of knowledge and the aptitude shown on nuclear subjects by each of the audiences.

CNEC activities included a travelling exhibition called "The Week of the Atom" with 60 panels, each devoted to nuclear subjects, which was shown in 43 cities in Chile then totally renovated, with new safety information added and the audio-visual component improved. The exhibition demonstrates the Chilean reactors' operation as well as a pressurized water reactor model. Micro-computer software presents a nuclear plant at work, in addition to video films. The attendance of teachers, students and the public is coordinated with the government, town councils and the Department of Education.

There is a permanent exhibit in CNEC's headquarters in Santiago with graphic panels, and electronic components run by microcomputers that display the main stages of the nuclear fuel cycle, and the performance of research and power reactors. The Department of Education coordinates the attendance of

primary and high school students. 'Monitor teachers', who later attend and guide their students at the exhibit, are given seminars on nuclear power. All visitors are assisted by specialized personnel and shown a movie followed by a question and answer period before the tour. Because of the great public interest in this exhibit, a specialized book store offering the latest agency publications has been added.

A 'Nuclear Energy Room' in the Science and Technology museum has been set up at the request of the private corporation that operates the museum. It is aimed primarily at students in elementary and high school. The teachers are supplied with a guide to the exhibit which they can use to evaluate their students' visits to the museum.

Nuclear energy courses for journalists have been developed to help the communication professionals be able to communicate basic nuclear information so that news on nuclear issues can be reported objectively to the public. There is also an incentive programme for journalists and mass media professionals and prizes are awarded annually.

We have an open door policy in our two nuclear centres so that university students and professionals can learn about our programme activities. Visitors are guided by specialized personnel with informative material given out. The Commission began distributing massive amounts of education material in 1980. This motivated many different organizations and the mass media to produce information on the peaceful uses of nuclear power.

Technical magazines and national newspapers have dedicated issues and

articles to nuclear subjects. The Commission has published a book in two volumes for students and teachers about nuclear power with a digest of basic nuclear information, radiation protection and a glossary of nuclear terminology. The books are distributed to all libraries in the country. Two publications have been developed aimed at giving information to primary school children. One, distributed to students at the exhibition, contains a nuclear glossary. The other is a comic magazine "The Secrets of the Atom" with fictional characters who are used with simple language in funny ways to introduce the student to the fundamental concepts and peaceful uses of nuclear power. This book has been translated into Portuguese and published in Brazil.

The Commission has established a video library with 33 movies on different nuclear energy topics. This material is also presented during the 'Week of the Atom' exhibition. Pictorial and scientific contests are held to gain the children's interest and broaden their knowledge of the peaceful uses of nuclear energy. These contests are also used to evaluate the impact of the educational programme.

The National Meeting of Gifted Young Students has been established to unite the best students from the country's physics departments, to immerse them in a weekly programme of activities that include lectures by specialized scientists, visits to universities, and laboratory work. This allows the students to eliminate the misconception that a dedication to science is not appealing.

The Commission has no formal evaluation process but the public education programme appears to be very successful, simply judging from participation in the pictorial and scientific contests. These show that interest in the subject of nuclear energy has grown ten times from what it was in 1980. Media interest has also heightened, based on the number of positive articles published and television shows produced on the Commission's activities. The commission is expanding its programme to include guidebooks for students, educational programmes for gifted students in the science programmes at their schools, and a series of lectures on the topics most requested by the schools around the country.

Public Information Resources

- **Non-proliferation**
- **Radiation and Health**

Ambassador Michael Wilson (Australia)

The prevention of nuclear proliferation is one of the greatest challenges facing the world in the this decade.

The Non-Proliferation Treaty (NPT) and the IAEA Safeguards are fundamental to preventing nuclear proliferation.

The NPT is the most widely adhered to international disarmament agreement in existence. There are currently 143 Member States parties (not counting China and France).

Projections in the 1950's pointed to a world of 20-30 nuclear weapon states by the 1980's. This did not transpire, largely due to the NPT.

Without the assurances offered by the NPT and IAEA Safeguards, distrust of nuclear intentions would feed regional security problems. Without the assurances offered by the NPT, international nuclear trade and cooperation would dwindle.

Without confidence in the NPT and the IAEA Safeguards, the same effects could result.

Australia gains benefits from these institutions at a number of levels: at the global security level, at the regional security level, assurance about nuclear trade generally, access to nuclear tech-

nology and assurances about Australian nuclear exports.

The aftermath of the gulf war and important developments in global relationships over the past year have provided a window of opportunity to tackle the problems of nuclear proliferation and to strengthen the non-proliferation regime and safeguards system.

Australia wants to see a better flow of information to the IAEA from Member States and a more active role by the Secretariat in carrying out its responsibilities. This includes design information on nuclear facilities as well as information on nuclear trade. We want to see a strengthening of the Agency's ability to deal with the problem of clandestine facilities again through a better flow of information, greater use of special inspections and political support from Member States and the Security Council. We want to see a tightening of nuclear export controls in the area of nuclear dual-use items. We want to see all current and potential suppliers adopt a condition for new nuclear supply.

We want to see resolute action by NPT members, particularly the depositary states and by the IAEA in the face of non-compliance with safeguard obligations and would like to see the NPT extended indefinitely in 1995.

Ambassador Mervat Mehana Tallawy (Egypt)

It is a pleasure to be with you and exchange thoughts with you on non proliferation and the Middle East from an Egyptian perspective. For more than a decade now, the Egyptian position has been to call for a nuclear free zone. More recently there has been an initiative by President Mubarak on having the Middle East free of all weapons of mass destruction. During the fourth NPT Review Conference, Egypt even went further and requested that more positive assurances be given to the non nuclear weapon States who are members of the NPT.

We are all for a strong safeguards system. The Agency and its safeguards system indeed proved to be very useful and we would like this system to be even strengthened, regardless of what happened and what is said now after the case of Iraq to the effect that the Agency safeguards are not sufficient or did not prove very effective to prevent such a case. But the blame should not be on the system of safeguards or the non proliferation regime but also, even if we have a strong efficient safeguards system, it depends on the countries — both the supplier and the recipient.

In the case of Iraq, part of the blame should be on the suppliers and especially if we look at it from the responsibility according to Article L of the Non Proliferation Treaty. Egypt would like to see a nuclear free zone, even more than that we are calling for the application of full scope safeguards on all nuclear installations, materials and activities in the region till we reach

a settlement on a nuclear free zone: an immediate application of full scope safeguards on the installations would be a confidence building measure until we get a nuclear free zone agreement. This would be a very reassuring step, relaxing the political atmosphere for the preparation of the Middle East Peace Conference.

This is how Egypt sees the fact that international relations have now shown nuclear weapons as a deterrent as being no longer valid. We should therefore try hard to strengthen safeguards and to encourage States to put their nuclear activities under full scope safeguards. Exporters should be very careful about official exporting as well as the clandestine problem in order to live up to their responsibilities under the NPT.

What happened in Iraq should not in any way, and this is another point of the Egyptian position, undermine the safeguards or the non proliferation work of the Agency. At the same time it should not be used as an excuse to stop or to decrease the importance of the peaceful uses of nuclear technology.

The right of States to use and develop this technology for peaceful uses should not be effected under any circumstances due to the grave mistake that happened in Iraq. The reason for this is that developing countries, with the acute problems of development, need more than ever new and high technology to overcome them. Science and technology must not be prevented from helping and increasing the standard of living of people because of one mistake.

Ambassador Tetsuya Endo (Japan)

I presume the reason I was asked to be one of the speakers was one of the following:

- Japan is the only country which suffered from nuclear bombs; I hope it will be so forever.
- Our government has three non-nuclear weapon principles; namely don't possess, don't bring in, and don't let anybody bring in.
- We are one of the most advanced countries with regard to nuclear energy utilization.

The NPT, or the Non-Proliferation Treaty, is the core of the present non-proliferation regime, and has contributed greatly to the promotion of the peaceful use of nuclear energy by ensuring the non-proliferation of nuclear material for nuclear weapons development.

Japan and the NPT

Japan ratified the NPT in June 1976, and concluded a full-scope Safeguards Agreement with the IAEA in December 1977. Since then, Japan has fully implemented the Treaty and the agreement.

Initially, there was domestic discussion when our Government ratified the NPT, as the treaty seemed unequal and it was feared that industrial secrets might be leaked through inspection. However, such concerns proved to be unnecessary. On the contrary, we dispersed the domestic and international uneasiness concerning Japan's peaceful use of nuclear energy by becoming an active, supportive party to the NPT.

I am confident that Japan is considered as one of the most advanced countries with regard to nuclear energy utilization, despite the fact that it remains the only victim of the nuclear bomb. Forty-one nuclear power stations, totalling 32.2 GW are now in operation, generating about 26 percent of Japan's total electricity generation, and this proportion will increase further. In addition, nuclear technologies are being developed and applied more and more in various fields.

Current Status of the Non-Proliferation Regime

The Non-Proliferation Treaty is the core of the non-proliferation regime. One hundred and forty-three countries are members of the NPT, making it one of the most universal treaties. It is extremely promising to notice that South Africa joined the NPT, and is preparing to conclude a safeguards agreement with the IAEA. Furthermore, France and China, the remaining nuclear weapon states, have decided to become members of the NPT.

Another positive development is that Brazil and Argentina, although they are not NPT members, are going to accept IAEA full-scope safeguards.

However, some problems do exist in the present non-proliferation regime.

First, there are several "threshold countries", such as Israel, India, and Pakistan which, from the technical point of view, are close to having nuclear weapons, but are not NPT members and do not accept IAEA full-scope safeguards.

Second, the NPT undoubtedly has unequal aspects. To diminish these aspects, the nuclear weapon states should make efforts towards nuclear disarmament. Currently, this is making slow but steady progress. An example of this is the conclusion of the START negotiations between the USA and the USSR. However, the non-aligned countries claim that efforts at disarmament, especially a comprehensive test ban as a symbol thereof, are far from satisfactory. At the same time, the developing countries wonder if NPT membership represents real and material advantages towards their development.

The IAEA full-scope safeguards system also has its weakness. Up to now, this system has applied only to declared nuclear material. The IAEA confronts difficulty in cases where a country develops nuclear weapons in secret, either by self-sufficient means, or by smuggling in nuclear materials and related equipment. Iraq's attempt to develop nuclear weapons was a shocking example.

Improving the Non-Proliferation Regime

To achieve world peace and prosperity through the peaceful use of nuclear energy, we should examine ways of making the NPT more attractive, and IAEA full-scope safeguards more effective, since they are the core of the non-proliferation regime.

First, more efforts towards nuclear disarmament on the part of the nuclear weapon states is indispensable toward a comprehensive test ban.

Second, measures should be taken so that developing NPT member states

can receive preferential treatment in technical cooperation, including nuclear power generation. This might be achieved, for example, through cooperation on so-called "footnote-a" projects, where donor countries can extend selective cooperation to certain member states. It is easier to give preferential treatment to NPT member states through bilateral cooperation. Japan provides its technical cooperation in line with such a policy.

We should investigate preferential treatment not just in the nuclear field, but also in the general economic and technical cooperation fields. Economic and technical cooperation to those countries which do not respect the non-proliferation regime, do not join the NPT, and do not accept IAEA full-scope safeguards, should be limited.

Thirdly, there are many aspects to improve the current safeguards system, but on this point, my colleagues have already spoken.

International Export Control

To supplement the NPT/IAEA safeguards system, it is imperative to control, within international frameworks, the export of not only nuclear material, but also sensitive nuclear-related material and equipment.

There are two such frameworks in existence today: The Zangger Committee and the London Guidelines. There is agreement among member states that such nuclear-related items should be safeguarded, and assurances should be given that such items are not exported nor used for nuclear explosive devices, and that some regula-

tions are necessary for the re-export to a third country.

However, these two frameworks are not flawless. One example is the report of attempted smuggling into Iraq and Pakistan. Another is the fact that it has become easier for suspect countries to develop their own nuclear weapon technology.

In response to these situations, it is necessary to make export control stricter. One possibility is to make acceptance of IAEA full-scope safeguards by recipient countries a condition when exporting nuclear-related items. Japan has announced its intention to adopt such a policy.

It is also necessary to control not only those items directly used in the nuclear fields, but also those general, or dual-use items, which may contribute indirectly to nuclear weapons development, although those items subject to such controls should be limited to those which are indispensable for nuclear weapons development. Currently, international regimes to control dual-use items are being discussed and the Japanese Government is lending full cooperation and support in this area.

In addition, I would like to encourage those new supplier countries, such as Argentina, Brazil, and China, to join an international export control regime such as the London Guidelines.

Ambassador Richard Kennedy (USA)

This has been a remarkable year in many respects. Historians will surely mark this year for many important events. Where these events will take us, who can say?

Two developments are particularly relevant to this seminar. Some of the most dramatic arms control agreements in history have been achieved. The spectre of a nuclear holocaust between the two super powers is no longer so dramatic, nor need it be.

But are these achievements to be lost by the other event? Iraq has made a mockery of its own freely adopted commitments under the Nuclear Non-Proliferation Treaty (NPT).

The NPT has been conceived as a bargain. On the one hand, the nuclear weapons states commit to pursue nuclear disarmament. On the other hand, the nuclear capable states pledge to make available the benefits of nuclear energy provided the recipients use these benefits for peaceful purposes.

The nuclear weapon states have moved toward disarmament. There has been an enormous spread of nuclear technology. We often tend to think of nuclear technology only to generate electricity. But let me digress to mention the vast use of non-power applications. Who among us has not benefitted from the many uses of nuclear medicine? There are numerous applications of nuclear techniques in agriculture, including pest control. These are some of the many benefits available to those countries—over 140—party to the NPT.

But one party has cast doubt and shadow over the Treaty. Is this a symptom of what is to come? Or is this an opportunity to strengthen the nuclear non-proliferation regime?

The United States strongly believes this is an opportunity. We share the views expressed here by others that it is desirable to expand the membership of the NPT and to achieve full scope safeguards. But the real question is how do we remove the shadow over the Treaty created by a single renegade.

Is it just one? Could there be others? The answer is—yes, there could be others. It is a matter of political will. We need a recommitment of states to the peaceful uses of nuclear energy and its many applications and to their freely accepted obligations under the Treaty.

It is all too easy to equate nuclear energy and nuclear bombs. Indeed there has been a recent spate of press articles doing exactly that. But this is not the case and should not have been seen that way.

Nuclear energy is producing electricity worldwide. In many countries there is no other viable way to produce this electricity. This is true in states in Central and Eastern Europe. Japan, France and others derive a high percentage of their electricity from nuclear reactors. The United States is operating over 100 reactors, generating approximately 25% of the total electricity in the US. Clearly nuclear energy is benefitting many people and we must keep it that way.

The shadow over the NPT must be dispelled. The NPT is not ineffective. However, commitments by some parties may be ineffective. That is, and should be, unacceptable to the international community.

The accomplishments of the NPT are great. We should not tinker with an instrument that has served us all so well. The NPT encompasses both arms control and helping people. The Treaty requires commitment by non nuclear weapons states to the unique system of safeguards applied to IAEA. In a world of sovereign states, acceptance of safeguards represents a rare and perhaps unprecedented delegation of sovereignty to IAEA.

Any system can be improved. This is true of safeguards. Let's do it. Let us not criticize the IAEA and its safeguards destructively. Rather, stand behind the Agency and safeguards. Let us work to expand the NPT to all states. Let us work to have all states accept full scope safeguards.

In closing, let me say that the IAEA should say more about what it does. It is a truly remarkable institution. Many look to it as a model for arms control arrangements in areas beyond the nuclear field. The IAEA should say more about itself so that it receives the recognition it clearly deserves.

Ambassador Roland Timerbaev (former USSR)

I would like to share the Soviet perception of the NPT situation. I will echo many of the sentiments and thoughts of my predecessors, but I would like to differ with my friend Ambassador Kennedy who said that Eisenhower started non-proliferation. I think it started before, in '45, and I will explain later on why I consider that the history of NPT started in 45/46. But in detail I do share the view that this year was the most turbulent and the most eventful year in the entire history of NPT. This year was packed with events which are of importance in *both positive but also negative senses.*

A year ago the NPT Review Conference in Geneva ended without adopting a final document. Many people rushed to the conclusion that the non-proliferation regime had entered a phase of crisis. I did not share that view. On the contrary, I was of the opinion that the attempts of some countries and first of all Mexico to link "horizontal" non-proliferation inseparably to "vertical" non-proliferation was what brought the conference to an alleged failure.

I by no means belittle the growing tendency on the part of a majority of states towards further strengthening non-proliferation. This year was a year of triumph. I will not list all the facts my predecessors did. I will only add a few more facts. Argentina and Brazil, countries with unsafeguarded nuclear activities and non members of NPT, have taken a decision to accept safeguards *and most probably by the end of this year will formalize their respective agreement with IAEA.*

Another event in addition to what was mentioned by my colleagues was the reconvening of the Nuclear Suppliers Group in The Hague last March at the initiative of the Netherlands. After a prolonged intermission, this meeting was held and reached some important agreements particularly to draw into this arrangement of nuclear export controls so-called new emerging nuclear suppliers.

Now, why do I believe the whole thing started before '45? The problem of non-proliferation appeared in the order of the day immediately after the emergence of nuclear weapons and after the emergence of the nuclear problem as such. When, in 1946, the US placed before the UN Atomic Energy Commission the well known Baruch Plan, its main purpose was to put an end to the proliferation of nuclear weapons to prevent its emergence in the Soviet Union and in other states. However, unfortunately this plan was doomed to failure because by *that time Stalin* was determined to acquire his own nuclear weapons and deploy a huge nuclear programme—the Soviet equivalent of the "Manhattan" project.

Without going into details of the motivations of each side, I would only like to remind you of the fact that by June '46 when the Baruch Plan was tabled, the United States—according to official information available—possessed only three atomic bombs and there was no mention of hydrogen weapons then.

One can only imagine how the course of history could have changed if at that period of time Stalin and Truman had heeded the voice of reason. The voice in particular of Robert Oppenheimer who considered it possible then to control the nuclear genie but was not able to convince Washington of such a possibility. Washington in its turn—and also not without grounds—could not believe in Stalin's good intentions. Indeed nuclear non-proliferation in our view is the essence of the nuclear problem, the heart of the matter, and I believe that the evident success of non-proliferation on which all of us have spoken can be explained by the fact that the strengthening of the international *non-proliferation regime* this year was simultaneously accompanied by a successful process of nuclear disarmament which has commenced under the Start Treaty. This is the positive side of the proceedings that are underway now.

Now about the negative aspects that Ambassador Kennedy mentioned, I had in mind first of all the events in Iraq, the Gulf war and the nuclear ambitions of Saddam Hussein. I wish at once to make a point here: we should not be overly discouraged by what has happened in Iraq. Perhaps it had to happen sooner or later anyway, and it is fortunate that it happened at the moment when Saddam Hussein had not yet managed to create a nuclear military potential and was not yet able to plunge the world into nuclear catastrophe.

Certainly, a question of confidence in the IAEA safeguards system arises, indeed such a question has already *arisen and this should be sensibly and thoroughly analyzed and necessary conclusions drawn.* To my mind, the

reason is that the present safeguards system is based, so to speak, on the presumption of innocence. In accordance with the provisions of NPT, all participants must put all their nuclear activities under IAEA safeguards, this is the basis of the standard safeguards agreement in INFCIRC-153. According to the model safeguards agreement, each participant declares all its nuclear activity and it is this declared activity which is covered by IAEA safeguards.

The system is meant for all participants of the Treaty. The overwhelming majority of these are undoubtedly being honest. But it is also clear that a participant to the Treaty, if it harbours ill intentions, can deceive any inspector no matter how highly qualified or meticulous he could be. It is for this particular case that it is necessary to have a special system of safeguards, a special system of control, a specific emergency policy mechanism. We did not have it. It must be set up and set up quickly and effectively.

I am convinced that with the current social and political changes worldwide, a non-proliferation tendency will be gathering momentum. But for the full guarantee, we must have a possibility supported by the higher authority of the UN Security Council, and this registered both in the IAEA statute and in its relationship agreement with the UN, to carry out any—if necessary the most intrusive—inspection so that the world is safely protected from any potential manufacture. I have no doubt that the Agency is capable of working out such a mechanism of control and some considerations to this end have already been suggested by Director General Hans Blix.

Now a few words about the Soviet Union. The latest events in our country, especially those connected with the emergence of independent republics and the restructuring of the Union's governing bodies, naturally caused certain anxiety worldwide. This is understandable, since the Soviet Union is a nuclear weapon state possessing huge amounts of nuclear weapons and a full nuclear fuel cycle with many nuclear-oriented enterprises in both civil and military sectors.

It is against this background that the special session of the Congress of peoples' deputies adopted last week very important decisions, to elaborate and conclude inter republican agree-

ments and treaties; not only on economic, monetary, scientific and other fields but, what is of special importance, on the principles of collective security and defence based on single armed forces and central command over nuclear and other weapons of mass destruction.

The decision was also taken to hold negotiations with those republics who had refused to join the Union and proclaim their independence to settle the whole range of problems connected with their accession and also their immediate accession to the NPT and the Final Act of the CSCE and other international treaties and agreements.

Lessons from Hiroshima and Chernobyl

(Prof. Friedrich Steinhäusler, IAEA)

Radiation and Cancer

Many agents occurring in our environment are known to cause cancer, e.g. viruses, pollution, smoking, chemicals, alcohol, non-ionizing radiation, stress and genetic predisposition. Ionizing radiation is just one of them, making it impossible to differentiate a radiation-induced cancer from cancers caused by other agents.

Our Knowledge Based on Research of Japanese Atomic Bomb Survivors

Detailed studies on almost 76 000 Japanese A-bomb-survivors over the past 45 years revealed that about 5900 cancer cases occurred due to natural causes and about 570 additional cases were due to exposure to radiation. This means that even a traumatic experience like the exposure to the detonation of a nuclear weapon increased the rate of cancer deaths due to increased radiation levels by less than 10%. Most of these cancers start appearing about 10 years after exposure and reach a maximum value after about 40 years. In the case of leukemia, first cases show up a few years after radiation exposure and reach a maximum value after about 5 to 7 years.

Lessons Learned from Chernobyl

Based on the "International Chernobyl Project" conducted in 1990 the following results were obtained:

Measurements and assessments of the environmental situation carried out under the Project provided general cor-

roboration of the levels of surface contamination for caesium as reported in the official maps that were made available to the Project. Analytical results from a limited set of soil samples obtained by the Project teams corresponded to the surface contamination estimates for plutonium, but were lower than those for strontium.

The concentrations of radionuclides measured in drinking water and, in most cases, in food from the areas investigated, were significantly below guideline levels for radionuclides contamination of food moving in international trade and in many cases were below the limit of detection.

The official procedures for estimating doses were scientifically sound. The methodologies that were used were intended to provide results that would not underestimate the doses. Independent measurements in individual residents monitored for external and for internal exposure from caesium incorporated into the body yielded results that would be predicted on the basis of calculational models. Independent Project estimates for surveyed contaminated settlements were lower than the officially reported dose estimates.

There were significant non-radiation-related health disorders in the population of both surveyed contaminated and surveyed control settlements studied under the Project, but no health disorders that could be attributed directly to radiation exposure. The accident had substantial negative Psychological consequences in

terms of anxiety and stress due to the continuing and high levels of uncertainty, the occurrence of which extended beyond the contaminated areas of concern. These were compounded by socioeconomic and political changes occurring in the USSR.

The official data that were examined did not indicate a marked increase in the incidence of leukemia or cancers. However, the data were not detailed enough to exclude the possibility of an increase in the incidence of some tumor types. Reported absorbed thyroid dose estimates in children are such that there may be a statistically detectable increase in the incidence of thyroid tumors in the future.

On the basis of the doses estimated by the Project and currently accepted radiation risk estimates, future increases over the natural incidence of cancers or hereditary effects would be difficult to discern, even with large and well designed long term epidemiological studies.

The unprecedented nature and scale of the Chernobyl accident obliged the responsible authorities to respond to a situation that had not been planned for

and was not expected. Thus, many early actions had to be improvised. The Project teams were not able to investigate in detail many **actions taken by the authorities** owing to the complexity of the events.

In those cases in which the Project teams were able to assess these actions, it was found that the general response of the authorities had been broadly reasonable and consistent with internationally established guidelines prevailing at the time of the accident. Some measures could doubtless have been better or taken in a more timely manner, but these need to be reviewed in the context of the overall response.

The protective measures taken or planned for the longer term, albeit well intentioned, generally exceed what would have been strictly necessary from a radiological protection viewpoint. It is recognized, however, that there are many social and political factors to be taken into consideration, and the final decision must rest with the responsible authorities. At any rate, no modification introduced should lead to more restrictive criteria.

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